WSX-C10 – Enhancement costs – Water Recycling Centre (WRC) growth

Response to Ofwat's PR24 draft determination

Wessex Water
YTL GROUP

FOR YOU. FOR LIFE.

Representation reference: WSX-C10

Representation title: Enhancement costs – Water Recycling Centre (WRC) growth

CONTENTS

1. Summary

Our PR24 business plan included plans to provide capacity at our Water Recycling Centres (WRCs) to accommodate growth in a timely manner, without planning restrictions and without reducing service levels for existing customers. We proposed £128 million in WRC growth investment in AMP8, to provide additional treatment capacity for a population equivalent (PE) of approx. 320,000 by 2030.

In the Draft Determination, the sum allowed was £86.4 million, a 33% reduction from our £128 million. We have concerns with the approach taken in setting the proposed cost allowances in this area, which is based on econometric modelling. For the reasons set out in WSX-C02 (Enhancement costs), and in this representation, there is a significant risk that this understates our true efficient cost allowances for WRC growth. We consider that the approach to setting allowances should recognise and account for the limitations of the chosen model for WRC growth. We have set out in this document how we consider this can be achieved to produce a more appropriate cost allowance.

Furthermore, since our PR24 business plan submission, incorporating the most recent data from 2023, we have become aware of several catchments with significant growth and/or change in Dry Weather Flow (DWF) risk, following which we have re-prioritised our growth requirements. This has led us to revise our view as to additional WRC capacity requirements in AMP8 to accommodate this growth, which has increased the proposed cost of our AMP8 programme by around £47 million.

We are requesting that Ofwat also changes our cost allowance to reflect this more up-to-date information. Additionally, while we are now requesting an increased allowance, we would highlight that the majority of these WRCs were included in our submission as at risk, but without associated costs. We have also reduced the need at several of our WRCs included in our original business plan because of reviews undertaken since our submission.

Table 1 – Summary of changes requested

Data table line	Draft Determination allowance	Our requested allowance	Further details
CWW3.155	£86.4m	£176.2m	Refer to 'Required adjustment to cost allowance'

2. Ofwat's approach to setting allowances

Base and enhancement issues

Ofwat has reassessed its approach to assessing growth expenditure from PR19. At PR19, Growth at STWs (which we refer to as WRC growth) was assessed as part of the base cost models. Historically, expenditure for WRC growth was included in the base cost econometric models and allowances reflected forecast population growth in each company's area.

For PR24, WRC growth has not been assessed within the base cost models, but as a separate enhancement programme. This was on the basis that WRC growth expenditure could be assessed separately from base costs as there is little overlap with operating and capital maintenance expenditure.

We welcome this change and consider this increases transparency and clarity over companies' maintenance and enhancement activities. As part of our PR24 business plan, we submitted a cost adjustment claim for growth at WRCs. This reflected that at the time:

1. it was not clear how Ofwat would assess this part of our business plan; and

2. had Ofwat continued to assess it as part of base costs, we did not consider the cost of WRC growth would be adequately captured by Ofwat's base cost modelling approach. We therefore prepared a high-level cost adjustment claim in the context of this uncertainty.

Now that Ofwat has clarified its approach to assessing costs and recognised that it should be funded as an enhancement programme, this cost adjustment claim is no longer applicable. We have therefore focused in this representation on Ofwat's enhancement cost modelling.

Enhancement cost modelling

Two econometric models have been used to estimate scheme-level costs for WRC growth using four cost drivers:

1. expected change in Dry Weather Flow (DWF) permit;

2. expected change in PE;

3. added process capacity in PE; and

4. ammonia permit change.

This has been used this to estimate allowances for each individual growth scheme in our business plan proposal, based on the triangulated results of the two models.

Outliers have then been identified based on Cook's distance approach and these schemes then assessed via a deep dive. This process identified one Wessex Water scheme (Avonmouth WRC) for which modelled costs were significantly higher than requested costs. Ofwat has allowed full costs for this scheme on the basis that it is an efficient outlier.

The growth allowance has then been adjusted to account for previous under-spend / -delivery over the 2015-25 period. Our underspend has been estimated at £11.82 million (after cost sharing is accounted for), and an adjustment of 50% of this estimate has been applied, which results in a £6 million reduction to our growth allowance.

Overall, the proposed cost allowance for WRC growth is **£86.4 million** in AMP8, compared to our business plan proposal of **£128 million**.

2.1. Fit of Ofwat's chosen model

In principle, we are supportive of the use cost benchmarking where it can be shown to produce reliable estimates of efficient costs, and where the results are interpreted to account for other relevant information.

We are concerned that the econometric modelling used may not be sufficiently robust to reliably set efficient cost allowances for companies' growth schemes in the way that Ofwat proposes. In particular, we consider that more consideration should be given to the presence of outliers for which efficient costs cannot credibly be estimated using the chosen approach. This is explained in more detail below.

2.1.1. Functional form and cost drivers

The choice of functional form and selected choice of cost drivers is reasonable. We also agree that change in PE served / process capacity and change in DWF permits are suitable cost drivers for this type of enhancement activity. A dummy variable has also been used to capture if a new ammonia permit level that is required due to the change in the DWF permit is expected to be below 3mg/l and therefore result in the need for tertiary treatment.

While we recognise this could capture a measure of overall treatment complexity, our design standards require tertiary treatment to be considered at an ammonia limit of 5mg/l, BOD of 18mg/l and 0.7mg/l Phosphorus. We would therefore suggest a higher threshold be used for the dummy variable.

2.1.2. Goodness of fit

Both models report a relatively low adjusted R squared value (0.39 to 0.4). This indicates that there is significant variation in scheme-level costs that is not being explained by the modelling approach. This creates a major risk that the cost modelling will not capture all the factors that determine scheme-level efficient costs and, depending on the mix of programme schemes, could lead to companies being underfunded for the efficient costs at programme level.

This is reflected in the fact that there are some very large differences in requested allowances and modelled allowances at scheme level, both upwards and downwards. This can be seen both across companies and within companies; in other words, for a given company some modelled allowances are much larger than the company's own view of efficient costs, and vice versa. It is highly unlikely that this scale of residual variation can be explained by inefficiency or mis-forecasting on the part of companies, particularly when it is present at scheme level; it is more likely that the chosen model is not capturing all the key cost drivers that determine efficient costs.

We note that, in the context of sanitary parameters, Ofwat has said it was not able to develop robust scheme level models "*partly due to the relatively smaller sample of schemes in the sanitary parameters dataset compared to other areas covered by scheme level models".* Ofwat has more observations for sanitary parameters schemes (287, or 214 when observations are screened) than for WRC growth schemes (201). We consider that this is a further reason why any results from the scheme-level modelling should be treated with caution, having particular regard to instances where predicted costs are significantly different to companies' plans. We discuss this further below.

2.1.3. Treatment of outliers

The models use Cook's distance approach to exclude outliers. For WRC growth, this removes 19 outliers from the dataset, using an accepted threshold of 4/N. As with other areas, Ofwat has "*for simplicity...performed only one iteration of removing outliers for each scheme level enhancement modelling area*."

However, as Figure 1 below shows, there are still significant differences between requested and modelled allowances for several schemes that have been included in the modelling, after the exclusion of outliers based on the first application of Cook's Distance method.

1. The right-hand side of the chart presents the difference between requested and modelled allowances for Ofwat's identified outliers, based on running its model with all observations included.

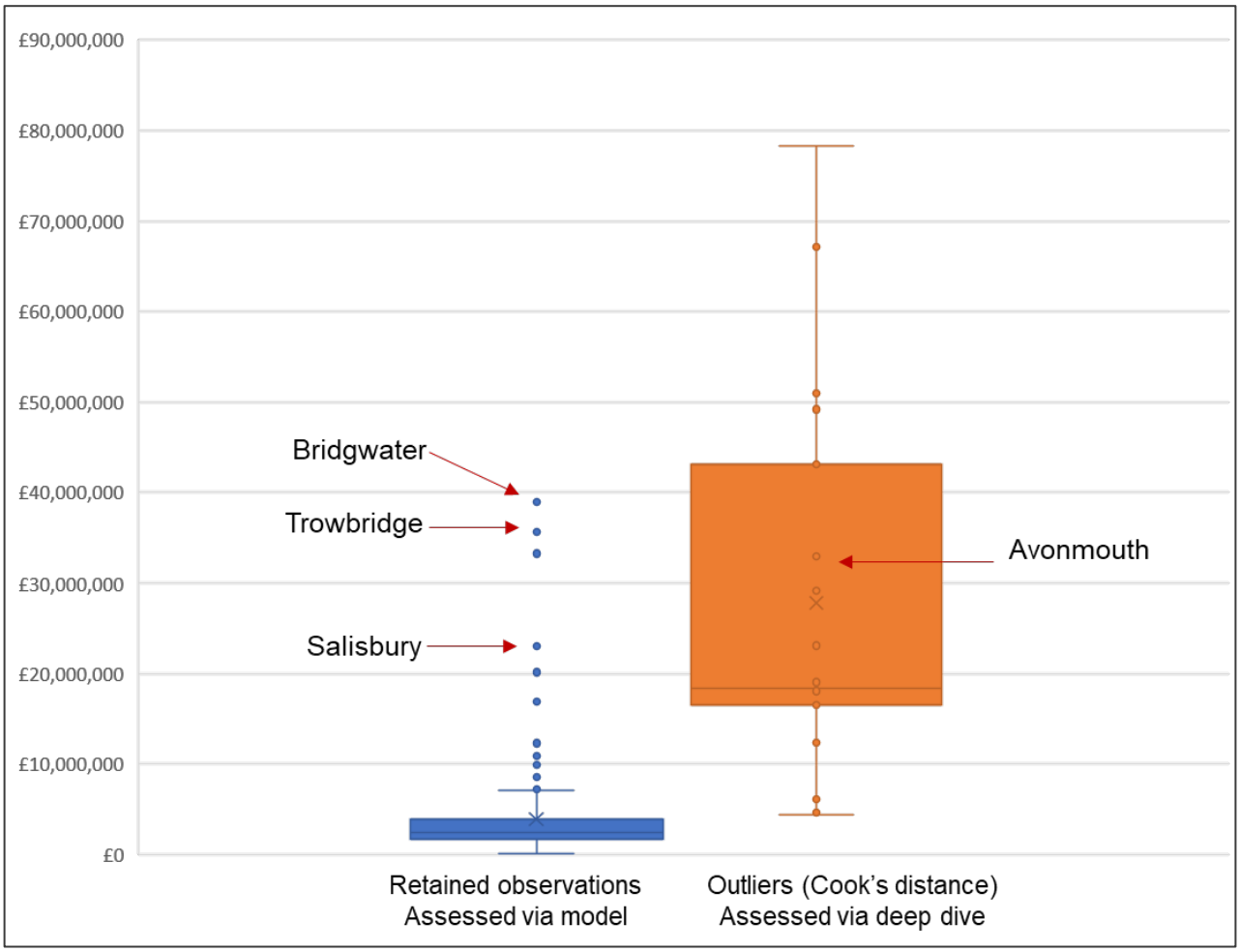
2. The left-hand side of the chart presents the difference between requested and modelled allowances for the remaining schemes, based on running the model with the outliers excluded i.e. after the application of Cook's distance method.

This shows that there are several schemes with comparable differences to those that were excluded as outliers. Three of the four largest schemes by difference (Bridgwater, Salisbury and Trowbridge) are part of our WRC growth programme. The difference for two of these three (Bridgwater and Trowbridge) is in excess of the median difference in requested and modelled allowances for those schemes already treated by Ofwat as outliers and assessed via a deep dive. The scale of the observed differences for these schemes indicates there are other factors driving costs for these specific schemes that the econometric model is not capturing – particularly as these schemes are three of the largest five schemes in our programme by change in PE (Avonmouth being the largest), with some of the most complex associated requirements for expansion.

This is consistent with applying a second iteration of Cook's distance method, removing a further group of outliers on the revised model. If Ofwat was to apply this iteration, a further 15 further sites would be removed from the

model, including Bridgwater, Trowbridge, and Salisbury. The R squared for the resulting regressions with these schemes excluded are significantly higher (0.63 and 0.65).

Figure 1 – Comparison of difference between modelled and requested allowances - outliers versus modelled costs



Given the broader robustness issues in the model set out above, there is a clear risk that the efficient costs of these schemes may not be fully captured in the modelling. In these circumstances, consideration should be given to excluding these 15 schemes (or at least a subset of them) and assessing them also by way of a deep dive assessment. We consider that, when considering the scale of the observed results, and the robustness issues identified with this model, there is a clear case for also treating these results as outliers and investigating the information provided in business plans more closely. This will allow for a fuller understanding of all the factors affecting efficient costs.

We discuss the impact of this on our requested allowance in the next section. We note that if these three schemes (as well as Avonmouth) are excluded, the resulting modelled allowance is within 2.2% of our requested allowance.

2.2. Additional factors not considered

After feedback from water companies with regards to the new DWF methodology, Ofwat consulted with the Environment Agency, who indicated discussions with companies had been ongoing for ten years. However, this does not consider the intricacies in understanding the consequences of the associated Flow Passed Forward (FPF) calculation changes and their reliance on accurate inlet flow monitoring and Event Duration Monitoring, where the programme of installation of these monitors is still on-going. Our own AMP8 programme to provide front-end MCerts

monitoring has been advanced to ensure delivery by the end of AMP7 and the associated data continues to be reviewed when available.

3. Required adjustment to cost allowance

We request an allowance of **£176.2 million** in enhancement funding is set for our WRC growth programme in AMP8. This is an increase of **£94.6 million** on the currently proposed allowance. This is due to the following:

1. Modelling should be updated to reflect changes to our WRC growth programme since business plan submission. These changes are summarised below and reflected in the associated data tables. This is consistent with Ofwat's guidelines in its Draft Determination[1]:

   We recognise that there may be further changes to the growth at STW requirements since we requested scheme level data. We expect companies to reflect any changes required to their submissions because of updated requirements within their response to draft determinations. We will reflect any changes to allowances and PCDs required in final determinations.

   We are now expecting to complete or start growth-related upgrades at a total of 59 sites in AMP8.

2. Three growth schemes should be excluded from the econometric modelling– Bridgwater, Salisbury and Trowbridge – that, in addition to Avonmouth, are clearly outliers and whose efficient costs are not well-reflected in the modelling. The full cost allowances should be allowed for these schemes.

3. Ofwat's own modelling shows that our requested cost allowances for the remainder of our revised WRC growth programme is significantly **below** the modelled allowance.

4. The past-delivery adjustment does not correctly identify previous underspend on growth schemes against PR14 and PR19 allowances and should not be implemented. We discuss this in more detail in section 4.4.

4. Rationale

4.1. Changes to WRC programme

As set out above, Ofwat confirmed within their response to draft determinations that since it requested scheme level data, it expects companies to reflect any updates required to their growth at STW requirements. Table 2 represents the complete list of sites that have been considered to date, whether as part of the original PR24 submission or those that have been added to reflect the latest DWF compliance and population forecast data to the end of December 2023. This data corresponds to data table ADD19, which we understand will be used to update the cost allowance analysis for final determination.

[1] See page 55, PR24-draft-determinations-Price-control-deliverables-appendix.pdf (ofwat.gov.uk).

Table 2 – Scheme level Growth at STWs enhancement totex models

WRC	Need	PE			Scheme Complete in AMP8	Comments
		2025	2050 Design Horizon	Increase		
All Cannings (Bishops Cannings)	DWF	1,330	1,507	177	Y	-
Amesbury	Capacity	844,646	-	-	N	Design to commence in AMP8
Ashill - Windmill Hill Biodisc	Capacity	-	-	-	N	Design to commence in AMP8
Avonmouth	DWF	844,646	971,569	314,770	Y	-
Beckington	Capacity	-	-	-	N	Design to commence in AMP8
Bradford on Tone	DWF	1,459	1,653	194	Y	-
Bridgwater	Capacity	-	-	-	N	Design to commence in AMP8
Bridport (West Bay)	Capacity	-	-	-	N	Design to commence in AMP8
Buckland Newton	DWF	470	530	60	Y	-
Cannington	DWF	4,547	5,151	604	Y	-
Compton Bassett	DWF	5,973	10,301	4,569	Y	-
Cromhall	DWF	2,088	-	278	N	Design to commence in AMP8
Dalleston	Capacity	-	-	-	N	Design to commence in AMP8
Dorchester	Capacity	-	-	-	N	Design to commence in AMP9
Dowlish Wake	Capacity	-	-	-	N	Design to commence in AMP8
East Lyng - Hillview Terrace Bioclere	Capacity	-	-	-	N	Design to commence in AMP8
Erlestoke	DWF	1,028	1,364	336	Y	-
Fitzhead	Capacity	-	-	-	N	Design to commence in AMP8
Freshford	Capacity	-	-	-	N	Design to commence in AMP8
Gorley	Capacity	-	-	-	N	Design to commence in AMP8
Great Wishford	DWF	-	-	-	-	A program of networks investigations and sealing undertaken between 2016 and 2022 at Great Wishford has resulted in a decrease in measured DWF. This need has now been removed as we will monitor WRC performance in relation to future growth.

WRC	Need	PE			Scheme Complete in AMP8	Comments
		2025	2050 Design Horizon	Increase		
Hardington Mandeville	Capacity	516	584	69	Y	-
Hatch Beauchamp	DWF	529	599	70	Y	-
Holwell (New)	Capacity	-	-	-	N	Design to commence in AMP8
Hullavington	DWF	1,424	1,613	205	Y	-
Hurdcott	DWF	3,998	4,597	598	Y	-
Ilton	Capacity				N	Design to commence in AMP8
Leyhill	DWF	1,628	1,971	297	Y	-
Longburton	-	-	-	-	-	Review of proposed DWF permit limits and site compliance has been undertaken since the original submission. Due to good performance of Longburton WRC Wessex has now re-prioritised this need and will continue to monitor site performance.
Marden	DWF	892	1,010	118	Y	-
Marnhull Common	-	-	-	-	-	Completion of AMP7 works, whilst not providing capacity, has enhanced the performance of Marnhull Common WRC since the original submission. This is in conjunction with reduced measured DWF through a programme of infiltration investigation and sealing. Due to the increase in emergent needs at our other WRCs, Wessex has re-prioritised required capacity on sites and determined that Marnhull Common WRC is a lower risk, though we will continue to monitor performance.
Matchams	Capacity	-	-	-	N	Design to commence in AMP8
Meare	DWF	1,393	1,578	185	Y	-
Merriott	Capacity	-	-	-	N	Design to commence in AMP8
Milborne Port	DWF	5,118	5,686	568	N	-

WRC	Need	PE			Scheme Complete in AMP8	Comments
		2025	2050 Design Horizon	Increase		
Nether Stowey	-	-	-	-	-	Due to the increase in emergent needs at our other WRCs, Wessex has re-prioritised required capacity on sites and determined Nether Stowey WRC is now lower risk, but we will continue to monitor performance.
North Petherton	DWF	4,599	7,237	2,638	Y	-
Oakhill	Capacity	-	-	-	N	Design to commence in AMP8
Over Stratton	DWF	317	357	42	Y	-
Pewsey	DWF	8,468	9,592	1,124	Y	-
Pilton	Capacity	-	-	-	N	Design to commence in AMP8
Portbury Wharf	Capacity	-	-	-	N	Design to commence in AMP8
Powerstock	Capacity	-	-	-	Y	-
Puncknowle	Capacity	-	-	-	N	Design to commence in AMP8
Ringwood	DWF	18,728	22,559	3,831	Y	-
Salisbury	Capacity	-	-	-	N	Construction will commence in AMP8
Stinsford - Stinford House	Capacity	-	-	-	Y	-
Stoke St Gregory	DWF	2,015	2,283	297	Y	-
Stourton Caundle	Capacity	-	-	-	N	Design to commence in AMP8
Swanage	Capacity	-	-	-	N	Design to commence in AMP9
Thornbury	Capacity	-	-	-	N	Design to commence in AMP9
Tintinhull Ash	DWF	1,534	1,737	203	Y	-
Trowbridge	Capacity	-	-	-	N	Design to commence in AMP8
Wareham	Capacity	-	-	-	N	Design to commence in AMP8
Wellington	Capacity	-	-	-	N	Design to commence in AMP9
Wells	Capacity	-	-	-	N	Design to commence in AMP8
West Bagborough	DWF	218	250	32	Y	-
Wick St Lawrence	DWF	21,759	24,648	2,889	Y	-

WRC	Need	PE			Scheme Complete in AMP8	Comments
		2025	2050 Design Horizon	Increase		
Wimborne	Capacity	-	-	-	Y	-
Wiveliscombe Styles	DWF	1,520	1,722	204	Y	-
Wookey	DWF	1,247	1,413	166	Y	-
Wrington	Capacity	-	-	-	-	A review of assets provided within AMP7 has reduced risk
Yarlington	Capacity	-	-	-	N	Design to commence in AMP8
Total				339,171		

4.2. Revised modelling allowances based on updated growth programme

We have updated the growth at STWs model to reflect our updated WRC growth programme[2]. Specifically, we have replaced our original scheme costs and cost driver information with the new information contained within the new data table ADD19 and replicated Ofwat's modelling approach (including the removal of additional outliers based on Cook's distance method). Consistent with Ofwat's approach, we have included totex data for AMP8 and Capex after 2029-30, i.e. including costs for AMP8 schemes which companies intend to incur (or have incurred) in AMPs other than AMP8.

There are 20 additional observations, reflecting our expanded growth programme. No changes to the specification or functional form have been made.

The updated model parameters with this new data are set out in Table 3 below. The parameters and adjusted R-squared have changed slightly but are broadly similar to the original model.

Table 3 – Scheme level Growth at STWs enhancement totex models

Explanatory variable	GS1	GS2	GS1 (updated)	GS2 (updated)
Added process capacity in PE	202.9	-	194.9	-
Expected change in DWF permit	6,461.6	6,573.6	5,091.647	5,821.118
Ammonia permit change dummy	6,075,941.7	5,284,737.2	7,485,044	7,378,278
Expected change in PE	-	1032.6	-	155.0937
Constant	3,249,715	3,261,917	3,130,783	3,440,217
Adjusted R-squared	0.40	0.39	0.37	0.33
Observations	201	201	221	221

Our resulting modelled allowance using the updated parameters is set out in Table 4 below[3]. Our updated AMP8 and AMP9 allowance is slightly higher than our original requested allowance (which was £276.4 million). Our revised modelled allowance - £251.1 million instead of £176.2 million – is also significantly higher. For avoidance of doubt, these updated allowances are exclusively due to the inclusion of our updated WRC growth programme data in Ofwat's modelling.

Table 4 – Ofwat revised modelled allowance, AMP8 and AMP9

Requested allowance (excluding Avonmouth)	Modelled allowance	Difference
£290.7 million	£252.6 million	(£38.0 million)

[2] See PR24-DD-WW-Growth-at-STWs-2.xlsx (live.com)
[3] We note that Table 4 excludes the Avonmouth WRC growth scheme, which is removed from the model as part of Cook's distance method and assessed separately as an efficient outlier.

However, as explained in the previous section, this model remains a relatively poor fit for estimating efficient costs particularly for the largest growth schemes. As with the original model, and based on business plan data, the modelled cost for three schemes (Bridgwater, Salisbury, Trowbridge) are significantly different to our requested cost allowance; specifically, requested allowances are between four-and-a-half and eight-and-a-half times more than the model implies. As Figure 1 shows, these are much larger differences than some schemes that Ofwat has excluded and undertaken a deep dive against on the basis that the modelling cannot properly capture all the factors influencing cost.

This is not surprising given that these schemes are some of the largest in our programme, and there are some particular features of these sites (explained in more detail below) that have fed into our assessment of costs for WRC growth but do not relate to size of programme or DWF / ammonia permit and are therefore driving the higher-than-modelled costs – in particular the presence of land constraints. For the reasons set out in the next section, we consider this meets Ofwat's own criteria for a modelled adjustment as there is:

1. Compelling evidence that these schemes have additional costs which are a material driver of costs, but which are not included in our enhancement model approach; and

2. Given the materiality of these factors, the allowances would, in the round, be insufficient to account for evidenced special factors without an enhancement model adjustment.

3. Additionally, as discussed further below, a significant proportion of the full scheme costs for these outlier schemes fall in AMP9. For Bridgewater and Trowbridge we are requesting 5% of the full scheme costs within AMP8 (to commence design-work) and approximately 63% of the Salisbury scheme costs within AMP8.

In this respect, we also note that the modelled cost for our Avonmouth WRC growth scheme is around £59 million[4]. This is around £33 million more than our requested allowance, i.e. a similar absolute difference to that for Bridgwater, Salisbury, Trowbridge. If Ofwat does not consider this modelled result is sufficiently reliable to provide such an allowance and is worthy of special consideration (which *reduces* our allowance), we consider it should apply the same logic to similar outlier results.

We have therefore further updated the modelling to remove these outliers. We have considered two approaches. The first approach simply excludes these schemes from the modelled results presented above. The second approach applies a second iteration of Cook's distance method to remove those observations classed as outliers, and then re-runs the model with a smaller sample. This results in the exclusion of 15 further observations (including Bridgwater, Salisbury, Trowbridge) i.e. a sample of 206 observations, and a new set of model parameters.

Table 5 presents the results of both these approaches. Under both approaches, Ofwat's modelling allowance is significantly in excess of our requested allowance for the remainder of our WRC growth programme.

[4] This is based on Ofwat's model *before* excluding any outliers, which is more appropriate when considering the modelled allowance for Avonmouth. The modelled allowance on the sample excluding Cook's distance outliers is £127 million.

Table 5 – Ofwat revised modelled allowance, AMP8 and AMP9, full set of outliers excluded.

Approach	Requested allowance (excluding Avonmouth, Bridgwater, Salisbury, Trowbridge)	Modelled allowance	Difference
Approach 1 (single Cook's distance iteration)	£176.7 million	£238.2 million	**£61.4 million**
Approach 2 (second Cook's distance iteration)	£176.7 million	£190.0 million	**£13.3 million**

This demonstrates that, when these other schemes are given proper consideration, our WRC growth programme is revealed to be highly efficient. In principle, Ofwat's own modelling implies we should receive between an additional £13.3 million and an additional £61.4 million to carry out the required capacity upgrades. We have not requested this as part of our business plan submission, as we consider that we can complete this programme of work for the requested amount. However, this reinforces the extent to which our growth programme is comparatively efficient when cost benchmarking is used (Ofwat's preferred approach to assessing costs), and the results are interpreted and cross checked against other evidence. We therefore consider that there is a clear justification for our full cost allowance for this part of our WRC growth programme.

The next sub-section sets out why we require our requested allowance for those 3 schemes - Bridgwater, Salisbury, Trowbridge – which cannot be reliably modelled using Ofwat's approach.

4.3. Assessing outliers from model

As set out above, our requested cost allowances excluding four WRCs are below Ofwat's modelled allowances. One of these WRCs – Avonmouth – has been assessed as being an efficient outlier. The other three schemes are summarised in Table 6 below.

Table 6 – Outliers identified by Wessex Water

WRC	Justification	Draft determination allowance	Our requested allowance
Salisbury	The site has unique complications due to its location within the flood zone. Flooding has a significant impact at Salisbury, much more than any other WRC within our region, as all assets are affected by fluvial flooding. Expansion is not possible within the existing site boundary and while a longer-term strategy may involve diverting flows elsewhere (possibly a new WRC), for the foreseeable future any expansion has to be within the flood plain and will involve significant design & construction issues, including flood compensation.	£6.1m	£29.1m

Trowbridge	Due to use of surrounding land the only area available is to the southwest; potential planning issues due to proximity to housing / amenities. Additional complexities are anticipated due to location of ex. assets on already congested land and proximity to sludge processing assets (e.g. DSEAR).	£4.9m	£40.5m
Bridgwater	The site is effectively land-locked (disused landfill site, waste recycling centre, local council depot) and there is no useable area available on site or in the immediately surrounding area. It will require demolition of the existing offices, with facilities of a similar standard to be provided elsewhere in the locality on a permanent basis. This will still only provide minimal area for expansion which then drives the need for a more compact footprint (and expensive) technology.	£5.3m	£44.2m

We explain in the rest of this section the unique special factors relevant to each of these schemes; why the efficient costs of adding growth capacity would not be captured by Ofwat's cost model due to material factors; and why these factors are sufficiently material that without making specific adjustments to allowances for these schemes, our overall allowances would be insufficient deliver our programme. Additionally for all three of these outlier schemes, we are not requesting full scheme costs within the PR24 allowance, as these are all completing in AMP9 with a significant proportion of the full scheme costs falling in AMP9. For Bridgewater and Trowbridge we are requesting 5% of the full scheme costs within AMP8 (to commence design-work) and approximately 63% of the Salisbury scheme costs within AMP8.

4.3.1. Salisbury WRC

Salisbury WRC serves a population equivalent of 70,982, and its current discharge permit is:

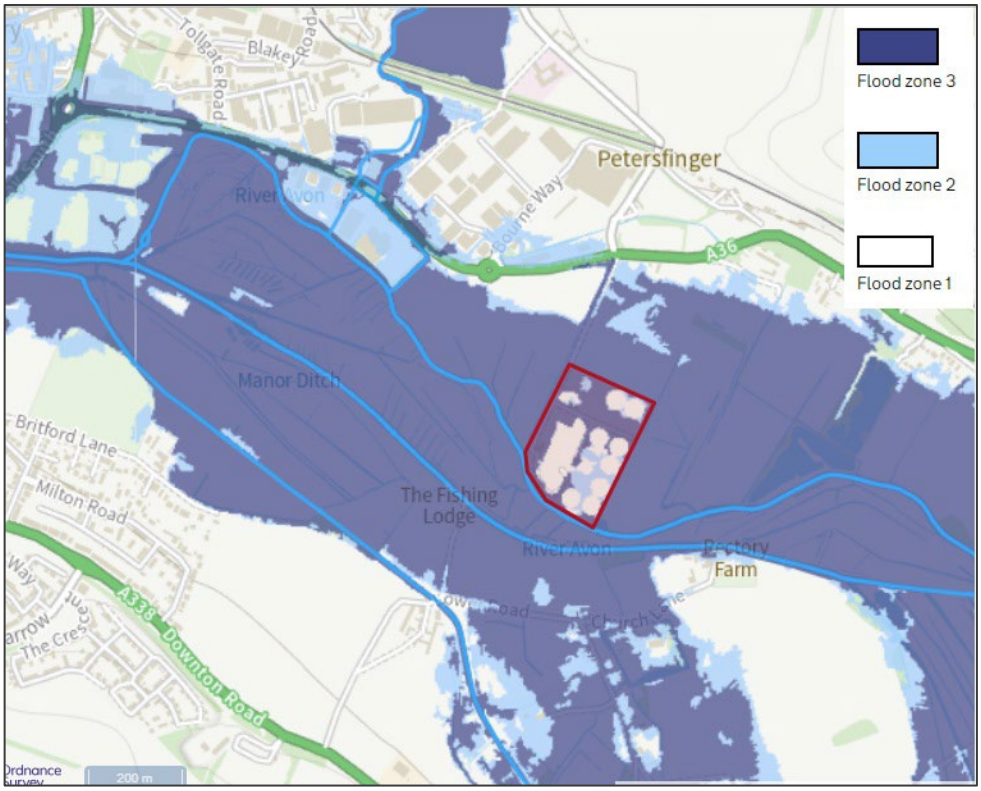
Dry Weather Flow (DWF)	23,500 m^3/d
Full Passed Forward (FPF)	492 l/s
BOD	18 mg/l (95%ile)
Suspended Solids	35 mg/l (95%ile)
Ammonia	5 mg/l (95%iile)
Phosphorus	1 mg/l (average)*
Iron	6 mg/l (absolute)

*0.25mg/l from 01/04/30 for which WINEP funding has been requested separately from growth funding.

A review of local plans identifies high levels of population growth to be anticipated, increasing by 3,151 within AMP8 and process capacity to meet an additional 11,680 PE (16% increase) is being planned to ensure efficiencies over AMP cycles.

The WRC itself is located within the highest-risk flood zone area, 3, as shown in the figure below.

Figure 2 – Flood Zone plan

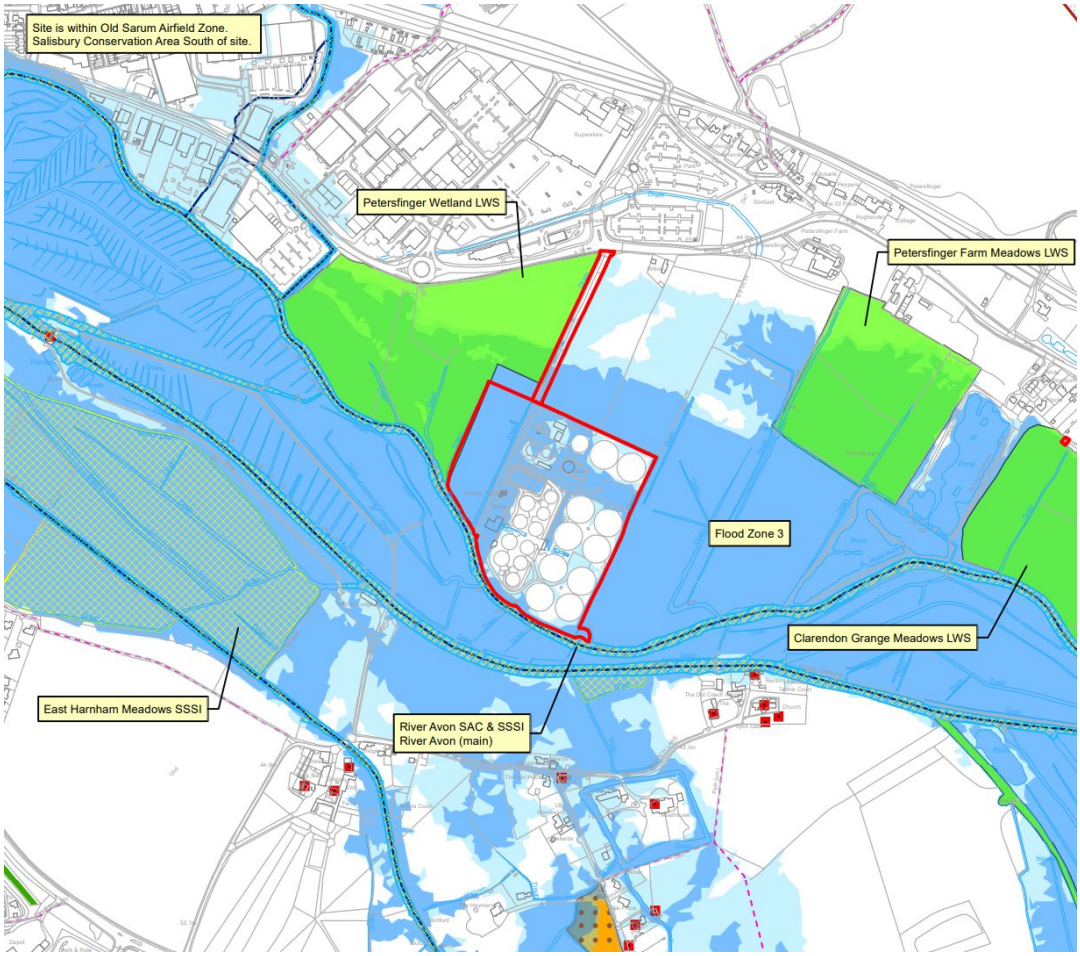


Any land within Flood zone 3 has been assessed as having a ≥ 1 in 100 annual probability of river flooding (>1%). However, operational experience is that the current site, and any adjacent land owned by Wessex Water, regularly floods (every 1-5 years) and the extent of flooding is far in excess of other WRCs in the region. The land to the Northeast of the WRC, whilst still technically in Flood zone 3, is known to flood less frequently as it is further from the watercourse. Figure 3 below shows the extent of the flooding which has been experienced in recent years and the effect on the WRC itself.

Figure 3 - Salisbury WRC Flooding – 2023

There are also a number of environmental constraints / amenity considerations that will impact on any future development of the site, such as SSSIs and Local Wildlife Sites, as shown in Figure 4 below.

Figure 4 – Salisbury WRC surrounding land constraints



A number of options to cater for catchment growth were considered as part of the development of our DWMP and these are outlined below.

Options considered:

1. Transfer

Salisbury WRC is classified as a size band 6 STW with flows passed forward (FPF) of 492l/s. Other catchments in the vicinity of Salisbury are significantly smaller (Amesbury WRC - 12,588 PE and Hurdcott WRC - 3,998 PE) and any upgrades at these sites would be well in excess of that proposed for Salisbury, on top of the cost and complexity in diverting flows to these sites. There are only two sites in our Southern region that treat flows in excess of this – at Poole and Holdenhurst. Neither have sufficient headroom available, both would require land which is not available within their locality, and the relative significant distance to these sites does not make transfer viable.

A new WRC could be considered outside of the flood zone; though this would likely mean abandonment of assets and building of new. The timescale for purchasing the land required and engaging with the relevant authorities to address planning and ecological issues / concerns mean that this could be considered as a longer-term option.

2. Nature Based Solutions

Due to land availability, the impact of flooding zone and stringent permit requirements, this is not a feasible option.

3. Grey solution:

The DWMP identified options for growth over a 20-year design horizon, as shown in Figure 5 below, that included:

- Land purchase
- New biofilter feed pumping station
- Additional biofilter capacity (secondary biological treatment)
- Recirculation

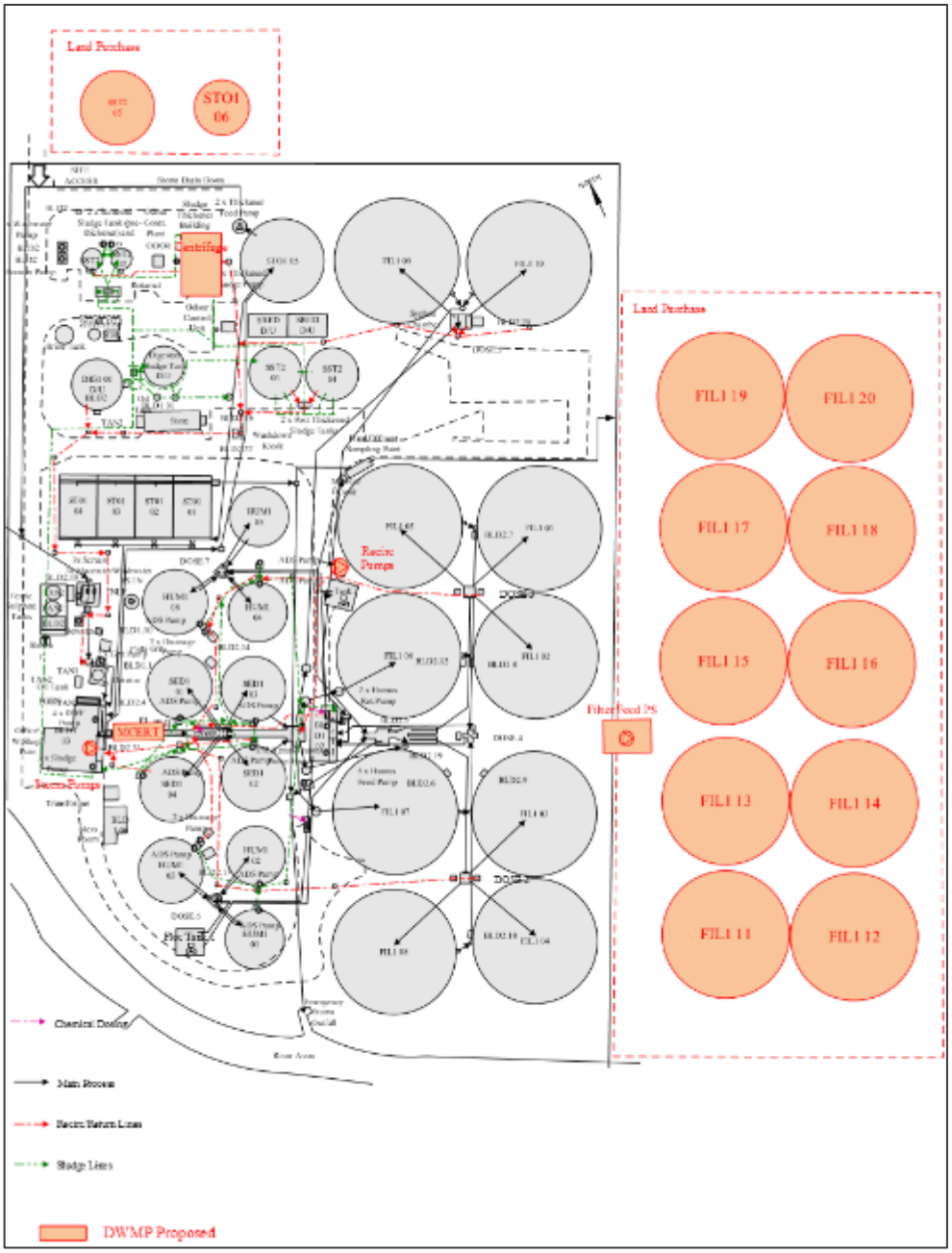
This assumes the site is expanded utilising similar processes that are already in use. Smaller footprint, but more labour, power and carbon intensive processes could be provided, but would be unlikely to deliver significant capex savings.

We believe that factors driving costs for Salisbury WRC are not captured by Ofwat's cost model due to the specifics related to the site. As described above, there are particular issues with any development within the surrounding area which result in materially higher costs than for standard growth schemes; mainly related to:

- Design
    - Locating filters at ground level, as existing, will require flood protection and provision of flood compensation volume nearby.
    - Land purchase and planning approval required in a highly sensitive area, not only for new assets but for the associated flood compensation volumes.
    - Flooding risk could be mitigated by raising filters above ground level, supported by columns / piles; but results in structural challenges and visual impact will likely be an issue for planning approval (a new hotel has been constructed on the A36 immediately north of the site).
- Construction
    - Filters at ground level – high risk of extensive dewatering being required.
    - Filters above ground – Piling in an environmentally sensitive area, extensive temporary works required (e.g. suspended slabs) and
    - High risk of impacts from flooding until works are completed.
- Operation
    - Access to site would need to be protected from flooding.
    - Filters above ground – suitable access required for routine inspection and planned maintenance.

While Wessex Water does own land immediately to the west of the site, it is in the area immediately adjacent to the River Avon and floods regularly.

Figure 5 – Salisbury WRC proposed assets



With options 1 & 2 being excluded due to feasibility, for the remaining feasible option these are the most efficient costs for the unique circumstances at Salisbury WRC which have been derived from the DWMP scope for option 3 – grey solution using TR61[5], resulting in the estimate of £28.915m for the required scope for the full scheme across AMP8 and 9. We believe the modelled costs are not appropriate for Salisbury WRC due to the factors outlined

[5] TR61 is an industry-wide cost estimation tool from WRC used to model water and wastewater assets. It has been developed using cost estimate data from across the UK water industry and is updated every 2-3 years, the latest version being released in January 2024.

above. It is proposed that the solution for this site is aligned with the WINEP (phosphorus) driver and delivered across AMP8 and 9 to provide efficiencies in design and construction, but also to aid affordability.

4.3.2. Bridgwater (Chilton Trinity) WRC

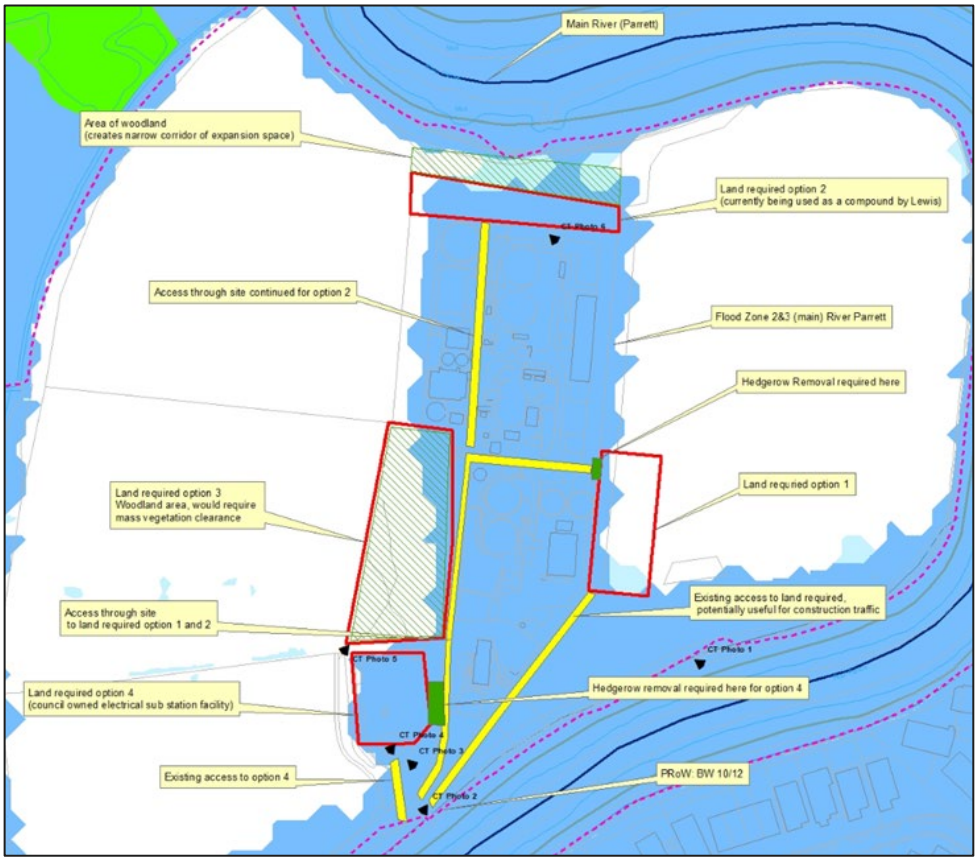
Bridgwater WRC serves a population equivalent of 92,442, and its current discharge permit is:

Dry Weather Flow (DWF)	15,200 m^3/d
BOD (UWW)	25 mg/l (95%ile)
Suspended Solids	60 mg/l (95%ile)
Ammonia	40 mg/l (95%iile)
Phosphorus	2 mg/l (average)*

A review of local plans identifies high levels of population growth to be anticipated, increasing by 2,040 within AMP8, with process capacity to meet an additional 10,313 PE (11% increase) being planned to ensure efficiencies over AMP cycles.

There is no land available on which to locate additional process capacity within the boundaries of the WRC and therefore at time of the October 2023 submission land purchase was considered necessary. In fact, Bridgwater was one of a number of sites that had been identified previously as possibly requiring improvements in AMP7; the figure below shows the areas that were being considered and the associated constraints.

Figure 6 – Bridgwater WRC constraints



Note that the areas to both the East and West are historic landfill sites (unlined) and identified as contaminated. While construction within these areas is possible, it is not without significant risks that need to be addressed, particularly with respect to remediation of contaminated material. The land to the East has subsequently been purchased for use as a solar farm. No other land is suitable for expansion of the WRC as the River Parrett runs

North & South of the site. The remaining potential option for expansion is to demolish and relocate the regional offices and parking (outlined in red in Figure 7 below) to another site or suitable location nearby.

Figure 7 – Bridgwater WRC offices

Options Considered

1. Transfer

Bridgwater WRC is classified as a size band 6 treating flows of circa 800l/s. Catchments in the vicinity of Bridgwater WRC are significantly smaller and any upgrades at these sites would be well in excess of that proposed for

Bridgwater, on top of the cost and complexity in diverting flows to these sites. This option has therefore been discounted.

2. Nature Based Solutions

Due to land availability and population size this is not a feasible option.

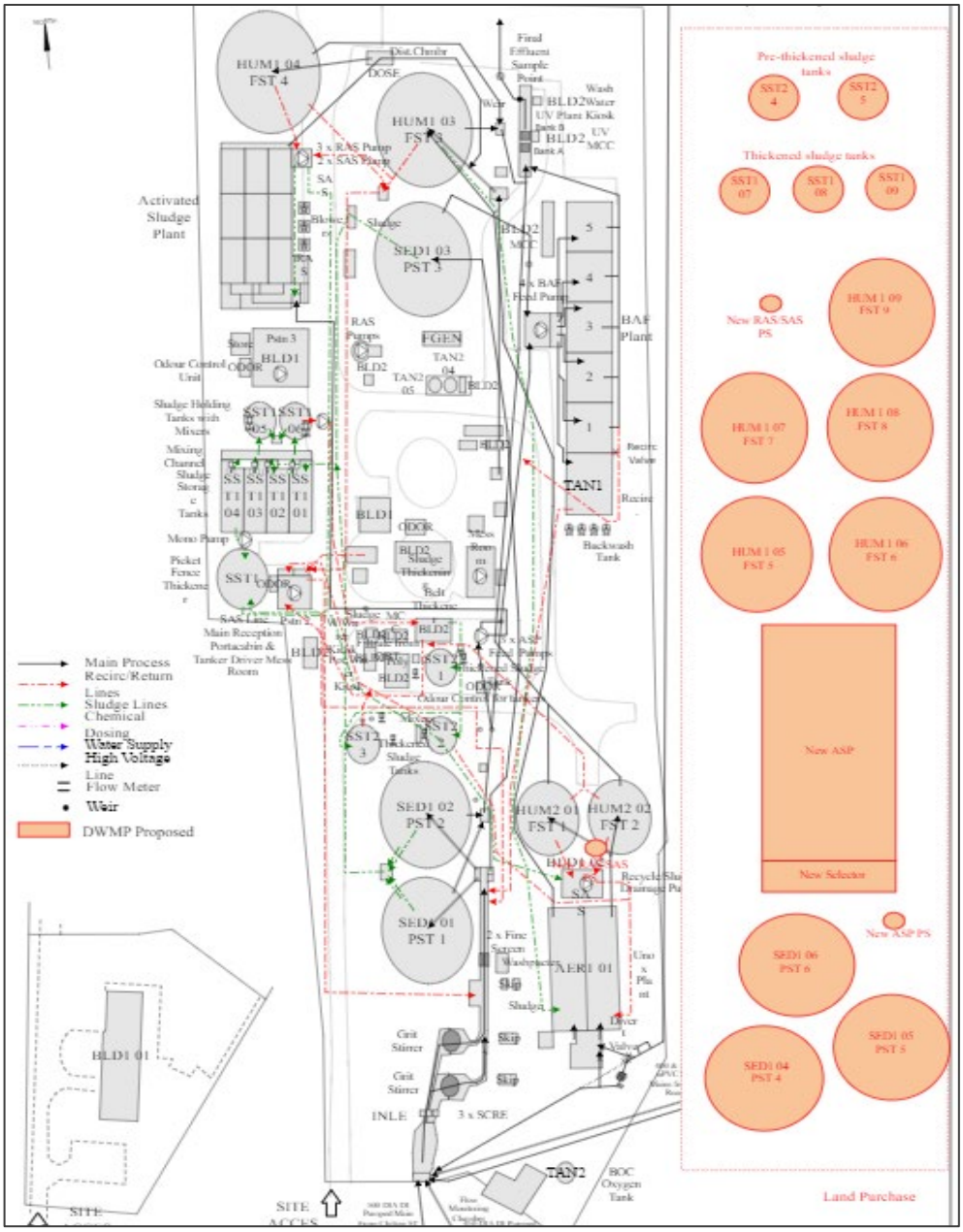
3. Grey solution

The DWMP identified options for growth over a 20-year design horizon, as shown in Figure 8 below, that included:

- Primary settlement
- Activated sludge plant (aeration lanes and final settlement)
- Sludge storage & odour control

This assumes the site is expanded to adjacent land and utilises similar processes as per the existing site (a new ASP stream was provided in AMP5 to cater for significant development proposed to the south and a new business park adjacent to the M5).

Figure 8 – Bridgwater WRC proposed assets



With options 1 & 2 excluded due to feasibility, costs have been derived from the DWMP scope for option 3 – grey solution. Costs have been derived from DWMP scope using TR61, for the scheme that will be delivered largely in AMP9, with design only commencing in AMP8. Given the above factors affecting the adjacent land, it will no longer be possible to build these assets, as a much smaller footprint will be available through the relocation the office and car parking facilities. Technologies that require smaller footprint (such as MBRs) are known to be higher capex and opex per population equivalent treated than the existing treatment processes, together with the additional costs associated with the office changes. With that in mind, ahead of the design commencing for this scheme, we have based the proportion of design costs being requested in AMP8 on the DWMP grey solution.

Additional factors affecting scheme costs at Bridgwater WRC

Bridgwater WRC is already a complex works with three treatment streams. One stream is fed directly from pumping stations. However the other two have a complicated flow split following primary settlement. Incorporating a fourth stream will create further difficulties.

The treatment streams are blended before being discharged to the Parrett following disinfection (ultraviolet). While the WRC does have a lenient permit, the treated effluent must achieve a higher standard to a minimum of 45% transmissivity. The WRC treats all flows (no FPF or storm storage), so increases in population will result in additional flows to the WRC, resulting in a need to increase the capacity of the disinfection stage. Replacement of the UV plant is planned for AMP8/9 (capital maintenance), and it would be more efficient to provide the additional capacity required through growth at the same time. This may dictate the timing of the UV plant replacement.

Further complexities also exist due to the composition of the incoming flows - about 21% of the load is from traders, with a significant proportion from a single (drinks) manufacturer. Whilst we are funded through trade effluent charges for this waste stream the mogden formula is based on COD & suspended solids. This waste stream is very high strength with minimal nutrients and can't be treated via 'conventional' biological treatment processes.

We believe the modelled costs are not appropriate for Bridgwater WRC due to:

- Treatment needs to be to higher standards than the permit BOD:AmmN:SS limits would require because of the disinfection requirements.
- Demolishing and relocation of offices to create space on site for a new process stream.
- The new process stream will need to be high rate / have a small footprint (and thus has a higher unit cost compared with conventional treatment technologies)
- Complexity of flow splits – four treatment streams for one site is unusual.
- Unique nature of the influent
- Requirement for additional disinfection capacity.

4.3.3. Trowbridge WRC

Trowbridge WRC serves a population equivalent of 69,667, and its current discharge permit is:

Dry Weather Flow (DWF)	14,000 m^3/d
Full Passed Forward (FPF)	857 l/s
BOD	45 mg/l (95%ile)
Suspended Solids	55 mg/l (95%ile)
Ammonia	10 mg/l (95%iile)
Phosphorus	2 mg/l (average)*
Iron	4 mg/l (95%ile)

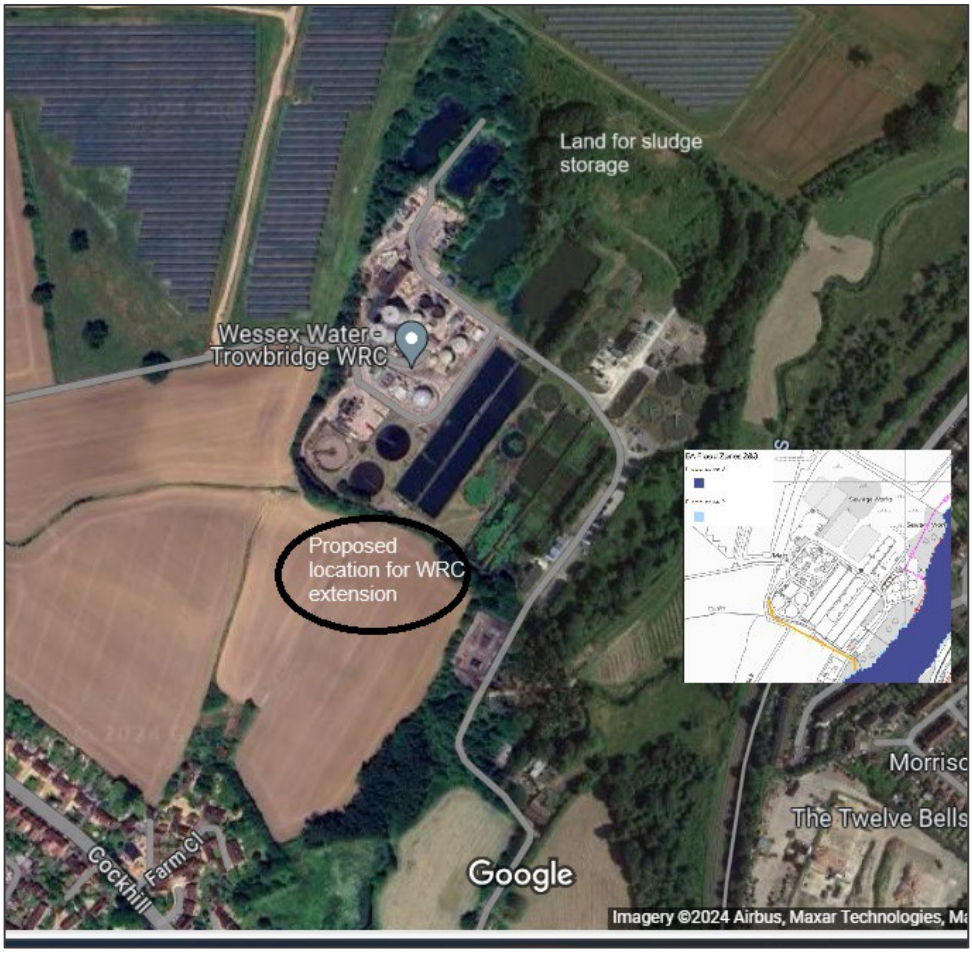
*0.5mg/l Stretch target

It is also a regional Sludge Treatment Centre, part of which involves biogas being conditioned and injected into the national gas network. Local plans identify high levels of population growth to be anticipated, increasing by 3,151 within AMP8 with process capacity to cater for an additional 8,198 PE (an increase of 12%) being planned to ensure efficiencies over the AMP cycles.

The site has had a number of improvements in the recent past, including provision of ferric dosing for P-removal, tertiary sand filters to assist AmmN and SS removal, replacement of the sludge digestion stream and further works are planned for replacing sludge dewatering plant and providing covered sludge cake storage on site due to new obligations and concerns over national landbank availability for cake disposal. This introduces additional process safety considerations for work that may be required in the vicinity of (or interface with) the bioresources assets (e.g. DSEAR). As a result, there isn't sufficient land available within the curtilage of the WRC and therefore land purchase will be required.

The WRC is however surrounded on three sides by solar farms and the River Biss, which is a Flood zone 3 area. The only available land is to the southwest as identified in Figure 9. This area is closer to residential housing and will lead to a complicated scheme to provide an appropriate flow split to the new stream and the need for gravity pipework and pumping mains to criss-cross an already congested site and thread their way through the existing process units.

Figure 9 – Trowbridge WRC location and land restrictions



Options Considered:

1. Transfer

Trowbridge WRC is classified as a size band 6 with flows passed forward of 492l/s. Other catchments in the vicinity of the site are significantly smaller and would require significant and more costly upgrades than those proposed for Trowbridge. This option has therefore been discounted.

2. Nature Based Solutions

Due to land availability, population size and stringent permit this is not a feasible option.

3. Grey solution

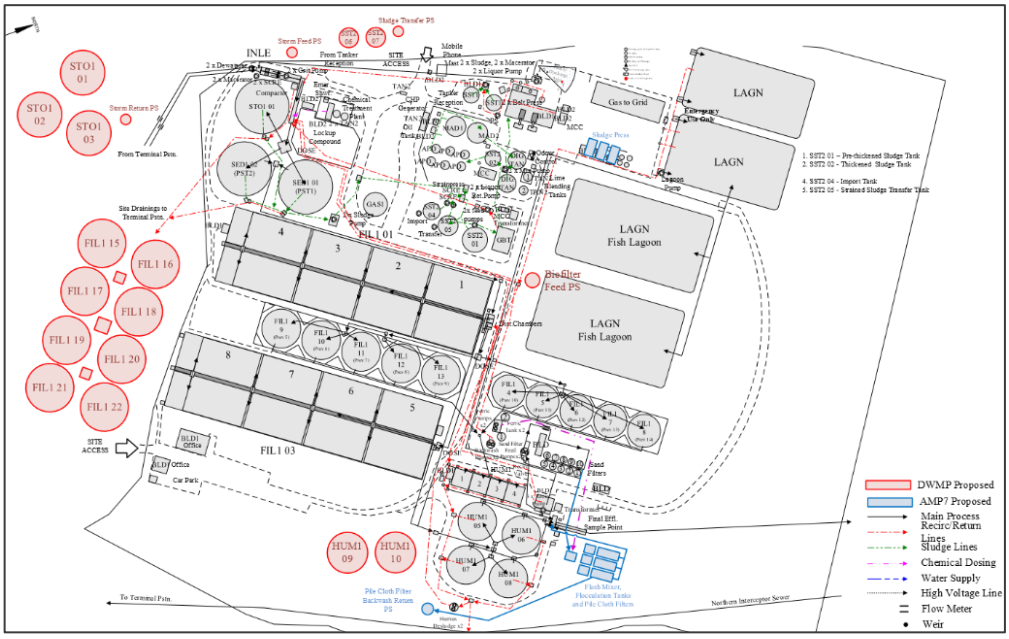
The DWMP identified options for growth over a 20-year design horizon that included:

- Land purchase
- New biofilter feed pumping station
- Additional biofilter capacity (secondary biological treatment))
- Recirculation
- Additional secondary settlement
- Additional sludge treatment
- Additional standby power capacity

A number of complexities exist that will affect the size of the scheme required, including:

- Power supply – additional power will be necessary, though the site is at capacity and as a result of the various process improvements over the past 2-3 AMPs, a complicated network of MCCs and site-wide electrical distribution exists that will need to be rationalised.
- Constructability – interactions with existing site will be complex and the location of sludge assets and the associated hazards need careful consideration and management, including potentially onerous plant / power shutdowns to enable work to proceed in a safe manner.
- Interactions with the Sludge Treatment Centre future spatial requirements – the sludge strategy for Trowbridge STC requires improved dewatering, handling and storage that will lead to a more congested site which impacts the costs of construction for the WRC capacity scheme.
- Potable & effluent washwater supplies – available flows are currently limited. The potable supply to the site will need to be replaced and the effluent system on site will require significant modifications to serve the new process stream.
- Planning – the new stream will be closer to residential areas and visibility may be an issue that could require extensive screening.

Figure 10 – Trowbridge WRC proposed assets



Options 1 & 2 being excluded, costs have been included for Option 3 – Grey solution. Costs have been derived from DWMP scope using TR61, which gives a capex of £39.778m for the scheme which is largely to be delivered within AMP9.

Trowbridge WRC is the largest WRC for catchment permitting within the Bristol Avon contributing 20.4% of the total phosphorus load removed for the 25 WRCs within the catchment. Whilst permit limits for the WRC are lenient, to achieve the stretch target for phosphorus of 0.5mg/l the works must achieve more stringent effluent standards.

We have previously raised our concerns concerning the use of ammonia as a dummy variable (see 2.1.1 above) in the model, which would exclude Trowbridge WRC as a site requiring tertiary solids (TSR) removal. However, TSR is critical to compliance at the site with operating technique agreement BA OTA 1.

In conclusion, we believe the modelled costs are not appropriate for Trowbridge WRC due to:

- The complexities and restrictions of working on a combined WRC / STC site.

- The construction issues associated with a large site that has been developed over a number of AMPs such that space for pipework to be installed is severely restricted.
- The model does not account for more stringent effluent limits due to catchment permitting requirements
- TSR is a necessity, but the current modelling approach does not compensate for this.

4.3.4. Robustness and efficiency of costs

This was covered in section 6.1.3 of WSX16. However, for the additional schemes that have been added to the proposed programme, and where no previous costing information (e.g. DWMP) is available, the totex has been determined with reference to already available data for existing schemes of similar scope and scale. This involved a review of PE data, existing site performance and consideration of the likely process upgrades required to ensure that the identified scope only addresses the necessary growth requirements.

4.4. Past-delivery adjustment

Ofwat have stated that over the past 3 AMPs, Wessex Water has underspent against its growth allowance. We do not consider this is supported by the latest data, and that provided in A1-4.3 within CAC3 as part of the PR24 submission. The table below reflects updated figures to reflect the current 2024/25 forecast spend and shows that since 2010 Wessex Water's expenditure has been greater than that allowed as part of the PR process.

Table 7 – Previous business plan allowances for WRC capacity provision

	Business Plan submission	Ofwat (implicit) allowance	Actual expenditure
PR09 / AMP5 (2010 – 2014)	£52.9m*	£60.4m	£57.7m
PR14 / AMP6 (2015 – 2019)	£51.9m	£29.5m	£60.4m
PR19 / AMP7 (2020 – 2025)	£72.1m	£49.5m	£28.1m
Total	£176.9m	£139.4m	£146.2m

All costs at 2022/23 price base.
* Excludes costs associated with DWF Exceedance, as prior to PR14 quality enhancement due to a growth-related DWF exceedance was funded under the National Environment Programme (NEP) as a 'prevent deterioration' driver.

We therefore request that Ofwat removes its past-delivery adjustment from our cost allowance. Alongside the other requested changes set out in this section, this would result in a cost allowance consistent with our updated business plan data tables i.e. £176.2 million.

5. Why the change is in customers' interests

We strongly believe that adjusting our cost allowance to the level proposed in this representation is in the interest of our customers. Our programme has been reviewed to ensure that the best options for customers are to be implemented and avoided unnecessary expenditure. Ofwat's determination reflected a 37% cut in investment which would:

1. Lead to continued reliance on overloaded assets which may result in the deterioration of effluent quality discharged.
2. Reduce our ability to align investment with other drivers, reducing efficiencies in delivery.

3. Restrict the implementation of our longer-term strategy as our plan also covers AMP9.

We also note that the recently commenced open consultation on 'Proposed reforms to the National Planning Policy framework and other changes to the planning system'[6] (which closes on 24th September 2024) has proposed a series of changes to national planning policy, including measures to accelerate the delivery of housing, with a new target of 1.5 million homes. Of the ten council areas within the Wessex region, nine would be expected to significantly increase housing stock levels over those previously proposed, by up to 104%. It is imperative that we are able to invest significantly in growth in AMP8 to ensure these anticipated increases can be accommodated.

[6] See Proposed reforms to the National Planning Policy Framework and other changes to the planning system - GOV.UK (www.gov.uk)