Planning our future together

Affinity Water PR24 Draft Determination Representation

Affinity Water

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01. Executive summary

Introduction and context

We occupy a unique space in the water industry in England and Wales. As a water company located in the south-east of England, we face the twin challenges of growth and climate change, and are classified as a water-stressed area. We have 10% of the globally rare and environmentally important chalk streams within our area and have a pressing need to bring more water into our area to help protect those habitats.

We are the largest water-only company, more akin to the water services of the water and sewerage companies than the other water only companies. We serve large parts of London with key national infrastructure such as three London airports, several major hospitals and 3.9m household customers.

Our customer base is among the most culturally diverse and is significantly more transient than the majority of other companies, and our customers also represent simultaneously some of the most deprived, but also the least deprived, neighbourhoods in the country.

Preparing our PR24 business plan

Our September 2023 business plan and Long-Term Delivery Strategy has been developed to deliver an unprecedented step change in the level of environmental ambition for our region. Our customers are clear that they want to see improvements in the sustainability of local rivers which will require large scale abstraction reductions and significant investment in long-distance water transfers.

In developing our largest and most challenging ever Enhancement programme, so we sought to strike a fair balance between the needs of customers and the environment, the requirement for significant investment in assets and fair returns for investors. Our plan was developed against the backdrop of good overall performance, demonstrable shareholder support, and positive engagement with our environmental regulators.

Having produced a plan that fairly balanced these needs without putting undue pressure on customer bills, we had reasonably anticipated an equally balanced Determination. However that careful overall balance appears to have been lost in the mechanics of producing a draft Determination for Affinity Water.

We set out below in summary the critical areas in Ofwat's draft Determination for Affinity Water that need to be reconsidered for the final Determination. Namely:

- totex allowances, particularly for Enhancement, which are at levels that would not enable us to deliver our obligations
- outcome delivery incentives (ODIs) at rates that are comparatively disproportionate and uncalibrated to a reasonable level of risk
- an overall balance of risk and return that is heavily skewed to the downside to the point where the conditions for investability and equity have been undermined.

Since our September 2023 business plan submission, and therefore not included in the draft Determination, a significant new obligation has arisen which requires us to reduce drinking water levels of per- and poly-fluoroalkyl substances (PFAS). We have identified 21 sites where additional treatment is the only reliable solution to comply with the Undertaking, requiring an additional £149m. The combination of the large number of sites, and the scale of the investment compared to our original, already significant, enhancement programme, underlines our unique position within the industry. We have a signed Undertaking issued by the Drinking Water Inspectorate (DWI), and so must be able to secure the necessary finances to deliver these obligations. We have included this investment in our Representations and proposed protections for customers, along with an additional uncertainty mechanism to address any additional sites that may be identified over the period.

We want to work with Ofwat over the Autumn ahead of the final Determination in December 2024 or January 2025, and take all the actions necessary to ensure that by the time the final Determination is issued, these critical areas have been resolved.

We would welcome regular and open dialogue throughout the lead up to the final Determinations, and we commit to making Board members, Directors and senior management available to progress these discussions.

Our view of the draft Determination and our Representations

We have clearly set out the five key issues, below and in Chapter 2. Five key issues of this document, along with other issues in our full Representation where it is important that Ofwat takes action so that we are able to accept the final Determination in the round.

1. We have significant concerns with Ofwat's assessment of totex Enhancement allowances. The approach has led to an overall efficiency challenge of 30% compared to the September 2023 business plan submission, which is inconsistent with the outcome of the efficiency assessment in Base expenditure, where we are the benchmark efficient company. We also have concerns over the assumptions underpinning and the quantum of the assumed implicit allowances in Base. Our Enhancement investment is needed to deliver on the environmental obligations from the Environment Agency (EA), quality obligations from DWI, and maintain a resilient supply of water.
2. We have included an additional £149m investment needed to deliver new obligations to remove PFAS from drinking water, and an uncertainty mechanism to deal with potential future occurrences to allow us to deliver these new quality obligations set by the DWI.
3. The draft Determination includes incentive rates that are not proportionate to Affinity Water's size, penalises our good performance, and in the case of Per Capita Consumption (PCC), does not take account of the Environment Agency's methodology to recognise weather impacts. These issues create an extreme exposure to performance risk, and we have included proposals in the following representation to suggest reasonable adjustments to the calibration of Outcome Delivery Incentives.
4. The risk and return position within the draft Determination is heavily skewed to the downside to a larger extent than most companies, including those performing less well than Affinity Water, and those also providing wastewater services. To restore fairness and balance, we propose aggregate sharing mechanisms across expenditure and outcome delivery incentives totalling 2% instead of Ofwat's proposal of 3% and 5%.
5. The overall effect of the foregoing four issues has undermined the confidence in the investability of Affinity Water by not providing the necessary conditions to enable equity to be forthcoming. To address this, an appropriate assessment of equity financeability, over and above the existing consideration of debt financeability, is vital for the PR24 final Determination.

Our Representations plan in summary

Below we set out the investment required in our Representation plan, alongside our original submission and Ofwats draft Determination.

	Business plan submitted	Business plan restated	Draft Determination	Variance to plan	Representation plan	Variance to plan
	(£m)	(£m)	(£m)	(£m)	(£m)	(£m)
Base opex	1,006	1,006	1,305	-116	1,028	22
Base capex	367	415			399	-15
Retail opex	160	160	158	-2	160	0
Network reinforcement	34	34	33	-1	29	-5
Total base	1,567	1,615	1,497	-118	1,616	1
Enhancement totex	572	524	415	-109	550	26
Totex	2,139	2,139	1,912	-227	2,166	27
Additional PFAS totex					149	149
Totex					2,316	176

Table 1.1 Summary investment for our business plan submission, restated due to transfers, compared with the draft Determination and our Representation plan

Our performance commitments were largely accepted in Ofwat's draft Determination, and we confirm that our Representations plan will enable us to deliver those commitments, and as with our September 2023 plan, performance is largely delivered from base investment.

Ofwat's draft Determination included a number of interventions for outcomes which has led to a negatively downward skewed effect on RoRE. We make Representations on a small number of areas, which will help bring the overall plan back into balance. Most significantly, we propose appropriate company and customer protections for PCC performance, as Ofwats draft Determination represents an unacceptable level of risk on a measure that is not directly within our control. In addition we make representations on the application of the incentive framework, and withdraw our bespoke low pressure performance commitment.

Financing, risk and return

In preparing our Representations, we have proposed a higher Weighted Average Cost of Capital (WACC) than Ofwat's view in the draft Determinations, at 4.23%. We have found this necessary in order to balance against the negative skew in Return on Regulated Equity Earnings (RoRE) risk and also to reflect updated market rates. We have used the services of the expert market teams at KPMG to reassess and updated the range for the WACC, in line with CMA at PR19 and Ofgem's recent approach. We have adopted a revised WACC at the lower end of KPMG's proposed range.

The outcome of our updated investment plan costs and updated WACC is that we are financially resilient. We have gained third-party assurances that, under our Representations, we would show a strong financeability position and have strong credit ratings. However, under a wider understanding of financeability that considers equity investability as well as debt metrics, we do not consider that either the actual or notional company is financeable in the context of the draft Determination.

We have proposed a number of adjustments to the inputs to the RoRE position to reduce the extreme risk position and ensure that PR24 can provide a fair and equitable balance of risk and return.

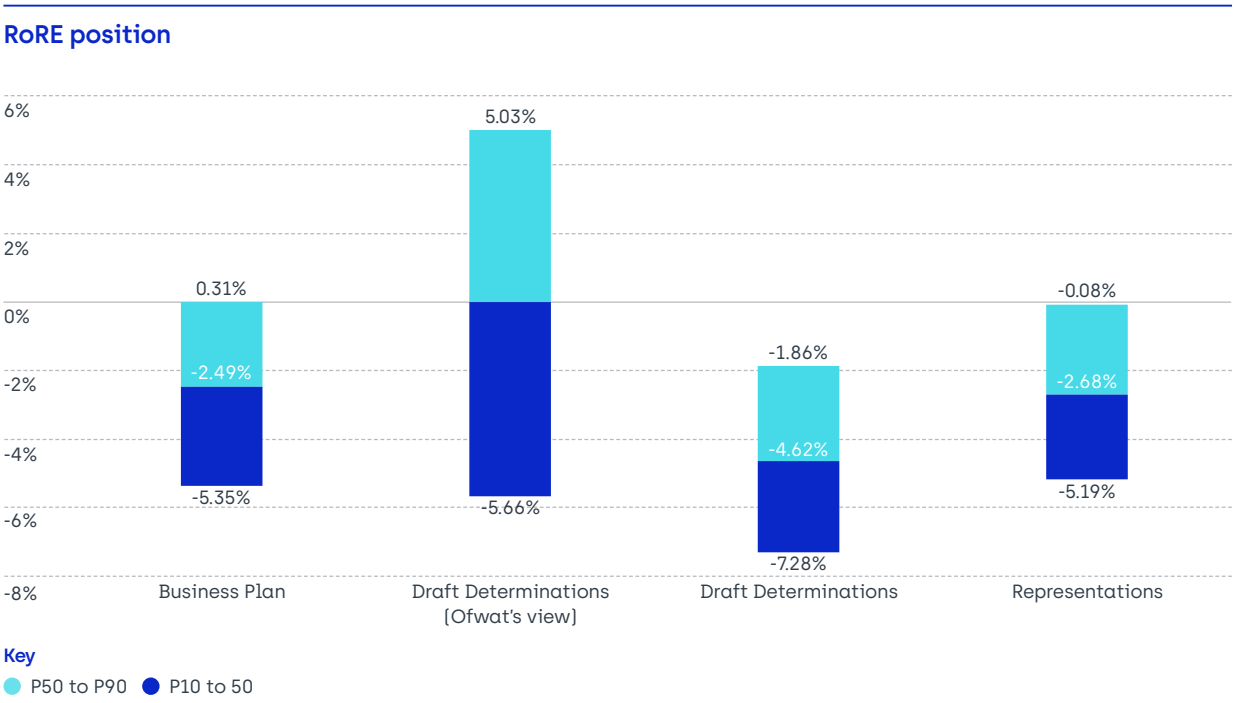


Figure 1.1 RoRE position

Customer bills

The adjustments and additions that we have made to the draft Determination lead to an increase in customer bills of 25% by 2030, when compared with bills in 2025. We recognise that this is a higher increase than the 13% we originally proposed in September 2023, and we have challenged ourselves to confirm that this is necessary.

We have gained assurances that the costs we have put forward are efficient, and the investment we have included is necessary. We have considered whether to delay revenues into future periods to deliver lower bill increases between 2025 – 2030. We have elected not to propose this as customers have told us they prefer to pay for services at the point of consumption rather than storing up cost implications up for future customers to bear.

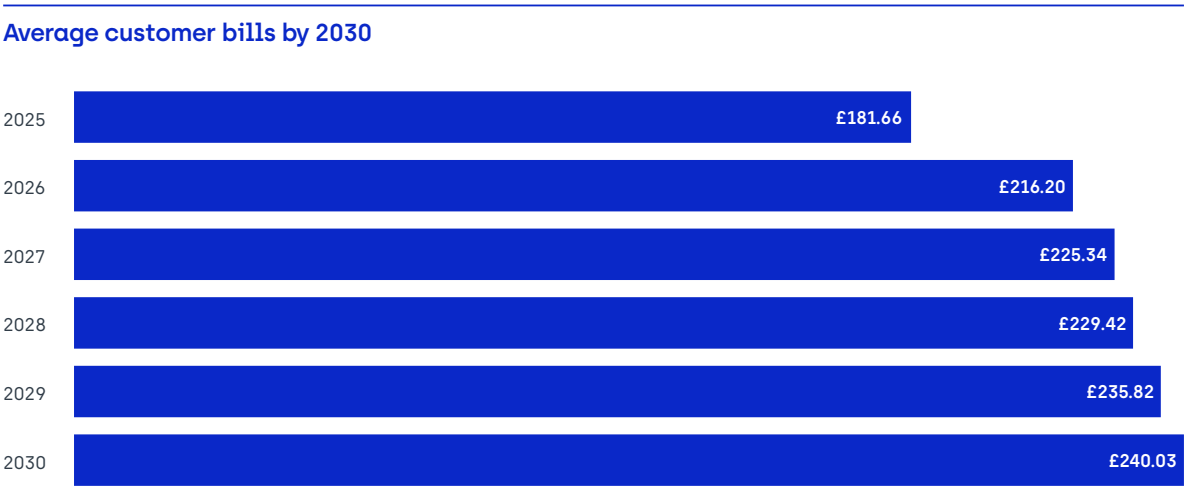


Figure 1.2 Average customer bills

The net result of our Representations is that our bill profile would still be below the average water bill profile increase of 27% in the September 2023 business plan.

The implications on customer bills emerged late in the Representations process, and we were able to carry out a small amount of customer engagement specifically on the new PFAS requirements and the overall bill proposed at this stage. This supplements the wide ranging, long term, comprehensive research we have undertaken over the last three years and which is embedded in our plan, and against which our plan was tested.

Customers told us that they are aware of the emerging PFAS situation with 66% aware or vaguely aware of the issue, and it ranked third in their priorities for water supply.

When asked about the bill profile as a result of this addition to our plan and the other changes in our Representations, 73% of customers thought it was a little or a lot more than they were expecting. Responding to this feedback we have re-examined our affordability support proposals to ensure we are supporting customers where we can and increasing the take up of support available to specific customer groups in need.

Affordability support

We are acutely aware that a small proportion of our customers struggle to pay their water bills. We have a long history of developing and providing affordability support those customers and were at the forefront of developing the social tariff. We currently have the second highest take up of the social tariff and plan to expand take up from 114,000 households at the start of 2025 to 149,000 households by 2030. As a direct result of the bill profile increase proposed in these Representations, we are committing to ensuring full take up of the agreed cross subsidy, and so will be increasing the number of targeted one-off £50 credits from 150,000 in our original plan to 162,000 in these Representations.

We will continue to expand and evolve our communications to customers, always striving in our efforts to connect with hard-to-reach customers to ensure high levels of awareness of the affordability support we provide, and how to access it.

We are continuing with our rising block tariff trial, which is showing promising initial results, and will consider extending that tariff to a wider customer group if the final results confirm it has a positive effect on customers to manage their water bills. We are planning for several further trials in the coming years.

Governance and assurance

Our Representations have been subject to strong internal governance and third-party assurance. We have engaged AtkinsRéalis and KPMG to provide assurance on the data underpinning our response, and Centrus to provide assurance over financeability and financial resilience of both the notional and the actual company.

Our Board has been fully involved in developing our Representations and has met on four occasions to to consider the draft Determination, direct management's actions and satisfy itself of the quality of the Representation. The Affinity Water Board has fully approved the contents of the Representation as outlined in the Board Assurance Statement.

02. Five key issues

Our September 2023 business plan submission has been carefully constructed to strike a fair balance between the needs of customers and the environment, the requirement for significant investment in assets and fair returns to investors. We developed our plan against the backdrop of good overall performance in 2020 - 2025, demonstrable shareholder support through 2020 - 2025, plus challenging expectations and externally driven needs in 2025 - 2030. Having produced a plan that fairly balanced these needs without putting undue pressure on customer bills, we had expected to receive a similarly balanced Determination. However, in considering the draft Determination, it appears to us that the balance may have become lost in the necessary mechanics of producing a Determination. We set out below and through our Representation the critical issues that we would like to resolve with Ofwat ahead of the final Determination.

Investability

Since 2018 our shareholders have supported the company and its customers by forgoing dividends from the regulated company. This has allowed us to focus on investing in performance improvements whilst maintaining financial resilience.

There are significant challenges ahead for Affinity Water, not least will be investing in our largest ever enhancement programme to address the real risk of water scarcity, sustainability and raw water quality deterioration in the south east of England. Recognising these challenges, shareholders have demonstrated their continued support through our September 2023 business plan submission proposal to inject £150m of additional equity. This proposed injection was founded on the understanding and trust that there would be a demonstrably fair balance of risk and return when setting the base return and the balance of upside and downside risk.

Considering the draft Determination, we have concluded that the package provided by the base return, and risk and return balance, is skewed to the downside. Allowed returns have not been set at market rates in order to be able to attract new capital and fairly reward existing shareholders. CAPM ranges have been set well below those indicated by Ofgem in its contemporaneous RIIO-3 decisions, and not market-tested to check adequacy under current market conditions. We are therefore concerned that the draft Determination has undermined the conditions necessary to maintain investor confidence and enable equity funding. Our Representations set out the adjustments we consider necessary to restore balance and for investor confidence to return.

Risk and return balance

We have examined the draft Determination's balance of risk and return and are concerned about the way ODIs and expenditure are being applied to Affinity Water relative to other companies. We are unable to reconcile our plans, performance levels and excessive (downside) risk exposure with that of the wastewater companies.

In the case of ODIs, Affinity Water's draft Determination has one of the most negatively skewed packages in the sector. Whilst we acknowledge the protection from the application of reward/penalty sharing thresholds, we consider these to be inappropriately calibrated to the overall balance of return. In our representations we reset these at a more balanced level.

We have similar concerns with the risk and return incentives associated with expenditure. We recognise the introduction of the Aggregate Sharing Mechanism (ASM) aims to provide overall protection, applying at 2% of RoRE. However, as with the ODI sharing thresholds, we do not consider this has been appropriately aligned with the overall balance of return. The draft Determination also does not adequately account for increased risk exposure resulting from the broader introduction of Price Control Deliverables (PCDs).

Overall, we are seeking to establish an equitable level of protection for customers and the company. Our Representations do this by apportioning risk so that the exposure is less extreme. While this reduces the downside skew, we are still concerned that the overall framework does not enable a fair and equitable balance of risk and return.

Enhancement investment

Ofwat's modelling of Base costs has demonstrated that Affinity Water's costs are efficient to the point that it is currently the benchmark company. At the same time Ofwat's Enhancement models have assessed costs as requiring a 30% efficiency challenge. We have not been able to reconcile these two positions.

We have material concerns over the use of some of the models used to assess enhancement costs. We consider these models do not fully reflect large complex scheme requirements. In particular, the WRMP interconnector model significantly underestimates the real costs of our complex and critical schemes. The model only accounts for length of pipe and flow volume and makes no allowance for the costs associated with numerous motorway crossings and other real world complexities faced by our proposals.

There are also significant assumptions about what is implicitly funded in Base expenditure. The draft Determinations provide little explanation for how these qualitative top-down assessments have been verified. Despite clear evidence being provided in our September 2023 business plan submission, our Raw Water Deterioration costs were significantly reduced due to a perception of overlap with Base expenditure. This is not the case. Further top-down judgements have been made about assumed scheme overlaps with 2020 - 2025. Again, this cannot be the case as the legal notices from the DWI occurred post the PR19 final Determination and are not included in the current 2020 - 2025 allowed expenditure.

Our Representations respond directly to feedback and modelling assumptions in the draft Determination to provide Ofwat with the information needed to make a more mature assessment of our Enhancement costs.

Outcome Delivery Incentives

We consider Ofwat's methodology for setting ODI incentive rates has resulted in some unintended outcomes, with Affinity Water receiving significantly larger penalty and incentive rates relative to size than those for much larger wastewater companies, or poorer performing companies.

While some protection for risk has been applied to newer performance commitments, this is not the case for Per Capita Consumption (PCC), where Ofwat's approach does not take account of the WRMP methodology for managing uncertain weather impacts. Similarly, a reasonable consideration of the inherent uncertainty in delivering this commitment is not apparent, with Affinity Water expected to have full management control over consumer behaviour on water use; something that is clearly not possible. We welcome the immediate recognition from Ofwat on the issues we have raised on discharge consent compliance and water quality contacts incentive rates and look forward to continued constructive engagement on the wider issues raised in our Representations.

Our Representation provides remedies that are simple, proportionate and easy to apply to correct these issues in the final Determination.

PFAS uncertainty

Affinity Water's Representation includes an additional £149.1m Enhancement costs to fund a recent DWI Undertaking relating to PFAS. The costs are accompanied by an uncertainty mechanism to manage the flexibility necessary to deliver these new statutory requirements. The proposed uncertainty mechanism is intended to protect customers and the company from the uncertainty in outcomes, deliverables and costs.

03. Risk, return and investability

3.1 Risk and return summary

Our September 2023 business plan submission

Our business plan presented a robust and financially resilient company with a capital structure that enabled us to maintain strong credit ratings and withstand downside scenarios, whilst raising capital to fund our investment programme for the benefit of customers and the environment.

Our plan included a planned equity injection of £150m into the regulated company, which was conditional on the final Determination providing a sufficiently attractive investment proposition for investors.

We conducted significant analysis on the risk profile faced by the actual company and the risk profile faced by the efficient notional company. Our analysis showed that the conditions specified in the final methodology led to downside asymmetry and higher absolute levels of downside risk in terms of RoRE risk ranges.

We articulated some of the reasons for this downside skew and, in line with the expectations of the final methodology, we outlined ways to correct this by mitigating risk at source.

Finally, we provided Board assurance that the notional company was financeable, and the actual company was financially resilient.

Ofwat's draft Determination

The draft Determination does not give us confidence that the final Determination will provide a sufficiently attractive investment proposition for equity investors.

Despite some additional risk protections being introduced in the draft Determination, the risk and return balance is significantly negatively skewed, particularly for totex and outcomes. Our analysis shows the outcome of the draft Determination almost doubles the downside risk in the RoRE range, while offering little prospect for an efficient and good performing company to earn return.

Correspondingly, the draft Determination WACC has not taken sufficient account of the weight of evidence provided by companies in the PR24 business plan submission. The miscalibration of the cost of capital, coupled with the negative skew in the risk and return balance, creates investability issues which could have detrimental impacts for customers and the environment.

As a result, the draft Determination has led to a decrease in the predictability and stability of the regulatory regime which has real world negative consequences for securing debt and equity needed to support investment and deliver improved operational performance and environmental outcomes.

Our Representation

Our Representations set out adjustments to provide a fair and equitable sharing of risk commensurate with the level of return, balancing the needs of customers and the environment, with the need for significant investment and competitive returns to investors.

Our Representations set out adjustments to the outcomes and totex framework to mitigate risk at source, by reinstating the efficient costs necessary to delivery statutory requirements and addressing bias in incentive rate calculations. We have also adjusted the sharing mechanisms thresholds on totex and outcomes to reduce the significant downward skew in the draft Determination RoRE range. We have also updated the WACC in line with latest market evidence and established regulatory precedent.

3.2 Executive summary

3.1 Our PR24 business plan was carefully constructed to strike a fair balance between the needs of customers, the environment, the requirement for significant investment in assets, and fair returns to investors. We developed our plan against the backdrop of good overall performance and demonstrable shareholder support, plus ambitious expectations for environmental improvements. Having produced a plan that fairly balanced these needs, which was recognised as of 'High Quality' in Ofwat's Quality and Ambition Assessment, we had expected to receive a similarly balanced draft Determination.

3.2 Instead, the draft Determination for Affinity Water results in an asymmetric range of risk driven by material reductions in cost allowances and inappropriately calibrated incentives. The draft Determination does not provide a reasonable return on capital nor underpin the long-term resilience of our company.

3.3 The balance of risk and return in our draft Determination is of critical importance. The investment needed to deliver improved outcomes for customers and environmental ambition in the next 5 year period and beyond underline the need to ensure the company is attractive to equity investment.

3.4 Affinity Water, like many companies in the industry cannot rely long-term on re-investing retained cash flows and borrowing against the RCV. Instead, we would like to attract new equity capital by offering risk adjusted returns that are sufficiently attractive when considered against UK and global market benchmarks.

3.5 Given the need for equity, the balance of risk and return is no longer a hypothetical "cross-check", but a crucial enabler in the successful delivery of our plans now and in the future.

3.6 Critically, this is in the context of a multi-decade need for higher levels of investment. At the sector level, enhancement investment alone is estimated at £260bn in AMP8 to AMP12, more than 2.5 times the size of the current sector RCV. Affinity Water has similar long term investment requirements, with enhancement expenditure in 2025 - 2030 roughly twice the size of the previous period, which is needed to improve water security and water quality in the south-east region.

3.7 Affinity Water will need to raise capital on a regular basis over the next 20 years alongside its peers; a point understood by investors who therefore place even greater weight on the long-term signalling and stability of the regulatory approach and the need for a fair and equitable balance of risk and return.

3.8 Our September 2023 business plan included a proposed £150m of additional equity, supported by investors on the basis of a fair base return and equitable risk and return balance. As a result of the draft Determination publication, our investors have confirmed that they would not be able to invest additional equity given the significant risk and insufficiently competitive returns indicated in the draft Determination.

3.9 The Board and Affinity Water shareholders consider that additional equity into the company, alongside appropriate levels of base returns and a fair balance of risk and reward, provide the best outcomes for customers. We have proposed adjustments to the risk and return balance in this draft Determination Representation aimed at improving the fundamental investability of the draft Determination to enable this preferred outcome for the company and customers to be achieved. We encourage Ofwat to consider the proposals put forward in the report commissioned by Water UK on Investability (appendix AFW142 - Water UK investability study), which proposes a framework to assess the investability of final Determinations to ensure that that the regulatory settlement provides the right conditions for equity to reconsidered.

3.10 In setting out the steps required to ensure the investability of our final Determination our Representations are grouped into two strands. First, those operational Representations with consequences for risk and return (e.g., cost allowances, ODIs, and PCDs). Secondly, those Representations that are finance led (e.g., cost of capital, gearing, dividend yield).

3.11 As the draft Determination stands, both of these elements currently result in a negatively skewed range of likely returns that do not provide a feasible proposition for existing or potential investors for 2025-2030. This is particularly challenging given that Affinity Water has demonstrated a positive record across both costs and operational performance in the current period, coupled with the reinvestment of returns into the company since 2018.

3.12 In setting out the consequences for Affinity Water's financial resilience and capital structure, the Board have considered two scenarios. First, that the final Determination would be sufficient to attract additional equity of £150m. Second, that the final Determination would not be sufficient to attract additional equity of £150m. The latter scenario is the default position adopted by the Board in the Representations based on prudency, but we are clear that a final Determination which can attract additional equity is the outcome sought on behalf of our customers.

3.13 The capital structure set out in the Representation, in which no equity is invested, is debt financeable at Baa1 (on the basis that rating agencies do not downgrade qualitative metrics based on regulatory stability and predictability) and passes the financial resilience tests.

3.14 However, it provides limited equity buffer (dividend yield) to absorb risk in any downside scenarios as dividends are being retained in the company to fund investment. This approach will clearly be unsustainable in the long term and is a sub-optimal outcome for customers and the environment given the longer-term needs for investment to ensure the security of water supply and quality in the south-east.

3.15 We set out our Representations relating to risk and return and financing below.

3.3 Return on Regulated Equity (RoRE) risk

3.16 The RoRE risk contained in the draft Determination is wider and even more negatively skewed than compared to the September 2023 business plan.

3.17 See Table 3.1 Our assessment of RoRE risk ranges in the September 2023 business plan and the draft Determination below.

RoRE risk ranges %	Business plan		Draft Determination	
	P10	P90	P10	P90
Totex	-0.5	0.49	-2.43	1.19
Retail	-0.43	-0.27	-1.29	0.38
Revenue forecasting incentive	-0.03	0	-0.01	0
Financing	-0.28	0.46	-1.85	1.51
ODI's and Mex's	-3.11	0.85	-3.26	-1.5
PCD	-1.68	-0.54	-1.39	-0.43
Total (simple aggregation)	**-6.33**	**1.29**	**-10.24**	**1.14**
Total (Monte Carlo)	**-5.35**	**0.31**	**-7.28**	**-1.86**

Table 3.1 Our assessment of RoRE risk ranges in the September 2023 business plan and the draft Determination

3.18 We recognise that the draft Determination contained additional risk mitigation such as the Aggregate Sharing Mechanism (ASM) for totex and sharing thresholds on ODIs. However, our analysis, which is largely based on observable outturn historical performance, shows that these do not fully address the issue and there remains a significant negative skew in RoRE risk at draft Determination.

3.19 Our concerns on RoRE risk ranges are outlined below and are focused in three areas; costs, outcomes and overall investability. Appendix AFW149 - Economic Insight - Full RoRE method write up contains a detailed explanation of our methodological approach to calculating our view of the RoRE risk ranges and appendix AFW144 - KPMG - RoRE risk contains the results of an industry risk analysis by KPMG.

3.4 The impact on RoRE relating to costs and outcomes

3.4.1 The importance of adequate cost allowances

Totex and Retail risk

3.20 See Table 3.2 RoRE risk ranges for totex under the September 2023 business plan and the draft Determination below.

RoRE risk ranges %	Business plan		draft Determination	
	P10	P90	P10	P90
Totex	-0.5	0.49	-2.43	1.19
Retail	-0.43	-0.27	-1.29	0.38

Table 3.2 RoRE risk ranges for totex under the September 2023 business plan and the draft Determination

3.21 Under the draft Determination, we consider that between -2.43% (P10) and 1.19% (P90) of our RoRE could be at risk under totex and between -1.29% (P10) and 0.38% (P90) under retail at PR24. This is based on our revised approach to estimating the totex and retail risk ranges using analysis of industry performance over PR14 and PR19 to date.

3.22 Appendix AFW149 - Economic Insight - Full RoRE method write up contains a detailed explanation of our approach to calculating these RoRE risk ranges.

3.23 We note that a key change from the September 2023 business plan is that the totex and retail risk ranges were previously based on the historic performance of Affinity Water only. However, Ofwat's QAA highlighted that we should consider sector wide data in the analysis. We have followed this feedback using an industry average which is why the totex and retail risk range for the draft Determination is wider and more negatively skewed.

3.24 In line with Ofwat's approach to calculating RoRE risk in the draft Determinations, we have also removed Southern Water from the 2020 - 2025 historical data. While this is justified in the draft Determinations on the basis that Southern Water is an outlier due to large expenditure on a turnaround plan, we note that Southern Water may not be a true outlier as the company does not perform far worse than the next worst performer in the industry, based on historical analysis [1].

3.25 We also note a number of factors that are difficult to model in totex risk ranges, particularly where they relate to new information or approaches that are not captured fully in the historical data sets. For example, the introduction of uncertainty mechanisms for energy and selected enhancement costs in 2025 - 2030, which (providing they are appropriately designed), should reduce totex risk.

1. Across the four years of available PR19 data, Southern Water has overspent against its allowances by 33%. By comparison, the next worst performer, South West Water, has overspent against its allowances by 30%

3.26 However, the introduction of PCDs significantly increases totex risk due to lack of flexibility and resulting allocative inefficiency. The introduction of PCDs will limit our ability to deliver outcomes in the most efficient and cost beneficial way, as they bind us to delivering certain outputs at pre-determined milestones based on pre-determined spending programmes.

3.27 Effectively, PCDs therefore introduce an allocative inefficiency which will likely mean that overall costs, and overall outcomes are not effectively optimised. This can result in higher (inefficient) totex, as well as welfare costs to customers who suffer inefficient outcomes. We also note that this makes the assumptions on frontier shift included in the draft Determination even more difficult to realistically achieve, and removes many of the benefits assumed to be delivered by the introduction of the 'total expenditure' approach in PR14.

3.28 We also consider that there are further reasons to believe that totex performance may be worse (i.e. more skewed to the downside) during 2025 - 2030 than the historical industry performance indicates. This is because Affinity Water, similarly to companies across the industry, has significant changes to the scale of the investment programme, particularly for enhancement expenditure resulting from new statutory requirements.

3.29 While some of this investment relates to similar activities that we have been undertaking in previous AMP periods, significant elements relate to larger, more complex schemes than have been seen before. The combination of these factors could affect totex risk, by plausibly affecting the variation in company performance. Companies would be at greater risk of overrun on new, innovative, and large-scale capex projects, relative to familiar and smaller scale projects.

3.30 In addition, the increase in scale of the investment programme alone applies greater pressure to the supply chain, increasing supply chain risk, for example, the large smart metering programmes required by Water Resource Management Plans across the industry in 2025 - 2030. The implication of this is that relying solely on historical performance (and specifically performance on totex as a whole) may fail to capture the effect of these expected changes to investment, and as a result, potentially understate the extent of the downside risk at PR24.

3.31 Since our September 2023 business plan submission, and therefore not accounted for in draft Determination, a significant new DWI obligation has arisen which requires us to reduce drinking water levels of per- and poly-fluoroalkyl substances (PFAS) from sites where these can be detected at concentrations above 0.01 Micrograms per Litre.

3.32 We have included an additional enhancement allowance of £149m in our Representations in order to partly address this. However, the undertaking will automatically apply the requirement to any site where a future detection exceeds 0.01Micrograms per Litre. This adds material expenditure uncertainty as additional investment (likely new treatment) will be needed to meet the requirements of the undertaking.

3.33 The number of sites and cost of mitigations over and above the £149m included in the Representation is unclear, but we estimate a P10 – P90 risk range of -3.62% - -0.30%. We propose an uncertainty mechanism to account for this totex risk and have therefore not included this within the totex risk range. We provide further detail on the nature of this totex risk and the design of the uncertainty mechanism in appendix AFW135 - Uncertainty mechanism for PFAS (Notified item).

3.34 It is also clear that totex risk has been increasing over the recent regulatory periods. As set out in the supporting evidence (appendix AFW149 - Economic Insight - Full RoRE method write up) the totex risk has increasingly been skewed to the downside over successive price review periods.

Totex risk ranges %	PR99-PR19	PR04-PR19	PR09-PR19	PR14-PR19	PR19 only
P10	-1.8	-2.03	-2.15	-2.43	-3.18
P90	1.77	1.7	1.82	1.19	-0.06

Table 3.3 Totex risk ranges

3.35 While it is unclear if the increasingly negative totex risk is the result of changes to the regulatory framework, such as the regulatory assumption that performance improvements can be delivered with no additional base expenditure, there is a clear and observable change in the risk profile over time which is a trend we expect will continue throughout PR24.

3.36 We encourage Ofwat to consider the changing nature of the totex risk profile and adopt a consistent approach to Ofgem's recent RIIO-3 investability assessment framework which recognises these trends and adjusts base returns to account for the risk levels.

PCD risk

3.37 The draft Determination RoRE analysis only considers the 'time incentive' element of PCDs, on the basis that the efficient notional company would not be subject to any 'non-delivery' risk. However, we consider it is important that the full extent of the PCD risk is captured in the RoRE ranges, as;

a. Non-delivery of PCDs results in companies having to return more than the cost of the allowed funding for the improvement and so there is a clear penalty element; and
b. The delivery of PCDs in some enhancement schemes is reliant on factors outside of management control, such as access to 3rd party land, planning application approvals etc;
c. There is a significant gap between our view of efficient enhancement costs, as developed through detailed bottom-up engineering approaches, and Ofwat's assessment of efficient costs in the draft Determination, some of which are based on simplistic cost models.

3.38 Below, we set out Table 3.4 Our view of PCD RoRE risk under the September 2023 business plan and the draft Determination.

	Business plan		draft Determination	
	P10	P90	P10	P90
PCD	-1.68	-0.54	-1.39	-0.43

Table 3.4 Our view of PCD RoRE risk under the September 2023 business plan and the draft Determination

3.39 Under the draft Determination, we consider that between -1.39% (P10) and -0.43% (P90) of our RoRE could be at risk at PR24 as a result of the PCDs imposed by Ofwat (this includes both the non-delivery risk and time-incentive risk).

Representations on costs

3.40 As a result of the downside skew in expenditure, we propose the following mitigations to rebalance the risk:

a. While not modelled in the RoRE risk, we consider there is a significant understatement in totex risk as a result of the difference in our view of efficient costs and those provided in the draft Determinations. As set out in Chapter 4. Costs of the Representations (Costs), we have provided detailed evidence to support our Representations expenditure

plans of £1,616m for base costs, and £550m for enhancement costs, similar to those originally set out in the September 2023 business plan (excluding new PFAS requirement).

b. We support Ofwat's application of an Aggregate Sharing Mechanism in the draft Determinations to help provide a fair and equitable balance of risk and return. However, we do not consider the level at which this is currently applied at +/-2% RoRE is consistent with Ofwat's own analysis of totex RoRE risk, which suggests a P10 and P90 range of +/-1.24%. By applying the ASM at 2% of RoRE, the draft Determination effectively suggests the protection would never be activated. We have therefore reduced the ASM level to trigger at +/-1% RoRE.

3.41 For PCDs, we have applied the following mitigations in the draft Determination:

a. Our Representations on enhancement expenditure set out in Chapter 4. Costs reinstate the necessary efficient allowances for schemes relating to PCDs (for the reasons explained in Chapter 4), in line with our September 2023 business plan. The reinstatement of our proposed enhancement allowances results in an increase in the penalty rates applicable under the relevant PCDs. This works to increase the risk we face, due to increasing the size of the non-delivery payments and time-incentive payments and rewards. However, appropriate allowances increase the likelihood of delivering, and on time.

b. We have proposed a change in the delivery profile for mains renewals. The adjusted delivery profile enables us to manage the delivery risks through the period and provides a glidepath from the position at which we end 2020 - 2025 to achieve the required 0.3% renewals through 2025-2030. This approach positions us well to achieve greater mains renewals in 2030 - 2035, in line with our long-term strategy (see Chapter 4. Costs for full details).

3.42 Under our Representations, the risk ranges for totex, retail and PCDs would be more balanced, although still skewed to the downside. This can be seen in the table below:

	draft Determination	Representations		
	P10	P10	P10	P90
Totex	-2.43	1.19	-2.07	1.15
Retail	-1.29	0.38	-1.17	0.35
PCD	-1.39	-0.43	-1.73	-0.46

Table 3.5 Our representation risk ranges for totex, retail and PCDs

3.43 The PCD risk increases as a result of the Representations, as the reinstatement (increase) of original enhancement expenditure in turn increases the penalty rates applicable under the relevant PCDs.

3.44 While we recognise PCD risk is difficult to estimate precisely given this dynamic, we are confident that our enhancement cost Representations reflect the true efficient expenditure needed to satisfy the statutory requirements. Therefore, the increased penalty rates reflect the efficient costs relating to delivery risk.

3.4.2 The importance of correctly calibrating ODIs and MeXs

3.45 See Table 3.6 Our assessment of RoRe risk ranges in the September 2023 business plan and the draft Determination below. For ODIs and MeXs the RoRE risk contained in the draft Determination is even more negatively skewed than compared to the September 2023 business plan.

	Business plan		draft Determination	
	P10	P90	P10	P90
ODI and Mex	-3.11	0.85	-3.26	-1.5

Table 3.6 Our assessment of RoRe risk ranges in the September 2023 business plan and the draft Determination

3.46 Under the draft Determination, we consider that between -3.26% (P10) and -1.50% (P90) of our RoRE could be at risk at PR24 as a result of ODIs and measures of experience. This risk is significantly skewed to the downside and offers no prospect for an efficient and well performing company to earn reward in the ODI framework – as is the observable case for Affinity Water in the current period.

3.47 Chapter 5. Outcomes outlines the specific concerns we have with regards to the ODI framework applied in the draft Determination. As can be seen from the chart below, the build-up of the overall RoRE balance for ODIs is the result of extreme outcomes in some performance commitments - notably PCC and discharge consent compliance.

RoRE risk by PC under the draft Determinations

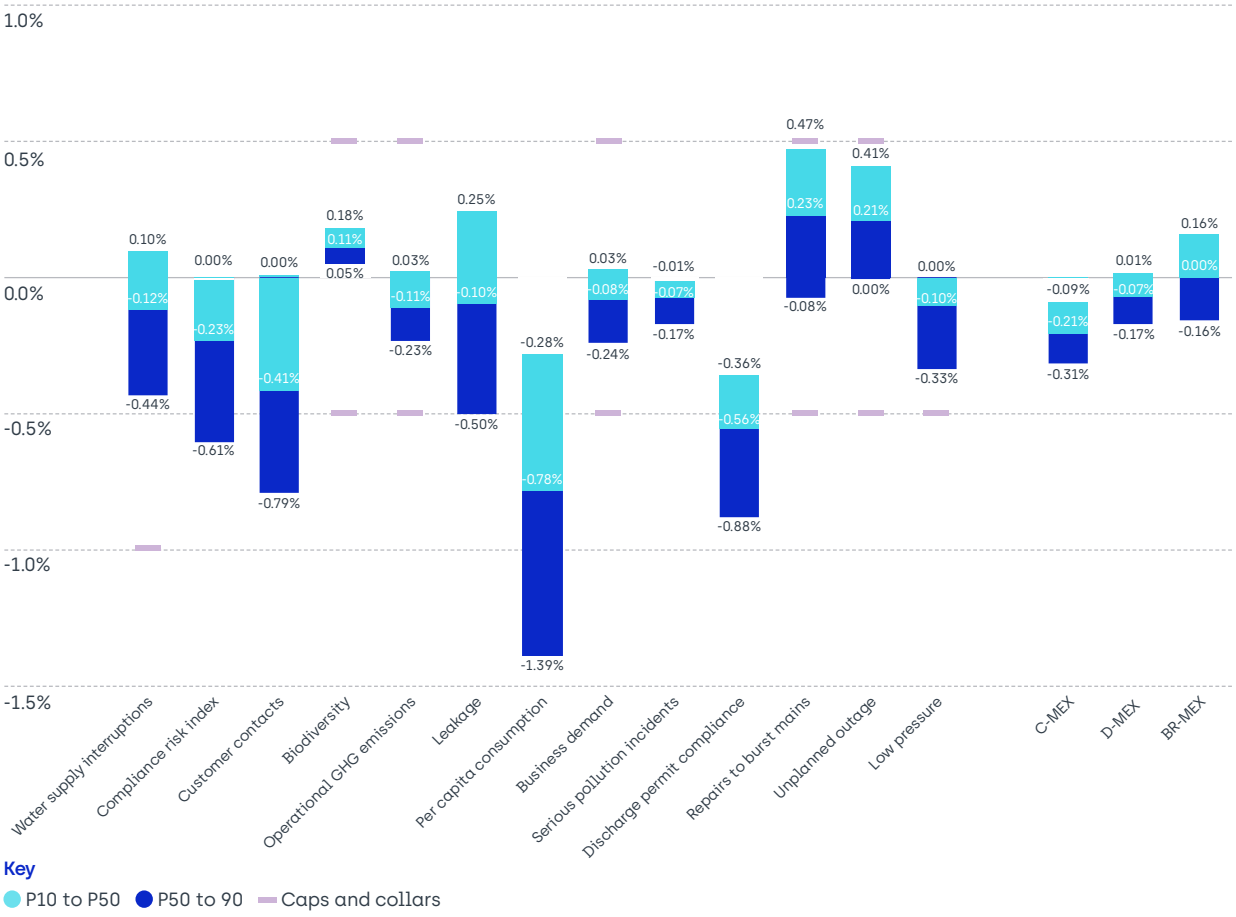


Figure 3.1 RoRE risk by PC under the draft Determination

3.48 Our Representations set out a number of changes which will address the significant downside skew in the balance of risk and return for Affinity Water's Outcomes package.

3.49 These include:

a. Aligning the incentive framework with Ofwat's own principle that: *"The amount of RoRE we allocate should represent a theoretical maximum amount of risk a company is*

exposed to through ODI payments, ie if it was very significantly underperforming or outperforming on a PC"[2].

Ofwat's own analysis shows that the draft Determination is inconsistent with this across the specific performance commitments relating to PCC, business demand, leakage, water supply interruptions, discharge permit compliance and Compliance Risk Index.

b. Revisions to the ODI incentive rate calculation methodology to remove the grouping of companies based on RCV size, which results in Affinity Water receiving the same absolute £ incentive value as Thames Water. This is one of the main drivers for the large difference in Ofwat's own ODI RoRE ranges between Affinity Water (with the second largest ODI RoRE range) and Thames Water (the second smallest ODI RoRE range).

c. Application of appropriate customer and company protections for the PCC performance commitment, which causes a very large negative skew and represents an extreme level of risk on a measure that is not directly within the company's control and is already significantly incentivised through PCDs on smart metering. These protections include a cap and collar on PCC, set at +/-0.4% RoRE, in line with Ofwat's allocation of RoRE to this PC from its collaborative customer research, and a deadband on PCC, equal to the dry year level.

d. Updates to the ODI incentive rate calculation methodology for discharge permit compliance to set incentives appropriate to the environmental risk for water only companies. We welcome Ofwat's immediate recognition of this issue in recent communications and look forward to engaging on this to resolve the issue.

e. Removal of the bespoke Performance Commitment on low pressure as it is a 'penalty only' commitment, and the draft Determination intervention on the performance target is not supported by either a strong (or any) statistical rationale or a relevant understanding of investment and operational realities.

f. Adjustment of the overall ODI sharing thresholds from +/-3% RoRE (where payments will be shared 50:50 with customers) and +/-5% RoRE. (where additional payments will be shared 10:90 between companies and customers), to +/-1% RoRE and +/-3% RoRE respectively.

3.50 The full range of ODI risk mitigation and adjustments are included in Chapter 5. Outcomes of the Representation.

3.51 We consider that these mitigations rebalance the risk we face on ODIs and MeX to a narrower range between -1.19% P10 and -0.20% (P90) as set out in the table below. While still heavily skewed to the downside, the total RoRE at risk on ODIs and MeX has been reduced.

	draft Determination		Representations	
	P10	P90	P10	P90
ODI and Mex	-3.26	-1.5	-1.19	-0.2

Table 3.7 Our Representation RoRE ODIs and Mex

3.52 We note that in completing table ADD18 (appendix AFW106 - Additional data tables ADD), we have reported the ODIs and MeX risk together in the ODIs row. This is because in the draft Determination, Ofwat has proposed for the MeX payments to be included in the aggregate sharing mechanism, "to ensure that the aggregate sharing mechanism fully encompasses the ODI risk faced by customers and companies". As a result, it is no longer possible to consider the risk of the MeX's separately from ODIs. Further detail can be found in appendix AFW149 - Economic Insight - Full RoRE method write up.

2. https://www.ofwat.gov.uk/wp-content/uploads/2023/08/PR24-Using-collaborative-customer-research-to-set-outcome-delivery-incentive-rates-.pdf

3.4.3 The importance of a fair and equitable balance of risk and return for investability

3.53 See Table 3.8 Our assessment of RoRE risk ranges as a result of the amendments we have made to the draft Determination in our Representations below, alongside the RoRE risk ranges from the draft Determination itself.

3.54 The adjustments we have applied in the Representations produce a fairer and more equitable balance of risk.

	Draft Determination		Representations	
	P10	P90	P10	P90
Totex	-2.43	1.19	-2.07	1.15
Retail	-1.29	0.38	-1.17	0.35
Revenue forecasting incentive	-0.01	0	-0.01	0
Financing	-1.85	1.51	-1.79	1.78
ODI's and Mex's	-3.26	-1.5	-1.19	-0.2
PCD	-1.39	-0.43	-1.73	-0.46
Total (simple aggregation)	-10.24	1.14	-7.96	2.62
Total (Monte Carlo)	-7.28	-1.86	-5.19	-0.08

Table 3.8 Our assessment of RoRE risk ranges as a result of the amendments we have made to the draft Determination in our Representations

3.55 In preparing our Representations, we have taken the approach of amending the existing regulatory mechanisms available to improve the balance of risk and return. In doing so, we have adjusted the sharing thresholds on the ASM and Outcomes protections, as well as individual PC and ODI amendments.

3.56 Even with these significant adjustments, the risk and return balance is still heavily skewed to the downside, indicating that the underlying regulatory framework creates a systemic negative bias. We recognise it is not feasible to make fundamental changes to the regulatory methodology for the PR24 Determinations, however we encourage Ofwat to consider adjusting the thresholds on ASM and ODIs to properly protect customers and companies from the consequences of mis-calibrated incentives.

3.57 Despite the adjustments made in the Representations, the result is still a feasible RoRE downside of -5.19% and is not sufficient to enable a fair and equitable balance of risk and return and, on the balance of probability, would not allow an efficient and well performing company to earn a reasonable return.

3.58 We therefore consider further improvements are necessary to the base return to address the issues with investability.

3.5 The impact on investability from cost of capital, gearing, and dividend yield

3.5.1 The importance of not under-estimating the cost of capital

3.59 A key duty of the regulator is setting the allowed return. Setting the cost of capital, (WACC - Weighted Average Cost of Capital) is the primary factor in ensuring that an efficient company can finance its functions. The WACC is therefore a key component of financeability, and the broader concept of investability.

3.60 Based on the information provided by Ofwat in the draft Determination, we are concerned that the calculation of the cost of capital has not taken sufficient account of the weight of evidence provided by companies in the PR24 business plan submission, or indeed the approach taken by the CMA in the PR19 Redeterminations, or that most recently indicated by Ofgem for the energy networks.

3.61 Our draft Determination Representations uses 4.23% as the WACC, this is 57bps higher than the WACC in the draft Determination. This is a prudent estimate based on the results of industry analysis by KMPG, appendix AFW108 - KPMG - Cost of embedded debt, appendix AFW109 - KPMG - cost of new debt, and appendix AFW152 - KPMG - cost of equity show the detailed evidence for the estimation of the constituent parts of the cost of debt and cost of equity. Appendix AFW110 - Economic insight Impact of asset growth on systematic risk contains further analysis on the impact of capital investment on systematic risk.

3.62 Our Representations WACC of 4.23% is broadly consistent with the CMA redetermination from PR19, updated for movements in rates. We have used a data cut off of June 2024 (compared to March 2024 for the draft Determination).

3.63 We have not taken the decision to alter the WACC lightly and this represents a change in our approach from the September 2023 business plan. However, given the extent of the downside risk present in the draft Determinations, we consider it appropriate and necessary to include our updated view of the WACC in the data tables and consequential financeability and financial resilience assessments.

Use of market-based cross-checks

3.64 A key factor in determining the cost of equity is the use of market cross-checks that Ofwat can and should undertake. In particular these include cost of debt inference approaches which show the gap between the cost of debt and cost of equity has narrowed to an unacceptable level [3].

3.65 The recent 17-year bond issue by South West Water, carried a coupon of 6.4% nominal, offering investors this level of return at far lower risk than to water company shareholders, as they are insulated from most of the operational and financial risks raised in the Representations. At the draft Determinations' cost of equity, shareholders are only offered an additional 40bps to take these equity risks, and only 13bps at Ofwat's mid-point estimate. Given historical ranges have typically been 200-400bps [4], a 4.8% allowed equity return is not adequate and contributes significantly to the issues raised in the Representations on investability.

3.66 If Ofwat does not adjust its proposed approach, there is a material risk that the PR24 cost of equity is underestimated. This is likely to adversely affect the investability of a company, since an investor not yet invested or an existing investor looking to commit more capital could not invest, as the investment will be undercompensated. In turn, this would compromise the sector's ability to finance the investment needed to deliver improvements for customers and the environment over AMP8 and beyond.

3.5.2 Base dividend yield

3.67 We have outlined our concerns regarding the cost of equity above, but we also consider that the 4% base yield indicated in the draft Determinations is not appropriate and is not being applied in a manner consistent with corporate finance principles.

3. https://www.affinitywater.co.uk/docs/PR24/Appendices/AFW23.pdf.
4. https://www.affinitywater.co.uk/docs/PR24/Appendices/AFW23.pdf

3.68 Ofwat introduced the concept of the 4% base yield for the notional company for PR14, it being based on an assumed payout ratio of 70% on a 5.65% cost of equity (real). Considering 10 years have elapsed since the estimate, it is no longer plausible to rely on this number as a limiting factor for dividend yield in PR24. More extensive cross checks are required to ensure that the dividend yield available in the UK water sector is competitive when compared to alternative investments propositions in the UK and beyond.

3.69 As outlined in Oxera's report (appendix AFW142 - Water UK investability study), dividend income is a key underpinning of infrastructure investment, by both listed and unlisted investors. In the recent Oxera investor survey, stable dividends are the second highest priority after higher & achievable base returns.

3.70 Analysis shows that current UK listed sector yields are 4.8-6.3%, National Grid is 4.9%, European utilities are 5.0-7.4% and Ofwat allowed 4.8% for Thames Tideway [5]. These levels have been broadly stable over time, and we consider that the 4% set in PR14 is no longer relevant, or indeed helpful in a sector looking to attract significant investment over 2025-2030 and beyond.

3.71 In terms of the application of the 4% base yield, we cannot find any basis in corporate finance theory for holding the dividend yield constant at 4% between notional and actual company. If the notional company can deliver cash dividends which equate to a 4% yield on notional equity, it logically follows that these same cash dividends will produce a different yield when divided by actual equity, where actual equity is different to notional equity.

3.72 Under corporate finance theory it is cashflows that drive dividends, not arbitrary yield percentage applied to different equity bases.

3.73 At a time where the marginal provider of capital is shifting from debt to equity, we consider that the 4% base yield and indeed the 2% minimum yield that Ofwat have employed in the financeability assessment are not set at competitive levels when compared to alternative investment opportunities.

3.5.3 Gearing as a single measure of financial resilience

3.74 The issue of financial resilience has been subject to significant consultation [6] over the last five years, culminating in a formal licence modification in March 2023 to address this very point.

3.75 We are therefore concerned that, despite this extensive process which was concluded only last year, as well as the existence of other regulatory protections to mitigate financial risk, Ofwat has suggested reopening the issue of financial resilience based on gearing in the draft Determinations without any evidence or supporting analysis explaining why the existing measures (including those adopted only last year) are insufficient or why it is now necessary to consider different approaches (particularly as these have previously been ruled out by Ofwat).

3.76 We have set out in full our views on the potential options discussed in the draft Determination in appendix - AFW136 Formal response to Dividend lock up after 70% gearing. We summarise our main concerns below.

3.77 As we have previously set out in the responses to the various consultations since 2021 on this issue, we fundamentally disagree with any approach that uses company gearing as the sole measure of financial resilience.

5. Tideway (2023), Annual report 2022/23', pp. 22 and 65.
6. Discussion Paper on Financial Resilience (Dec 2021), Licence Modification consultation (July 2022), Licence Modification (March 2023)

3.78 Ofwat agreed with this position in 'Financial resilience in the water sector: a discussion paper' (December 2021) [7], which stated that: *there is no single measure of financial resilience. All else equal, high levels of indebtedness (measured as gearing and defined as net debt:RCV) can exacerbate the effects of a financial shock. That said, there are many other factors that are relevant to an assessment of financial resilience, including debt financing costs and the consequences on cashflows of adjustments for service performance.'*

3.79 We reject any notion that 70% gearing (or indeed any specific level of gearing) represents the point at which a company stops being financially resilient. Affinity Water has gearing over 70% and yet, we have strong credit ratings (Class A debt A3/BBB+/BBB+) in line with Ofwat's expectation and over and above that required under our financing requirements. Ofwat's Monitoring Financial Resilience Report 2022-23 shows that in terms of lowest monitored credit rating, as at 31 March 2023, there are **8** companies with lower ratings than Affinity Water.

3.80 We believe that focussing on gearing masks the broader questions that need to be asked about the regulatory role in creating, maintaining or destabilising companies' financial resilience. As economic regulator, Ofwat controls several of the other levers that influence financial resilience including, cost allowances, performance targets, balance of risk and setting the allowed return.

3.81 Gearing headroom is not a suitable mitigation against the inability of a company to meet the demands of its regulatory framework. Debt and equity investors will not invest in a company (regardless of gearing) if they believe that there is a structural gap between its costs and its revenue.

3.82 Under the current system of economic regulation, the role of equity is to support capital investment, equity is not designed to plug structural gaps in financial resilience inherent in the regulatory settlement.

3.83 We are also concerned that sudden requirements to change gearing (with an associated penal cap) risk multiple companies across the sector being forced to de-gear, at a time when large volumes of equity need to be raised to support RCV growth. This is unhelpfully coinciding with circumstances where additional concerns have been identified on investability grounds that put at risk the availability of this new equity. As a result, Ofwat's approach in the draft Determination is intensifying further the significant risk to consumer interests arising from insufficiently addressing investability.

3.84 The uncertainties this approach creates for potential company viability creates a feedback loop in terms of higher risks to raising equity. Taken together, Ofwat is in danger of creating the risk of financial distress, which its financial resilience measures are by their own stated objectives seeking to address.

3.85 Companies' capital structures have been put in place over long periods of time and feature large elements of long-term debt and risk management instruments, which are potentially expensive to alter. The costs, ultimately to consumers, of these measures has been inadequately taken into account by Ofwat.

7. https://www.ofwat.gov.uk/wp-content/uploads/2021/12/Financial-resilience-in-the-water-sector_a-discussion-paper_Updated_9_Dec_2021.pdf

3.5.4 Ofwat's regulatory stability and predictability is weighing on financial resilience

3.86 In order to invest in long-lived assets, with long pay-back periods, investors must have trust and confidence in the regulatory systems that are in place. The concept of a regulatory capital value was introduced as a 'commitment device' to investors that they would be able to recover their capital investments plus a fair return[8].

3.87 Historically, UK economic regulators have scored highly within credit rating agencies' assessments in terms of the stability, predictability and supportiveness of their regulatory frameworks. Moody's revised its view on the stability and predictability of Ofwat's framework from Aaa to Aa in May 2018, resulting in higher guideline financial ratios for water companies at each rating.

3.88 In light of the draft Determination, Moody's has signalled that it is considering revising this further downwards to reflect the less supportive framework for investment: *'The draft determinations create a less supportive framework for the water companies and constrain their ability to earn the allowed return. The regulatory regime's stability and supportiveness, as well as companies' ability to earn a fair return, are key factors under our rating methodology for regulated water utilities. If the draft framework is confirmed at FD, business risk would increase for the sector and we would consider revising our score for either or both of these factors when assessing companies' credit quality. Against this background, companies would need to strengthen their credit ratios to maintain their current credit quality.*[9]'

3.89 Companies are now dealing with difficult circumstances (outside of their control) which cannot easily be managed. The regulatory approach sets the cost of equity, the cost of debt and tests notional financeability based on conditions that are becoming increasingly unachievable in the real world.

3.90 To give an example, recent debt issuances in the sector have failed to meet or better the iboxx less 15bps allowance which was set at PR19. For example; a recent Severn Trent bond was c.45bps wide of spot iboxx.

3.91 This increase in the actual cost of debt issuances has implications for equity funding in two ways. First, equity investors will not want to invest if an element of the equity is essentially plugging the gap between the allowed cost of debt and the actual cost of debt achievable, and second, as already discussed above, the uplift in return for taking increasing equity risk is diminishing when compared to rising debt returns.

3.92 If Moody's chooses to downgrade the predictability and stability of the regulatory framework at final Determination, which is a real possibility, a company will have to reduce its financial risk to offset the increase in business risk if it wants to maintain its credit rating. The regulator will essentially be asking equity investors to pay to reduce financial risk to offset the increased business risk caused by less stable and less predictable regulation.

3.93 At a time where we need predictable and stable regulation to secure equity funding for investment, we are concerned that the draft Determination is undermining water companies' ability to achieve this, and could deter equity investment completely.

3.94 Finally, we note that Ofwat assess notional financeability against credit rating metrics that rely on a stable regulatory environment, whilst it is simultaneously creating conditions that could lead to a downgrade of the predictability and stability of the regulatory environment. This is clearly an untenable position which must be resolved in the final Determination.

8. Stern, J. (2014), 'The Role of the Regulatory Asset Base as an Instrument of Regulatory Commitment', European Networks Law and Regulation Quarterly, 2:1, pp. 15-27

9. Moody's (2024), 'Regulated Water Utilities—UK: Ofwat's draft determination increases sector risk', 14 August

3.6 The consequences of the draft Determination on our capital structure and financial resilience

3.6.1 Necessary conditions to support equity

3.95 Consistent with our September 2023 business plan, our priority is to have a capital structure which supports investment for customers, provides financial headroom and maintains our strong credit ratings.

3.96 As outlined above and in the Board Assurance statement, our draft Determination Representations does not include the previously indicated £150m equity injection in year 1 (2025 - 2026). We have simultaneously reduced dividends from the appointee business in order to support the investment and demonstrate a gearing level consistent with maintaining our strong credit ratings and providing appropriate levels of financial resilience.

3.97 While the draft Determination Representations' removal of the equity and restriction of dividends still results in a financially resilient company, it is a sub-optimal outcome, caused by the regulator failing to create an investment proposition capable of attracting equity.

3.98 Despite this sub-optimal position, Affinity Water is still able to meet our priorities to support investment for customers, provide financial headroom and, consequentially, maintain our strong credit ratings without the planned equity injection.

3.99 The Board and Affinity Water shareholders remain committed to supporting the financial resilience of the company and consider that additional equity into the company, alongside appropriate levels of base returns and a fair balance of risk and return, provide the best outcomes for customers. The dividends proposed in the September 2023 business plan created an in-year equity buffer, which would strengthen financial resilience as they could be used to mitigate risks if they materialised in the AMP period.

3.100 Our draft Determination Representations sets out the adjustments required to ensure that it is a suitable investment proposition capable of attracting equity. If these issues are addressed in the Final Determination, it is still possible, and desirable, that equity will be forthcoming.

3.6.2 Implications for financial resilience

3.101 Our September 2023 business plan was supported by independent assurance on the ability of our plan and proposed capital structure to withstand the financial impact of downside scenarios and in essence, be financially resilient.

3.102 We have re-assessed financial resilience in the context of the draft Determination and our draft Determination Representations under our proposed capital structure. The results are shown in Table 3.9 Base case credit rating.

Base case credit rating	Actual company	Appointee
Draft Determination	Baa1/BBB+	Baa1/BBB+
Representations	Baa1/BBB+	Baa1/BBB+

Table 3.9 Base case credit rating

3.103 We do however note with concern that the ability to maintain Baa1 Moody's rating is dependent on Moody's maintaining the AA rating for stability and predictability of the regulatory environment (which will depend on the approach adopted by Ofwat at final Determinations)

Is the structure financially resilient?	Actual company	Appointee
Draft Determination	Yes	Yes
Representations	Yes	Yes

Table 3.10

3.104 We are able to pass Moody's metrics to maintain investment grade rating. In some downside scenarios relating to large spikes in inflations, the S&P FFO/net debt metric drops below the 5% level which is consistent with minimum investment grade BBB-. We have considered this in partnership with our external advisors and take comfort from the following points:

a. Based on our previous experience and indeed consistent with our current performance against this metric, we consider that isolated poor performance against the FFO/net debt metric is unlikely to lead to a downgrade below investment grade in cases where high inflation is the driver of poor performance. During the high inflationary period in 2022 and 2023 the FFO/net debt performance for the sector deteriorated significantly, in many cases below the implied threshold for BBB- but this has not led to rating downgrades below investment grade;

b. The downside scenario modelling excludes the impact of any potential management mitigations to offset or partially offset the deterioration of this credit metric.

3.105 The Representations are more financially resilient than the draft Determination on a pure ratios assessment. This is further enhanced by the sensible and proportionate risk mitigations we have included in the Representations.

3.106 Despite the removal of the equity support in the Representations as a direct consequence of the draft Determination, Affinity Water is still financially resilient and able to withstand the financial impact of downside scenarios in the Representations.

3.107 However, we note that when compared to our previous capital structure which included equity and dividends, the dividends proposed in our September 2023 business plan created an in-year equity buffer, which could be used to mitigate risks if they materialised in the AMP period. This demonstrates the importance of appropriately calibrating the risk and return balance around fair base returns to create the regulatory environment necessary to support financial resilience.
Full assessment of the financial resilience of the draft Determination Representations carried out by Centrus is contained in appendix AFW143 - Centrus report.

3.6.3 The importance of assessing investability for final Determinations

3.108 Our draft Determination Representations sets out the conditions needed to ensure that it is a suitable investment proposition capable of attracting equity. If the issues created in the draft Determinations around risk and return, base returns and a more stable regulatory environment are addressed in the Final Determination, it is still possible, and desirable, that equity will be forthcoming.

3.109 The existing process in which the regulator considers debt financeability in the notional world is no longer fit for purpose. Efforts must be made to properly consider and assess real world equity financeability/Investability. This has been the subject of a detailed report commissioned by Water UK on Investability (appendix AFW142 - Water UK investability study). We encourage Ofwat to consider this in full.

3.110 As outlined above, while Affinity Water passes the current narrow definition of financeability on a debt basis, we do not consider this is a sufficient or appropriate test for equity. On that basis, the Affinity Water Board has not provided assurance on the wider financeability of the company.

3.111 PR24 is a bellwether price review for the water sector and as things stand, there is a material risk under Ofwat's approach in the draft Determination that the sector will be unable to raise the new equity capital required to finance the proposed investment programme for AMP8 and beyond, which will not enable the planned service improvement for customers and enhanced environmental outcomes.

04. Costs

4.1 Costs summary

Our September 2023 business plan submission

In our plan we set out the investments required to meet the legal obligations we have, and to maintain resilient services. Our plan comprised 93% mandatory investment, as a result of an ambitious WRMP needed to bring water from other areas into our region, and a WINEP driven by environmental ambition to reduce unsustainable abstraction and create resilient chalk stream catchments. The plan was costed using efficient out turn costs that we have benchmarked and assured by AtkinsRéalis. Our plan was developed based on customer and stakeholder requirements and was tested at various points to ensure we were completely aligned with our customers priorities.

Ofwat's draft Determination

Ofwat's Determination set out Base allowances 8% and Enhancement allowances 26% below our plan. Ofwat applied a 1% frontier efficiency shift.

Our representation

We set out Representations for the costs area in the following sections within this chapter:

4.2 Enhancement investment - we have accepted all of Ofwat's shallow dive challenges. We make representations in four key areas assessed by deep dives: WRMP interconnectors, Water Framework Directive WINEP, raw water deterioration and smart metering. We include an additional £149.1m investment for PFAS removal as a result of new DWI requirements, and an uncertainty mechanism to deal with anticipated future additional investment requirements.

4.3 Base investment - we outline our concerns with the mechanism Ofwat has used for energy price true-ups, and include a proposal to revisit Ofwat's treatment complexity in base models given the new PFAS requirements.

4.4 Retail investment - we provide evidence that existing retail allowances are already sufficiently stretching.

4.5 Cost Adjustment Claims - we confirm we are not including any cost adjustment claims in our Representation.

4.6 Efficiency and real price effects - we retain our business plan assessment of frontier shift of 0.5%.

4.7 PCDs - we set out our concerns over the introduction of PCDs on base, the overall effect of PCDs on RoRE risk, and a number of scheme specific responses to Ofwats draft Determination.

4.2 Enhancement investment

Enhancement summary

4.1 We welcome Ofwat's move to increasingly comparative cost assessment as a way to protect customers from inefficient costs, particularly in a situation of increasing scale and uncertainty within Enhancement programmes. Recognising this, we have accepted cost challenges applied by Ofwat wherever these do not represent a material risk to the outcomes we have committed to delivering for customers within our September 2023 business plan submission and Long-Term Delivery Strategy. We have accepted Ofwat's proposed costs within 31 of the 45 assessments, on the basis we can still deliver required outcomes provided other material issues are addressed.

4.2 There are a number of key areas where accepting these cost challenges does represent a risk to these outcomes. Ofwat has, in some instances, used overly simplistic or superficial approaches to assessing costs, for example failing to account for material exogenous factors within the comparative benchmark or modelled approaches. For deep dive assessments, it is clear that further clarification is required in some areas before an appropriate assessment of costs can be undertaken. This is understandable given the more limited two-way engagement between Ofwat and companies prior to draft Determinations, compared to previous price controls, and we have provided this additional evidence in all instances.

4.3 As a result, the allowances for Enhancement expenditure in the draft Determination leave statutory obligations and key outcomes for our customers undeliverable, risking the long-term resilience of our services.

4.4 Over the following pages we detail our Representations to Ofwat cost assessments, laying out our specific concerns and proposed remedies for the Ofwat cost assessment approach and providing additional clarifications and evidence as aligned to Ofwat's assessment approaches.

4.5 Note that all numbers shown within this chapter are **post frontier shift and real price effects**. Given the deviation of these factors between this draft Determination and our Representation, scheme specific costs will not align where we have accepted the scheme specific allowance from Ofwat.

Business case / programme	Schemes / CBA sheets	% Challenge[1]	Ofwat cost assessment approach	Our Representation plan
Electric Vehicles	Electric Vehicles	-100%	N/A	Accept
Biodiversity	WINEP – Biodiversity schemes	-8%	Shallow Dive	Accept
Thames Fish Passage Improvements	Thames Fish Passage Improvements	-9%	Shallow Dive	Accept
WINEP Investigations (Simple)	Walton Fish Screens and Biodiversity Investigations	-39%	Modelled	Accept
WINEP Water resources Investigations (Complex)	All WINEP Water resources Investigations	-51%	Modelled	Represent 4.2.3 WINEP Water Resources Investigations (complex)
WINEP - Drinking water protected areas	Water protected areas - Catchment management - Karstic groundwater	-8%	Shallow Dive	Accept
	Water protected areas - Lower Thames and Wey	-8%	Shallow Dive	Accept
WINEP - River restoration and Catchment management	All catchment & river restoration schemes	-40%	Deep Dive	Represent 4.2.2 WINEP - C&NBS (River Restoration and Catchment Management)
WINEP - Sustainability Reductions	All sustainability reduction schemes	-40%	Deep Dive	Represent 4.2.1 WINEP - Sustainability Reductions
WRMP - Major Projects	WRMP - HS2 Non-SESRO	52%	Modelled	Accept
	WRMP - SESRO	-17%	Deep Dive & Benchmarking	Represent 4.2.4 WRMP - Major Projects/ SROs
	WRMP - GUC	34%	Deep Dive & Benchmarking	Accept
	WRMP - T2AT	-2%	Deep Dive & Benchmarking	Accept
	WRMP - Tappington South	-100%	Deep Dive	Accept
	WRMP - Minworth	30%	Deep Dive & Benchmarking	Accept
Smart metering/Demand Management	WRMP - Smart metering	-61%	Modelled	Represent 4.2.5 Smart metering/Demand management
	WRMP - Smart metering enabled demand management	21%	Modelled	Accept
	WRMP - Demand management (Behaviour change)	21%	Modelled	Accept

Business case / programme	Schemes / CBA sheets	% Challenge[1]	Ofwat cost assessment approach	Our Representation plan
WRMP Interconnectors	Connect 2050 - Transfer water from Egham to Harefield inc. BPS upgrade	-41%	Modelled	Represent 4.2.6 Connect 2050 - Interconnectors
	Connect 2050 - Grove Park link BS (Grove Licence increase)	-45%	Modelled	Accept
	Connect 2050 - Increase DO Egham/Chertsey/Walton	-41%	Modelled	Represent 4.2.6 Connect 2050 - Interconnectors
	Connect 2050 - Midway North BPS upgrade	-60%	Modelled	Accept
Resilience	Connect 2050 - Hadham Mill 20 Ml cells	-23%	Deep Dive	Represent 4.2.7 Connect 2050 - Resilience
	Connect 2050 - Hills 10Ml Cell	-23%	Deep Dive	Represent 4.2.7 Connect 2050 - Resilience
	Network Calming - Smart valves for all DMA boundary valves	-100%	Deep Dive	Accept
	Network Calming - Pressure management optimisation	-100%	Deep Dive	Accept
	Network Calming - Permanent trunk main transient monitoring	-100%	Deep Dive	Accept
	Flood Alleviation - Flooding	-100%	Deep Dive	Accept
	Single points of failure	-100%	Deep Dive	Accept
	Resilience industry uplift	Additional Allowance	Modelled	Accept
SEMD	SEMD - Emergency planning	-67%	Deep Dive	Represent 4.2.8 SEMD - Emergency planning
	SEMD - Physical security	-18%	Deep Dive	Represent 4.2.9 SEMD - Physical security
	SEMD - Cyber security	-8%	Shallow Dive	Accept
Raw Water Deterioration	Surface works - Iver Crypto (DWI)	-42%	Deep Dive	Represent 4.2.10 Raw water deterioration
	Surface works - Egham (DWI)	-42%	Deep Dive	Represent 4.2.10 Raw water deterioration
	PFAS - Wheathampstead	-8%	Shallow Dive	Accept
	PFAS - Bowring & Baldock Road	-8%	Shallow Dive	Accept

Business case / programme	Schemes / CBA sheets	% Challenge[1]	Ofwat cost assessment approach	Our Representation plan
	PFAS - Blackford	-22%	Deep Dive	Represent 4.2.10 Raw water deterioration
	PFAS - Holywell	-8%	Shallow Dive	Accept
	PFAS - Ardleigh	-8%	Shallow Dive	Accept
	Stortford resilience	-7%	Shallow Dive	Accept
	Nitrates - Broome	23%	Modelled	Accept
	Nitrates - Kingsdown	21%	Modelled	Accept
Lead pipe replacements	Lead pipe replacements	51%	Modelled	Accept
Leakage	Leakage (Base reallocation)	+	Modelled	Accept

Table 4.1 Enhancement summary

1 of draft Determination vs September 2023 Submission

Accepted adjustments

4.6 Note that all numbers shown within this chapter are **post frontier shift and real price effects**. Given the deviation of these factors between this draft Determination and our Representation, scheme specific costs will not align where we have accepted the scheme specific allowance from Ofwat.

Business Case / Programme	Schemes	Sept 2023 submission	Draft Determination	Our Representation plan
		Totex (£m)	Totex (£m)	Totex (£m)
Biodiversity	WINEP – Biodiversity	8.05	7.36	7.63
Thames Fish Passage improvements	Thames Fish Passage improvements	0.49	0.44	0.46
WINEP – Drinking water protected areas	Water protected areas - Catchment management - Karstic groundwater	1.52	1.39	1.45
	Water protected areas - Lower Thames and Wey	1.92	1.75	1.82
SEMD	Cyber Security	6.12	5.56	5.81
Raw Water Deterioration	PFAS - Wheathampstead	0.49	0.45	0.47
	PFAS – Bowring & Baldock	6.97	6.37	6.62
	PFAS - Ardleigh	0.65	0.60	0.62
	Stortford Resilience	1.97	1.82	1.88
	PFAS - Holywell	1.30	1.19	1.23

Table 4.2 Accepted shallow dive scheme adjustments

4.7 We stand by the appropriateness of the costs put forward within our September 2023 business plan submission and the robustness of our approach. However, the shallow dive cost challenge does not represent a material risk to the outcomes for our customers when taken in the round of our total Enhancement allowances, provided more material concerns are addressed. We have therefore accepted this cost challenge and have reflected this within our Representation.

Net zero - Electric vehicles

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Electric vehicles	4.31	0	0

Table 4.3 Net Zero - Electric Vehicles scheme adjustments

4.8 PCD - No PCD has been applied by Ofwat to this scheme as no funding allowance was made at draft Determination.

4.9 Ofwat has not funded this net zero scheme directly, stating both, "This scheme is therefore clear enhancement, driven primarily by net zero" whilst also stating that this activity, "Should continue to be funded by base allowance" within the Phase 1 assessment of the Net Zero feeder model.

4.10 A Net Zero Base cost adjustment has been made, providing Affinity with a further £1.05m of Base allowance (post frontier shift and real price effects), citing electric vehicle and charging points as examples of the expected use of this expenditure [10].

10. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Expenditure-allowances-to-upload.pdf page 44

4.11 We strongly refute that these costs are appropriately funded within the Base allowance and are concerned by the inconsistency and unjustified net reduction of funding for this scheme, particularly given the corresponding adjustments made to the Operational Greenhouse Gas (GHG) Performance Commitment Level (PCL). The costs included within this case are only those additional costs associated with the Electric vehicles (EV) transition i.e. those demonstratively above the costs of our existing fleet.

4.12 However, given the comparatively small net reduction when compared to wider allowances, this cost challenge does not directly represent a material risk to the outcomes (i.e the CO_2 benefit) associated with the scheme, provided more material concerns within Base and Enhancement cost allowances are addressed. We therefore accept this cost reduction within the Enhancement cost allowances, and will use the entire Base cost adjustment allowance to partially fund this new investment.

WINEP Investigations (simple)

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
WINEP Investigations (simple)	1.94	1.18	1.23

Table 4.4 WINEP Investigations (simple) scheme adjustments

4.13 PCD - No PCD has been applied by Ofwat to this scheme as the value at draft Determination does not meet the materiality threshold.

4.14 This suite of investigations included the Walton Fish Screens and our Biodiversity investigations with the following drivers; Eels, sites of special scientific interest (SSSI), Natural Environment and Rural Communities Act (NERC) and Invasive Non Native Species (INNS). These were included under the WINEP investigations survey, monitoring or simple modelling within the data tables and includes six schemes.

4.15 We stand by the efficiency of the costs put forward within our September 2023 business plan submission and the robustness of our approach. However, this challenge does not represent a material risk to the outcomes for our customers when taken in the round of our total Enhancement allowances, provided more material concerns laid out in this chapter are addressed. We have therefore accepted this cost challenge and have reflected this within our Representation.

Leakage

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Leakage	0	19.08	22.98

Table 4.5 Leakage scheme adjustments

4.16 We welcome Ofwat's policy of funding all leakage reductions beyond PR19 levels through Enhancement, rather than expecting significant performance improvements through Base as in PR19 [11]. The recognition of the link between costs and outcomes will reduce necessity for short-term solutions, providing significant benefit to future customers.

11. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Expenditure-allowances-to-upload.pdf page 102

4.17 The use of a median unit rate is not materially different from our expected expenditure. However, we note that the total leakage improvement not funded through other Enhancement areas does not account for our network calming case, having been reallocated to Base allowances, along with 3.4 Ml/d of leakage benefit. Having accepted this reallocation within our Representation, we have adjusted costs within our Representation accordingly, in line with the modelled approach laid out within the draft Determination.

Other accepted adjustments from modelled approaches

Business case/programme	Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
		Totex (£m)	Totex (£m)	Totex (£m)
Smart metering/Demand management	WRMP - Smart metering enabled demand management	10.30	12.35	12.88
	WRMP - Demand management (Behaviour change)	11.00	13.20	13.75
Raw Water Deterioration	Nitrates – Broome	5.37	6.14	6.40
	Nitrates - Kingsdown	4.48	6.20	6.42
Lead pipe replacements	Lead pipe replacements	4.00	5.99	6.26

Table 4.6 Accepted modelled schemes adjustments

4.18 We accept the above scheme adjustments resulting from Ofwat modelled approaches.

4.19 PCD - We note that a number of these schemes attract PCDs.

- we are not providing Representations on the draft Determination approach to use Ml/d as the metric to measure successful delivery of the demand management schemes
- we are not providing Representations on the draft Determination approach to use completion of DWI legal instruments as the metric to measure successful delivery of the SEMD schemes
- we understand the rationale set out by Ofwat in the draft Determination to use completion of DWI legal instruments as the metric by which to measure successful delivery of these schemes. However, it is not appropriate to include the Undertakings for lead and PFAS strategies as two additional PCDs. The works proposed for delivery in 2025 - 2030 from within both these strategies have already been included in specific Enhancement expenditure business cases or are being submitted as part of our draft Determination response, attracting regular oversight from the Drinking Water Inspectorate (DWI). There is no additional customer benefit to be gained from also applying penalties to, and requiring monitoring of, the strategies themselves. Indeed, Ofwat came to the same conclusions when considering bespoke performance commitments in PR14 and PR19, so it is not clear why this approach is now necessary in the PCD framework.

Resilience

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Single points of failure	5.14	0.00	0.00
Flood alleviation	1.06	0.00	0.00
Climate change mitigation through network calming	8.78	0.00	0.00
Resilience industry uplift	0.00	8.07	8.45

Table 4.7 Resilience scheme adjustments

4.20 We recognise that climate change poses significant and similar challenges to all companies and support the rationale of an industry wide uplift of 0.7% of modelled allowances to prioritise the management of the biggest climate change risks. We therefore accept the adjustments made to the above resilience investments.

4.21 We provide specific details on which schemes will be delivered through this funding within appendix AFW140 - Outline cases for support of the £8m allowance for climate change adaption.

Representations on schemes

Cross cutting themes

4.22 Across our Representations for Enhancement costs, there are several recurring themes based on the cost assessments undertaken and evidence required to address the points raised. We summarise these below.

Base overlap

4.23 In several instances of Ofwat deep dive assessments, cost challenges have been applied for perceived overlap with Base expenditure allowances. In these instances, we have provided more granular breakdowns of expenditure relating to the scheme across both Base and Enhancement. We have applied the Ofwat definitions of Base and Enhancement expenditure as laid out in appendix 9 : Setting expenditure allowances of the PR24 final methodology, namely[12] :

4.24 *"Base expenditure includes:*

- *routine, year-on-year costs, which companies incur in the normal running of their businesses to provide a base level of good service to customers and the environment;*
- *expenditure on maintaining the long-term capability of assets;*
- *expenditure to improve efficiency; and*
- *expenditure to comply with current legal obligations.*

4.25 *Whereas Enhancement expenditure includes:*

- *Enhancement expenditure is generally where there is a permanent increase or step change in the current level of service to a new 'Base' level and/or the provision to new customers of the current service level.*
- *Enhancement funding can be for environmental improvements required to meet new statutory obligations, improving service quality and resilience, and providing new solutions for water provision in drought conditions."*

Existing and new evidence

4.26 Much of the evidence put forward within our Representations on Enhancement costs is existing evidence prepared prior to the September 2023 submission, for which we are clarifying or providing significantly more detail than within our original submission to better inform the final Determination assessment.

4.27 There are specific instances where we present wholly new evidence, either to address a specific nature of the cost assessment approach or as pertinent information has come to light since submission, for example the outcomes of procurement exercises for smart metering.

4.28 In Table 4.8 Evidence and rationale below, we provide a summary of the new evidence included and the rationale for its inclusion within this Representation.

Investment area	Evidence	Rationale for inclusion
Sustainability Reductions (WINEP WFD) Iver, Egham & Blackford water quality schemes (Raw Water Deterioration)	AtkinsRéalis third party assurance of costs	To provide additional evidence of the external benchmarking of costs already included from Mott MacDonald and Aqua Consultants for these schemes
Smart metering	Smart metering procurement results	To provide the latest market data within an area of relatively high cost uncertainty

12. https://www.ofwat.gov.uk/wp-content/uploads/2022/12/PR24_final_methodology_Appendix_9_Setting_Expenditure_Allowances.pdf page 4

Investment area	Evidence	Rationale for inclusion
WRMP – Interconnectors Smart metering WINEP - Investigations	Analysis of Ofwat modelled approaches	To provide specific responses to consultation questions and evidence representation in the context of the modelled assessment
SESRO (WRMP major schemes)	Additional scope for SESRO reservoir, aligned with Thames Water adjustment	To provide additional evidence to explain changes in proposed scheme costs
Grand Union Canal (WRMP major schemes)	Additional scope for GUC, representing a significant long-term spend to save opportunity	To provide additional evidence to explain changes in proposed scheme costs

Table 4.8 Evidence and rationale

4.2.1 WINEP - Sustainability Reductions

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
WINEP- Sustainability Reductions	125.35	74.68	125.35

Table 4.9 WINEP - Sustainability Reductions scheme adjustments

Our Representation

4.29 We do not agree with Ofwat's 38.1% overall reduction in allowed expenditure for this business case, resulting from a 20% challenge on need, 10% challenge on options and 8% on cost efficiency. We provide the evidence, summarised from our plan, on which Ofwat's challenges are based.

4.30 The proposed allowances for these schemes are materially less than the required costs to implement the abstraction reductions agreed with the Environment Agency within our Water Resources Management Plan and in line with our environmental destination strategy. These schemes are essential for providing resilient supplies to those customers currently being supplied by those sources where abstraction will be reduced or ceased. Our investment process has ensured we put forward the best option for customers at efficient costs, with base overlap appropriately accounted for. As a result, reduced allowances directly risk customer supplies and/or meeting our statutory obligations.

4.31 Ofwat has assessed our Sustainability Reductions business case and our catchment & nature-based solutions (catchment management and river restoration) business cases together within a single deep dive assessment. These are distinct programmes of work, with one investing in built infrastructure to enable abstraction reductions and another directly enhancing rivers and catchments of our region. The use of a single assessment has caused the application of cost challenges on programmes due to concerns raised on others that are wholly unrelated. We therefore consider that Ofwat will need to undertake separate assessments on these two distinct cases ahead of final Determination to ensure that the efficient costs for each are appropriately understood and applied.

4.32 We are also concerned by the lack of transparency and apparent inconsistency in Ofwat's assessment for this business case. The deep dive assessment of this case is in direct contradiction, and has a marked discrepancy with, Ofwat's own models which;

a. demonstrated that our sustainability reductions costs are efficient, and
b. would have allowed considerably more expenditure had the modelled costs been applied.

4.33 The contradiction and marked discrepancy between the two different assessment methods makes it opaque as to how Ofwat arrived at the decisions in the draft Determination for these interventions, and for the related Connect 2050 interconnectors schemes. It is not clear what the basis is for this inconsistent and selective application of the interconnector models to interconnector expenditure in sustainability reductions and Connect 2050 cases.

4.34 We refer to the supporting technical evidence, Assessment of Ofwat's supply interconnector analysis by Oxera, included within appendix AFW103 - Connect 2050 supply interconnector modelling critique which analyses the construction and application of the models and proposes corrections to address these shortcomings in order to provide a robust and transparent process for setting credible expenditure allowances.

4.35 PCD - We are not providing representations on the draft Determination approach to use km mains delivered as the metric to measure successful delivery of the sustainability reductions interconnectors schemes.

Summary of evidence

Need for enhancement investment

Ofwats Enhancement assessment criteria grouping	Assessent comments	Criteria decision	% adjustment
Need for enhancement investment	The investment partly meets the criteria for enhancement investment and additional customer funding. The proposed investment is consistent with the company's water industry national environment programme (WINEP) schemes. • The company does not provide sufficient and convincing evidence that there are no water framework directive (WFD) activity overlaps with base allowances and previously funded enhancement schemes. The company sets out in its technical annex for the Connect 2050 (umbrella name for the schemes being proposed to meet its WRMP and agreed sustainability reduction (WINEP) requirements) how the strategic level assessment was carried out using an approach that aimed to address both the WRMP24 needs, as well as the requirements relating to the WINEP. The company illustrates its optioneering process which involves the application of network constraints in modelling for the identification and selection of final solutions. This indicates that the current constraints have been incorporated into the problem statement (modelling) the company seeks to address. Therefore, the company does not provide any evidence that applying existing operational constraints does not create overlaps with base expenditure. • The company further states that a water supply systems-based approach has been taken to identify the preferred options and therefore whilst it has separated out costs and apportioned these against individual sources, there are multiple interdependencies of schemes. Affinity Water states that the costs are only those additional as a result of the sustainability reductions i.e. the installation of additional assets that otherwise would not be required. For the Connect 2050 project it says there is no overlap of projected improvements with previously funded investments under the company's Supply 2040 programme or any other programmes, but it is unclear if this is the case because the company fails to provide sufficient and convincing evidence that there are no overlaps. Therefore, the company does not provide sufficient and convincing evidence that there are no overlaps with activities funded through base costs (such as maintenance/operational activities)	Partial pass	20%

Table 4.10 Ofwat's deep dive assessment of the need for WINEP - Sustainability

4.36 We do not agree with the 20% adjustment that Ofwat has made on the basis of need. The adjustment is based on the application of incorrect assumptions that a) proposed expenditure interacts materially with existing assets and b) that existing network constraints are affecting current service performance.

4.37 Our network has a current configuration and capacity which has to date been sufficient to deliver the required level of service to meet existing demands. There is now a step change in the configuration and capacity of our assets needed to meet our supply/demand balance while accommodating new obligations such as sustainability reductions. The inclusion of existing network constraints in modelling is not an indication of overlap with Base, rather a fundamental requirement of any such modelling approach to ensure the solution will deliver the required outcome for customers and the environment.

4.38 These Enhancement drivers result in a need to invest in additional assets, rather than upsizing existing assets or revisiting assets previously receiving Enhancement expenditure for this purpose.

4.39 There is no overlap with previous expenditure, nor a material overlap with Base expenditure. We have analysed at the asset level where existing assets are being impinged by this expenditure and have shown that a very small proportion (£98.738k) of the overall £124.430m SR investment (less than 0.08%) results from advanced capital maintenance.

4.40 We provide evidence on these points against need, options and cost efficiency below.

Clarification of the need

4.41 At present, we have sufficient water available for use (WAFU) and acceptable headroom to supply our customers. However, this target headroom will erode over the coming years due to various factors, severely impacting certain Water Resource Zones (WRZs). In the short-term (by 2030), this erosion will cause several WRZs to fall into a headroom deficit without intervention.

4.42 Factors contributing to this include the implementation of sustainability reductions (abstraction reductions) in line with our environmental destination, supported by the Environment Agency and identified as being required to contribute towards meeting Water Framework Directive objectives of Good Ecological Status/Potential. These reductions will reduce the available deployable output (DO) in our Central region as we work to protect our chalk streams.

4.43 Additionally, significant population growth will further stress the remaining DO. In the long-term, this deficit will be exacerbated if no interventions are implemented, as we experience further impacts of population growth and climate change on our local environment.

4.44 To ensure we can provide our customers with clean and safe water while protecting our precious local environment through the Sustainability Reduction programme, we have taken a systems-based approach and designed our Connect 2050 programme, within which our Sustainability reduction expenditure will be delivered. This approach considers all of the relevant needs and requirements of our water supply system simultaneously and finds the optimum solutions at a system-level, as opposed to meeting each need in isolation. In doing so, we can be confident that the best options for customers have been put forward.

4.45 The Connect 2050 programme is the latest iteration of our long-term planning to ensure we can meet customer demand across our region whilst delivering sustainability reductions, acting as a joining thread between WINEP, WRMP and other long-term planning. Connect 2050, builds on the plans and investments within Supply 2040, the previous iteration for the period 2015- 2025 Regional schematic of AMP7 Supply 2040 and Regional schematic of AMP8 SR and AMP8 Connect 2050 Interconnector interventions lay out the investments made to date under Supply 2040 and those planned under Connect 2050.

4.46 See Table 4.11 Overall connect 2050 programme interventions for the interventions in this programme.

Scheme driver	Project name	Project descriptor
WRMP- 4 Projects £73.58M	Egham to Iver	Transfer
	Stanwell Moor upgrade	Transfer
	Grove park link	Transfer
	DO increase Wey	Treatment
WINEP Sustainability reductions – 10 Projects £129.06M	Ickenham to Harrow	Transfer
	Heronsgate to Bovingdon	Transfer
	Licence Reliability (zone affected by SRs)	Treatment / Abstraction / Pumps
	Blackford treatment (Turbidity)	Treatment
	50% Hadham Mill Additional Storage	Storage
	Local Mitigation to Sustainability Reduction: • Markyate BPS • Maintain resilience for 4 licence cessations (Codicote, Redbourne, Kensworth Lynch and Kings Walden)	Transfer
Resilience 2 Projects £13.72M	Hills Additional Storage	Storage
	50% Hadham Mill Additional Storage	Storage

Table 4.11 Overall connect 2050 programme interventions

2020 - 2025 and 2025 - 2030 scope overlap

4.47 In this section, we address Ofwat's assessment that there is overlap with expenditure allowed in previous periods.

4.48 Table 4.12 Summary of 2020 - 2025 and 2025 - 2030 sustainability reductions show the sources subject to Sustainability reductions during 2020 - 2025 and the sources identified for sustainability reductions during 2025 - 2030.

4.49 Only the Amersham source is identified for further reductions in 2025 - 2030, the other sites are subject to reductions for the first time in 2025-2030 with the exception of Great Missenden (AMP2) and Piccotts End which was subject to a reduction in 2015 - 2020.

2020 - 2025 Sources	2025 - 2030 Sources[1]	2025-2030 ADO Sources
Amersham	Amersham	The Grove
Chartridge	Berkhamsted	Blackford
Chesham	Causeway	Northmoor
Holywell	Chalfont St Giles	West Hyde
Mud Lane	Codicote	
Digswell	Crescent Road	
Periwinkle Lane	Gerrards Cross	
Runleywood Chalk	Gt Missenden	
Brett Group	Hare Street	
Newport	Kensworth Lynch	
	Kings Walden	

2020 - 2025 Sources	2025 - 2030 Sources[1]	2025-2030 ADO Sources
	Marlowes	
	North Mymms	
	Piccotts End	
	Porthill	
	Redbourn	
	Sacombe	
	Standon	
	Waterhall	

Table 4.12 Summary of 2020 - 2025 and 2025 - 2030 sustainability reductions

1 Note: Amersham and Newport 2025 - 2030 reductions are new, and are additional reductions to those required in 2020 -2025

4.50 The 2020 - 2025 reductions in output from the Amersham site did not require any local site-specific works and were achieved by the implementation of the 2020 - 2025 schemes detailed in Table 4.13 Summary of 2020 - 2025 and 2025 - 2030 sustainability reduction schemes below.

4.51 The 2020 - 2025 network schemes detailed in Table 4.13 Summary of 2020 - 2025 and 2025 - 2030 sustainability reduction schemes enabled moving of water into the area sufficiently to meet the 2020 - 2025 deficit, but are not sufficient to meet the 2025 - 2030+ deficit. In addition, the 2020 - 2025 reductions were relatively small so that existing on-site assets were able to still meet the changed flow rates without significant impact or new investment.

4.52 The increased abstraction reductions in 2025 - 2030 are shown by modelling to require further new network interventions (separate and additional to that delivered in 2020 - 2025) and to also impact the performance of the on-site assets.

2020 - 2025 sustainability reduction scheme	2025 - 2030 sustainability reduction schemes (Excluding specific works)
Heronsgate to Bovingdon reinforcement	Ickenham to Harrow trunk main and new booster pumping station
Berkhamsted/Kingshill resilience scheme	Heronsgate to Bovingdon trunk main and new booster pumping station
Cholesbury service reservoir chlorination plant	Kings Walden resilience
Hunton Bridge iron removal treatment scheme	Codicote resilience
New St Albans import main	Redbourn resilience
Stonecross GAC	Kensworth Lynch resilience
New booster at Oxhey Woods reservoir	
PRV into DMA 6419	Blackford Group treatment works
Digswell treatment and pumps	Hadham Mill 10Ml storage
Blackfan Road booster related PRV installations	
Nomansland Run to waste	
Blackfan Road to Sherrardswood trunk main	
Bulls Green reservoir new cell	
Beech Road reservoir reconfiguration	

2020 - 2025 sustainability reduction scheme	2025 - 2030 sustainability reduction schemes (Excluding specific works)
Preston reservoir PRV	
Letchworth to Royston reinforcement	
Ivel River support scheme	
Ickenham booster pumps upgrade	
Ickenham to Hillside Road trunk main	
Uttlesford Bridge turbidity treatment and pump upgrade	

Table 4.13 Summary of 2020 - 2025 and 2025 - 2030 sustainability reduction schemes

4.53 While having a similar name, the Heronsgate to Bovingdon Reinforcement 2020 - 2025 scheme is an entirely distinct scheme from the 2025 - 2030 Heronsgate to Bovingdon trunk main and booster pumping station scheme.

4.54 The 2020 - 2025 Heronsgate to Bovingdon Reinforcement consisted of localised sections of mains reinforcement within the existing network. The 2025 - 2030 Heronsgate to Bovingdon trunk main and booster pumping station schemes comprise an all new, additional strategic trunk main installation and new, additional boosters required to provide the capacity required to meet the deficit introduced by the 2025 - 2030 sustainability reductions.

4.55 The high-level schematic Route of Heronsgate to Bovingdon scheme vs AMP7 schemes shows the locations of past and proposed expenditure at a regional level.

4.56 At the level of an individual scheme, the drawings in AMP7 Localised Main Reinforement Works at New Road , Chipperfield and AMP7 Localised Main Reinforcement Works at Dunny Lane, Chipperfield outline the extent of the 2020 - 2025 works, showing that the 2020 - 2025 works was clearly small discrete local works and not part of a bigger ongoing trunk main reinforcement. The two locations of local mains reinforcement in 2020 - 2025 do not form any part of the 2025 - 2030 Heronsgate to Bovingdon new trunk main works.

4.57 **Figure 1 in appendix AFW150 - Security sensitive maps** [13].

4.58 **Figure 2 in appendix AFW150 - Security sensitive maps** [14].

4.59 2020 - 2025 Heronsgate to Bovingdon scope comprised of smaller network improvements to the local network such as cross-connections and pressure control relating to properties supplied directly from the trunk main. These works enabled operation of the existing trunk main to optimised sufficiently to allow the 2020 - 2025 sustainability reductions to be achieved.

4.60 The further sustainability reductions required in 2025 - 2030 necessitate a much larger scale entirely new and separate trunk main installation.

4.61 The schematic in Route of Heronsgate to Bovingdon scheme vs AMP7 schemes shows the location of the two discrete schemes delivered under 2020 - 2025 Heronsgate to Bovingdon works.

4.62 **Figure 3 in appendix AFW150 - Security sensitive maps** [15].

4.63 **Figure 4 in appendix AFW150 - Security sensitive maps** [16].

4.64 **Figure 5 in appendix AFW150 - Security sensitive maps** [17].

13. moved to appendix AFW150 due to the redacted nature of the information shown
14. moved to appendix AFW150 due to the redacted nature of the information shown
15. moved to appendix AFW150 due to the redacted nature of the information shown
16. moved to appendix AFW150 due to the redacted nature of the information shown
17. moved to appendix AFW150 due to the redacted nature of the information shown

Base Overlap

4.65 In this section, we address Ofwat's assessment that there is overlap with Base expenditure:

4.66 *"The company illustrates its optioneering process which involves the application of network constraints in modelling for the identification and selection of final solutions. This indicates that the current constraints have been incorporated into the problem statement (modelling) the company seeks to address. Therefore, the company does not provide any evidence that applying existing operational constraints does not create overlaps with base expenditure"*

4.67 Our MISER and PYWR modelling undertaken for our WRMP shows that the increased abstraction reductions in 2025 - 2030 result in a need for further new network interventions (separate and additional to that delivered in 2020 - 2025) and also impact the performance of on-site assets.

4.68 These interventions will prevent the deterioration of future service performance which would otherwise result from our existing network's current configuration and capacity constraints, and will take the form of providing new assets, rather than replacing and upsizing existing ones.

4.69 The current configuration and capacity of our existing network is not causing service performance shortfalls today, so these constraints do not imply that this is a Base issue and therefore Base expenditure. Furthermore, capital maintenance activity would not address the capacity constraints. The driver for the expenditure is sustainability reductions creating a performance shortfall, and therefore is Enhancement.

4.70 The assumptions we have made to allocate investments to Base or Enhancement are outlined in Table 4.14 Our assumptions around Base and Enhancement investments. We assume that continuing our current business-as-usual activities, which deliver on asset health improvement needs from previous periods, will be covered by Base investment. This includes operational costs for maintaining the water distribution network, existing treatment works, and storage reservoirs. It also encompasses low-cost, high-benefit incremental improvements for customers.

Base	Enhancement
• Maintenance of the ongoing of existing storage reservoir, water network and treatment processes • Business-as-usual incremental improvements (e.g. minor improvement during refurbishment) • 2020 - 2025 Enhancement carry over	Needs driven by statutory requirements WRMP and Water Framework Directive • WINEP (sustainability reductions).

Table 4.14 Our assumptions around Base and Enhancement investments

4.71 Specific to the interventions being proposed in this investment case, these assumptions are tabulated as follows:

Base	Enhancement	2020 - 2025 Enhancement schemes
On-going maintenance of storage reservoir	Step change significant increase in storage capacity driven by factor outside management control: extended period of high demand	40Ml additional storage funding in 2020 - 2025 across Supply 2040 and SRs are being delivered in Preston and Chaul End sites in 2020 - 2025
Repair and refurbishment of existing reservoir	New trunk main assets providing additional transfer capacity	
Incremental improvements, minor upgrade	New booster pumping station assets providing additional transfer capacity	

Base	Enhancement	2020 - 2025 Enhancement schemes
Replacement of existing	New treatment process providing additional treatment capacity at sites	

Table 4.15 Our assumptions specific to the Connect 2050 – WRMP and WINEP sustainability reductions for Base and 2025 - 2030 and 2020 - 2025 Enhancement schemes

4.72 All investments listed under the Connect 2050 – WRMP and WINEP sustainability reductions business cases are for new assets. These investments address our statutory needs and have not been funded in previous price reviews.

4.73 A review has been carried out on three distinct elements of work that contribute to achievement of the 2025 - 2030 sustainability reductions:

- potential overlap with Base, on replacement of existing assets as part of local site-specific works.
- potential overlap with Base, on trunk main and booster schemes
- potential overlap with Base, on storage scheme (Hadham Mill)

Site specific works

4.74 The majority of the site-specific scope cost is associated with the significant Water Treatment and Borehole schemes located at the following sites:

- Blackford
- Northmoor
- West Hyde
- The Grove

4.75 These works comprise construction of all new, additional water treatment assets required solely due to the impact of changing abstraction flow rates on water quality caused by the sustainability reductions and in particular the Average Deployable Output (ADO) relocation element of these.

4.76 For the other sites, the scope of work comprises more minor works to address changes to operation arising from the reductions to abstraction. These include the following:

- decommissioning / mothballing works (for sites identified for full cessation of abstraction)
- licence Change costs (EA fee associated with work to agree changes to abstraction licences)
- addition of Variable Speed Drives to address water quality issues arising from required changes to operation (for example increased stop/start operation resulting in increased turbidity issues)
- changes to pumps to allow new flow rates to be adequately met and to provide adequate level of resilience where these source sites have become more critical due to the impact of the Sustainability reductions as a whole on the supply network.

4.77 As only the pump related works relate to existing assets, it is our assessment that all of the above scope items are necessitated solely because of the changes to operation required due to impact on water quality of changing the abstraction rates. Only the pump replacement (uprating) elements of the work scope have an interaction with Base activities and expenditure, as related to advanced maintenance.

4.78 Table 4.16 Summary of pump assets and costs summarises the assessment on the existing pumping assets identified as being impacted as part of the Sustainability reductions work scope. Base replacement value has been calculated using both the base cost of replacement (GMEAV) and a scaled value based on remaining life value for each identified asset (taken from our Base Asset Health Database, further detail on this is provided on page 83 of appendix AFW08 - Our investment development process of our original September 2023 submission).

4.79 This value (c.£99k) is immaterial in the context of the £124m value of the proposed sustainability reductions, expenditure, demonstrating that Ofwat's 20% adjustment is wholly disproportionate to the <0.08% this overlap represents.

Sites	Base replacement cost	Base replacement cost (Adjusted for remaining life)
	(£k)	(£k)
Amersham, Chalfont St Giles, Northmoor, West Hyde, Blackford, The Grove, Berkhamsted, Marlowes [1]	181.020	98.738

Table 4.16 Summary of pump assets and costs

1 A full site by site breakdown of assets and cost can be made available

Trunk main and booster schemes

4.80 The 2025 - 2030 trunk main and booster schemes detailed in Table 4.16 Summary of pump assets and costs above are comprised entirely of new, additional assets. The booster stations are completely new assets and not upgrades to existing booster stations. The details of these schemes and the need for them is covered in 4.2.6 Connect 2050 - Interconnectors.

Storage schemes

4.81 The Hadham Mill 10Ml/d Cell is an entirely new storage installation that is in addition to existing assets, and is required solely as a consequence of the decreased resilience (increased risk of supply outage) that results from the sustainability reductions.

2025 - 2030 Non-sustainability reductions schemes overlap

4.82 The 2025 -2030 schemes detailed in Table 4.16 Summary of pump assets and costs above are entirely standalone schemes necessitated solely by the sustainability reductions.

4.83 The mains reinforcement schemes in the Kings Walden, Codicote, Redbourn and Kensworth Lynch areas are independent, localised mains reinforcements (new, additional mains i.e. twinning) associated with the supply deficit introduced by the reduction in local abstraction. As such these are independent of any other works.

4.84 The regional schematic (redacted above) of 2020 - 2025 and 2025 - 2030 sustainability reductions and 2025 - 2030 Connect 2050 Interconnector interventions illustrates that the trunk main expenditure proposed in the sustainability reductions, case is distinct from the Connect 2050 Interconnector expenditure.

4.85 In the case of Blackford Group Treatment Works, where 2025 - 2030 works are also planned on the same site as part of another business case (Water Quality Deterioration - PFAS - see 4.2.11 PFAS - Additional business case) the solutions have been developed with consideration to ensure no doubling up of work elements. The two schemes were assessed as requiring entirely different treatment schemes, however, elements such as borehole related works have only been costed within the AMP Sustainability reductions intervention and not in the PFAS works.

4.86 The projects listed under the umbrella name "Connect 2050" are essential to meet our statutory requirements under both the Water Resources Management Plan (WRMP) and the Water Framework Directive – Water Industry National Environment Programme (WINEP) sustainability reductions.

4.87 In line with Ofwat drivers, interconnectors **between** adjacent Water Resource Zones (WRZs) are included in the Connect 2050 'WRMP' business case.

4.88 Additionally, other interconnectors **within** a WRZ, including minor local reinforcements needed to mitigate the impact of the 'Water Framework Directive – WINEP sustainability reductions' initiative, are included in this WINEP Sustainability reductions business case.

4.89 For the business cases mentioned above please see appendix AFW14a - Enhancement investment cases and appendix AFW14b - Enhancement investment cases from our September 2023 business plan submission.

4.90 Through our optioneering, we have identified the following network enhancements required to meet our WRMP and WFD – WINEP statutory obligations:

4.91 WRMP – 4 Projects – £73.58m

1. Egham to Iver (Harefield) Interconnector

- **Details**: A new interconnector with a peak transfer capacity of 35 Ml/day. This capacity is necessary to handle peak demand, short-term lapses in PCC and/or leakage, and outages or reductions at Iver
- **Scope & expenditure requirement**: Covers new, additional assets including a booster pumping station with a maximum capacity of 35 Ml/day and an 11.9 km trunk main with 27 trenchless crossings, including 12 major crossings (M25, M4, railway lines, aqueducts, and Heathrow Airport Expansion land)
- **Alternative route**: Avoiding Heathrow Airport expansion land would require a 15 km trunk main with major crossings. However, the shorter 11.9 km route is most cost-efficient and better value for customers. There is no overlap with Base expenditure as these are new assets.

2. Stanwell Moor Capacity Increase (Midway North)

- **Details**: Increase capacity available from WRZ6 Wey to WRZ4 Pinn by 8 Ml/day for the 2020 - 2025 period, providing a total site capacity of 25 Ml/day by 2025 - 2030
- **Scope and expenditure requirement**: Covers only the price difference between building a 17 Ml/day and a 25 Ml/day booster pumping station, ensuring no overlap with base or previously funded activities

3. Grove Park Link Interconnector

- **Details**: A new interconnector with a peak capacity of 25 Ml/day
- **Scope and expenditure requirement**: essential to meet WFD and WRMP statutory requirements

4. Wey Treatment Capacity Increase

- **Details**: Additional treatment capacity of 40 Ml/day, covered by four new GAC treatment processes at the Walton and Chertsey sites
- **Scope & expenditure requirement**: Covers implementation of four new Granular Activated Carbon (GAC) treatment processes at the Walton and Chertsey sites. This expansion is essential to meet WFD and WRMP statutory requirements

4.92 WINEP – SR – 10 Projects – £129.06m

1. Ickenham to Harrow Interconnector within WRZ 4 Pinn

- **Details**: A new interconnector providing an additional capacity of 30 Ml/day
- **Scope and expenditure requirement**: Covers new assets including trunk mains and booster stations, with no overlap with Base expenditure

2. Heronsgate to Bovingdon Interconnector within WRZ1

- **Details** : A new interconnector providing an additional capacity of 40 Ml/day
- **Scope and expenditure requirement** : Covers new assets including trunk mains and booster stations, with no overlap with Base expenditure.

3. New Storage Reservoir at Hadham Mill

- **Details**: A new storage reservoir providing an additional local storage capacity of 10 Ml (50% of the 20 Ml additional storage required) to mitigate rise in risk of supply outage due to the loss of a local source in WRZ5 – Stort under the WFD initiative
- **Scope and expenditure requirement**: Covers new assets with no overlap with Base expenditure. No additional opex is considered necessary as operational efficiency improvements from the new structure will offset maintenance costs

4. New Local Trunk Main and Booster

- **Details**: Mitigates the local impact of a 35 Ml/day sustainability reduction
- **Scope and expenditure requirement**: Covers new assets including trunk mains and booster stations, with no overlap with Base expenditure

4.93 The optioneering process which we have followed to arrive at these options is explained in the next section responding to Ofwat's challenges on 'Best option for customers'.

Best option for customers

Ofwats Enhancement assessment criteria grouping	Assessent comments	Criteria decision	% adjustment
Best option for customers	We have minor concerns whether the investment is the best option for customers. • The company does not consider an appropriate number of options over a range of intervention types to meet the identified needs. • Affinity Water states that a wide range of options have been considered and verified with its stakeholders and coarse screening process used to select feasible options from a list of alternative options for each need. • The company evidences a consideration of alternative options and states it selected best value options using economic analysis. However, alternative options are **limited in number given the scale of the programme** and **focussed on a narrow range of options, limited to network reinforcements and transfer schemes.**	Minor concerns	10%

Table 4.17 Ofwat's deep dive assessment of the options for WINEP – Sustainability reductions

4.94 We do not agree with the 10% adjustment Ofwat has made on the basis of inadequate optioneering. We agree with Ofwat that the quality of a case needs to be proportionate to its materiality, in keeping with the UKWIR 2014 Framework for Expenditure Decision Making. Consequently, we undertook extensive optioneering in the development of this business case, as we outline below.

Optioneering for each business case

4.95 For our options development process, we have proposed best value solutions using rigorous optioneering. We have followed a structured process to identify a wide range of potential options captured in the unconstrained list.

Optioneering approach

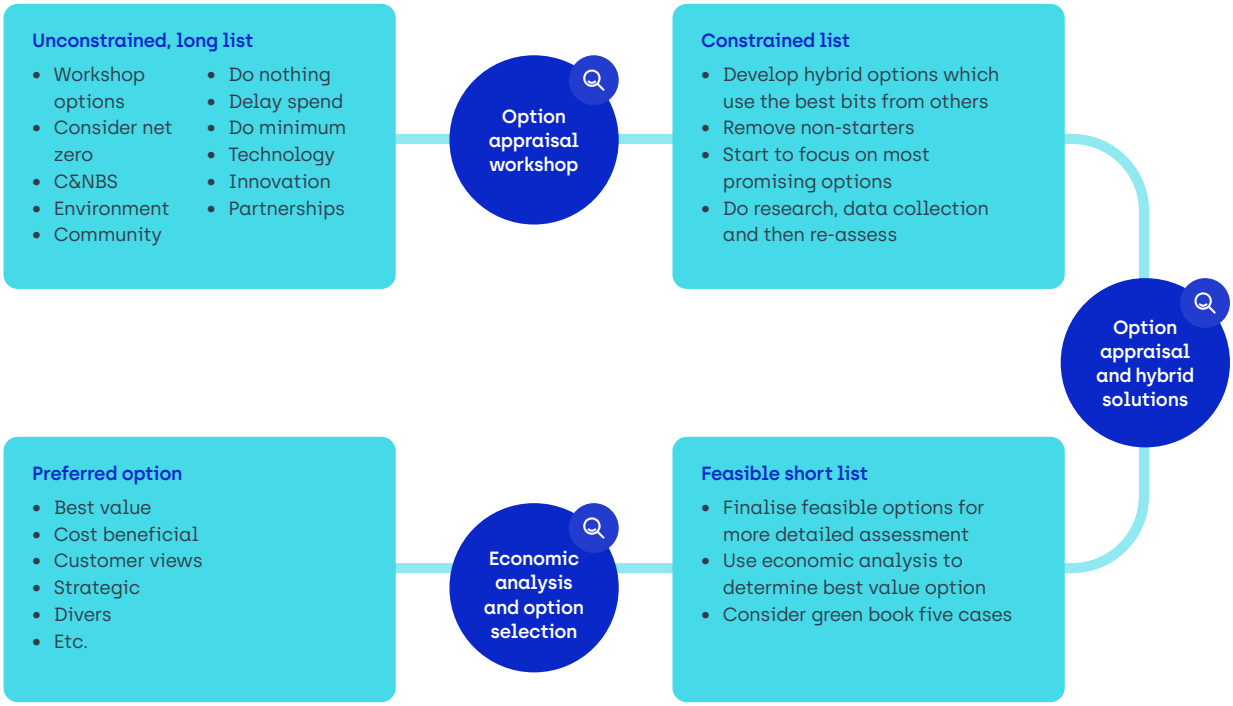


Figure 4.1 Our optioneering approach

Root causes identified

4.96 In line with established asset management planning practice, we began by undertaking root cause analysis for needs, as this ensures that our proposed interventions will be both allocatively and dynamically efficient.

Not in our control	Planned for 2025 - 2030 and already set as very challenging PCLs/assumed 2025 - 2030 ambition is achieved	Remaining root causes
The following root causes have not been selected for intervention as they are not in our control: • New development • Climate change • Reduction of abstraction under WFD WINEP initiative	The following root causes have not been selected as they are already planned for 2025 - 2030 and set as very challenging PCLs. By addressing these root causes at a company level, we are contributing to achieving the outcomes intended by the sustainability reductions, driver i.e. leaving water in the aquatic environment where this is cost beneficial. This will enable us to reduce average demand however if done in isolation they will expose the customer to a supply shortfall in peak demand conditions: • Per Capita Consumption (PCC) • Leakage	The following are the remaining root causes that we will specifically address as part of our 2025 - 2030 plan for Network Connectivity • Lack of treatment capacity • Lack of water transfer capability and capacity • Raw water deterioration

Table 4.18 Root cause analysis

4.97 As part of our options appraisal, we have evaluated an unconstrained list of options as summarised in Table 4.19 Consideration of unconstrained options for sustainability reductions business case.

Options	Meets statutory needs	Technically feasible	Comments/ reason for discarding
Imports from other water companies	Yes	No	Discarded -Not feasible, not enough water in the region

Options	Meets statutory needs	Technically feasible	Comments/ reason for discarding
Stop SEW export	No	No	Discarded -Does not solve the problem and is not feasible due to existing bulk supply agreements
Accelerate GUC project	Yes	No	Discarded -We cannot build it earlier.
Create new sources of water or new licence	Yes	No	Discarded -Not feasible, EA does not allow new licences.
Maximise current licences with additional treatment capacity	Partially	Yes	There is a programme of works for 2025 - 2030 for £10m under Sustainability Reductions. Assumption is happening.
Grey water, recycling water	Yes	No	Discarded -Not feasible due to scale, practicality and cost.
Desalination plants and link with SE and East.	Yes	No	Discarded -Not feasible under the timescale and cost
Import from Beckton sewage treatment works	Yes	No	Discarded -Not feasible under the timescale
Reduce PCC beyond our PCL target	Partially	Yes	Discarded - Assumption is that we meet our target. There is a separate programme of works. £80m. Already maximised
Reduce leakage beyond our PCL target	Partially	Yes	Discarded-Assumption is that we meet our target. There is a separate programme of works. £55m. Already maximised
New treatment plant at Iver	Partially	No	Discarded -Not feasible under the timescale and cost
Increase DO in Wey (new treatment plant)	Partially	Yes	To explore further – taken forward as Option 1
Relocate average DO to Blackford Group	Partially	Yes	To explore further – taken forward as Option 2
Reinforced Link between Harefield and Harrow	Partially	Yes	To explore further – taken forward as Option 3
Heronsgate to Bovingdon reinforced link	Partially	Yes	To explore further – taken forward as Option 4
New link between Watford and Heronsgate	Partially	Yes	To explore further – taken forward as Option 5
Reinforced link zone 6 (Wey) to 4 (Pinn)	Partially	Yes	To explore further – taken forward as Option 6

Table 4.19 Consideration of unconstrained options for sustainability reductions business case

4.98 Only two option combinations (#8 and #15) enable us to fully address the risks.

Option	Solution Option Description	Capex WLC	Opex WLC	WLC	Starting risk value	Residual risk /opp	Risk reduction / opp attained	Notes
		(£)	(£)	(£)	(£)	(£)	(£)	
1	Increase DO in WRZ6 – Wey (new treatment plant)	7.00	1.25	8.25	33.62	25.19	8,400.00	
2	Relocate average DO to Blackford Group	30.00	1.25	31.25	33.62	30.25	3.37	

Option	Solution Option Description	Capex WLC	Opex WLC	WLC	Starting risk value	Residual risk /opp	Risk reduction / opp attained	Notes
		(£)	(£)	(£)	(£)	(£)	(£)	
3	Reinforced Link between Harefield HDZ and Harrow	35.00	25.00	60.00	33.62	33.62	0.00	
4	Heronsgate to Bovingdon reinforced link	30.00	7.50	37.50	33.62	33.62	0.00	
5	New link between Watford and Heronsgate	3.20	15.00	18.20	33.62	33.62	0.00	
6	Reinforced link zone 6 - Wey to 4 - Pinn	60.00	25.00	85.00	33.62	33.62	0.00	
7	Link ain between zone 6 to 5	500.00	250.00	750.00	33.62	33.62	0.00	
8	1+2+7	537.00	252.50	789.50	33.62	-	33.62	WFD WINEP and WRMP statutory requirement met
10	1+2+6	97.00	27.50	124.50	33.62	10.01	23.61	
11	1+2+6+3	132.00	52.50	184.50	33.62	10.01	23.61	
12	1+2+6+4	127.00	35.00	162.00	33.62	10.01	23.61	
13	1+2+6+3+5	135.20	67.50	202.70	33.62	4.49	29.13	30,000 properties - no water during drought
14	1+2+6+4+5	130.20	50.00	180.20	33.62	5.51	28.11	40,000 properties - no water during drought
15	1+2+6+3+4+5	165.20	75	240.20	33.62	-	33.62	WFD WINEP and WRMP statutory requirement met

Table 4.20 All the options evaluated for the investment case, the preferred options are highlighted in green (option numbers 8 and 15)

Sustainability reductions need (Local site-specific requirements)

4.99 Need and scope of sustainability reductions was developed with external stakeholders, primarily the Environment Agency. The process for assessment of local requirements for the chosen source sites was carried through a Risk & Value process involving key internal stakeholders with knowledge of the following areas:

- borehole condition (historical issues and any remedial works) - Water Resources Team / Hydrogeologists
- borehole yield and performance (historical, current and forecast) - Water Resources Team / Hydrogeologists
- water quality: Source water composition and known issues - Process Scientists
- water quality: Existing on-site treatment, performance and known issues - Process Scientists

- production: Pumps - Sizing and performance of existing assets - Production Engineers
- production: Treatment - Type, sizing and performance of existing treatment assets - Production Engineers
- water treatment options - Water Quality Senior Strategy Leads, Process Scientists and Production Engineers and Leads

4.100 The workshops held during July and September of 2022 were undertaken to assess the impact of the decreased or increased peak and average abstraction rates on the performance of the existing assets and their capability to maintain current levels of supply resilience.

4.101 Potential impacts identified included the following:

- increased turbidity as a result of increased flow rates
- increased turbidity as a result of enforced pumping changes. For example, at sites where there was a substantial decrease in Average Deployable Output but where the requirement for a high Peak Deployable Output remained. This would necessitate more frequent shorter duration stop/start pumping to allow borehole to remain conditioned to achieve peak flows whilst not exceeding the reduced average flow. That type of operation can induce a greater risk of turbidity on start-up
- sizing of pumps being incapable of delivering the required flow rates for the new pumping regime necessitated by the changes to abstraction rates
- inability of existing borehole assets to provide adequate yield to meet new flow rates (including consideration of boreholes needing to provide sufficient resilience in the context of the overall abstraction reduction and the increased site criticality resulting from the reduction in available water from alternative sources).

4.102 Following assessment of existing assets and the assessed impacts for each site, a range of potential solution options was identified, and the unconstrained list reviewed to assess the best value option.

4.103 Detailed below are the optioneering exercise outputs for the major abstraction and treatment work projects identified through workshop analysis of the sustainability reductions impacts.

4.104 The same methodology was applied to all site-specific project schemes that were identified.

West Hyde sustainability reductions local requirements

4.105 Impacts identified:

- increased turbidity resulting from increased abstractions from boreholes showing historical turbidity failures. Turbidity identified as being related to organic iron
- insufficient yield for increased output required under the sustainability reductions (West Hyde sees an increase in output as part of the ADO Relocation schemes).

Unconstrained

Option	Meets outcome	Feasible	Rationale for not taking option forward
	[Y/N]	[Y/N]	
Pressurised sand filters	Y	Y	
Package cartridge filters	Y	N	Lower initial installation cost however, filters are designed for optimally dealing with short duration spikes in turbidity. The nature of the turbidity at West Hyde results in a more consistent turbidity requiring treatment less prone to clogging and with backwash capability.

Option	Meets outcome	Feasible	Rationale for not taking option forward
	(Y/N)	(Y/N)	
Membrane filters	Y	Y	Review of membrane filter treatment at Mill End site demonstrated issues with membrane filters being unable to adequately cope with similar organic iron source water resulting in site outages and loss of output.
Use of existing borehole assets	N	N	Based on historical evidence of achievable yield, it was assessed that the existing boreholes would not have the capacity to meet the increased output required by ADO relocation with sufficient resilience given the overall reduction in available alternative supply sources resulting from the other sustainability reduction across the area.
Remediation of existing borehole assets	N	N	Remediation efforts such as re-drilling were assessed to carry too high a risk of impacting yield given the criticality of the site.
Development of new borehole asset	Y	Y	
Replacement of all pumps optimised for SR flows	Y	Y	Assessment was made of the capacity of the existing pumps and although it would be ideal to replace all pumps to be sized optimally for the new flow rates necessitated by the Sustainability Reductions. It was assessed that replacement of a single pump in conjunction with software control changes would allow flows to be adequately met in the first instance.
Replacement of one pump and utilisation of other existing pumps	Y	Y	

Table 4.21 . Consideration of unconstrained options for West Hyde sustainability reductions investment

Constrained list

4.106 Based on the above assessment of the potential range of intervention options to meet West Hyde's local requirements, dependent on whether they:

- met requirements
- were technically feasible
- were robust in their operational performance across the range of conditions at the site.

4.107 The following options were progressed to the constrained list for West Hyde;

- pressurised sand filters
- development of new borehole asset
- replacement of one pump and utilisation of other existing pumps.

Blackford sustainability reductions local requirements

4.108 Impacts identified:

- increased turbidity resulting from increased abstractions from boreholes showing historical turbidity failures. Turbidity identified as being related to organic manganese.
- insufficient yield for increased output required under the sustainability reductions (Blackford sees an increase in output as part of the ADO Relocation schemes and **becomes** a strategically critical site once 2025 - 2030 SRs are implemented across the area).

Unconstrained

Option	Meets outcome	Feasible	Rationale for not taking option forward
	[Y/N]	[Y/N]	
Pressurised sand filters	Y	Y	
Package cartridge filters	Y	N	Lower initial installation cost however, filters are designed for optimally dealing with short duration spikes in turbidity. The nature of the manganese based turbidity at Blackford results in a more consistent turbidity requiring treatment less prone to clogging and with backwash capability.
Membrane filters	Y	Y	Review of membrane filter treatment at Mill End site demonstrated issues with membrane filters being unable to adequately cope with similar organic manganese source water resulting in site outages and loss of output.
Run to waste (RTW)	N	N	Given requirement to consistently deliver the full 20Ml/d peak output, the outage durations associated with RTW activities and subsequent restarting, would not be feasible and would mean it would not be possible to meet the new licence requirements.
Use of existing borehole assets	N	N	Based on historical evidence of achievable yield, it was assessed that the existing boreholes would not have the capacity to meet the increased output required by ADO Relocation with sufficient resilience given the overall reduction in available alternative supply sources resulting from the other sustainability reduction across the area.
Remediation of existing borehole assets	Y	Y	
Development of new borehole asset	Y	Y	Assessment was based on review of historical borehole and water quality performance, development of a new borehole was unlikely to be necessary and that remediation works, as successfully carried out on other boreholes would adequately address the sustainability reductions induced impacts while representing a better value solution.
Replacement of all pumps optimised for SR Flows	Y	Y	Assessment was made of the capacity of the existing pumps and although it would be ideal to replace all pumps to be sized optimally for the new flow rates necessitated by the Sustainability Reductions. It was assessed that replacement of a single pump in conjunction with software control changes would allow flows to be adequately met in the first instance.
Replacement of one pump and utilisation of other existing pumps	Y	Y	

Table 4.22 Consideration of unconstrained options for Blackford sustainability reductions investment

Constrained list

4.109 Based on the above assessment of the potential range of intervention options to meet Blackford's local requirements, dependent on whether they

- met requirements
- were technically feasible
- were robust in their operational performance across the range of conditions at the site.

4.110 The following options were progressed to the constrained list for Blackford;

- pressurised sand filters
- remediation of borehole asset
- replacement of one pump and utilisation of other existing pumps.

The Grove sustainability reductions local requirements

4.111 Impacts identified:

- increased turbidity resulting from increased abstractions from boreholes showing historical turbidity failures
- insufficient yield for increased output required under the sustainability reductions (The Grove sees a significant increase in output as part of the ADO Relocation schemes and **becomes** a strategically critical site once 2025 - 2030 SRs are implemented across the area).

Unconstrained

Option	Meets outcome	Feasible	Rationale for not taking option forward
	(Y/N)	(Y/N)	
Pressurised sand filters	Y	Y	Assessment of historical performance of the boreholes indicates that for the majority of operating time, the required post sustainability reductions flow will be achievable from use of multiple boreholes. Risk is associated with shorter duration running from less boreholes during borehole outage events. This, coupled with analysis showing the nature of the turbidity being more chalk based, resulted in assessment that pressurised sand filters solution would be excessive for level of risk associated with the sustainability reductions.
Package cartridge filters	Y	Y	
Membrane filters	Y	Y	Not taken forward on same basis as pressurised sand filters description above.
Run to waste (RTW)	N	N	Given requirement to consistently deliver the full 22Ml/d peak output, the outage durations associated with RTW activities and subsequent restarting, would not be feasible and would mean it would not be possible to meet the new licence requirements.
Remediation of existing borehole assets	Y	Y	Assessment of historical performance indicated that given the capability to meet post sustainability reduction abstraction rates from combination of multiple boreholes – it was a lower risk option to provide a simple treatment solution for use during borehole outage scenarios. Development of borehole also carries risk of loss of yield and water quality deterioration.
Development of new borehole asset	Y	N	Assessment was based on proximity of existing boreholes to each other and to available location for development of new borehole. Assessment was that risk of development of a new borehole on water quality of existing boreholes was unacceptably high, particularly given the strategic supply criticality of this source site.
Replacement of all pumps optimised for sustainability reductions flows	Y	Y	There is a significant increase in the peak and average outputs at The Grove sites and an associated increase in strategic supply criticality of the site as a result of the sustainability reductions (ADO Relocation schemes). Therefore, the requirement to be able to achieve these flows at all times from a combination of boreholes to allow for maintenance and outage events cannot be met with the existing pumps – up-sizing is required across all boreholes for this specific site.
Replacement of one pump and utilisation of other existing pumps	N	N	Not taken forward on the same basis as detailed for replacement of all pumps optimised for SR flows above. Use of existing assets would not provide sufficient resilience to meet the post Sustainability Reductions supply.

Table 4.23 Consideration of unconstrained options for The Grove sustainability reductions investment

Constrained list

4.112 Based on the above assessment of the potential range of intervention options to meet The Grove's local requirements, dependent on whether they

- met requirements
- were technically feasible
- were robust in their operational performance across the range of conditions at the site.

4.113 The following options were progressed to the constrained list for The Grove;

- package cartridge filters
- optimise for SR flows
- replacement of all existing pumps.

Northmoor sustainability reductions local requirements

4.114 Impacts identified:

- increased turbidity resulting from increased abstraction at peak rate pumping from boreholes showing historical turbidity failures
- insufficient yield from all borehole combinations for increased output required under the sustainability reductions (Northmoor sees an increase in output as part of the ADO Relocation schemes and becomes a strategically critical site once 2025 - 2030 sustainability reductions are implemented across the area).

Unconstrained

Option	Meets outcome	Feasible	Rationale for not taking option forward
	(Y/N)	(Y/N)	
Pressurised sand filters	Y	Y	Assessment of historical performance of the boreholes indicates that the risk from turbidity is likely to be associated with the changes to higher flow rates and changeover between boreholes required to maintain the increased output. This, coupled with analysis showing the nature of the turbidity being more chalk based, resulted in assessment that pressurised sand filters solution would be excessive for level of risk associated with the sustainability reductions.
Package cartridge filters	Y	Y	
Membrane filters	Y	Y	Not taken forward on same basis as pressurised sand filters description above.
Run to waste (RTW)	N	N	Given requirement to consistently deliver the increased average output, the outage duration associated with RTW activities and subsequent restarting, would not be feasible and would mean it would not be possible to meet the new licence requirements.
Remediation of existing borehole assets	Y	Y	Assessment of historical performance indicated that given the capability to meet post sustainability reduction abstraction rates from combination of multiple boreholes – it was a lower risk option to provide a simple treatment solution for use during borehole outage scenarios. Development of borehole also carries risk of loss of yield and water quality deterioration.
Development of new borehole asset	Y	N	Assessment was based on proximity of existing boreholes to each other and to available location for development of new borehole. Assessment was that risk of development of a new borehole on water quality of existing boreholes was unacceptably high, particularly given the strategic supply criticality of this source site.
Replacement of all pumps optimised for Sustainability Reductions flows	Y	Y	Assessment was made of the capacity of the existing pumps and although it would be ideal to replace all pumps to be sized optimally for the new flow rates necessitated by the Sustainability Reductions. It was assessed that replacement of two pumps in conjunction with software control changes would allow flows to be adequately met in the first instance.

Option	Meets outcome	Feasible	Rationale for not taking option forward
	[Y/N]	[Y/N]	
Replacement of two pumps and utilisation of other existing pump	Y	Y	

Table 4.24 Consideration of unconstrained options for Northmoor sustainability reductions investment

Constrained list

4.115 Based on the above assessment of the potential range of intervention options to meet Northmoor's local requirements, dependent on whether they

- met requirements
- were technically feasible
- were robust in their operational performance across the range of conditions at the site.

4.116 The following options were progressed to the constrained list for Northmoor;

- package cartridge filters
- replacement of two pumps and utilise other existing pump.

Cost efficiency

Ofwat's Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Cost efficiency	• We have some concerns whether the investment is efficient. The company does not provide sufficient and convincing evidence that the proposed costs are efficient. • For **Sustainability Reductions** Affinity Water states it used a strategic level optioneering process incorporating a number of different modelling processes, but **does not reference cost efficiency.** • The company **does not provide evidence to show that it has considered the efficiency of costs for its WFD schemes and does not evidence the use of external benchmarks.** • The company states that it used a third-party to carry out assurance of this business case **but it does not provide sufficient and convincing evidence of cost estimation and efficiency assurance.** • **For the three pipelines included in this programme**, we tested the efficiency in the Supply interconnector model using the relevant variables of length (km) and benefit (Ml/d). Based on this benchmarking **we concluded that the pipeline schemes were efficient.** • For the remainder of the cost request (**non-interconnector component**) we apply our cost efficiency challenge (20%), due insufficient evidence for cost efficiency as described above. This results in an overall 7.56% challenge	Some concerns	20%

Table 4.25 Ofwat's deep dive assessment of the cost efficiency for WINEP – Sustainability Reductions

4.117 We do not agree with the 20% cost efficiency adjustment Ofwat has applied to the non-interconnector components of our sustainability reductions intervention and provide further evidence and clarification below on the robust cost estimation and efficiency assurance undertaken on these costs.

4.118 We note the cost efficiency challenge has not been applied to the interconnector schemes on the basis they have been deemed efficient by the supply interconnectors model. We note that this Ofwat model indicates that these costs are not only efficient, but that our September 2023 submission costs are 81% below the funding allowance that would be supplied if these schemes were on the WRMP - Interconnectors driver. By contrast, the cost assessment applied to these schemes results in a 30% cost challenge being applied. Ofwat appears to simultaneously assert that efficient costs for these interconnector schemes are both 30% below and 81% above our September 2023 submission costs. This contradiction and marked discrepancy between two different assessment methods makes it opaque as to how Ofwat arrived at its decisions in the draft Determination for these interventions.

4.119 We refer to the supporting technical evidence appendix AFW103 - Connect 2050 supply interconnector modelling critique which analyses the construction and application of the models and proposes corrections to address these shortcomings in order to provide a robust and transparent process for setting credible expenditure allowances.

4.120 For completeness, we provide further evidence and clarification on the robust cost estimation and efficiency assurance undertaken for both the interconnector and non-interconnector investments within our sustainability reductions case.

Purpose of the cost estimate

Connect 2050 interconnectors, including sustainability reductions interconnectors

4.121 The projects listed under the umbrella name "Connect 2050" are needed to meet statutory requirements under both WRMP and Water Framework Directive – WINEP (sustainability reductions). There the cost estimates were developed using industry best practice, including following the steps laid out within 'Approaches for estimating and benchmarking costs for large scale water infrastructure projects by RAPID and OFWAT' (CEPA LLP, 2022). Please refer to appendix AFW08 - Our investment development process for further details on our PR24 cost models. Our PR24 cost models were used in conjunction with historical costs for special engineering difficulties such as major crossings. For booster pumping stations and reservoirs we have used our 2020 - 2025 historical costs with a 2022 - 23 price base.

Sustainability reductions site specific works

4.122 Projects identified under the umbrella scheme name of "Improve Licence reliability in area affected by sustainability reductions 2025 - 2030" are needed to address site specific abstraction, treatment and distribution requirements resulting from the impact of on-site flow changes caused by the 2025 - 2030 sustainability reductions. These works address site specific issues caused by the sustainability reductions and are entirely separate to the Connect 2050 projects detailed above, which act to address the strategic transfer deficit induced by the sustainability reductions.

4.123 For these site-specific projects, the cost estimates were developed using industry best practices, using our PR24 cost models. We continually refined our unit cost database (UCD) to forecast capital and operational expenditure ever more accurately. The process by which unit costs were developed and deployed in our decision support processes and tools is outlined schematically below (see appendix AFW08 - Our investment development process of our plan submission for full narrative around the process steps).

Our decision support process and how unit costs were developed and deployed

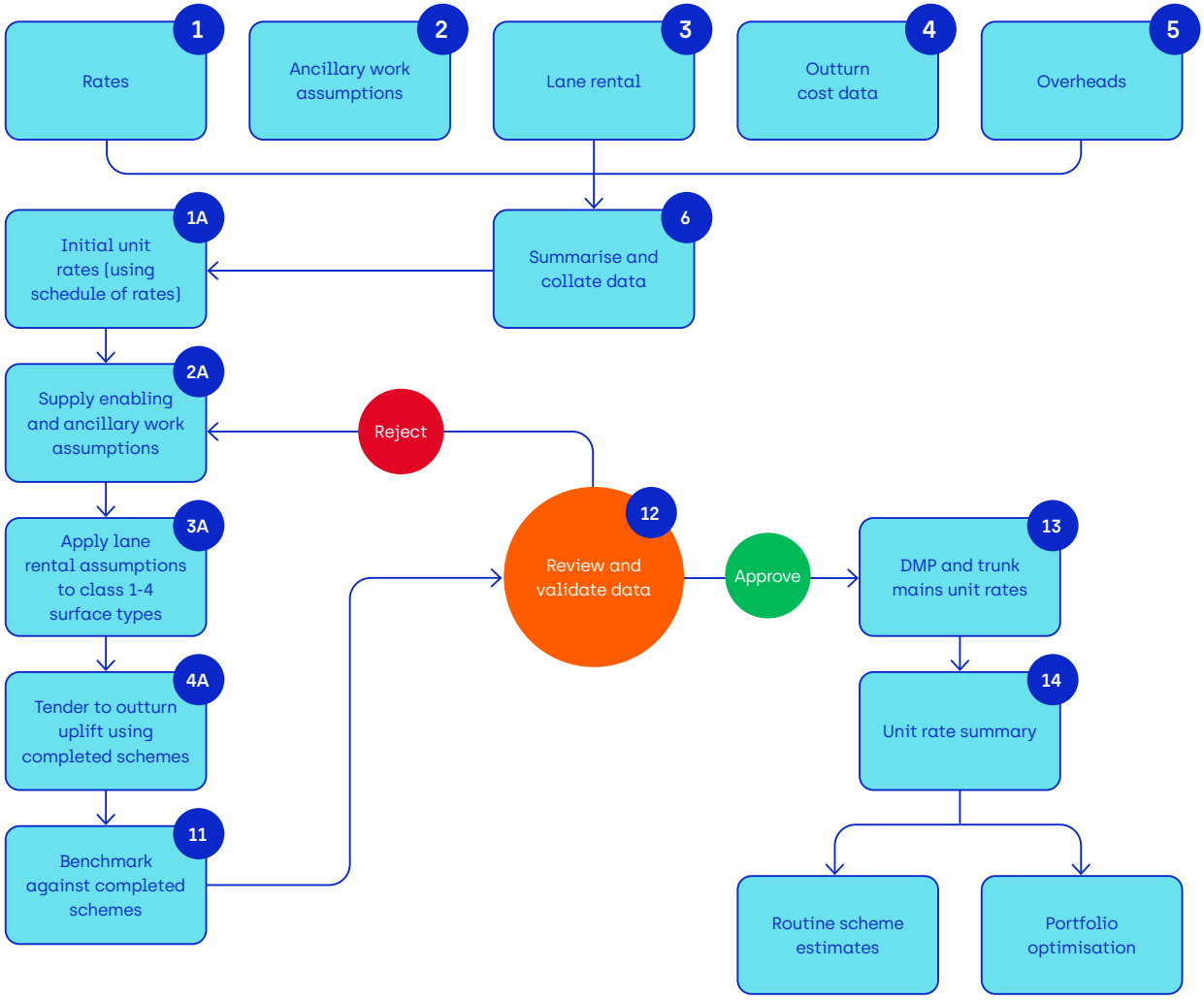


Figure 4.2 A schematic showing our decision support process and how unit costs were developed and deployed within the process

4.124 Our UCD has been built using information from a range of sources, such as our framework contracts and breakdowns from historic scheme outturn costs, supplemented by additional data and industry costs from Mott MacDonald and from TR61. The unit cost models for service reservoirs and for trunk mains both include Mott MacDonald and TR61 external costs, meaning that cost benchmarking is intrinsic to our cost build up.

4.125 For special engineering projects such as major new water treatment processes, our PR24 cost models were bench marked against recent Affinity Water tenders for equivalent schemes such as the Hunton Bridge Iron Removal Treatment project currently in delivery.

4.126 Direct quotes were also obtained from the manufacturers for large treatment items such as the cartridge filter solutions. Where cost models were still under the validation process, we have used the 2020 - 2025 historical costs with a 22 - 23 price base (following review of scheme scope and cost with area experts).

Governance Framework

4.127 Our cost estimates have been independently audited and benchmarked by AtkinsRéalis, and provided to our Board as part of the draft Determination Representation assurance. In the audit report of November 2022, AtkinsRéalis noted that:

4.128 *"At the time of the audit it was clear that significant work has been undertaken to date for these schemes. However, the programme was still under development and there were a number of areas still requiring finalising. We are satisfied that the tool and approach used to derive the constrained option list and select the preferred option is reasonable. We are also satisfied that the* ***risks associated with the deriving the cost estimates for each option, that were identified during our initial audit, have now been addressed*** and *the Company's approach is now in line with the guidance."* and ***"The approach to costing of options was audited*** *as part of two separate Business Case audits: the* ***Sustainability Reductions Business Case*** *and the Colne Business Case for catchment and nature-based solutions and river restoration schemes. A number of questions were raised about the approach to costing and missing cost elements during our initial audits. The Company have since made a number of changes to address these concerns, and* ***we are now satisfied that the methodology and data that underpin the cost estimates are compliant with the guidance****."*

4.129 We disclose this full audit within appendix AFW139 - Assurance of enhancement costs and 3rd part benchmarking.

4.130 Additional costing assurance has been undertaken by AtkinsRéalis to ensure we continue to put forward efficient costs for this investment. This included both assurance of our cost estimation approach and 3rd party benchmarking of costs, included within appendix AFW139- Assurance of enhancement costs and 3rd party benchmarking.

4.131 Regarding our approach to cost estimation, AtkinsRéalis state:

4.132 *"We consider that the cost estimation process is reasonable. The extensive use of the unit cost database for pipelines increases the confidence in these estimates"*

4.133 Regarding 3rd party benchmarking of costs, Atkins Realis assessed the construction cost component, representing 74% of the overall scheme costs. This assessment found;

4.134 *"Affinity Water approach of utilising historic cost data, market testing and obtaining specialist third party quotations demonstrates a sound proactive approach to cost planning."*

4.135 And that the construction costs across the suite of SR schemes assessed to be within 7.8% of the benchmark values, "In light of this cost benchmarking work, it has been concluded that the benchmarked construction cost data is within a reasonable alignment with anticipated market rates."

4.2.2 WINEP - C&NBS (River Restoration and Catchment Management)

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
WINEP – C&NBS	16.70	9.95	16.70

Table 4.26 WINEP - C&NBS scheme adjustments

Our Representation

4.136 We do not agree with Ofwat's reductions across need, options and cost efficiency on the basis that comments have either been inappropriately applied from the incorrect assessments of Connect 2050 and sustainability reductions , and/or that Ofwat has not taken into account the material presented in our plan. We provide evidence to show that:

a. there is no overlap with Base or past expenditure
b. that our options appraisal process is mature and thorough
c. our costing approach is robust and externally assured.

4.137 The proposed allowances for our catchment and nature-based solutions (C&NBS) multi-driver WINEP actions are materially less than the required costs to adequately undertake these schemes. These C&NBS schemes are essential for our Long-Term Delivery Strategy and delivery of our 2025 - 2030 WISER/WINEP obligations. The draft Determination allowances are insufficient to effectively deliver the scale of schemes across each operational catchment and associated waterbody action ID that will support the chalk streams in our supply area achieving Good Ecological Status/Good Ecological Potential under the Water Framework Directive.

4.138 We consider a separate deep dive assessment from the Sustainability Reductions case, which is significantly different in nature, is required for final Determination using the information summarised here and provided in our original plan.

4.139 PCD - We accept that the PCD will be monitored using delivery of actions within the WINEP. However, the main concern we have is whether there will be adequate flexibility to alter timescales for delivery of WINEP actions mid-AMP. We do not understand well enough yet whether the alterations process managed by the EA will be reflected in the PCD target for a given year.

4.140 We understand that Ofwat is aware of this concern and is already working with the EA to create the required process, however these changes cannot currently be reflected, which adds uncertainty and risk to this programme.

4.141 The WINEP programme will be monitored via a third layer of assessment under the AMP Environmental Performance Assessment (EPA) scorecard; it will be critical that the three processes are aligned and do not interfere with one another or cause competing pressures which could result in both EPA and PCD penalties. We are aware that this issue affects all companies and welcome the outcome of the discussions between the EA and Ofwat on how best to align the three measures to ensure companies are not exposed to unnecessary regulatory risk.

Summary of evidence

Need for enhancement investment

Ofwats Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Need for Enhancement investment	The investment partly meets the criteria for Enhancement investment and additional customer funding. The proposed investment is consistent with the company's water industry national environment programme (WINEP) schemes. • ·The company does not provide sufficient and convincing evidence that there are no water framework directive (WFD) activity overlaps with Base allowances **and** previously funded Enhancement schemes. • The company also states that through the PR24 WINEP development process it has worked to ensure that all lines on the PR24 WINEP spreadsheet relate to **new schemes** and that its 2025 - 2030 river restoration and catchment management programme will focus on **new reaches of rivers/areas within catchments but** does not provide sufficient and convincing evidence to show there is no overlap with previous Enhancement funding	Partial pass	20%

Table 4.27 Ofwat's deep dive assessment of the need for WINEP – C&NBS

4.142 We do not agree with the 20% adjustment Ofwat has made on the basis of need for Enhancement. The adjustment is based on the application of an incorrect assumption relating to the Connect 2050/sustainability reductions investment cases, but was erroneously applied across the C&NBS river restoration and catchment management cases. These are significantly different interventions to those in the proposed Connect 2050/ sustainability reductions cases. A separate assessment for C&NBS (river restoration and catchment management) to Connect 2050/sustainability reductions is required.

4.143 Notwithstanding the above, we provide supporting information below to address the feedback that Ofwat has made on the Need for Enhancement for the C&NBS (river restoration and catchment management) case.

4.144 The purpose of our catchment and nature-based solutions (river restoration and catchment management activities) is to contribute towards achieving Water Framework Directive objectives, whilst also improving groundwater water quality and quantity. This is Enhancement investment, required for environmental improvements to meet legal obligations and aligned with the Water Industry Strategic Environmental Requirements (WISER), supporting long-term improvements in water quality and quantity.

4.145 By enhancing our chalk stream catchments we are improving their resilience to climate change, providing the best approach for customers today and in the future.

4.146 The schemes set out to address the following challenges:

- manage the drinking water quality pressures for our groundwater sources
- contribute towards mitigation of the impacts of climate change at the operational catchment-scale to create more resilient catchments for water resources
- deliver projects alongside wider stakeholders and partners to address reasons for not achieving good (RNAG) status and the reasons for deterioration (RFD) and contribute to achieving WFD objectives.

4.147 The 2025 - 2030 scope will deliver significant benefits improving soil health, reducing runoff and leaching to groundwater whilst also improving the habitat and resilience of the globally rare chalk streams within our supply area. In keeping with Ofwat's public value principles, this investment has been developed to provide best value, and has our customers' support. The interventions proposed in this programme are aligned with our LTDS, as doing the right thing now to improve catchment resilience has long-term benefits for customers, biodiversity and communities. They have the potential to offset or negate the need for future sustainability reductions or more complex treatment.

4.148 Our Water Industry National Environment Programme (WINEP) of C&NBS for 2025 - 2030 comprises of river restoration (WFD_IMP_WRFlow) and catchment management actions (WFDGW_ND) for the Colne; Upper Lea; Dour and Little Stour; Cam and Ivel catchments. It also includes the Beane catchment flagship scheme, which will pilot delivery of the ambition of Defra's CaBA chalk stream restoration strategy. The actions have been developed in collaboration with the Environment Agency and key stakeholders, including catchment partnerships and Rivers Trusts, so that they can be delivered in an integrated approach and create a range of ecosystem services, including water quality benefits, enhanced water resource resilience, river flow and ecology and wider biodiversity benefits. This investment has been designed in line with the WINEP methodology to achieve wider environmental outcomes, align with wider catchment/river objectives to support meeting WFD drivers, generate wider funding streams through collaboration and partnership working and through consultation with our key stakeholders. Evidence of customer support for this programme was also obtained through the use of customer research, outlined in our September 2023 submission (see page 24 in appendix AFW04 - What customers want).

WINEP Action IDs

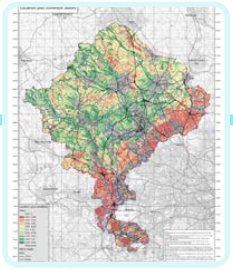
4.149 For our C&NBS (river restoration and catchment management) schemes, the PR24 WINEP spreadsheet lists schemes by WINEP action numbers based on WFD Operational Catchment area e.g. Lea operational catchment. This is then broken down into an appropriate number of associated components or suffixes (a,b,c etc) for the individual rivers or waterbodies within that catchment e.g. '08AF100010 a' and '08AF100010 b' for the upper and lower sections of the River Mimram which lies within the Lea operational catchment.

4.150 Our approach to developing the extent and scope of C&NBS (river restoration and catchment management) interventions is outlined in Figure 4.3 Our approach to developing the extent and scope of C&NBS interventions and Figure 4.4 Our approach to developing the extent and scope of C&NBS interventions. This indicates how our 2025 - 2030 proposals are additions to our previous programmes showing what the C&NBS interventions comprise of 'on the ground'.

Figure 4.3 Our approach to developing the extent and scope of C&NBS interventions

Catchment management

PR24 WINEP



2020-2025
Targeted WINEP water quality catchment management schemes delivered under one driver

Delivered around impacted source protection zones for specific issue e.g. nitrate covering 670km2 of safeguard zone catchments

2025-2030
C&NBS schemes at the operational catchment-scale for multiple benefits agreed with the EA and key stakeholders under multiple WINEP drivers

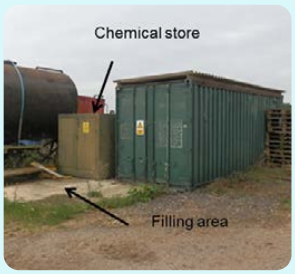
2025-2030
C&NBS programme delivering schemes for water quality, water quantity, chalk stream resilience and biodiversity covering 1593km2 of new catchment area not previously under WINEP schemes

Prioritisation of measures for 2025-2030 undertaken through modelling, priority and opportunity mapping, WFD Reasons for Not Achieving Good Status (RNAG) and Drinking Water Safety Planning outputs
Potential options developed within each of the 17 new waterbody and 16 sub-waterbody reaches. Options prioritised with the EA to determine schemes to progress to feasibility study providing greatest environmental benefit to meet WFD objectives

A combination of different land management measures will be implemented in priority areas for different benefits (e.g. water quantity). Options include:

Cover crops for multiple ecosystem services benefits

Companion cropping for biodiversity, soil health and increased water holding capacity



Pesticide handling and wash down area for water quality benefits

Figure 4.4 Our approach to developing the extent and scope of C&NBS interventions

Evidence of no WFD activity overlap with Base or previously funded Enhancement

4.151 These schemes all relate to new locations and/or pressures which have not required investment in previous periods. Consequently, there is no overlap with previous periods or Base expenditure associated with this Enhancement expenditure for 2025 - 2030.

4.152 For the river restoration programme, ongoing stewardship and liability resides with the landowner for stretches of river where works have been completed during previous periods. Any ongoing costs for 2015 - 2020 and 2020 - 2025 activities is not therefore within modelled allowances, neither base nor enhancement costs will be incurred or have been included within our September 2023 submission.

4.153 Table 4.28 WINEP WFD River Restoration and Catchment and Nature-based Solution Actions new target areas not allowed in previous Price Reviews sets out the catchments within which we are planning to deliver work in 2025 - 2030. For waterbodies where we have previously delivered river restoration projects in 2015 - 2020 or 2020 - 2025, we will be delivering new projects at new locations, where our operations contribute to the reasons for not achieving good status.

4.154 The simple schematic in Figure 4.5 Difference between 2015 - 2025 activities and 2025 - 2030 activities shows in concept how 2025 - 2030 activities are discrete from expenditure in previous periods.

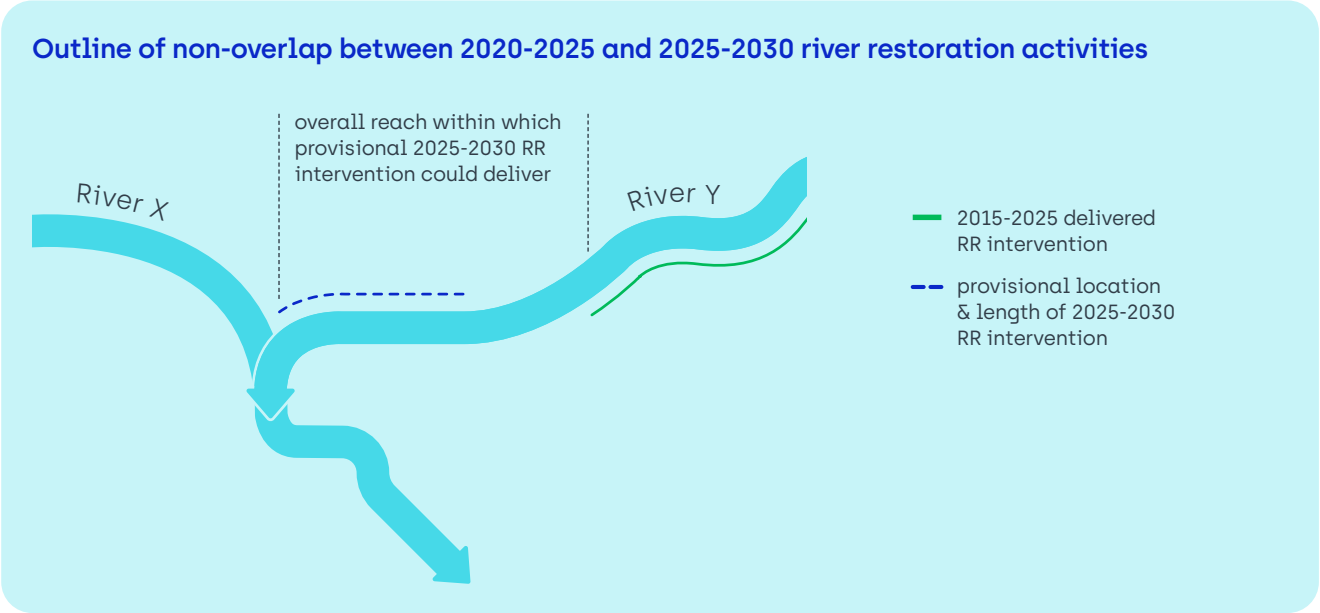


Figure 4.5 Difference between 2015 - 2025 activities and 2025 - 2030 activities

4.155 At the scale of our region, this can be seen in Figure 4.6 Map showing the 2015 - 2020 and 2020 - 2025 river restoration project areas and the new waterbody areas within which AMP8 projects will be delivered which provides a map showing locations of completed projects and the remaining areas of river where we will deliver specific projects to restore, or enhance, the chalk stream habitats.

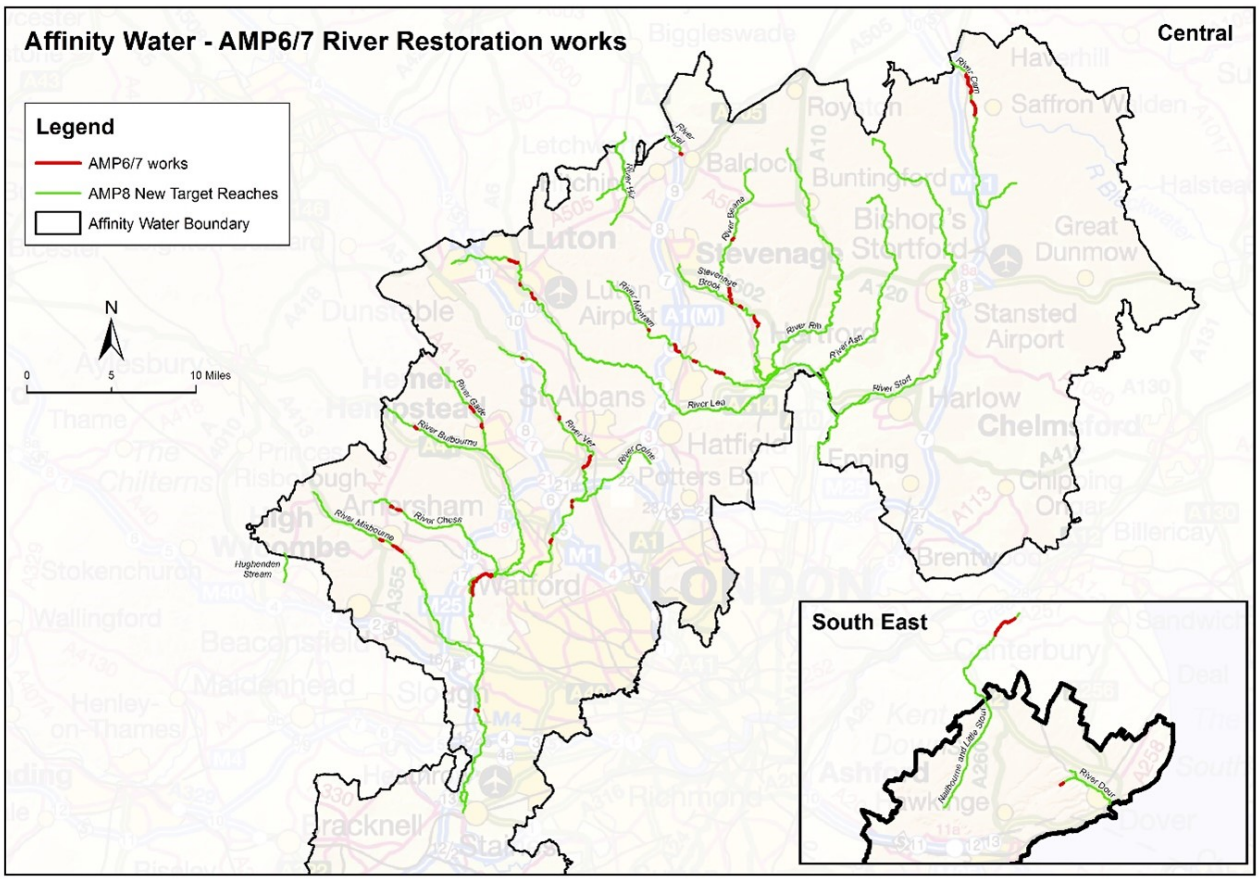


Figure 4.6 Map showing the 2015 - 2020 and 2020 - 2025 river restoration project areas and the new waterbody areas within which AMP8 projects will be delivered

4.156 As such, there is no overlap with, or duplicate of, Enhancement investments already included in previous allowances.

4.157 For our catchment management actions listed in Table 4.28 WINEP WFD River Restoration and Catchment and Nature-based Solution Actions new target areas not allowed in previous Price Reviews, we are delivering measures in 23 new WFD waterbody catchments.

4.158 Note the 2025 - 2030 Target length is not the full length to be addressed - it represents the entirety of the length of reaches within which specific activity will take place.

WINEP Action IDs	Action name	Action description	Primary driver	New waterbody / catchment	New reach or additional catchment area	2015 - 2025 length	2025 - 2030 new target length
						(km) / area (km^2)	(km) or area (km^2)
08AF100010 a	River restoration projects -Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Mimram (Whitwell to Codicote Bottom)	WFD_IMP_WRFlow	Yes	Yes	0	6.4 km
08AF100010 b	River restoration projects -Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Mimram (Codicote Bottom to Lea)	WFD_IMP_WRFlow	No	Yes	1.85 km	15.4 km
08AF100010 c	River restoration projects -Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Stort (at Clavering)	WFD_IMP_WRFlow	Yes	Yes	0	15.7 km
08AF100010 d	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Stort and Navigation, Bishop Stortford to Harlow	WFD_IMP_WRFlow	Yes	Yes	0	20.4 km
08AF100010 e	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Stort and Navigation, Harlow to Lea	WFD_IMP_WRFlow	Yes	Yes	0	16.4 km
08AF100010 f	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Rib (upper stretches, above confluence with the Quin)	WFD_IMP_WRFlow	Yes	Yes	0	15.7 km
08AF100010 g	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Rib (from confluence with Quin to Lea Navigation)	WFD_IMP_WRFlow	Yes	Yes	0	20.9 km
08AF100010 h	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Ash (from confluence with Bury Green Brook to Lea)	WFD_IMP_WRFlow	Yes	Yes	0	11.9 km
08AF100010 i	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Ash (from Meesden to confluence with Bury Green Brook)	WFD_IMP_WRFlow	Yes	Yes	0	22.4 km
08AF100010 j	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Lea (from Luton Hoo Lakes to Hertford)	WFD_IMP_WRFlow	Yes	Yes	0	31.7 km
08AF100010 k	River restoration projects - Upper Lea operational catchment	2025 - 2030 River improvement works as part of the Upper Lea operational catchment holistic C&NBS scheme: Lea (from Luton to Luton Hoo Lakes)	WFD_IMP_WRFlow	No	Yes	0.979 km	16.6 km
08AF100010 w	Catchment and Nature Based Solutions programme for Multiple benefits - Upper Lea operational catchment	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate), chalk stream health and biodiversity as part of the Upper Lea operational catchment holistic C&NBS scheme delivered in combination with river restoration	WFDGW_ND	No	Yes	210.8km	897.5km
08AF100011 a	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Bulbourne	WFD_IMP_WRFlow	No	Yes	0.23km	9.5km

WINEP Action IDs	Action name	Action description	Primary driver	New waterbody / catchment	New reach or additional catchment area	2015 - 2025 length	2025 - 2030 new target length
						(km) / area (km^2)	(km) or area (km^2)
08AF100011 b	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Chess	WFD_IMP_WRFlow	No	Yes	0.47km	19.7km
08AF100011 c	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Colne (Confluence with Chess to River Thames)	WFD_IMP_WRFlow	No	Yes	1.05km	50.4km
08AF100011 d	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Colne (from Confluence with Ver to Gade)	WFD_IMP_WRFlow	No	Yes	1.04km	20.2km
08AF100011 e	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Gade (Upper stretch Great Gaddesden to confluence with Bulbourne / GUC)	WFD_IMP_WRFlow	No	Yes	3.17km	7.5km
08AF100011 f	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Gade (from confluence with Bulbourne to Chess)	WFD_IMP_WRFlow	Yes	Yes	0	15.0 km
08AF100011 g	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Misbourne	WFD_IMP_WRFlow	No	Yes	1.04km	26.0km
08AF100011 h	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Upper Colne and Ellen Brook	WFD_IMP_WRFlow	Yes	Yes	0	13.9km
08AF100011 i	River restoration projects - Colne operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Ver	WFD_IMP_WRFlow	No	Yes	1.6km	26.7km
08AF100011 j	River restoration projects - Chilterns South operational catchment	2025 - 2030 River improvement works as part of the Colne operational catchment holistic C&NBS scheme: Hughenden Stream	WFD_IMP_WRFlow	Yes	Yes	0	3.628 km
08AF100011 u	Catchment and Nature Based Solutions programme for Multiple benefits - Colne operational catchment	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate), chalk stream health and biodiversity as part of the Colne operational catchment holistic C&NBS scheme delivered in combination with river restoration	WFDGW_ND	No	Yes	137.9km	949.1km
08AF100013 a	River restoration projects - Dour and Little Stour Catchments	2025 - 2030 River improvement works as part of the Dour and Little Stour holistic C&NBS scheme: Upper Dour	WFD_IMP_WRFlow	No	Yes	0.33km	1.5km
08AF100013 b	River restoration projects - Dour and Little Stour Catchments	2025 - 2030 River improvement works as part of the Dour and Little Stour holistic C&NBS scheme: Dour from Kearsney to Dover	WFD_IMP_WRFlow	Yes	Yes	0	4.6km
08AF100013 c	River restoration projects - Dour and Little Stour Catchments	2025 - 2030 River improvement works as part of the Dour and Little Stour holistic C&NBS scheme: Nailbourne and Little Stour	WFD_IMP_WRFlow	No[1]	Yes	0.855km	25.0km.
08AF100013 g	Catchment and Nature Based Solutions programme for multiple benefits - East Kent Chalk, Dour and Little Stour catchments	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate, ammonia and microbiological), chalk stream health and biodiversity as part of the East	WFDGW_ND	No	Yes	61.4km	250.2km

WINEP Action IDs	Action name	Action description	Primary driver	New waterbody / catchment	New reach or additional catchment area	2015 - 2025 length	2025 - 2030 new target length
						(km) / area (km^2)	(km) or area (km^2)
		Kent Chalk, Dour and Little Stour catchments holistic C&NBS scheme delivered in combination with river restoration					
08AF100014 a	River restoration projects - Ivel and Cam operational catchments	2025 - 2030 River improvement works as part of the Ivel and Cam holistic C&NBS scheme: Ivel (US Henlow)	WFD_IMP_WRFlow	No	Yes	0.6km	9.1km
08AF100014 b	River restoration projects - Ivel and Cam operational catchments	2025 - 2030 River improvement works as part of the Ivel and Cam holistic C&NBS scheme: Hiz (DS Hitchin)	WFD_IMP_WRFlow	Yes	Yes	0	11.4 km
08AF100014 c	River restoration projects - Ivel and Cam operational catchments	2025 - 2030 River improvement works as part of the Ivel and Cam holistic C&NBS scheme: Hiz (through Hitchin)	WFD_IMP_WRFlow	Yes	Yes	0	3.7 km
08AF100014 d	River restoration projects - Ivel and Cam operational catchments	2025 - 2030 River improvement works as part of the Ivel and Cam holistic C&NBS scheme: Cam (US Newport)	WFD_IMP_WRFlow	Yes	Yes	0	10.7km
08AF100014 e	River restoration projects - Ivel and Cam operational catchments	2025 - 2030 River improvement works as part of the Ivel and Cam holistic C&NBS scheme: Cam (Newport to Audley End)	WFD_IMP_WRFlow	No	Yes	0.5km	4.7km
08AF100014 f	River restoration projects - Ivel and Cam operational catchments	2025 - 2030 River improvement works as part of the Ivel and Cam holistic C&NBS scheme: Cam (Audley End to Stapleford)	WFD_IMP_WRFlow	No	Yes	3.5km	16.4km
08AF100014 m	Catchment and Nature Based Solutions programme for Multiple benefits - Ivel catchment	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate), chalk stream health and biodiversity as part of the Ivel catchment C&NBS programme delivered in combination with river restoration projects. Upper Bedford Ouse chalk	WFDGW_ND	Yes	Yes	174.54km	0
08AF100014 n	Catchment and Nature Based Solutions programme for Multiple benefits - Cam catchment	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate), chalk stream health and biodiversity as part of the Cam catchment C&NBS programme delivered in combination with river restoration projects. Cam and Ely Ouse Chalk	WFDGW_ND	Yes	Yes	53.4km	239.8km
08AF100012 a	River Beane CaBA flagship chalk stream catchment restoration pilot	2025 - 2030 River improvement works as part of the River Beane catchment flagship chalk stream restoration project delivering the ambition of the CaBA chalk stream restoration strategy:Beane (Source to Stevenage Brook)	WFD_IMP_WRFlow	No	Yes	1.785km	16.8km
08AF100012 b	River Beane CaBA flagship chalk stream catchment restoration pilot	2025 - 2030 River improvement works as part of the River Beane catchment flagship chalk stream restoration project delivering the ambition of the CaBA chalk stream restoration strategy: Stevenage Brook	WFD_IMP_WRFlow	Yes	Yes	0	7.5km
08AF100012 c	River Beane CaBA flagship chalk stream catchment restoration pilot	2025 - 2030 River improvement works as part of the River Beane catchment flagship chalk stream restoration project delivering the ambition of the CaBA chalk stream restoration strategy: Beane (from confluence with Stevenage Brook to Lea)	WFD_IMP_WRFlow	No	Yes	1.7km	12.6km
08AF100012 g	River Beane CaBA flagship chalk stream catchment restoration pilot	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate), chalk stream health	WFDGW_ND	Yes	Yes	61.5km	0

WINEP Action IDs	Action name	Action description	Primary driver	New waterbody / catchment	New reach or additional catchment area	2015 - 2025 length	2025 - 2030 new target length
						(km) / area (km^2)	(km) or area (km^2)
		and biodiversity as part of the River Beane flagship chalk stream restoration project delivered in combination with river restoration : Beane (Source to Stevenage Brook)					
08AF100012 h	River Beane CaBA flagship chalk stream catchment restoration pilot	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate), chalk stream health and biodiversity as part of the River Beane flagship chalk stream restoration project delivered in combination with river restoration : Stevenage Brook	WFDGW_ND	Yes	Yes	0	38.9km
08AF100012 i	River Beane CaBA flagship chalk stream catchment restoration pilot	2025 - 2030 Land management focused C&NBS for multiple benefits including prevention of deterioration of groundwater (nitrate), chalk stream health and biodiversity as part of the River Beane Ffagship chalk stream restoration project delivered in combination with river restoration. Beane (from confluence with Stevenage Brook to Lea)	WFDGW_ND	Yes	Yes	0	73km
Total River length in km where we have delivered work or length of new river within which we will be working in 2025 - 2030. **NB 2025 -2030 river length is not total length to be delivered.**						20.749km	479.4km
Total Catchment area in km^2 that we have or will be working within. NB Total area for 2025 - 2030 should not be taken as total area covered by interventions e.g. cover crops.						699.6km	2263km

Table 4.28 WINEP WFD River Restoration and Catchment and Nature-based Solution Actions new target areas not allowed in previous Price Reviews

1 joint project with Southern & SEW

4.159 Figure 4.7 Map showing 2020 - 2025 WINEP water quality scheme areas and the new catchment areas for the multi-driver 2025 -2030 catchment management schemes shows the spatial extent of 2020 - 2025 schemes area and the planned 2025 - 2030 catchment areas. For catchments where we have previously delivered WINEP actions, our 2025 - 2030 actions are focusing both on new catchment areas covering the entire WFD operational catchment area and on new drivers. Previous actions have focused on specific water quality issues around specific abstractions (e.g. nitrate), whereas our C&NBS actions for 2025 - 2030 will incorporate measures to support the following wider environmental outcomes set out in the 25 Year Environment Plan and Defra's Plan for Water:

- Water resource resilience
- Chalk stream protection
- Groundwater quality
- Climate change adaptation and resilience
- Biodiversity protection and enhancement.

4.160 These actions are being delivered under multiple WINEP drivers:

- WFDGW_ND (Primary driver)
- NERC_IMP (Secondary driver)
- 25_YEP (Tertiary driver).

4.161 Actions allowed in previous price reviews have not been included under multiple drivers or delivered at the landscape (Operational Catchment) scale and therefore are not duplicating previous Enhancement scope.

4.162 In total, we will be delivering actions in 1,563km^2 of new catchment areas within our supply area. The map in Figure 4.7 Map showing 2020 - 2025 WINEP water quality scheme areas and the new catchment areas for the multi-driver 2025 -2030 catchment management schemes shows the new 2025 - 2030 catchment management scheme areas compared to the 2020 - 2025 WINEP actions.

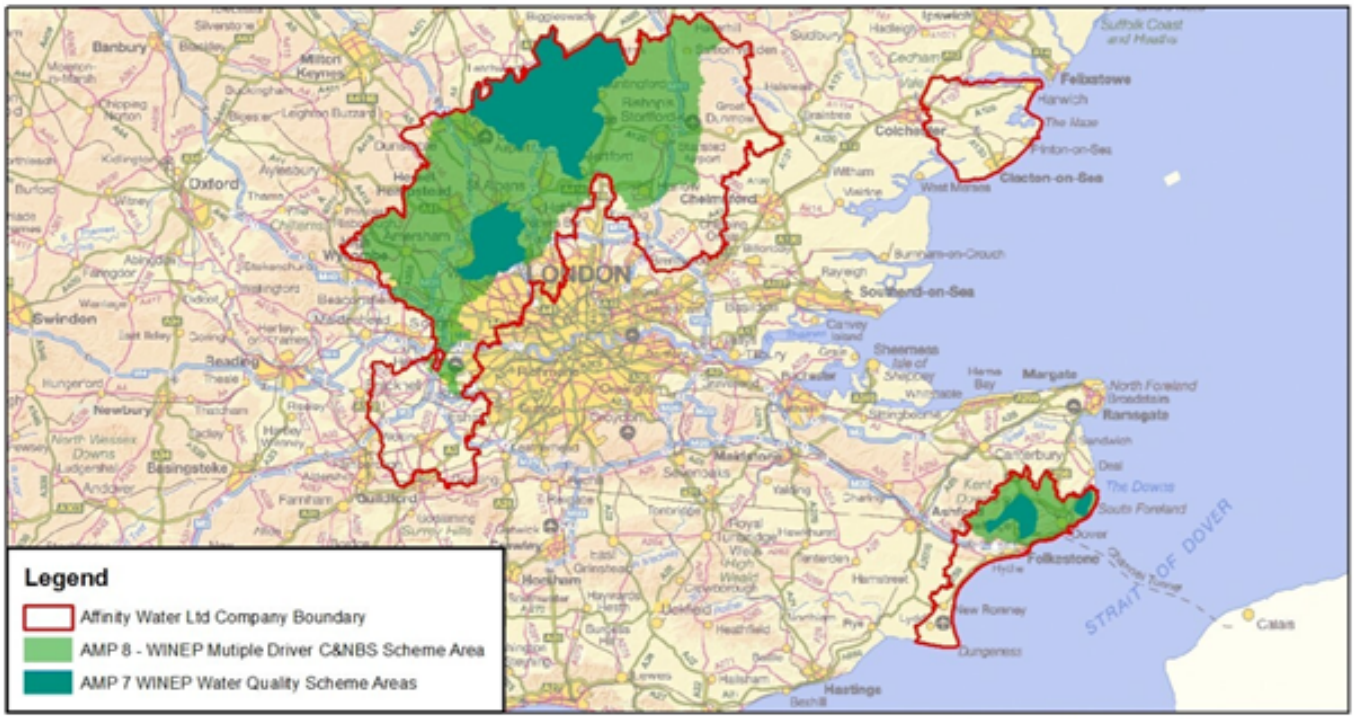


Figure 4.7 Map showing 2020 - 2025 WINEP water quality scheme areas and the new catchment areas for the multi-driver 2025 -2030 catchment management schemes

Best option for customers

Ofwats Enhancement assessment criteria grouping	Assessent comments	Criteria decision	% adjustment
Best option for customers	**Minor concerns:** We have minor concerns whether the investment is the best option for customers. **The company does not consider an appropriate number of options over a range of intervention types** to meet the identified needs. Affinity Water states that a wide range of options have been considered and verified with its stakeholders and coarse screening process used to select feasible options from a list of alternative options for each need. The company evidences a consideration of alternative options and states it selected best value options using economic analysis. However, alternative options are limited in number given the scale of the programme and focused on a narrow range of options, limited to **network reinforcements and transfer schemes.**	Minor concerns	10%

Table 4.29 Ofwat's deep dive assessment of the options for WINEP – C&NBS

4.163 These comments, and the consequential 10% reduction, are wholly irrelevant to the C&NBS (river restoration and catchment management) investment cases, presumably referring to the Connect 2050 and sustainability reductions elements with the references to "network reinforcements and transfer schemes". Our original submission provided very clear evidence of optioneering.

4.164 Again, we provide supporting information here to address and counter the application of the optioneering challenge Ofwat has made to the C&NBS (river restoration and catchment management) case.

Optioneering for each scheme business case

4.165 For our options development process, we have proposed best value solutions using rigorous optioneering. We have followed a structured process to identify a wide range of potential options captured in the unconstrained list.

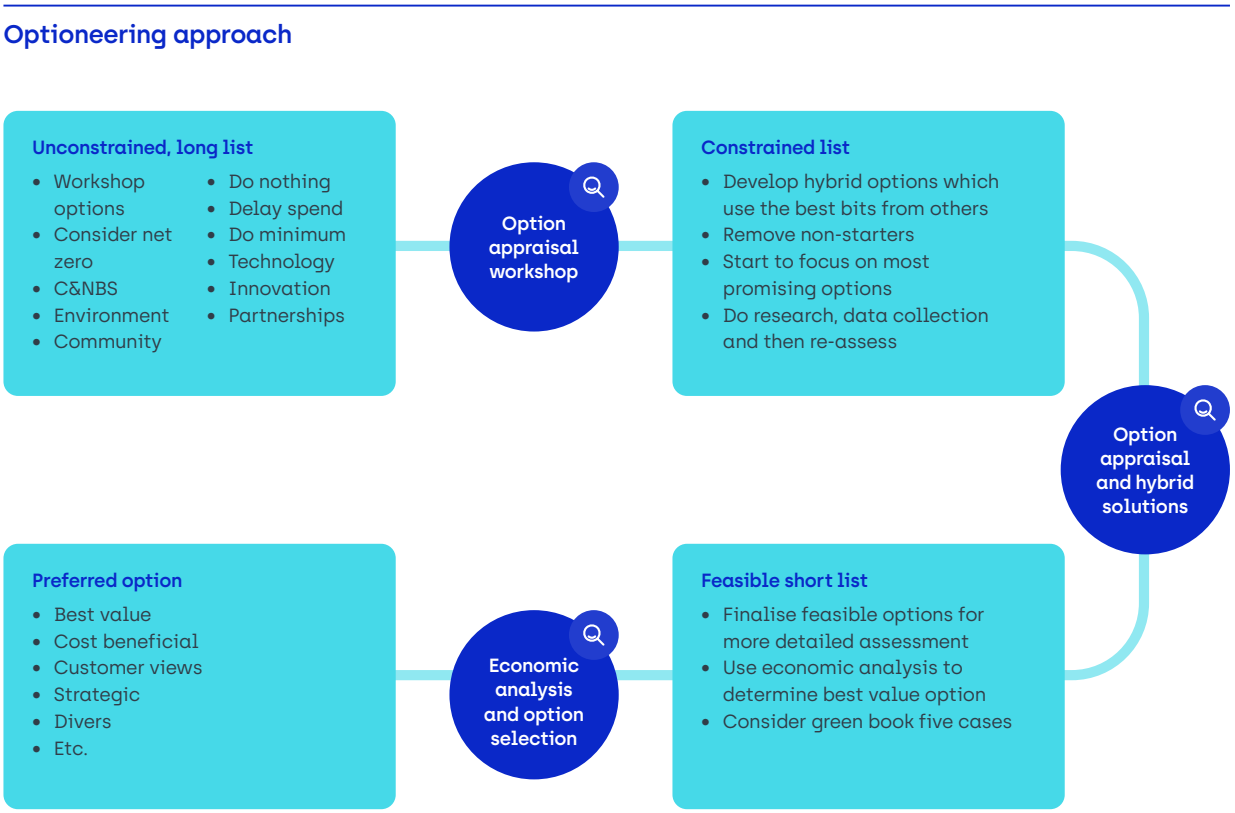


Figure 4.8 Our optioneering approach

Options captured in the unconstrained list included

- Do nothing scenario
- Catchment management – advice, support and training – no intervention
- Minor/major/enhanced river restoration/river improvement works (RCR)
- Minor/major/enhanced land management catchment and nature-based solutions (RCC)
- Combinations of the above.

Unconstrained

4.166 An example unconstrained option list for the Colne catchment is shown in Table 4.30 Consideration of unconstrained options for the Colne catchment.This process was replicated with catchment appropriate information for the other operational catchments included within the WFD Catchment & Nature Based Solutions submission (river restoration and catchment management).

Option	Meets outcome	Feasible	Unconstrained options going forward for options evaluation
	(Y/N)	(Y/N))	(Yes/No)
Do nothing option. Focus solely on treatment options and agreed sustainability reductions	N	N	No - Does not meet statutory and non-statutory requirements
Catchment management awareness and engagement. No implementation of C&NBS, focus on stakeholder engagement, awareness raising of issues, newsletters, low level funding support for external partner projects.	N	N	No - Does not meet statutory and non-statutory requirements
Revitalising chalk rivers (RCR) option 1 - Standard (1 small and 1 large project on each river)	N	N	No - Does not meet statutory and non-statutory requirements
Revitalising chalk rivers (RCR) option 2 - Enhanced (between 1 and 3 small projects and 1 and 3 large projects on each river)	Y	Y	Yes - See options evaluation spreadsheet outputs below

Option	Meets outcome	Feasible	Unconstrained options going forward for options evaluation
	(Y/N)	(Y/N))	(Yes/No)
Revitalising chalk rivers (RCR) option 3 – Enhanced + (delivering 3 small and 3 large projects on each river)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Resilient chalk catchments (RCC) C&NBS option A (Pilot sub-catchment)	N	N	No - Does not meet statutory and non-statutory requirements
Resilient chalk catchments (RCC) C&NBS option B (Spatial targeting using CAfW and DWSP WQ heat maps)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Resilient chalk catchments (RCC) C&NBS option C (Spatial targeting plus wider landscape measures upstream of river restoration (RCR) schemes)	N	N	No - Does not meet statutory and non-statutory requirements
Resilient chalk catchments (RCC) C&NBS option D (Whole catchment)	N	N	No - Does not meet statutory and non-statutory requirements
Revitalising chalk rivers (RCR) option 1 - Standard (1 small and 1 large project on each river) and resilient chalk catchments (RCC) C&NBS option A (Pilot sub-catchment)	N	N	No - Does not meet statutory and non-statutory requirements
Revitalising chalk rivers (RCR) option 1 - Standard (1 small and 1 large project on each river) and resilient chalk catchments (RCC) C&NBS option B (Spatial targeting using CAfW and DWSP WQ heat maps)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Revitalising chalk rivers (RCR) option 1 - Standard (1 small and 1 large project on each river) and resilient chalk catchments (RCC) C&NBS option C (Spatial targeting plus wider landscape measures upstream of river restoration (RCR) schemes)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Revitalising chalk rivers (RCR) option 1 - Standard (1 small and 1 large project on each river) and resilient chalk catchments (RCC) C&NBS option D (Whole catchment)	N	N	No - Does not meet statutory and non-statutory requirements
Revitalising chalk rivers (RCR) option 2 - Enhanced (between 1 and 3 small projects and 1 and 3 large projects on each river) and resilient chalk catchments (RCC) C&NBS option B (Spatial targeting using CAfW and DWSP WQ heat maps)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Revitalising chalk rivers (RCR) option 2 - Enhanced (between 1 and 3 small projects and 1 and 3 large projects on each river) and resilient chalk catchments (RCC) C&NBS option C (Spatial targeting plus wider landscape measures upstream of river restoration (RCR) schemes)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Revitalising chalk rivers (RCR) option 2 - Enhanced (between 1 and 3 small projects and 1 and 3 large projects on each river) and resilient chalk catchments (RCC) C&NBS option D (Whole catchment)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Revitalising chalk rivers (RCR) option 3 – Enhanced + (delivering 3 small and 3 large projects on each river) and resilient chalk catchments (RCC) C&NBS option A (Pilot sub-catchment)	N	N	No - Does not meet statutory and non-statutory requirements
Revitalising chalk rivers (RCR) option 3 – Enhanced + (delivering 3 small and 3 large projects on each river) and resilient chalk catchments (RCC) C&NBS option B (Spatial targeting using CAfW and DWSP WQ heat maps)	Y	Y	Yes - See options evaluation spreadsheet outputs below
Revitalising chalk rivers (RCR) option 3 – Enhanced + (delivering 3 small and 3 large projects on each river) and resilient chalk catchments (RCC) C&NBS option C (Spatial targeting plus wider landscape measures upstream of river restoration (RCR) schemes)	Y	Y	Yes - See options evaluation spreadsheet outputs below

Option	Meets outcome	Feasible	Unconstrained options going forward for options evaluation
	(Y/N)	(Y/N))	(Yes/No)
Revitalising chalk rivers (RCR) option 3 – Enhanced + (delivering 3 small and 3 large projects on each river) and resilient chalk catchments (RCC) C&NBS option D (Whole catchment)	N	N	No - Disproportionate, expensive and deliverability issues

Table 4.30 Consideration of unconstrained options for the Colne catchment

4.167 The unconstrained list was reviewed by technical experts from the catchment management, river restoration and capital delivery teams, with additional support and technical oversight of the cost benefit process from external consultancy. This resulted in a shorter list of feasible options being taken forward for coarse screening against the WINEP wider environmental outcomes. An excerpt is provided in Table 4.31 An example of course screening of unconstrained options to the constrained list for detailed options evaluation by way of example. See our full example provided with our plan submission in appendix AFW14a - Enhancement investment cases.

Option	Expected to meet statutory obligations(s) or non statutory requirements	Contribute to the WINEP wider environmental outcomes	Technically feasible	Deliverability
Revitalising Chalk Rivers (RCR) option 2	NNN	YYY	YYY	YYY
Revitalising Chalk Rivers (RCR) option 3	NN	YYY	Y	NNN
Resilient Chalk Catchments (RCC) C&NBS option B	NN	YY	YYY	YYY
Resilient Chalk Rivers (RCR) option 1 - Standard and Resilient Chalk	N	Y	YYY	YYY

Table 4.31 An example of course screening of unconstrained options to the constrained list for detailed options evaluation

Constrained/feasible options

4.168 We have then assessed these options against a comprehensive set of criteria, based upon the WINEP coarse screening criteria and Ofwat's requirements, to develop a shorter, constrained list. We then used our Option Evaluation Tool to score the constrained list to determine the feasible options for costing and cost benefit assessment to determine the best value option for customer. Details of the criteria and the options evaluation assessment using our Option Evaluation process, for which an example of the summary outputs is shown in Table 4.32 WINEP WFD River Restoration and Catchment and Nature-based Solution Actions new target areas not allowed in previous Price Reviews.

No.	Business Case	Criteria	Type	Definition	1	2	3	4	5	6	7	8	9	10	11
1	Strategic	Statutory obligation	Must do	Comply with the statutory obligations	NNN	NN	N	Y	YY	YY	YYY	YYY	YYY	YYY	YYY
2	Strategic	Non-statutory requirements	Must do	Achieve the non-statutory requirements	NNN	NN	N	N	N	YY	YYY	YYY	YY	YYY	YYY
3	Strategic	Customer support	Trade-off	Show customer support	-	-	-	-	-	-	-	-	-	-	-
4	Strategic	Collaboration / support	Trade-off	Gain support from partners and stakeholders	N	N	N	N	Y	Y	Y	Y	YY	YYY	YYY
5	Strategic	Strategic alignment	Trade-off	Support the SDS and AWS long-term strategy, outcomes and targets	Y	Y	Y	Y	Y	YY	YY	YY	YY	YYY	YYY
6	Strategic	Other strategies	Trade-off	Support the other relevant strategies, e.g. WRMP, Water basins, catchment strategies	Y	Y	Y	Y	Y	YY	YY	YY	YY	YYY	YYY
7	Strategic	Adaptive strategy	Trade-off	Ensure no / low regrets if strategy has to adapt in the future	N	Y	YYY	YY	YY	YY	YYY	N	N	NN	N
8	Strategic	Natural capital	Trade-off	Support the natural capital outcomes	Y	Y	YY	YYY	YYY	YY	YYY	YY	YY	YYY	YYY
9	Strategic	Net zero	Trade-off	Support the net zero outcomes	N	N	YY	YY	YY	YY	YYY	YY	YY	YY	YYY
10	Strategic	Catchment resilience	Trade-off	Support the catchment resilience outcomes	Y	Y	YY	YYY	YYY	YY	YYY	YYY	YYY	YYY	YYY
11	Strategic	Access, amenity and engagement	Trade-off	Support the access, amenity and engagement outcomes	Y	Y	Y	YY	YY	Y	Y	Y	YY	YY	YY
12	Strategic	Environmental net gain	Trade-off	Deliver a net environmental gain	Y	YY	YY	YY	YY	YY	YYY	YYY	YYY	YYY	YYY
13	Strategic	Environmental risk	Trade-off	Address an environmental risk	Y	Y	YY	YYY	YYY	YY	YYY	YYY	YY	YYY	YYY
14	Strategic	Climate change	Trade-off	Be resilient against climate change	Y	Y	YY	YY	YY	YY	YY	YY	YY	YYY	YYY
15	Strategic	Catchment and nature-based solution	Trade-off	Support the use of catchment and nature-based solutions	Y	YY	YYY	YYY	YYY	YYY	YYY	YYY	YYY	YYY	YYY
16	Strategic	Partnerships	Trade-off	Work closely with partners to provide wider benefits	Y	Y	YYY	YYY	YYY	YYY	YYY	YYY	YYY	YYY	YYY
17	Strategic	Innovation	Trade-off	Develop new technology and innovation	NN	NN	YY	YY	YY	YY	YY	YY	YY	YY	YY
18	Strategic	Uncertainty	Trade-off	Provide certainty in delivering the desired outcomes	NN	NN	N	N	N	Y	YY	YY	YY	YYY	YYY
19	Strategic	Evidence	Trade-off	Provide evidence to support the justification of the project	Y	Y	Y	N	N	YY	YY	Y	YY	YYY	Y
20	Commercial	Procurement	Trade-off	Be easily procured	Y	Y	Y	N	N	Y	Y	N	Y	NN	Y
21	Financial	Overall cost	Trade-off	Have a low overall cost	YYY	YYY	YY	N	N	YYY	YY	N	NN	NNN	N
22	Financial	Cost beneficial	Trade-off	Provide overall cost benefits to society	Y	Y	YYY	Y	Y	YY	YY	YY	YY	YYY	YY
23	Financial	Best value	Trade-off	Provide overall best value	NN	NN	N	NN	N	Y	YYY	N	NN	NNN	Y
24	Management	Deliverability	Trade-off	Manage the delivery risks	YY	YY	Y	Y	Y	Y	YY	NN	NN	NN	Y
25	Management	Resources	Trade-off	Be delivered with the available skills and resources	YY	YY	YYY	Y	Y	Y	Y	NN	NN	NNN	N
26	Management	Monitoring and reported	Trade-off	Be able to be monitored and reported	YY	YY	YY	Y	Y	YYY	YYY	YY	YYY	YYY	YY
				Ranking (5 – best)	1	1	2	2	4	5	4	3	3	3	3
				Constrained list	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				Feasible list	N	N	N	N	Y	Y	Y	N	N	N	N

Table 4.32 WINEP WFD River Restoration and Catchment and Nature-based Solution Actions new target areas not allowed in previous Price Reviews

4.169 For both the revitalising chalk rivers (river restoration) and resilient chalk catchments (catchment management) options, a bespoke scheme builder was used to develop the costs for the feasible options. Quotes used for each unit cost have been uplifted to the appropriate CPIH financial year average (2022 - 23 for the WINEP options assessment). An economic assessment following the WINEP methodology and the UK HM Treasury Green Book (2020) approach as the basis for the calculations. We undertook the analysis for the different options calculated the NPV's and benefit/cost ratios. Through this process we developed several options for analysis, undertook sensitivity studies, and combined projects for analysis as necessary to ensure we have selected the best option for customers.

Catchment	Option	2025 - 2030 cost [1]	NPV cost	Total NPV benefits	Total NPV
		(£)	(£)	(£)	(£)
Beane CaBA flagship project	Do nothing	0	0	0	0
	Preferred - River Restoration option 2, and option C with Nature Based Solution[2]	3,011,041	-4,896,713	6,494,054	1,597,341
	River Restoration option 2, and option B with Nature Based Solutions	2,408,621	-4,335,850	3,402,190	-933,660
	River Restoration option 2, and option D with Nature Based Solutions	4,974,091	-6,724,346	9,854,717	3,130,371
	Option C and Nature Based Solutions Only	1,873,260	-1,744,237	1,038,917	-705,321
	River Restoration only	1,137,780	-3,152,475	5,455,137	2,302,662
Colne	Do nothing	0	0	0	0
	Preferred - River Restoration Option 2, and Option C with Nature Based Solution[2]	4,389,888	-7,898,936	18,613,742	10,714,806
	River Restoration option 2, and option B with Nature Based Solutions	4,077,290	-7,444,910	9,714,130	2,269,221
	River Restoration Option 2, and option D with Nature Based Solutions	6,509,469	-10,977,473	25,955,090	14,977,617
	Option C and Nature Based Solutions only	1,218,950	-1,785,420	1,954,845	169,426
	River Restoration only	3,170,939	-6,113,516	16,658,897	10,545,380
Dour	Do nothing	0	0	0	0
	Preferred - River Restoration option 2, and option C with Nature Based Solution[2]	1,811,854	-3,005,970	2,576,717	-429,253
	River Restoration option 1, and option C with Nature Based Solutions	1,619,671	-2,634,736	1,931,828	-702,908
	River Restoration option 2, and option B with Nature Based Solutions	1,547,951	-2,622,670	2,299,780	-322,890
	Option C and Nature Based Solutions only	1,037,511	-1,521,893	1,286,940	-234,953
	River Restoration option 2 only	774,343	-1,484,077	1,289,777	-194,300
Lea	Do nothing	0	0	0	0
	Preferred - River Restoration option 2, and option C with Nature Based Solution[2]	4,636,755	-6,385,899	11,550,364	5,164,465
	River Restoration option 2, and option B with Nature Based Solutions	4,323,370	-5,930,730	6,687,443	756,714
	River Restoration option 2, and option D with Nature Based Solutions	7,870,424	-11,082,567	18,078,855	6,996,288
	Option C and Nature Based Solutions only	1,726,551	-2,537,657	3,030,010	492,353
	River Restoration only	3,021,563	-4,039,950	8,520,354	4,480,403
Ouse	Do nothing	0	0	0	0
	Preferred - River Restoration option 2, and option C with Nature Based Solution[2]	4,077,166	-4,864,157	5,734,477	870,321

Catchment	Option	2025 - 2030 cost [1]	NPV cost	Total NPV benefits	Total NPV
		[£]	[£]	[£]	[£]
	River Restoration option 2, and option B with Nature Based Solutions	4,012,829	-4,770,711	3,217,482	-1,553,230
	River Restoration option 2, and option D with Nature Based Solutions	5,246,221	-6,562,124	9,078,143	2,516,019
	Option C and Nature Based Solutions only	617,952	-912,514	895,971	-16,543
	River Restoration only	3,459,214	-3,951,643	4,838,506	886,864

Table 4.33 Consideration of constrained options by catchment

1 includes third party opex funding
2 original submission

4.170 We have also used our Copperleaf system to replicate and consolidate different projects and programmes of work across the whole asset base for our September 2023 business plan submission. Copperleaf combines our total investment programme and analysis the environmental and community and performance metrics.

4.171 The key features and assumptions of the economic analysis approach include:

- whole life costs, benefit and dis-benefit calculations
- net present values, calculated over a 30-year period
- benefit valuations and metrics, following the WINEP methodology in all areas
- use of the Consumer Price Index with Housing Costs for indexation for costs and benefits
- use of the RCV and the Spackman approach for capitalisation
- options presented in 2022 - 23 cost base
- depreciation of the financial costs using a Weighted Average Cost of Capital (WACC) of 2.92%, which is consistent with the value used for the development of our Long-Term Delivery Strategy.

4.172 The best value option determined from this process were reviewed against the relevant WISER requirements and documented in a table for each scheme, included in appendix AFW14a - Enhancement investment cases. This formed the basis of our Options Development Report submitted and accepted by the Environment Agency and agreed for inclusion in the WINEP.

4.173 In the PR24 WINEP Assurance Report produced by AtkinsRéalis as part of our third-party assurance process for the development of our WINEP programme for the September 2023 submission, in relation to optioneering AtkinsRéalis made the following statements in the Assurance Statement for the audits:

4.174 *"Affinity Water has developed the programme through a number of Business Cases. Each Business Case covers a number of individual WINEP actions, generally under multiple drivers. Initially, the Company developed a comprehensive approach, methodology and tools for Business Case leads to follow when preparing their options for each WINEP action.**This methodology has been designed to ensure that the options are developed in line with the Options Development Guidance, and this has been done effectively in our opinion.** The Business Case template has been designed to ensure it contains all of the information that the Environment Agency (EA) requires to be submitted in the Options Development Report (ODR) which accompany each WINEP action or set of actions.*

4.175 *The methodology was also designed to ensure that options development was carried out with regard to the six overarching WINEP principles. The Company has considered multiple options for each driver and taken a proportional approach to the number of options that were taken through the options appraisal process.* *There is also evidence that**catchment and nature-based solutions have been considered under multiple drivers**. The Company*

has also demonstrated that it ***has taken a collaborative approach to options development where appropriate****. Examples include working in collaboration with SE Water and Thames Water through the Thames Catchment Management Steering Group in development of schemes under the DrWPA driver, and stakeholder engagement to inform the schemes being developed for the Biodiversity Business Case and Water Resources Business Case.*

4.176 ***The Company's methodology and options appraisal process that has been used to assess the wider benefits of the schemes is also compliant with guidance in our opinion.*** *The benefits assessment has focussed on Biodiversity Net Gain and associated Natural Capital benefits, which aligns with the EA's recommended approach. The approach ensures that the contribution of the options to the wider WINEP environmental outcomes is quantified, and uses natural capital metrics to inform development of the options and selection of the preferred and least cost options.*

4.177 *In the majority of cases, Business Case leads have followed the methodology and used the available tools which has meant****that there is a strong and well evidenced decision-making trail for the preferred and least cost options (and alternative options where applicable)*** *for each action that will be proposed in the WINEP submission."*

4.178 We have followed a rigorous process that has considered a wide range of options, intervention types and combination of options that has determined the best value option both for customers, but to also deliver the best outcome for the environment and support meeting the wider environmental outcomes of the 25 Year Environment Plan.

4.179 As stated previously, the high quality of our options appraisal process is readily apparent and we do not agree with Ofwat's assessment, based on an erroneous application to the C&NBS (river restoration and catchment management) case of incorrect observations on the Connect 2050 and SR cases, that an insufficient number and range of options was considered.

Cost efficiency

Ofwats Enhancement assessment criteria grouping	Assessent comments	Criteria decision	% adjustment
Cost efficiency	We have come concerns whether the investment is efficient. The company does not provide sufficient and convincing evidence that the proposed costs are efficient. • The company states that the costs for each option have been calculated using a combination of unit cost model, which uses unit costs for river restorations and catchment management activities to build up projects, and costs from previous known work and schemes. • For **Sustainability reductions** Affinity Water states it used a strategic level optioneering process incorporating a number of different modelling processes, but does not reference cost efficiency. • **The company does not provide evidence to show that it has considered the efficiency of costs for its WFD schemes and does not evidence the use of external benchmarks.** • The company states that it used a third-party to carry out assurance of this business case but it **does not provide sufficient and convincing evidence of cost estimation and efficiency assurance**. • For the three pipelines included in this programme, we tested the efficiency in the Supply interconnector model using the relevant variables of length (km) and benefit (Ml/d). Based on this benchmarking we concluded that the pipeline schemes were efficient. **For the remainder of the cost request (non-interconnector component) we apply our cost efficiency** challenge (20%), due insufficient evidence for cost efficiency as described above. This results in an overall 7.56% challenge.	Partial pass	20%

Table 4.34 Ofwat's deep dive assessment of the cost efficiency for WINEP – C&NBS

4.180 These comments, and the consequential reduction, are irrelevant to the C&NBS (river restoration and catchment management) investment cases, being focused mainly on the Connect 2050 and sustainability reduction elements.

4.181 Notwithstanding the above, for completeness we provide supporting information here to address the challenges that Ofwat has made to the RR&CM case.

4.182 We are confident the cost proposed in our plan represent efficient costs and that our approach and level of assurance is sufficiently robust to evidence this. In the following sections we outline our approach for cost estimation in further detail, including data sources, benchmarking and the extensive third party assurance of these costs.

4.183 In summary, we address the key cost efficiency questions raised of our case in the following way in Table 4.35 Our response to cost efficiency questions.

Question	Company response
Is it clear how the company has arrived at its option costs? Is there supporting evidence on the calculations and key assumptions used and why these are appropriate?	The costs for each option have been calculated using a combination of our unit cost model which uses unit costs for river restorations and catchment management activities to build up projects, and costs from previous known work and schemes.
Is there evidence that the cost estimates are efficient (for example using similar scheme outturn data, industry and/or external cost benchmarking)?	The costs derived for the options are based on the 2015 - 2020 and 2020 - 2025 costs and are deemed to be accurate and efficient by third party assurance
Does the company provide third-party assurance for the robustness of the cost estimates?	We have used AtkinsRéalis to carry out third-party assurance of this business case

Table 4.35 Our response to cost efficiency questions

4.184 In the following sections we lay out our governance framework, including third party assurance of the robustness of costs, which was summarised within our original September 2023 submission appendix AFW08 - Our investment development process. We then provide a detailed breakdown of the costs, followed by detailed explanation of our methodology for developing these costs, data sources, assumptions and uncertainties and finally how these have been compared to other benchmarks.

Governance framework

4.185 All Enhancement business cases are governed through the below governance framework, ensuring quality to control and importantly that an appropriate approach to costing has been followed, with efficient costs put forward.

Governance process diagram

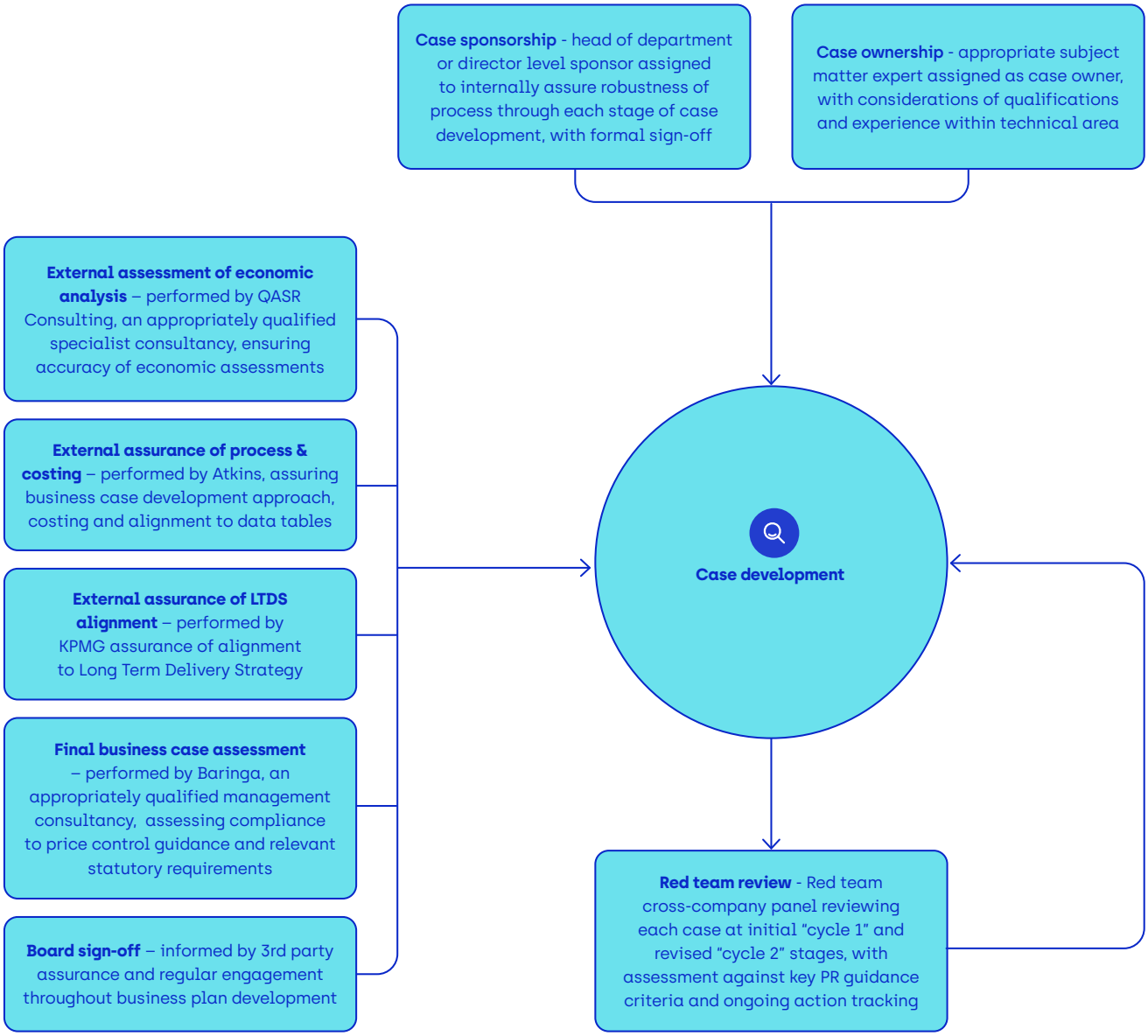


Figure 4.9 Our governance process

4.186 Given the specific nature of this scheme type, further detail is provided as to how these have been internally reviewed and externally assured.

Internal review

4.187 The costing methodology, cost estimates and scheme components were reviewed by our internal Catchment Management and River Restoration project managers within our Asset Strategy and Capital Delivery directorate. These were then reviewed and signed off by the relevant accountable Programme Sponsor (Head of department) and Portfolio owner (Director), benchmarking them against similar 2025 - 2030 schemes. The WINEP programme was presented to the Executive Leadership Team (ELT) and Board. A Board assurance statement was provided, in line with the WINEP methodology, for the November 2022 submission. The methodology and costing also went through external assurance.

External assurance

4.188 We commissioned AtkinsRéalis to undertake an independent assurance of our PR24 WINEP development process (including costing) and submission. The scope agreed focused on satisfying three areas:

1. Overall compliance of the WINEP to the overarching guidance and requirements
2. Driver specific compliance of the options development with the relevant driver guidance
3. Assurance that identification of the preferred and least cost options is underpinned by an adequate evidence base.

4.189 Our September 2023 business plan submission was also externally assured against the WISER by AtkinsRéalis, with a separate Assurance Report produced.

4.190 In the PR24 WINEP Assurance Report produced by AtkinsRéalis as part of our third-party assurance process for the development of our WINEP programme for the September 2023 submission, in relation to our costing approach, AtkinsRéalis made the following statements in the Assurance Statement for the audits:

4.191 *" Our assurance of the approach to costing of options focused on the Sustainability Reductions Business Case and the Colne Business Case for catchment and nature-based solutions and river restoration schemes.* ***At an early stage in our assurance process we raised a number of challenges and risks around the approach to costing for these two Business Cases. The Company has since made a number of changes to their methodology and assumptions that underpin the costings and we are satisfied that the approach taken is now in line with the guidance. Our review of the overall approach to cost development for the other Business Cases found it to be reasonable and well documented in our sample.***

4.192 *Overall, we formed the view that the methodology and process that Affinity Water has developed and implemented to produce its PR24 WINEP submission is compliant with the overarching guidance and requirements. The specific WINEP actions in each Business Case have also been developed in line with the more detailed guidance for each driver.* ***The overall approach and methodology that has been used to develop the costs of each option and assess the benefits of each option appears to be sound, and provides a good audit trail of the decision-making process.***"

Cost structure

Schemes	Cost			
	Capex (£m)	Opex (£m)	Totex (£m)	Third party 'target' funding inc. in CBA (£m)
River restoration project – Upper Lea Operational Catchment (covering rivers Lea, Mimram, Rib, Ash, Stort)	0.00	2.966	2.966	
Catchment & NbS – Upper Lea operational catchment	0.00	1.348	1.348	
Upper Lea operational catchment total		**4.314**	**4.314**	**0.323**
River Restoration projects – Colne Operational Catchment (covering rivers Colne, Misbourne, Chess, Bulbourne, Gade, Ver)	0.00	3.170	3.170	
Catchment & NbS – Colne operational catchment	0.00	0.987	0.987	
Colne operational catchment total		**4.157**	**4.157**	**0.233**
River Beane CaBA flagship restoration projects	0.00	1.138	1.138	
River Beane CaBA flagship C&NbS	0.00	1.51	1.51	
Beane flagship total		**2.648**	**2.648**	**0.364**
River restoration projects – Dour & Little Stour	0.00	0.774	0.774	
C&NbS East Kent chalk	0.00	0.841	0.841	
Dour & Little Stour total		**1.615**	**1.615**	**0.196**
River restoration projects – Ivel & Cam operational catchments (covering rivers Hiz, Ivel, Cam)	0	3.459	3.459	
C&NbS – Ivel catchment	0.00	0.506	0.506	
Ivel & Cam operational catchment total		**3.965**	**3.965**	**0.112**
Total	**0.00**	**16.699**	**16.699**	**1.228**

Table 4.36 Cost structure for WINEP - C&NBS

Methodology procedure - cost estimate technique

4.193 We have developed a robust and comprehensive cost estimating system for the WINEP activities. Costs have been collated from historical schemes to develop a set of unit costs for catchment management activities and a project unit cost for river restoration schemes. For both the river restoration and catchment management options, a bespoke unit cost spreadsheet and scheme builder have been used with quotes and historic costs from measures delivered in 2020 - 2025 and wider schemes that we have participated in to develop the costs for the feasible options. Quotes used for each unit cost have been uplifted to the appropriate CPIH financial year average (2022 - 23 or the WINEP options assessment).

Cost estimate workstream flow diagram

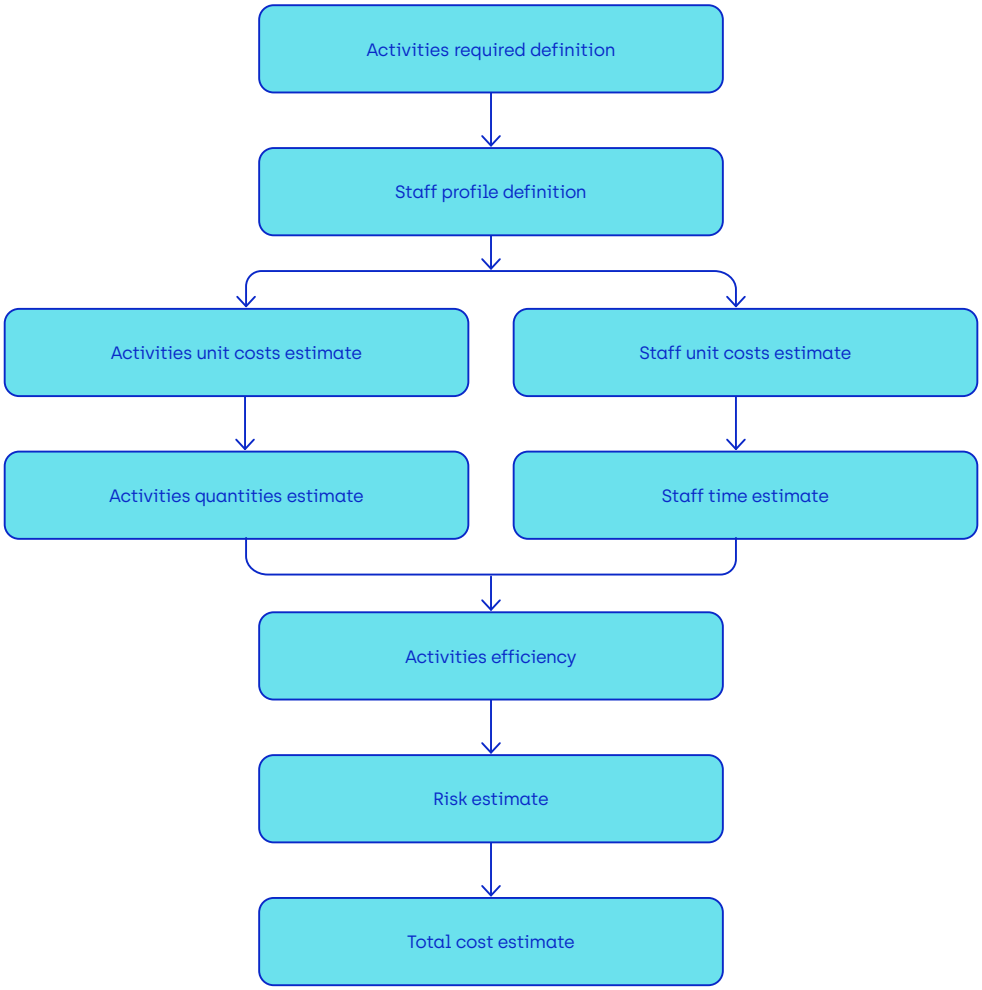


Figure 4.10 Cost estimate workstream flow diagram

4.194 Projects have been costed using a bottom-up approach, as these WINEP schemes build on previous experience in previous periods. We have a good understanding of requirements and have used this experience to improve and refine our approach.

4.195 We used a bespoke 'scheme builder' tool with pre-defined drop-down fields and associated macros that has been successfully audited during the WINEP process. This guaranteed uniform approach and consistency across estimates. A similar approach was used for PR19 WINEP and has proved to be appropriate in the delivery of our 2020 - 2025 programme.

Component definition	Description	Efficiency / improvements
Activities required	Activities determined based on similar types of work undertaken in 20215 - 2020 and 2020 - 2025	Lessons learned incorporated into scheme components & unit costs e.g. benefit of early stakeholder/landowner engagement and early identification of permitting requirement.
	Innovative solutions e.g. new Payment for Ecosystem services (PES) schemes	Higher degree of uncertainty to be addressed in Action Specification Forms to be developed with EA.
Staff profile	Staff profile determined based on activity type e.g. as general rule, we assigned a combination of Asset Scientist, Project Manager and Project Director roles. Time for supervision and approval of subcontracted costs included.	In house training and development to ensure competency and drive efficiency in day-to-day project delivery.

Component definition	Description	Efficiency / improvements
	Subcontracted staff costs embedded in subcontracted costs.	
Activities unit cost estimate	Most likely costs determined based on same/similar activities cost spend in past e.g. Asset Scientist assigned larger number of hours for field-based activities. Project Manager, Project Director time assigned for supervision and process approvals.	Activity efficiencies identified where possible to group field-based activities together by catchment location to reduce travel time etc
Total cost estimate	Sum of activity costs. For internal activities cost was determined by multiplying activity unit cost for the estimated quantity and summing up unit time staff multiplied for time quantity. For subcontracted activities, the cost is calculated by multiplying the unit cost for the activity quantity	Benchmarking of activities against River Restoration centre Use of supply chain

Table 4.37 Approach taken to develop cost estimates and benchmark costs to determine best value option(s)

Data Sources

4.196 We have extensive experience in river restoration and catchment management activities and have used this, along with quotes, bills of quantities and actual 2015 - 2020 and 2020 - 2025 spend data to take a bottom-up approach to costing the proposed 2025 - 2030 schemes. By their nature, these interventions are very site specific, and so a bottom-up approach tailoring the scope of each intervention is required.

4.197 The compilation of costs has been benchmark using Motts cost curves, undertaken by experienced Project and Programme Managers reviewed by technical leads and signed off by the Programme sponsor.

4.198 As noted above, external assurance was undertaken by AtkinsRéalis to confirm that identification of the preferred and least cost options were underpinned by an adequate evidence base.

Scheme	Data source	Description	Identification of limitations & gaps	Impact assessment of limitation & gaps
River restoration	Affinity cost estimating spreadsheet based on historical project costs from 2015 - 2020 and 2020 - 2025 delivery. Unit cost per project unit calculated	Costs for different types of schemes e.g. weir bypass, creation of in-channel features, fencing, tree work, habitat enhancement	Historic project delivery and may not take account of site-specific requirements. Projects will be screened on feasibility before commencing works. New EA permitting requirements not encountered in historic project delivery.	Low impact on cost as based on delivered historic works
Catchment management	Affinity cost model based on historical project costs from 2015 - 2020 and 2020 - 2025 schemes	Cost for different types of scheme intervention e.g. cover crops, companion crops	External influences of crop prices and government grants may influence uptake of schemes	Low impact on cost as based on delivered historic works
Natural capital assessment	Natural capital assessment and account for the Beane catchment undertaken by AtkinsRealis	Independent assessment of the natural capital benefits of catchment management, river restoration, biodiversity and abstraction reductions in the Beane catchment.	Assessment used to support cost benefit assessment and wider environmental outcomes	Medium – provides evidence of benefit realisation from historical project delivery

Table 4.38 Data sources for WINEP - C&NBS

Documenting assumptions and uncertainties

4.199 In developing our costs, we assessed the assumptions and uncertainties which could have a material bearing on our cost estimates (and likelihood of outcome), as tabulated below. Visibility of these assumptions was part of our governance process so that decision makers in the company were made aware of them.

Assumptions	Description	Purpose
Cost assumptions	(e.g. prices, efficiencies) Prices have been based on historical actual spend, uplifted to 2022 - 23 price base Our experience in delivering similar projects over the last 10 years has allowed us to improve our cost estimating and efficiency in delivery. As we have become more mature, we have used frameworks, catchment partnerships and identified better ways to deliver project outcomes. River restoration projects have been costed using a project unit cost approach as defined in our 2020 - 2025 bespoke River Restoration Performance Commitment, based on delivery of 'large' and 'small' projects. Third party funding will be secured up to 25% of project costs for schemes with non-statutory secondary/tertiary drivers.	
Commercial assumptions	(e.g. contracting decisions, risk appetite) We will deliver work through a mixture of inhouse delivery through our technical Catchment & River Restoration teams and input from our supply chain. River Restoration design and construction will be undertaken by our Framework Contractors. Third party partnership funding and co-delivery will be sought where opportunities allow and in line with the WINEP methodology for up to 25% contribution for schemes with non-statutory driver(s). Landowners will grant permission to undertake works. Farmers will want to sign up to schemes Supply chain will be able to deliver projects (sufficient green skills and capacity to support industry delivery of WINEP schemes) Appropriate environmental permitting (Flood Risk Activity Permits, Impoundment licences etc) will be issued by EA in a timely manner.	
Environmental outcomes:		
Natural capital assessment	Evidence base from independently assessed case study of 6:1 benefit:cost	Evidence and monetised benefits of delivery of wider environmental outcomes e.g. biodiversity, water quality. Used to support best value option.
Length of river improved	We assume that the whole length of river to the next feature (e.g. weir, structure, impoundment) will be improved to some extent.	
Air quality, pollution reduction & CO2 sequestration	We assume a single year benefit for measures deployed. We assumed a total area that the preferred option will benefit based. We have used the outputs from a natural capital evaluation of a number of historic schemes to quantify benefits of previous interventions and provide confidence in the wider ecosystem services benefits of our planned 2025 - 2030 programme.	

Table 4.39 Assumptions for WINEP - C&NBS

Considerations	Assessment
Novelty and complexity of the scheme	Low. The schemes build on previous experience.
Maturity of the scheme design	Medium. The schemes have been designed around a tried and tested approach, working collaboratively with landowners and catchment partners.
Availability of benchmark/ historic data for similar schemes, and the quality of this data	High. Available historic project costs for similar river restoration and catchment management interventions.
The objective of the cost estimate	Informing decision making during the optioneering.

Table 4.40 Considerations and assessment of cost estimating techniques

Accounting for	Adjustments
Uncertainty	There is uncertainty over where the exact location the C&NBS (River Restoration and Catchment Management) interventions will be undertaken. We do however have an extensive list of potential river restoration projects that has been developed through walkover surveys, giving us confidence that there is a sufficient number of locations where projects can be undertaken. Projects will be identified and agreed with the Environment Agency to ensure they deliver environmental benefit. No locations will overlap with those delivered during previous periods, as laid out within the Need for Enhancement investment sub-section of this representation. Uncertainties around climate change and associated flood, drought and other impacts. We will use an adaptive management approach to develop C&NBS that are resilient to changing climate change scenarios throughout 2025 - 2030 and 2030 - 2035.
Risk	We have delivered similar river restoration improvement works and catchment management schemes in 2015 - 2020 and 2020 - 2025 and therefore have a strong understanding of the delivery risks and how best to manage these. Landowner permission and access to undertake works and EA permitting requirements. This has been mitigated by phasing the programme over 2025 - 2030 and 2030 - 2035, in line with the WINEP methodology.

Table 4.41 Calculation of the cost estimate accounting for uncertainty and risk

Benchmarking of river restoration activities

4.200 Our river restoration programme in 2015 - 2020 and 2020 - 2025 has worked with a framework for four contractors who provide design and/or construction services. We obtain competitive quotes and design/construction options to ensure best value to our customers on every scheme. We are also members of the River Restoration Centre host the national river restoration inventory. We have benchmarked against comparable external benchmarks. For example, we have compared our three 'channel realignment' scheme costs to the 50 channel realignment schemes in the inventory. Although it is difficult to draw direct comparisons between schemes as each scheme is unique, our average cost per scheme is £0.613m compared to the national river restoration inventory average of £1.797m.

Benchmarking of catchment management initiatives

4.201 Our schemes align with the Defra sustainable farm payments, and so these are consistent with rates applied by all sectors.

Further evidence of an efficient programme

4.202 In addition to the efficiency of our unit costs, the proposed programme of interventions is clearly economically efficient in the sense of the output per input, as summarised in Table 4.42 Summary of programme level cost benefit assessment.

4.203 In delivering the plan, we will also ensure that the application of our multi-Capitals Service Measure Framework in our Risk & Value process which continues to seek opportunities to create additional value, maximising transformation of Financial Capital into other Capitals.

2025-30 Cost	NPV Cost	Total NPV benefits	Total NPV
(£m)	(£m)	(£m)	(£m)
16.699 (2025 - 2030 Totex)			
1.228 (3rd party contribution to project costs)	-27.052	44.969	17.918
17.927			

Table 4.42 Summary of programme level cost benefit assessment

4.204 Our overall approach to cost efficiency has been robust and has been checked and assured through our independent assurance process. We addressed the challenges and risks raised within this process to ensure a high-quality assessment outcome which is fully compliant with the WINEP and Ofwat methodologies and therefore challenge the 7.56% adjustment made against the costs for these WINEP WFD actions.

4.2.3 WINEP Water Resources Investigations (complex)

Scheme	Sep 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
WINEP Investigations (complex)	10.00	4.87	10.00

Table 4.43 WINEP Investigations (complex) scheme adjustments

Our Representation

4.205 This suite of investigations in our Water Industry National Environment Programme (WINEP) includes our Water Resources investigations that have been included in the data tables under the 'multiple surveys, and/or monitoring locations, and/or complex modelling water' category.

4.206 Ofwat has undertaken a benchmark model assessment based on the unit cost per WINEP Action ID.

4.207 The proposed allowances for these investigations are materially less than the required costs to adequately undertake these investigations. These investigations are essential for our Long-Term Delivery Strategy. The draft Determination allowances are insufficient to establish the detailed understanding required to make informed decisions on future sustainability reductions and other interventions, which will drive hundreds of millions of pounds expenditure over subsequent investment periods.

4.208 The assessment approach taken by Ofwat ignores Action ID complexity. Investigations have been grouped by Environment Agency operational catchments, with a single Action ID per catchment. The number of investigations is reflected as suffixes (component codes) to each action. The relationship between Action ID and level of investment required is therefore arbitrary and Action ID should not be used directly as the sole driver of costs.

4.209 PCD - No PCD has been applied by Ofwat to this scheme as the value at draft Determination does not meet the materiality threshold.

Draft Determination – Water Resource investigations ('complex')

4.210 Our investment for Water Resource (WR) Investigations included 13 WINEP Action IDs, as per Table 4.44 Water Resource investigations.The schemes are a combination of four WINEP groups (indicated by the shaded cells in Table 42): WFD Flow Investigation Water, Biodiversity, Environmental Destination, WFD Groundwater. Be aware that an additional WINEP investigation has been requested by EA on 31 July 2024; further details can be found in the Additional considerations section below.

Title	WINEP action reference	Driver	WINEP group	Investigations lines	Requested scheme cost	Scheme unit cost benchmark allowance	Scheme WINEP group benchmark allowance	Final modelled scheme allowance
					(£m)	(£m)	(£m)	(£m)
River Cam	08AF100026	WFD_NDINV_WRFlow	WFD (flow investigations) Water	CW3.34 -3.36	0.788	0.43	0.297	0.364
Hiz	08AF100027	WFD_INV_WRHMWB	WFD (flow investigations) Water	CW3.34 -3.36	0.607	0.43	0.297	0.364
Stansted Brook	08AF100030	WFD_INV_WRFlow	WFD (flow investigations) Water	CW3.34 -3.36	0.338	0.43	0.297	0.364
Nailbourne	08AF100036	WFD_INV_WRFlow	WFD (flow investigations) Water	CW3.34 -3.36	0.545	0.43	0.297	0.364
Seabrook Stream	08AF100037	WFD_INV_WRFlow	WFD (flow investigations) Water	CW3.34 -3.36	0.398	0.43	0.297	0.364
Dour	08AF100038	WFD_NDINV_WRFlow	WFD (flow investigations) Water	CW3.34 -3.36	0.491	0.43	0.297	0.364
Oughton Head	08AF100028	NERC_INV	Biodiversity	CW3.34 -3.36	0.456	0.43	0.168	0.299
Denham Lock Wood, Frays Farm	08AF100032	SSSI_INV	Biodiversity	CW3.34 -3.36	0.211	0.43	0.168	0.299
Hydrological Behaviour	08AF100039	NERC_INV	Biodiversity	CW3.34 -3.36	0.318	0.43	0.168	0.299
Ivel US Henlow	08AF100029	EDWRMP_INV	Environmental Destination	CW3.34 -3.36	0.969	0.43	0.582	0.506
Secondary effects of SR HNL	08AF100033	WFDGW_INV	WFD- Groundwater	CW3.34 -3.36	3.856	0.43	0.544	0.487
Secondary effects of SR EAN	08AF100034	WFDGW_INV	WFD- Groundwater	CW3.34 -3.36	0.544	0.43	0.544	0.487
LLT Investigation	08AF100040	WFDGW_INV	WFD- Groundwater	CW3.34 -3.36	0.413	0.43	0.544	0.487

Table 4.44 Water Resource investigations

4.211 A further four Biodiversity WINEP investigations are represented in Table 4.45 Additional Biodiversity WINEP schemes included in Water Resource investigations. These were included within our Biodiversity business case and assessed by Ofwat alongside the WR investigations. Whilst we stand by our original business plan submission, we are not challenging the allowance for the 'simple' investigations as detailed in Table 4.45 Additional Biodiversity WINEP schemes included in Water Resource investigations as the reduction in allowed costs does not represent a material risk to the outcomes for our customers when taken in the round of our total Enhancement allowances, provided the more material concerns laid out in other areas of this Representation are addressed.

Title	WINEP action reference	Driver	WINEP group	Investigations lines	Requested scheme cost	Scheme unit cost benchmark allowance	Scheme WINEP group benchmark allowance	Final modelled scheme allowance
					(£m)	(£m)	(£m)	(£m)
Walton WTW Fish Screen	08AF100001	EE_INV	Eels, fish and salmon	CW3.31 - 3.33	0.305	0.43	0.159	0.295
Horsell Common, Cowslip Meadow and Dungeness SSSI	08AF100002	SSSI_INV	Biodiversity	CW3.31 - 3.33	0.56	0.43	0.168	0.299
Species Reintroduction	08AF100004	NERC_INV	Biodiversity	CW3.31 - 3.33	0.834	0.43	0.168	0.299
Raw Water Transfer INNS Mitigation	08AF100009	INNS_INV	INNS	CW3.31 - 3.33	0.225	0.43	0.225	0.328

Table 4.45 Additional Biodiversity WINEP schemes included in Water Resource investigations

4.212 The total estimated costs for all schemes in Table 4.44 Water Resource investigations and Table 4.45 Additional Biodiversity WINEP schemes included in Water Resource investigations was £11.858M. The allowed costs in the draft Determination are £6.266M. This represents a reduction of approximately 48%.

4.213 Funds allocated to each scheme are also included in the Final Model Scheme Allowance column in Table 4.44 Water Resource investigations and Table 4.45 Additional Biodiversity WINEP schemes included in Water Resource investigations; these are derived from Ofwat's benchmark model output (PR24 – DD – W Investigation).

4.214 We have analysed the benchmark model output and have two material concerns which undermine Ofwat's ability to accurately assess the costs:

A. WINEP Action ID components: the Ofwat benchmark model assigns funds based on the number of WINEP Action IDs; the WINEP action components (suffixes) are not accounted for in the allocation of funds

B. Individual investigation features: The model does not sufficiently take into account geographic extent of the catchment under investigation, the number of groundwater abstractions under investigation, the volume of licence under investigation and the individual level of complexity/type of the investigation within the same "complex investigation" group.

4.215 Consideration of the modelling results and therefore costs which would have been allocated if concerns A) and B) were remedied are included in the Additional considerations section below.

WINEP Action ID Components

4.216 The Final Model Scheme Allowance (FMSA) is the average of a Scheme Unit Cost Benchmark Allowance (SUCBA) and Scheme WINEP Group Benchmark Allowance (SWGBA) (See Table 4.44 Water Resource investigations and Table 4.45 Additional Biodiversity WINEP schemes included in Water Resource investigations).

4.217 SUCBA is calculated as a median of average costs per Water Company; the average cost per Water Company is calculated as Total Request divided by the number of Action ID; Calculated SUCBA for Water Resource Investigations is £0.430M (Table 4.46 Scheme Unit Benchmark Allowance (SUCBA) from PR24-DD W Investigations – Tab Unit Cost). The unit cost calculated by Ofwat for our investigations based the total cost included in our September 2023 business plan submission divided by the number of WINEP Action ID was £0.698M.

Company	Total Number of Investigations	Unit Cost per Action (£m)	Total Request (£m)	Median Unit Cost Modelled Allowance	Regression Unit Cost Modelled Allowance (£m)	Median efficiency (%)	Regression Cost effeciency (%)
ANH	10	0.920	9.201	4.301	6.287	213.92%	146.35%
WSH	26	0.275	7.148	11.183	13.404	63.92%	53.33%
HDD	7	0.127	0.889	3.011	4.952	29.53%	17.95%
NES	46	0.151	6.928	19.786	22.300	35.02%	31.07%
SVE	113	0.430	48.604	48.604	52.103	100.00%	93.28%
SWB	37	0.416	15.41	15.915	18.297	96.83%	84.22%
SRN	15	0.803	12.047	6.452	8.511	186.72%	141.55%
TMS	54	0.494	26.702	23.227	25.859	114.96%	103.26%
NWT	56	0.477	26.685	24.087	26.749	110.79%	99.76%
WSX	28	0.710	19.886	12.043	14.294	165.12%	139.13%
YKY	27	0.355	9.592	11.613	13.849	82.59%	69.26%
AFW	17	0.698	11.858	7.312	9.401	162.17%	126.14%
BRL	18	0.110	1.981	7.742	9.845	25.59%	20.12%
PRT	10	0.448	4.481	4.301	6.287	104.18%	71.28%
SEW	36	1.637	58.943	15.484	17.852	380.66%	330.17%
SSC	14	0.163	2.288	6.022	8.066	38.00%	28.37%
SES	10	0.170	1.699	4.301	6.287	39.50%	27.02%
Median Unit Cost:		**0.430**	**264.342**	**225.385**	**264.342**	**117.28%**	**100.00%**

Table 4.46 Scheme Unit Benchmark Allowance (SUCBA) from PR24-DD W Investigations – Tab Unit Cost

4.218 The Scheme WINEP Group Benchmark Allowance (SWGBA) is calculated for each WINEP group as median of all the WINEP scheme requests from all Water Companies, for that WINEP group (Table 4.47 Scheme WINEP Group Benchmark Allowance (SWGBA) from PR24 – DD – W Investigation - Tab WINEP Group Unit Cost).

WINEP Group	Median Unit Cost by WINEP Group (£m)
Eels, fish & salmon	0.159
Biodiversity	0.168
INNS	0.225
WFD (Flow Investigations)Water	0.297
Environmental destination	0.582
WFD- Ground Water	0.544
Drinking Water Protected Areas	0.361
European Sites	0.254
25 Year - Env Plan	0.293
WFD (Water Quality)	0.529
WFD Water	0.275

Table 4.47 Scheme WINEP Group Benchmark Allowance (SWGBA) from PR24 – DD – W Investigation - Tab WINEP Group Unit Cost

4.219 The Final Model Scheme Allowance is assigned to each WINEP Action ID. Affinity Water included 17 WINEP Action IDs in the WINEP Proposal (13 for Water Resources and 4 for Biodiversity added by Ofwat to the WR Business case total). These account for a total of 36 Action Components (with one additional Action ID and Action Component added now to the original schemes as detailed in "additional considerations" section).

4.220 The Number of Action IDs used in our September 2023 business plan followed the WINEP methodology agreed with EA, ***'it is recommended to use a single Action ID with multiple Action Components when the actions refer to the same wider catchment or are part of the same group of investigation'.*** For example, Affinity Water included one single Action ID for the River Cam investigation (WINEP ID 08AF100026), which incorporated seven individual Action Components, as the investigation is undertaken across seven WFD Waterbodies (Table 4.48 An example of the use of Action ID and Multiple Components for River Cam waterbody investigation and Figure 4.11 Map showing an example of WFD waterbodies, sources under investigation River Cam Action ID – Waterbodies under investigation map). The investigation includes three groundwater abstraction sites (Wenden, Debden Road and Newport).

Action ID	Action component	Primary driver	WFD waterbody	WFD GW body number
08AF100026	a	WFD_NDINV_WRFlow	Cam (US Newport)	GB105033037480
08AF100026	b	WFD_NDINV_WRFlow	Cam (Newport to Audley End)	GB105033037550
08AF100026	c	WFD_NDINV_WRFlow	Cam (Audley End to Stapleford)	GB105033037590
08AF100026	d	WFD_NDINV_WRFlow	Wicken Water	GB105033037540
08AF100026	e	WFD_NDINV_WRFlow	Debden Water	GB105033037490
08AF100026	f	WFD_NDINV_WRFlow	Wendon Brook	GB105033037560
08AF100026	g	WFD_NDINV_WRFlow	Slade	GB105033037580

Table 4.48 An example of the use of Action ID and Multiple Components for River Cam waterbody investigation

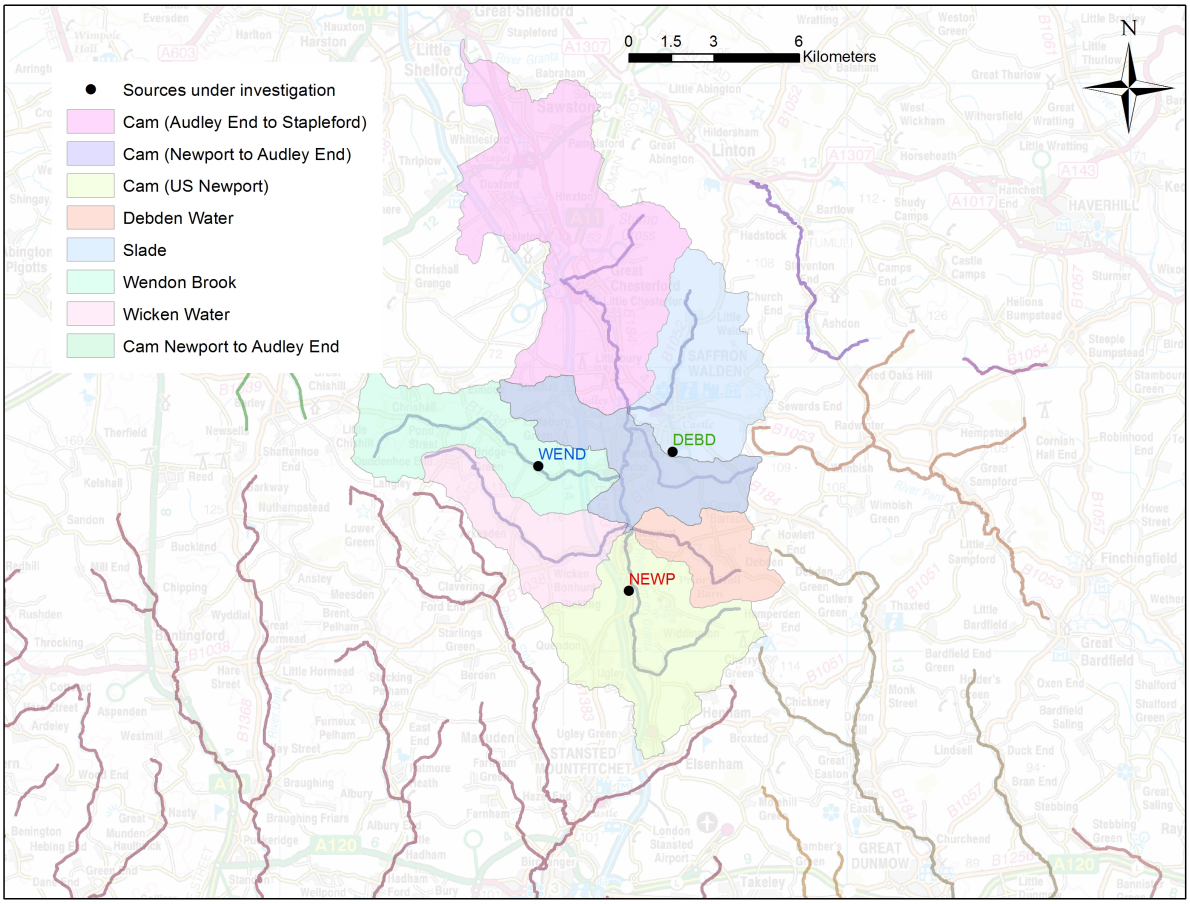


Figure 4.11 Map showing an example of WFD waterbodies, sources under investigation River Cam Action ID – Waterbodies under investigation map

4.221 Our request for a similar investigation within the same WINEP Group (WFD Flow Investigation Water) for the nearby Stanstead Brook (08AF100030) included instead one single line (one Action Component), as the investigation covers only one WFD waterbody (Table 4.49 Stanstead Brook Action IDs – Waterbody under investigation and Figure 4.12 Stanstead Brook and River Cam Action IDs – Waterbodies under investigation map).

Action ID	Action component	Primary driver	WFD waterbody	WFD waterbody N.
08AF100030	a	WFD_INV_WRFlow	Stanstead Brook	GB106038040090

Table 4.49 Stanstead Brook Action IDs – Waterbody under investigation

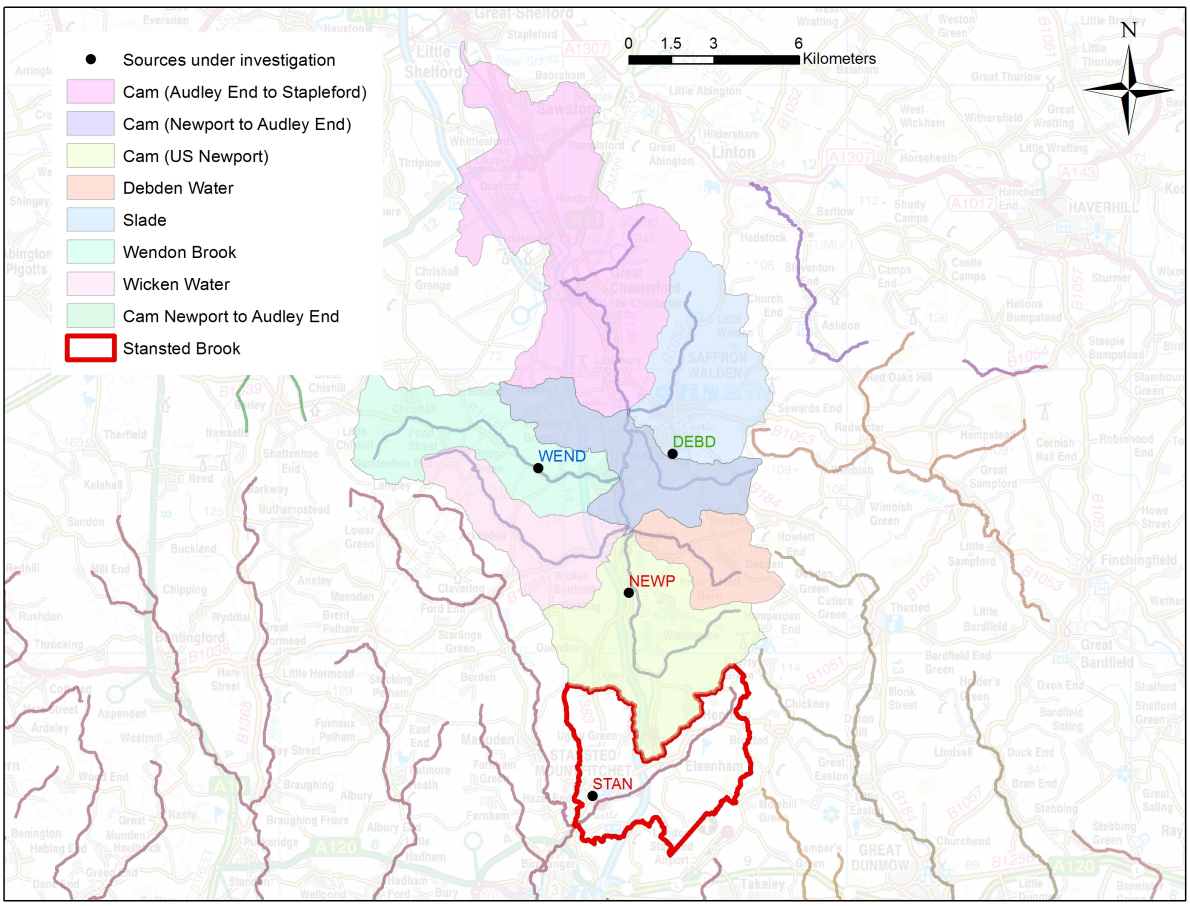


Figure 4.12 Stanstead Brook and River Cam Action IDs – Waterbodies under investigation map

4.222 The reason for grouping all the waterbodies in the Cam catchment under a single Action ID is because they hydrologically and hydrogeologically belong to the same catchment within the Cam Ely Ouse Chalk groundwater body (draining water towards Cambridge) and each groundwater abstraction under investigation might affect flow in the other nearby waterbodies within the Cam catchment. Combining all seven waterbodies for the Cam under a single investigation (corresponding to a single action ID 08AF100026) is more efficient and ensures consistency and alignment between the outcomes.

4.223 Whereas, the Stanstead Brook belongs to the separate Upper Lea Chalk groundwater body, draining towards London basin and the Stansted groundwater abstraction will unlikely affect the flow in the Cam.

4.224 As the Ofwat benchmark model assigned funds according to the number of Action IDs, the River Cam catchment investigations with seven Action Components received the same funds (£0.364M) assigned that Stanstead Brook investigation. This represented about 46% reduction for the Cam and an increase of 8% for the Stanstead Brook (Table 4.50 Stanstead Brook and River Cam Final Model Scheme Allowance against Original Business Plan Cost Estimate) below.

Title	WINEP action reference	WINEP component	Requested scheme cost	Scheme unit cost benchmark allowance	Scheme WINEP group benchmark allowance	Final modelled scheme allowance	Reduction/ increase	Waterbody area	Sources under investigation	Licence volumes under investigations
			(£m)	(£m)	(£m)	(£m)	(%)	(km^2)	Nr	(Ml/d annual equivalent)
River Cam	08AF100026	a,b,c,d,e,f,g	0.788	0.43	0.297	0.364	0.461929	178	3	6.48

Title	WINEP action reference	WINEP component	Requested scheme cost	Scheme unit cost benchmark allowance	Scheme WINEP group benchmark allowance	Final modelled scheme allowance	Reduction/ increase	Waterbody area	Sources under investigation	Licence volumes under investigations
			(£m)	(£m)	(£m)	(£m)	(%)	(km^2)	Nr	(Ml/d annual equivalent)
Stansted Brook	08AF100030	a	0.338	0.43	0.297	0.364	1.076923	25	1	2.73

Table 4.50 Stanstead Brook and River Cam Final Model Scheme Allowance against Original Business Plan Cost Estimate

4.225 As visible from Table 4.50 Stanstead Brook and River Cam Final Model Scheme Allowance against Original Business Plan Cost Estimate, Figure 4.11 Map showing an example of WFD waterbodies, sources under investigation River Cam Action ID – Waterbodies under investigation map and Table 4.50 Stanstead Brook and River Cam Final Model Scheme Allowance against Original Business Plan Cost Estimate above, each individual waterbody within the Cam catchment has a comparable area to the Stanstead Brook waterbody: i.e. the total area of the Cam waterbodies is c.178km^2 compared to c.25km^2 for the Stanstead Brook. If we had split the total £0.788m original cost estimate in our business plan into seven and assigned a different Action ID to each of the seven Cam WINEP Action Components, based on Ofwat's assessment methodology we would have received a funding allowance of c.£0.364m x 7 – £2.548m (although we note that if Ofwat rebuilt the model to incorporate more than one Action Component, as guided by the WINEP methodology, the median values for SUCBA and SWGBA would have marginally decreased).

4.226 The same criteria are applied across all other schemes with multiples Action Components within all WINEP Model Groups.

4.227 Our approach to use multiple Action Components against a single Action ID to encompass more than one WFD waterbody ID within a catchment is consistent with the WINEP guidance ("Read me" tab of PR24 WINEP spreadsheet). If we had assigned a single Action ID to each Action Component, and if we assume the same FMSA per WINEP Group as the draft Determination output, our overall FMSA for the WINEP Investigation would have resulted in a total allowance of **£12.865m** against our original request of **£11.858m**. Excluding the accepted allowance for the simple investigations, the revised investigation total cost estimate would be **£11.046m.** This indicates that overall, our original costs estimates are in line with the mean requests submitted by the water industry and should therefore be uplifted to align with our original business plan submission. Please see Table 4.51 Final model scheme allowance with single Action ID component schemes for details of original cost estimate, Ofwat's modelled allowances and our calculation of the revised scheme allowance, considering the individual WINEP Action Components.

WINEP Action Reference	WINEP Component	WINEP Group	Requested Scheme Cost	Scheme Unit Cost Benchmark Allowance	Scheme WINEP Group Benchmark Allowance	Final Modelled Scheme Allowance		Accept or Represent
			£(m)	£(m)	£(m)	£(m)	£(m)	
08AF100001	a	Eels, fish & salmon	0.305	0.43	0.159	0.295	0.295	Accept
08AF100002	a	Biodiversity	0.56	0.43	0.168	0.299	0.299	Accept
08AF100002	b	Biodiversity					0.299	Accept
08AF100002	c	Biodiversity					0.299	Accept
08AF100004	a	Biodiversity	0.834	0.43	0.168	0.299	0.299	Accept
08AF100009	a	INNS	0.225	0.43	0.225	0.328	0.328	Accept
08AF100026	a	WFD (Flow Investigations)Water	0.788	0.43	0.297	0.364	0.364	Represent
08AF100026	b	WFD (Flow Investigations)Water					0.364	Represent
08AF100026	c	WFD (Flow Investigations)Water					0.364	Represent
08AF100026	d	WFD (Flow Investigations)Water					0.364	Represent
08AF100026	e	WFD (Flow Investigations)Water					0.364	Represent
08AF100026	f	WFD (Flow Investigations)Water					0.364	Represent
08AF100026	g	WFD (Flow Investigations)Water					0.364	Represent
08AF100027	a	WFD (Flow Investigations)Water	0.607	0.43	0.297	0.364	0.364	Represent
08AF100028	a	Biodiversity	0.456	0.43	0.168	0.299	0.299	Represent
08AF100029	a	Environmental destination	0.969	0.43	0.582	0.506	0.506	Represent
08AF100030	a	WFD (Flow Investigations)Water	0.338	0.43	0.297	0.364	0.364	Represent
08AF100032	a	Biodiversity	0.211	0.43	0.168	0.299	0.299	Represent
08AF100032	b	Biodiversity					0.299	Represent
08AF100032	c	Biodiversity					0.299	Represent
08AF100033	a	WFD- Ground Water	3.856	0.43	0.544	0.487	0.487	Represent

WINEP Action Reference	WINEP Component	WINEP Group	Requested Scheme Cost	Scheme Unit Cost Benchmark Allowance	Scheme WINEP Group Benchmark Allowance	Final Modelled Scheme Allowance		Accept or Represent
			£(m)	£(m)	£(m)	£(m)	£(m)	
08AF100033	b	WFD- Ground Water					0.487	Represent
08AF100034	a	WFD- Ground Water	0.544	0.43	0.544	0.487	0.487	Represent
08AF100034	b	WFD- Ground Water					0.487	Represent
08AF100036	a	WFD (Flow Investigations)Water	0.545	0.43	0.297	0.364	0.364	Represent
08AF100036	b	WFD (Flow Investigations)Water					0.364	Represent
08AF100036	c	WFD (Flow Investigations)Water					0.364	Represent
08AF100036	d	WFD (Flow Investigations)Water					0.364	Represent
08AF100037	a	WFD (Flow Investigations)Water	0.398	0.43	0.297	0.364	0.364	Represent
08AF100038	a	WFD (Flow Investigations)Water	0.491	0.43	0.297	0.364	0.364	Represent
08AF100038	b	WFD (Flow Investigations)Water					0.364	Represent
08AF100039	a	Biodiversity	0.318	0.43	0.168	0.299	0.299	Represent
08AF100039	b						0.299	Represent
08AF100040	a	WFD- Ground Water	0.413	0.43	0.544	0.487	0.487	Represent
08AF100040	b	WFD- Ground Water					0.487	Represent
08AF100040	a							Represent
08AF100051	a	WFD (Flow Investigations)Water						New investigation post submission
Total			11.858			6.269	12.865	
					Total excluding accepted allowances		11.046	

Table 4.51 Final model scheme allowance with single Action ID component schemes

4.228 We are therefore concerned that there is a discrepancy in Ofwat's modelling approach and that there may be inconsistency between how companies have submitted investigations (either as individual Action Components, or as a combined Action ID).

4.229 Our representation therefore includes our original cost estimate for the WINEP water resources investigations (complex) of **£10.368m** including a new additional investigation for the River Pant (pre-efficiency and covering 31 action components).

Scheme complexity - individual investigation requirements

4.230 Our September 2023 business plan submission costs have been calculated based on a series of considerations linked to individual investigation requirements, the most relevant being:

- geographic extent of the area under investigation (as this directly impacts the field monitoring activity)
- number of groundwater abstractions under investigations (as this directly impacts the number of detailed monitoring and analysis activities)
- volume of licence under investigation (as this directly impacts on the extent of the field monitoring and the scale of the analytical activities).

4.231 There is a level of complexity classification in WINEP which is reflected in Ofwat's model; our investigations are all classified as complex investigations, with the exception of 08AF10001, 08AF10002 a,b,c, 08AF10004 and 08AF10009 schemes. It is our view that for the complex investigations, Ofwat's benchmark model does not take into account the different levels of complexity with an appropriate level of detail.

4.232 As an example, under WFD-Groundwater WINEP Group (Primary WINEP Driver WFDGW_INV), we estimated costs for three schemes:

- two schemes named Secondary Effects of Sustainability Reductions investigations with two Action IDs, each of them with two Action Components
- an additional request for allowed costs under the same WINEP driver was put forward for Lower London Tertiary groundwater body Investigation (LLT Investigation), with a two Action Components (Table 4.52 WFD_GW Schemes).

4.233 The Secondary Effects of Sustainability Reduction investigation has been split in two Action IDs because it includes two different EA area offices (HNL 08AF100033 and EAN 08AF100034). Both Action IDs have two Action Components (a and b) because they include two groundwater bodies (Upper Lea and Mid Chilterns Chalk for 08AF100033 and Upper Bedford Ouse and Cam Ely Ouse for 08AF10034).

4.234 The LLT Investigation has one Action ID with two Action Components, one referred to North Mymms Tertiary groundwater body and the second Action Component makes reference to unclassified groundwater body (superficial material above the Chalk in the Rib, Ash and Stort catchments).

Action ID	Action compt	Primary driver	WFD waterbody	WFD waterbody N.
08AF100033	a	WFDGW_Inv	Upper Lea Chalk	GB40601G602900
08AF100033	b	WFDGW_Inv	Mid Chilterns Chalk	GB40601G601200
08AF100034	a	WFDGW_Inv	Upper Bedford Ouse Chalk	GB40601G603000
08AF100034	b	WFDGW_Inv	Cam Ely Ouse Chalk	GB40601G400500
08AF100040	a	WFDGW_Inv	North Mymms Tertiary	GB40602G401200
08AF100040	b	WFDGW_Inv	Upper Lea Chalk	N/A

Table 4.52 WFD_GW Schemes

4.235 The estimated costs for 08AF100033 (Secondary Effects of Sustainability Reduction – Upper Lea and Mid Chilterns Chalk) is significantly larger than those estimated for 08AF100034 (Secondary Effects of Sustainability Reduction – Upper Bedford Ouse and Cam Ely Ouse Chalk) and the latter is larger than the costs estimated for 08AF100040 (LLT Investigations). The difference in estimated costs is directly related to the complexity of the investigations. The geographic extent of each groundwater body is presented in Figure 4.13 WFD GW Schemes. The difference in scale and complexity of the different investigations is clearly evident, showing the number of sources and spatial extent of the investigation.

4.236 Table 4.52 WFD_GW Schemes includes, for the Secondary Effects of sustainability reduction investigations, the number of sources to assess (black dots in Figure 4.13 WFD GW Schemes). The Secondary Effects of sustainability reduction investigations aim to determine, for each of the four groundwater bodies, the increased level of risk induced by future sustainability reductions, in terms of groundwater emergence and fluvial flood (Figure 4.13 WFD GW Schemes - Risk A blue labels) and groundwater quality deterioration (Table 4.52 WFD_GW Schemes - Risk B red labels). Some of the sources will need to be assessed for a combination of both Risk A and Risk B, and for nine sources the type of risk will need to be determined (Figure 4.13 WFD GW Schemes - green label).

4.237 The LLT Investigation has no associated groundwater abstraction sources, as the investigation aims to explore the groundwater resources available in this aquifer, from which currently we do not abstract.

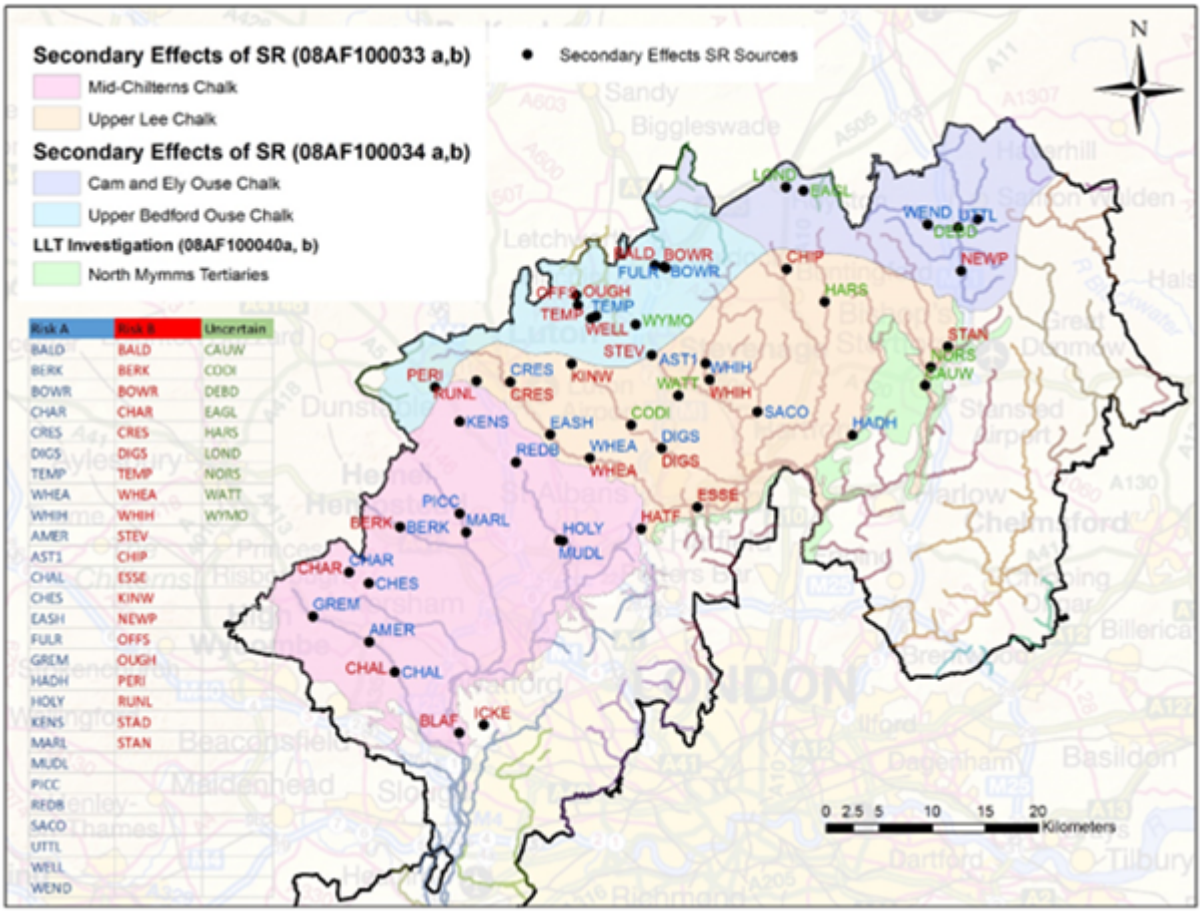


Figure 4.13 WFD GW Schemes

4.238 From Figure 4.13 WFD GW Schemes and Table 4.52 WFD_GW Schemes it is evident that each Action ID has a materially different level of complexity, with the 08AF100033 having the larger geographic extent, the largest number of sources under investigation and the largest associated licensed volume; plus the extent of the investigation activity is further controlled by the number of associated risks (Risk A and Risk B) each source needs to be assessed for.

Title	WINEP action reference	WINEP component	Requested scheme cost	Scheme unit cost benchmark allowance	Scheme WINEP group benchmark allowance	Final modelled scheme allowance	Reduction/ increase	Waterbody area	No. sources under investigation	Licence volumes under investigation
			(£m)	(£m)	(£m)	(£m)	(%)	(km^2)		(Ml/d annual equivalent)
Secondary effects of sustainability reductions (HNL region)	08AF100033	a,b	3.856	0.43	0.544	0.487	0.13	1359	37	244
Secondary effects of sustainability reductions (EAN region)	08AF100034	a,b	0.544	0.43	0.544	0.487	0.9	647	14	50
LLT investigation	08AF100040	a,b	0.413	0.43	0.544	0.487	1.18	101	n/a	n/a

Table 4.53 Main features of WFD GW investigations

4.239 As detailed in Table 4.52 WFD_GW Schemes, the differing levels of complexity of each Action ID is not reflected in the Final Modelled Scheme Allowance, which has assigned to each scheme the same £0.487M. This corresponds to an 83% cost reduction for 08AF100033, a 10% reduction for 08AF100034 and an increase of 18% for 08AF100040.

4.240 In addition to the lack of consideration for the complexity of the investigation, the observations made in Section A) regarding the number of Action Components also applies here: each Action ID has two Action Components; if we had submitted two Action ID for each Secondary Effects of SR and two for LLT Investigations we would have received twice the allowance.

4.241 We accounted for the expected level of complexity of each investigation when assigning a certain type and number activities which we propose to undertake to deliver the WINEP obligation. Each activity has an associated unit cost derived by previous similar activity. A master unit cost spreadsheet model has been used for the calculations; the details of the methodology used to derive the costs for each WINEP Action ID is included in appendix AFW14a - Enhancement investment cases - Water Resources Investigations - p771 - 773.

4.242 Investigation complexity and existing catchment conceptualisation are also key factors in our cost estimates. An example of this can be explained when comparing the WINEP Biodiversity investigations for three SSSI sites (Denham Lock Wood, Fray's Farm and Old Rectory Meadows) with Oughton Head Common investigation. The former falls under Action ID 08AF100032, with a, b and c as Action Components, whilst Oughton Head Common investigation refers to a single Action ID with a single component as associated to a single site (08AF100028a). The cost estimate for Oughton Common is larger than the funds requested for the sum of the three sites under 08AF100032. This is because the level of complexity we anticipate for the Oughton Common investigation is larger than for the three SSSIs. The level of complexity is greater because the information available for Oughton Common is scarce and therefore will require more extensive investigation and field work compared to the other sites. Current conceptualisation of the sites under

investigation are also different and is a factor in estimating the works required to achieve satisfactory level of understanding to be able to conclude the investigation to the required level. As the benchmark model does not consider this level of detail, the Final Modelled Scheme Allowance resulted in an increase of 42% for Denham Lock, Fray's Farm and Old Rectory Meadows, whilst reducing the allowance by 35% for Oughton Common.

Additional considerations

4.243 Following correspondence with the Environment Agency (31 July 2024), we have an additional 2025 - 2030 investigation requirement related to the River Pant in North Essex. This has been added to the PR24 WINEP spreadsheet with a new Action ID and single component code in accordance with the WINEP alteration process (Table 4.54 Additional WINEP Investigation).

WINEP Action ID	WINEP component	Primary driver	Action title
08AF100051	A	WFD_NDINV_WRFlow	Investigation into risk of deterioration in the River Pant

Table 4.54 Additional WINEP Investigation

4.244 This investigation needs to be added to the 13 original schemes proposed under the Water Resources investigations. Based on the Primary Driver it falls under the WINEP Group of "WFD (Water Investigation) Flow". Our cost estimate for this newly added investigation reflects the modelled allowance associated with this WINEP Group from the Ofwat model, equivalent to £364k.

4.2.4 WRMP - Major Projects/ SROs

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
SESRO	25.44	21.63	35.58
HS2 Non-SESRO	11.25	12.48	13.06
GUC	12.75	16.99	24.86
Minworth	5.75	7.4	7.68
Tappington South	0.71	0.00	0.00

Table 4.55 WRMP - Major projects/SROs scheme adjustments

Our Representation

4.245 We have accepted the modelled costs of the draft Determination in three of the five cases. An adjustment has been made to the SESRO scheme within our Representation to align with Thames Water and Southern Water submissions, full details of the rationale will be provided within Thames Water draft Determination Representation. An adjustment has also been made to the costs for the GUC scheme, to reflect additional scope that can further reduce whole life cost and risk to scheme delivery, in the long-term interest of customers.

4.246 PCD - No PCD has been applied by Ofwat to this scheme the RAPID regulatory framework already provides a customer protection mechanism.

Summary of evidence

SESRO

Ofwat deep dive comments

- *SESRO: £3.82m allowance reduction for SESRO which comprises of a 15% cost challenge and the original CW3 request for all 3 companies being higher than the sum of the Expenditure by AMP template, land expenditure, and post contract delivery costs. It should be noted that £2.8m of the SESRO funding is classed as 'contingent' in the DD, which effectively means it is not included in bills in AMP8, but is the subject of a 'true up' at FD29.*

4.247 The draft Determination allowances do not provide sufficient funding to undertake the required development of the scheme during the 2025 - 2030 period, risking the long-term resilience of supplies for the southeast of England. Additional evidence will be provided by Thames Water to address the comments relating to the 15% reduction, with development costs for SESRO in 2025 - 2030 business plan levels. In addition, a further £30m has been included within the total 2025 - 2030 costs, of which we are requesting £4.5m, this is designed to 'de-risk' the development and bring forward funding, so relate to costs that had previously been included in the post DCO stage. Thames Water will provide further explanation and evidence relating to this change within the draft Determination Representations (Section 2.1 of Thames Water's draft Determination Representation, document TMS-DD-043).

GUC

Changes since our September 2023 business plan submission

4.248 The scope of the Grand Union Canal development costs as included in our September 2023 business plan submission, have been fully funded in the draft Determination, and an additional £9.65m has been provided on a total scheme basis (£4.825m share to Affinity Water) in the draft Determination to support Direct Procurement for Customers (DPC). However, since the September 2023 business plan submission, it has been identified that there are three development activities that are required to 'de-risk' the scheme prior to DPC procurement. These are:

- construction of a pilot water treatment plant, at £3.5m (total scheme cost)
- construction of a pipe 'sleeve' as part of the HS2 construction activities, which will allow the Minworth to Atherstone pipeline to pass through HS2 without the need for a new pipe tunnel which would be significantly higher cost, at £1.0m (total scheme cost)
- inclusion in cost allowances for land purchase in advance of the DPC for areas that have been identified as higher risk to the schemes in terms of landowner objections, at £5.0m (total scheme cost).

4.249 The total cost to the scheme of these items is £9.533m. As we have a 50/50 cost sharing ratio with Severn Trent, this represents a Representation request for Affinity Water of £4.767m, which will be mirrored in Severn Trent's Representation.

4.250 All of these items are proposed as they reduce the risk to the project and will achieve significantly greater savings for customers in the DPC contract through this early spend. The details of the rationale for each item are as follows:

- ***Pilot Plant**: Currently there is significant uncertainty about the raw water quality that will need to be abstracted and treated to provide potable water at the southern end of the scheme, as chemically this will be a mix of the dominant recycled water produced at Minworth, combined with water entering the canal from the existing surface water sources. This mix does not currently exist in the environment, so the*

design of the treatment works will be necessarily conservative unless a better understanding of the treatability of the raw water can be obtained. By testing the recycled water being produced at Minworth with different source water from the canal we can determine:

- the effectiveness of the carbon processes in removing listed chemicals under 'real world' conditions, including actual sediment loading and backwash associated with canal/recycled water
- the flexibility of the proposed processes in terms of how quickly it can increase and decrease treatment flow rates
- the interaction between raw water quality and the treatment processes, and in particular whether by products such as bromate are likely to be a risk.

4.251 This information can be used during the DPC process to reduce the cost of the Water Supply Works at the southern end of the scheme and hence save customers money once the scheme is built. Exact savings are impossible to quantify at this stage, but a saving of just 10% on the works design would save customers approximately £20m capex and potentially reduce operating costs by £400k per annum.

4.252 HS2 *'Sleeve'*. By constructing this tunnel during the construction of the HS2 embankment this both significantly reduces the risk associated with tunnelling under an operational high speed rail line and reduces the final cost. Although costs for this activity are necessarily bespoke, it is estimated that construction in advance will save 1/3 of the costs of a later tunnel.

4.253 Land Purchase. All relevant land access, easements and ownership changes will need to be 'secured' before the DCO is submitted. For the PR24 submission it was intended that this would be done via options, so with minimal costs outside of the CAP. However, at a number of locations there are emerging issues that mean it may be prudent to purchase the land outright in advance of the DCO. **This item may be suitable to consider as 'contingent' for the Final Determination.**

Governance framework

4.254 Costs for the pilot plant are bespoke but based on actual costs for the pilot plant programme that has been procured for the water recycling plant at Minworth, which uses similar technologies at a similar flow rate. The operational costs are based on the agreed, detailed programme developed by the join SRO for Minworth, which are formally subjected to external assurance and joint company sign off as part of the gated process.

Data sources

4.255 Costs for the pilot plant are based on actual contract costs and the detailed programme of running and lab testing costs developed for Minworth.

4.256 Costs for the HS2 crossing are based on standard major road crossing costs used for PR24 interconnector schemes, which are material drivers of costs with schemes such as Iver to Egham. For more detail on these costs please see Connect 2050 -Interconnectors, Cost Efficiency sub-section later in this chapter. The costs have been uplifted by 50% due to the significant constraints and sensitivities associated with a high-speed rail link driving additional costs.

4.257 Costs for land are nominal, based on standard agricultural costs per unit area.

Documenting assumptions

4.258 The key assumption for is that the costs for the pilot water treatment plant will be similar to the water recycling plant, as both involve settlement/clarification followed by carbon-based absorption to remove the chemicals of concern. Both plants are of similar size and will be constructed on the same site. There will be some cost differences due to the different output requirements of the two plants, but this is unlikely to be material.

4.259 The cost of the HS2 crossing has been assumed to be 50% more than the unit cost of a 'typical' major road crossing, as used in the Affinity Water PR24 cost models.

4.260 Costs for land are based on anticipated area required at the identified areas of risk, multiplied by an agricultural unit rate, with 'hope' value included where appropriate.

Breakdown of additional costs

4.261 The costs below are provided on a **whole project basis**. The request for Affinity Water represents half of this in accordance with the cost sharing arrangements on the GUC scheme.

Scheme	Cost header	Description	Total project cost [1]
			Unit cost (£m)
GUC pilot plant	Capital expenditure (Operation and Maintenance forms part of the pre-project construction costs so is proposed as capital expenditure)	Pilot treatment plant running at up to 31/s, with clarification, filtration, GAC treatment and disinfection	2.2 [1.1 for Affinity Water]
		Site and project management	0.18 [0.09 for Affinity Water]
		Site rent, chemicals & power, transport of canal water to site	0.3 [0.15 for Affinity Water]
		Water quality laboratory testing	0.5m [0.25m for Affinity Water]
		Risk @ 10%	0.32 [0.16 for Affinity Water]
Minworth to Atherstone Pipeline (part of GUC)	Capital expenditure	Bring forward funding to the pre DPC stage to allow the installation of a 'sleeve' for the pipeline during the construction of HS2.	1.033 [0.517 for Affinity Water]
Land Purchase	Capital expenditure	Nominal allowance	5 [£2.5 for Affinity Water]

Table 4.56 A table showing the breakdown of costs for each scheme under WRMP – major projects

1 AffinityWater request in brackets

4.2.5 Smart metering/Demand management

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Smart metering	131.37	51.24	63.72

Table 4.57 Smart metering/demand management scheme adjustments

4.262 The reduction in Enhancement funding identified as 'Our Representation plan' in Table 4.57 Smart metering/demand management scheme adjustments above is due to a reallocation to Base of £67.1m not a reduction in the overall funding request.

Summary of our Representation

4.263 In our September 2023 business plan submission, we requested **£131.37m** to rollout the company's first Smart Metering Programme and deliver significant demand and leakage reduction benefits in line with our Water Resource Management Plan (WRMP) and DEFRA's national targets.

4.264 We have engaged with other UK water companies that have been trialling and delivering smart metering programmes, worked with consultancies that are experts in the field and run a robust tender process to select a high quality and cost-effective technology and the right suppliers to implement our smart metering solution over the next 15 years. The business case is an accurate representation of all the actual costs we require to deliver the programme as they are derived from up-to-date market procurement exercises.

4.265 At draft Determination, Ofwat used two simple econometric models to calculate smart metering allowances, one model for new installations and another for meter upgrades. This resulted in a significant efficiency challenge to our proposed metering programme: a 21% challenge on new meter installations, and a 44% challenge on meter replacements/upgrades, post re-allocation to base.

4.266 Funding reductions of the scale proposed within the draft Determination will impact the quality of installations, the performance of the network, our ability to provide high quality service to our customers and will essentially compromise our ability to deliver our Smart Metering Programme and all its associated benefits. The significant reduction of allowance will set-up our smart metering programme for failure.

4.267 Ofwat has not used efficient Enhancement costs within the draft Determination, risking the delivery of this critical programme and creating perverse incentives for short-termism within the delivery. Our analysis demonstrates this through comparison of Ofwat costs to a detailed bottom-up approach, using efficient costs that consider work mix and the latest actual market rates. It is also clear that Ofwat's modelled approach has significant flaws, which have led to this significant variance. We have therefore included the original Enhancement costs from our September 2023 business plan submission accepting reallocations to Base expenditure. We would welcome further direct engagement with Ofwat to better explore how to accurately assess these costs.

4.268 The base cost adjustment (BCA) for replacements and upgrades does not appropriately account for the number of meters that should be included or provide an efficient unit cost for these. Again, this has been demonstrated through both bottom-up comparison of efficient costs and assessment of flaws within the modelling. Given the materiality of this shortfall, unaddressed this would diminish our ability to deliver customer outcomes and maintain resilient services over the long term through wider Base allowance. We have therefore reflected an appropriate uplift within the Base cost adjustment within our Representation.

4.269 Below we have answered the consultation questions as requested, describing shortcomings in the modelling approach. We have also provided further evidence of our individual circumstances, with details of the work mix included in our September 2023 business plan submission and why this is necessary to maximise the return on investment for this programme to deliver the benefits for our customers and the environment in the quickest and most cost-efficient way possible.

4.270 PCD - While we accept that the total number of smart meters included within the PCD is an appropriate measure, we consider that the strict controls around the number of each type of installation to be delivered in each year will stifle our ability to optimise delivery to maximise the desired output, which is reduction in customer demand.

4.271 In addition, the requirement to meet the specified performance metrics – 95% success rate at recording data at least once per hour and 95% success rate at transmitting that data once per 24 hours – are not a requirement of a successful program and are practically unachievable; they will significantly limit our ability to explore the market for best value solutions for customers. Further discussion of the issues we have identified with Ofwat's methodology for defining the Smart Metering PCD, specifically evidence against the use of a 95% success rate for recording data and 95% success rate for transmitting data, is presented in appendix AFW154 - Smart metering PCD working group report. We would welcome further direct engagement with Ofwat to better explore how to appropriately measure successful delivery of this scheme.

4.272 Finally, the application of both a time-incentive and a non-delivery penalty to this programme will create too much risk and does not allow flexibility for a smart metering programme to adapt to external factors, flexing delivery profiles within the period to achieve the required outcome for customers by 2030.

Consultation questions

Question 9.1) Do you agree with our approach to assessing new meter installation and meter upgrade costs?

4.273 No, we consider the benchmarking models used to assess and set the allowances for the smart metering programme to be unreliable for three main reasons:

1. they fail to consider important programme variations across companies
2. they are based on unreliable cost forecasts
3. their results are non-credible.

4.274 We have explained each of these points below.

1. They fail to consider important programme variations across companies.

4.275 Ofwat's models use a single cost driver (volume of installations or upgrades). This ignores the fact that the unit cost of installing different types of meters can be significantly different, and that companies may have significant differences in the profile of meters included in their programme.

4.276 Installation costs vary significantly between different meter types, sizes and type of installation required (e.g. external/internal or dig/screw-in). Unit costs are notably higher for external installations when excavation (a "dig") is required. Based on current market rates acquired through a robust tender process, a dig on hard surface to install a small residential meter can be up to 17 times more expensive compared to a simple screw-in to a pre-existing external boundary box. Similarly, internal installations are 2.5 times more expensive compared to a simple screw-in but that jumps to 10 times higher if you consider the access issues and abort rate. Each of these individual unit-rates will also vary based on location, household vs non-household, and whether it is part of a planned process vs customer request. In commercial / Non-Household (NHH) metering, the variation is even more pronounced due to size and complexity of the planning and installation work required. As an example, the cost of buying and installing a large DN150 meter could be 22 times higher compared to a screw-in of a small DN15 meter.

4.277 Companies have materially different composition of meter types in their 2025 - 2030 programme. The composition of meters often reflects the type of premises, establishments, and characteristics of the area. It also reflects how companies have been delivering metering programmes over the last few decades. Installing new meters in a region that has high meter penetration will be more difficult and consequently expensive, compared to regions with low meter penetration. That is because in regions with low meter penetration, there are typically more standard, screw-in installations. As you move to regions with higher meter penetration, there are fewer standard installations remaining,

so complexity and costs increase due to exogenous technical complexities necessitating digs or internal installations, often paired with customer hesitance to be switched to a metered supply. This has been discussed more in the Enhancement unit cost for new meter installations section further below. Our projections for the different installation and meter types have been informed by extensive property-level surveying and delivering 10 years of compulsory metering programmes.

4.278 By controlling only for the number of meters installed, the model generates an average unit cost that is appropriate to a company with an 'average' profile of meters in its programme. In practice, this unit cost would be inappropriately high for some companies and inappropriately low for others. This is further analysed below in our third point.

4.279 We consider this programme to be a Demand Management programme rather than a Metering one, as this will be our main enabler in our efforts to reduce water consumption and leakage. Thus, the targeting of installation and replacement should be based on the projected benefit that can be delivered rather that alignment to industry average work mix. Our plan is based on a 15-year delivery timeframe, optimising for an efficient and sustainable programme that will allow us to achieve our leakage, per capita consumption and business demand targets over the long term, not just the 2025 - 2030 period.

4.280 A model of this type can lead to perverse incentives whereby companies may be forced to select low-cost installations rather than the most cost beneficial installations. The result would be patchy smart meter penetration within a geographic or hydraulic area, problematic network coverage, underperforming meters still in the ground, poor customer engagement and customer satisfaction, inability to deliver benefits and accumulated costs passed to following periods.

4.281 The different composition of meters is a material factor in the assessment. The information and data below have been provided through the Smart Metering Advisory Group (SMAG) to illustrate the impact the different composition of meters can have on the unit cost. Figure 4.14 A comparison of total costs between two smart metering programmes with different compositions of meter installation compares the cost of two metering programmes with different composition of meter types.

- Programme A is an existing large smart metering programme. It has over 30 different unit-rates to cover all household and non-household installation types, of which around 30% of the new HH meters are external digs and the remaining are difficult internal meter installations, along with more than 100k NHH meters which all have higher unit-rates than the 'median' rates published in the draft Determination.
- Programme B is the actual programme of another company in the sector. It has a much larger share of simple, external HH meters, >75%, and a much smaller share of the costlier internal installation, <1%. The total cost of the two programmes is calculated using Programme A unit rates, so that any difference in cost is due to the different meter compositions rather than due to efficiency.

4.282 The chart shows that Programme A is 1.8 times more expensive that Programme B. That is, Programme A's programme is found to be 80% inefficient even though the unit costs (i.e. the underlying efficiency) are the same. This can be used as evidence that ignoring the work mix in the programme has a material effect.

2025-2030 water company comparison : total smart metering programme costs

Figure 4.14 A comparison of total costs between two smart metering programmes with different compositions of meter installation

4.283 To demonstrate how essential it is to account for each company's different work-mix, proportions of different meters and installation types – along with the wide range of associated unit rates – 2025-2030 water company comparison : Figure 4.15 2025-2030 water company comparison : meter type and installation mix and Figure 4.16 2025-2030 water company comparison : meter enhancement projection illustrate the wide range of meter and installation type proportions of four major water companies' 2025 - 2030 smart meter programmes. As above, the information and data presented below have been provided through the Smart Metering Advisory Group (SMAG).

4.284 Each company requires a very different split of installations, with some requiring only 5-10 different unit-rates, whilst others require over 30 specific meter and installation types to suit the building stock and physical environment within each supply area. The combining of different meter types into single unit-rates, and the use of a simple 'average' meter type profile to assess these vastly different programmes, is not an appropriate methodology to assess such complex and area-specific submissions.

4.285 To further demonstrate the significant influence that these company-specific work-mixes have on the total funding required, Figure 4.15 2025-2030 water company comparison : meter type and installation mix uses Company A's total meter installation volumes and meter unit-rate costs, applied to the different meter & installation programme splits from Companies B, C and D. The differences in meter and installation work-mix, is the only variable.

4.286 The different proportions of meter and installation type work-mix, results in total programme and enhancement-only cost projections that differ from Company A's programme by more x2.5 fold. This use of a single 'median' unit-rate, plus the use of an average benchmarking approach, is therefore clearly not an appropriate method to assess cost-efficiency.

2025-2030 water company comparison : meter type and installation mix

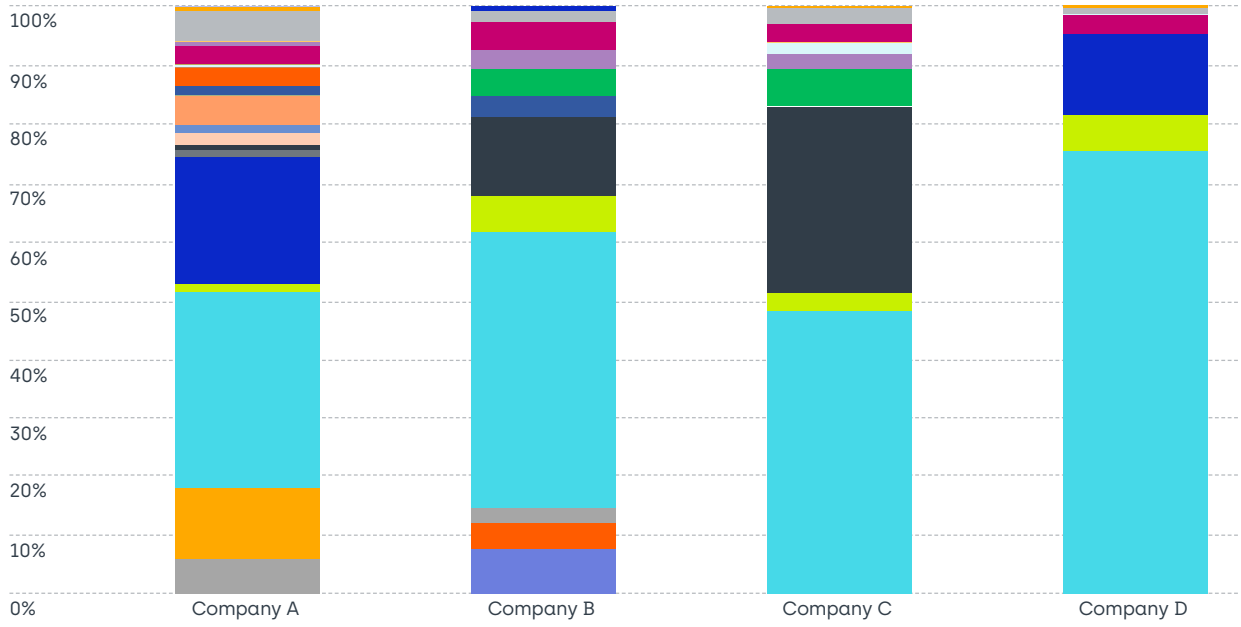


Figure 4.15 2025-2030 water company comparison : meter type and installation mix

2025-2030 water company comparison : meter enhancement projection

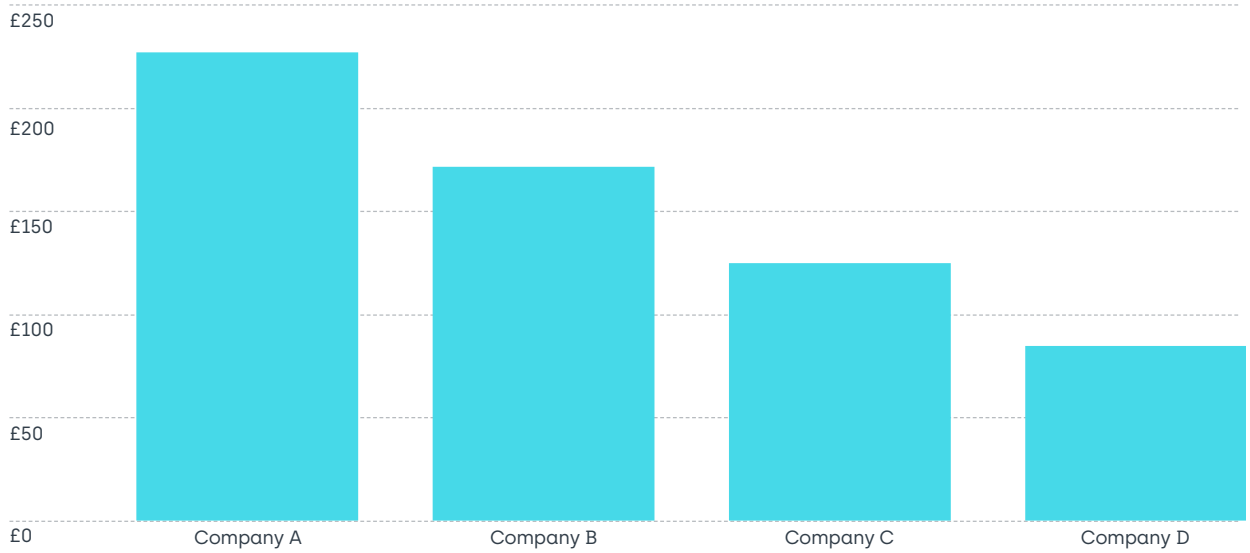


Figure 4.16 2025-2030 water company comparison : meter enhancement projection

4.287 In our Representation below, we have explained how the models can be improved but also how looking at companies individually and using their actual meter and installation work mix can provide more appropriate unit costs.

2. The models use unreliable cost forecasts.

4.288 The roll out of smart metering features prominently across most water companies' September 2023 business plans. However, as of today, only a select few have in-flight smart meter roll out programmes. Most companies have not yet delivered large-scale smart metering programmes, have not yet engaged with markets to secure contracts, or have engaged on a trial basis only.

4.289 Ofwat's models are based on a combination of forecast costs, some of which are based on actual contractual market prices, secured by companies that have run successful tender processes, such as Affinity Water, and others which are assumptions and estimations. We consider that giving equal weight to both types of forecasts is a flawed approach.

4.290 Challenging the cost of our well tested metering programmes based on inappropriate models results in unachievable unit rates, which will risk the delivery of this crucially important programme.

4.291 Several companies' costs are informed by actual delivery costs based on tendered offerings from the market providers and continual improvement to customer engagement, installation delivery and cost efficiency.

4.292 Given the strength of the market for smart meter installations, we consider that Ofwat could depart from a benchmarking assessment of costs. Instead, Ofwat can rely on evidence related to the robustness of our tendering and procurement and the improved cost efficiency over time as we keep up with market progress.

4.293 In the future, Ofwat could consider assessing the smart metering programmes of all companies based on the same evidence of robust market testing.

4.294 Furthermore, it appears that Ofwat's models run in isolation; there is no visibility of the allocation of all smart metering costs. As an example, a water company could have allocated the costs of installing or replacing boundary boxes to another programme i.e. Lead Replacement Programme. Therefore, the work mix presented through their smart metering business plan would be misleading as the percentage of digs required would be significantly lower. That would result in a lower unit cost which would affect the average figure used by Ofwat in their modelling. That would also have a detrimental impact on companies such as Affinity Water that have included all the relevant costs in their business plan and as such unit costs appear higher.

4.295 We have used actual data from delivering metering programmes in 2015 - 2020 and 2020 - 2025 to establish our baseline, we are fully aligned with our Water Resources Management Plan to ensure that our plan will enable us to deliver the required demand and leakage reduction savings, we have accurate current market rates following a robust tender process and we do not have any hidden or misplaced costs as everything required to implement our Smart Metering Programme has been included in our Smart Metering business plan. As a result, we are confident that our plan is efficient and deliverable, allowing us to realise the benefits for our customers and our environment.

4.296 In our Representation below, we have explained how the models can be improved but also how looking at companies individually and using their actual current market rates, where these are available, can provide more reliable cost forecasts.

3. The models' results are non-credible.

4.297 Ofwat's models result in cost forecasts that are significantly different to companies' own forecasts in business plans. The comparative efficiency of companies' metering costs ranges from 40% to 190%. This wide range cannot be considered reliable; it cannot be representing differences in efficiencies across companies. The range must primarily be driven by material factor/s the modelled approach misses.

4.298 As outlined above, the models produce a unit cost for meter installations or upgrades that is a hybrid of all meter types. The unit cost may be appropriate for a company whose composition of meter types is close to the sector average, but it does not produce a sensible result for companies with a profile of meter types that is significantly different to the sector average. Indeed, a few companies receive an allowance which is significantly higher than what they have requested in their business plan. This is unlikely to be in customers' interest, especially as this is a result of omitted factors from the models rather than genuine efficiency.

4.299 When Ofwat benchmarks wastewater treatment costs, for example, it controls for the size of the population, the size of works (to capture economies of scale), discharge quality consents and more. A wastewater treatment model that uses only a scale driver would still produce a high R-squared, but Ofwat correctly considers that it is not accurate enough and it must control for secondary and tertiary cost drivers to improve the accuracy of the model. Ofwat should similarly consider that in metering (and other areas in enhancement) it is not acceptable to rely on a model that uses a single cost driver, without controlling for material secondary and tertiary effects.

4.300 In our Representation below, we have explained how the models can be improved but also how looking at companies individually and using their actual current market rates, where these are available, and their actual meter and installation work mix can provide more credible results.

Question 9.2) Do you agree with our decision to assess smart infrastructure costs within the meter installation and meter upgrades models?

4.301 The principle of ensuring that all smart meter infrastructure costs are included in the unit rate assessment should ensure that unit rates can be compared across the industry. We agree with the draft Determination decision to assess smart infrastructure costs within the meter installation and upgrade models, subject to the future models incorporating work type and meter type mix in its assessment.

Our Representation

4.302 Our representation focuses on two main areas of the draft Determination, the Enhancement unit cost for new meter installations and the base cost adjustment for meter replacements/upgrades. To do that, we followed two different approaches:

- Approach 1: we used our current market rates and installation work mix, acquired from our recent procurement activities and our experience from previous periods respectively, to calculate the unit costs required to deliver our Smart Metering Programme
- Approach 2: we worked with specialist consultants at Oxera to review the Ofwat models to assess this approach.

4.303 Below, we have provided evidence to support our arguments, using both approaches.

Enhancement unit cost for new meter installations – Approach 1

4.304 For new meter installations, Ofwat have determined that £377.72 per meter, for our 72,850 new meters, is an efficient unit cost. We acknowledge that this unit cost is close to what we require, however a figure of **£383.15** would be more appropriate and we have provided evidence for this below.

4.305 We have been running our Universal Metering Programme over the last two investment periods, installing new AMR meters to previously un-metered customers. That has provided us with extensive experience and data to build our Smart Universal Metering Programme (or New Selective) for 2025 - 2030.

4.306 In the current 2020 - 2025 period, Affinity Water have installed circa 200,000 new meters and based on this extensive data set, understand that 55% of all new installations required a dig while for the remaining 45% we were able to screw a new meter into an existing boundary box. We are therefore confident that we understand the requirements for different installation types in 2025 -2030 and have reflected this in our September 2023 business plan submission.

4.307 In common with other companies in the UK, we have experienced problems with fitting meters within customer properties (internal fits). Whilst theoretically simple, in practice, working with a customer's internal plumbing (often under their kitchen sink) has been problematic. This resulted in a high proportion of unsuccessful appointments (10% success rate and 20% abort rate), increasing the costs significantly. This problem is compounded by customers who do not want a meter fitted or prevent us from gaining access to fit the meter.

4.308 Additionally, throughout 2020 - 2025, we experienced a significant volume of jobs that could not be completed for several reasons such as joint supplies, H&S issues, no access, refusal and Section 58. This No-Metering Solution (NMS) work bank includes approximately 80,000 jobs that could not be completed in 2020 - 2025. In previous periods, we had not undertaken these complex and expensive installs as we were not targeting higher penetration rates. However, we will need to address these in 2025 - 2030 and beyond, as meter penetration is increased there will be fewer straightforward installs available.

4.309 By 2025, we will have a meter penetration over 70% which is notably higher than the industry average. We are planning to install 72,850 new AMI meters which will allow us to engage with our customers and support them in reducing their consumption, and also identify and fix both leakage and wastage. Installing those meters in a limited geographical area (due to network deployment and availability) will be challenging and to achieve our target we will have to tackle both internal installations and our NMS work bank. We have calculated a 20% uplift can be expected in the unit rate to account for the increasing complexity of installations that will be undertaken, reflecting this high percentage of internal and NMS jobs.

4.310 Using current market rates, (as presented below) following a robust tender process, our experience from the previous two periods, the need to increase meter penetration to deliver the demand and leakage reduction targets and our continuous drive to be efficient, we are confident that a unit cost of **£383.15** for new meter installations represents the minimum allowance required to deliver our programme.

Enhancement unit cost for new meter installations – Approach 2

4.311 There are two issues with Ofwat's model specification:

- the model estimates constant returns to scale, but this relationship is not implemented in the specification, for example, by modelling on a unit cost basis
- the panel structure introduces unnecessary noise / uncertainty around the estimates (where differences within companies over time appear sporadic, and relevant variation is probably between companies).

4.312 First, Ofwat has noted that there is a discrepancy in the modelling results on which it has based the draft cost Determinations and those reported in the accompanying STATA outputs (reported in the corresponding feeder model excel file). We have replicated Ofwat's model and compare the results to those used in the draft Determinations in Table 4.58 Ofwat modelling results, draft determinations vs corrected below:

	New installations		Meter upgrades	
Explanatory variable	Ofwat's DD	Oxera replication	Ofwat's DD	Oxera replication
Ln(Nr)	0.977***	0.987***	0.981***	1.000***
	{0.000}	{0.000}	{0.000}	{0.000}
Constant	5.969***	5.963***	4.454***	4.357***
	{0.000}	{0.000}	{0.000}	{0.000}
Adjusted R-squared	0.961	0.963	0.952	0.959
Observations	74	74	86	86
Source: Ofwat draft determination modelling coefficients, as reported, and Oxera replication based on Ofwat modelling files (aligned with Ofwat's 'STATA' reporting) appendix AFW102 - Review of Ofwat's smart metering assessment at PR24 .				

Table 4.58 Ofwat modelling results, draft determinations vs corrected

4.313 The differences in the model coefficients have two consequences for the Enhancement expenditure determinations:

- Ofwat's published cost determinations are (marginally) incorrect, as they are based on the wrong model coefficients. (Ofwat states it will be corrected for final Determination)
- more importantly, the corrected model coefficients suggest that constant returns to scale exists for both the new installations or meter upgrades models. That is, the coefficient of one on the volume of meters indicates constant returns to scale for upgrade (1% increase in the number of meters upgrades implies a 1% increase in cost). The coefficient is also not statistically different from one for new installations (the 95% confidence interval on the logged new meter numbers coefficient estimate is [0.93, 1.04]). This is contrary to Ofwat's initial conclusions, based on the incorrect estimates above.

4.314 Constant returns to scale suggests that an alternative functional form would be more appropriate, like a unit cost model or introducing a unit cost (ratio benchmarking) assessment. A unit cost approach in the context of constant returns to scale could be more appropriate given that:

- it is consistent with Ofwat's approach elsewhere. For example, in the lead reduction Enhancement modelling Ofwat uses both a univariate panel and median unit cost approach, based on the expectation of constant returns to scale
- it is more consistent with Ofwat's broader smart meter assessment (with the BCA derived based on median unit costs)
- it could ameliorate some of the reporting and data quality concerns (using a median would moderate the effect of outliers, that is, as long as the median company's value is not affected by reporting concerns and is reflective of the true median unit cost, whereas outliers can bias econometric model predictions if they are not excluded).

4.315 Additionally, in the current case, Ofwat's panel structure is most likely failing to identify the true variation in metering costs within companies over time, but rather tracking 'noise' (or measurement error) instead. This is introduced by cost-volume profiling mismatches and the fact that the costs assessed are more of a construct (of Ofwat's SMI allocations and other reallocations) than actual submitted annual costs. Further details are provided in subsection A2 in appendix AFW102 - Review of Ofwat's smart metering assessment at PR24.

4.316 Below we present the results based on a more appropriate modelling approach, taking the weighted average across the proposed (i) median unit cost (i.e., ratio benchmarking) and (ii) cross-sectional versions of Ofwat's current econometric models for new installations and upgrades respectively under constant returns to scale (further details are provided in subsection A2 in appendix AFW102 - Review of Ofwat's smart metering assessment at PR24.

- for new installations this would result in a 9.9% increase in modelled allowances from £952m to £1,046m for the whole industry and a 10.0% increase from £27.52m to **£30.26m** for Affinity Water
- for upgrades this would result in a 4.7% increase from £577 to £604m for the whole industry and a 3.5% increase from £25.51m to **£26.41m** for Affinity Water.

Base cost adjustment for meter replacement/upgrades - Approach 1

4.317 With regards to meter replacements and upgrades, we allocated all the costs of our smart proactive replacement programme to enhancement in our PR24 Business Plan, as we believed it met the relevant criteria. By proactively replacing Basic and AMR meters with AMI meters to enable us to reduce demand and leakage, we are "enhancing the capacity or quality of service beyond current levels" to meet "new statutory obligations". Through draft Determination, Ofwat have re-allocated all meter upgrade costs to Base expenditure. We understand this allocation, however we do not agree that the unit costs allowed through the BCA are appropriate for our programme.

4.318 For meter replacements/upgrades, Ofwat have determined that £128.89 per meter, for our 215,430 AMI meters, is an efficient unit cost. We believe that this unit cost is materially different to an appropriate efficiency cost, **£229.32** would be more appropriate. We have laid out our explanation of this position regarding the suitability of the model within our response to the consultation question 9.1 and have provided evidence for our unit cost below. Also, the number of meters Ofwat has allocated to the BCA (215,430) is erroneous and we have provided justification below.

4.319 With regards to the total number of meters that the BCA has been applied to, after reviewing all the information included within the cost models, we have identified that these have not captured a number of meters from our data tables and therefore have not provided any allowance for their installation. Specifically, 7,375 residential and 150 business AMR to AMR replacements and 2,000 residential AMR Optants.

4.320 The AMR to AMR replacements is included in CW7.9 and CW7.10 but not in CW7.11 – CW7.14 that has been used by Ofwat for the base cost adjustment. Similarly, the AMR residential Optants from CW7.6 have been completely omitted (appendix AFW105 - Data tables v7 August).

4.321 The result of these meters being omitted from the calculation has resulted in a shortfall in the Base cost adjustment uplift. The correct number of meters should be 215,430 + 7,375 + 150 + 2,000 – **224,955 .**

4.322 With regards to unit costs, we have provided below evidence around:

1. our work mix
2. our replacement dig rate
3. the actual unit costs we have secured from our suppliers through a robust tender process.

1. Evidence around work mix

4.323 In 2025 - 2030, we will continue with our reactive replacement programme, replacing meters that fail, both inside and outside our smart area network. We will also introduce a proactive replacement programme where we will replace Basic and AMR meters with AMI ones, within our smart area network, that will enable us to accelerate the smart meter penetration and deliver the demand and leakage reduction benefits.

4.324 To maximise the return on investment of this programme and deliver the benefits in the quickest and most cost-efficient way possible, we will need to target District Metered Areas (DMAs) with a high percentage of demand/consumption and leakage.

4.325 Within those DMAs, we will prioritise the replacement of old, underperforming basic meters which comes with increased chances of requiring a boundary box replacement, as we have explained below. For those DMAs, we will also aim to provide 100% smart meter penetration, alongside our Smart Universal Metering Programme. That will allow us to better engage with customers and communities, to help them reduce water consumption and save water but will also help us reduce operational costs and our carbon footprint from not having to do Basic and AMR meter readings in whole areas. However, to achieve that, we will have to tackle more complex and expensive jobs that will require a dig to replace the boundary box.

4.326 The following work mix for replacements was used to support our September 2030 business plan submission proposed costs:

- 10% internal jobs
- 90% external jobs (65% screw-ins and 35% digs)
- 20% of externals will be on private land and 80% on public
- 20% of external digs will be soft digs and 80% hard digs
- 10% of all NHH meters will be medium or large size i.e. DN50 – DN150.

4.327 Across our whole asset base, our current rate of internal meter installation is 14%. However, due to the high job complexity and access issues, we have forecasted 10% of our replacements will be internal meters. The private/public land and soft/hard dig splits are calculated based on our 2020 - 2025 reactive replacement programme. Finally, the volume of medium and large NHH meters was determined based on our 2020 - 2025 NHH reactive replacement programme. Further evidence to support our forecast as the most appropriate is provided by MOSL's recent report which demonstrates that medium and large NHH AMI meters offer the highest benefit in terms of demand and leakage reduction,

2. Evidence around replacement dig rate.

4.328 The 35% dig rate identified in our plan has been calculated from learning gained from delivering our current reactive replacement programme in 2020 - 2025. Across our region we have identified that we have completed an average of 15% digs on external replacements, but also within these zones we identified an additional 10% of jobs that required a dig but have been put on a backlog due to the increased complexity and costs. There is also another 4% of jobs where digs have been completed by our Maintenance and Repair teams and a meter subsequently installed by our metering team at a later date.

4.329 In total, as an average across all DMA's in our region, a minimum of 29% replacements have been identified as requiring a dig in 2020 - 2025 to complete the reactive replacements in the area. There are a wide range of work mixes completed in different areas which range from a below 10% dig rate to over 50% dig rate for replacing meters through the current reactive programme.

4.330 There are many reasons why we need to dig and replace a boundary box on a replacement job which we have identified below:

- natural and/or unnatural ground movement which over time results in misalignment of water pipe, boundary box fittings and manifold, preventing the meter from been replaced. Types of ground movement include:
    - expansion and contraction of soil due to the weather elements and extreme temperature changes
    - vehicles driving or parking over assets
    - installation of drop kerbs and new driveways
    - council footpath replacement programmes, including road and cycle path modifications
    - planting of trees and tree root movement
- unable to isolate asset due to ageing or damaged stop tap
- unable to remove and install new meter due to ageing or damaged boundary box carrier/manifold
- unable to safely secure new meter due to damaged lid or boundary box
- old type boundary boxes (i.e. MSM, SoCam) where replacement parts or installation keys are no longer available
- fusion of brass meters to brass boundary box carriers causing damage/leaks during removal of meter
- boundary boxes with damaged lids that cannot be replaced
- old assets with plastic isolation valves become brittle and break
- snapped isolation valves due to excessive usage
- potential new supplies run by a customer on private land
- converted properties where 1 stop tap feeds 2 properties.

4.331 The majority of the reasons above are age dependent which means that the older the asset the higher the chances of having to replace it. Since we will be targeting to replace all non-smart meters within DMAs there will be a higher proportion of old assets (>15 years old) to be replaced. Using data from our internal systems we have identified that on average, across the delivery programmes in 2015 - 2020 and 2020 - 2025, if assets are >15 years old, 5% more replacements will require a new boundary box.

4.332 Figure 4.17 Percentage of residential meters beyond life expectancy in the next 25 years below illustrates the percentage of meters beyond their life expectancy assuming no interventions i.e. no new meters are installed, and no meters are replaced.

4.333 Essentially, by 2025, 17% of our residential meters are older than 15 years old and by 2030 that number jumps to 36%. For commercial/NHH meters, those figures are higher. So, in 2025 - 2030 we will have more "old" meters compared to 2020 - 2025 since our asset base becomes older quicker than we renew it which will impact the number of replacements requiring digs.

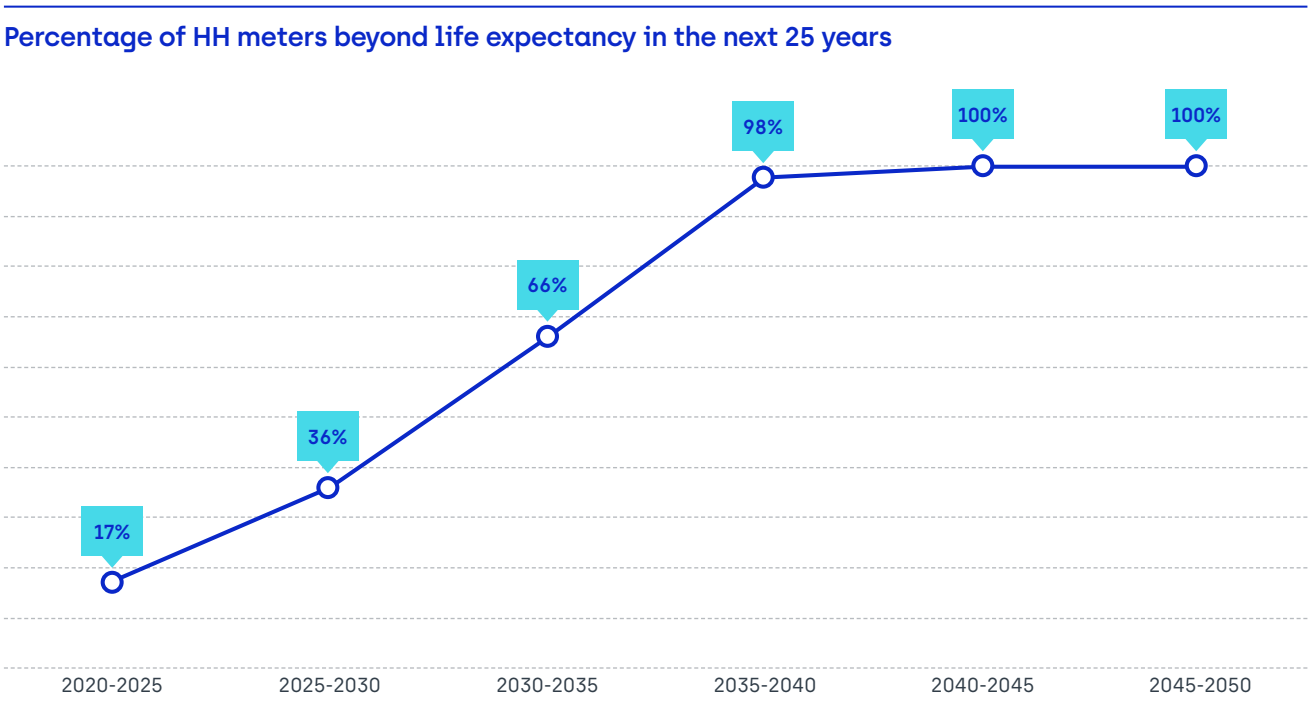


Figure 4.17 Percentage of residential meters beyond life expectancy in the next 25 years

4.334 When factoring in the need to upgrade all the meters to maximise benefits and deliver efficiencies as part of the proactive programme, a higher percentage will require a dig solution to upgrade the meter in order to fully saturate the DMAs. The saturation of smart metering in DMAs is fundamental to the proposed plan, along with the impact of ageing assets to be replaced, we are forecasting the dig ratio to be in excess of 35% on average across all areas when delivering the proactive programme. Given the uncertainty, we used the lowest plausible value of 35%, to protect customers from inefficient costs being put forward within our business plan. Note that the 35% dig rate is applied to the external replacements only, so considering that 10% of all replacements jobs will be internals, the percentage of digs over the total number of replacement jobs is 90%*35% – 31.5%.

4.335 Considering the work mix proposed in our plan as described above, our proposed unit rate, although appearing to be higher in comparison to other companies, is primarily driven by the higher percentage of digs we are targeting across the programme. Using our current market rates and the modelled unit rate of £128.89, that would allow us to undertake less than 4% digs on replacements, which as evidenced above, is unrealistic and will hinder our ability to deliver the benefits of this programme over the long term.

3. Actual unit costs secured from our suppliers through a robust tender process.

4.336 Since the September 2023 business plan submission we have run a robust procurement exercise and have received competitive market rates to support our planned costs. This followed the work we originally undertook with numerous consultancies to develop financial models that indicate we could deliver our plan for £130.5m.

4.337 The following are current market rates we have secured following a robust tender process:

4.338 **Appendix AFW153 - Commercially sensitive information** [18].

4.339 Using the proposed work mix and the latest current market rates we have secured, we have calculated the resulting cost base adjustment unit cost of **£229.32** per meter, which support and give confidence that the original plan costs are both efficient and deliverable.

18. Table moved to appendix AFW-153 due to the redacted nature of the information shown

Base cost adjustment for meter replacement/upgrades - Approach 2

4.340 Ofwat's derivation of the (i) implicit volume of metering activity funded at PR24 and PR19, and (ii) median Base unit costs elements of BCA are poorly justified and not on a like-for-like basis in terms of the types of meters being replaced, discussed in turn below.

4.341 There are at least two major areas of error in (i). Note that these are in addition to the other overarching concerns highlighted previously, that Ofwat should consider at a more disaggregated level types of meters renewed (e.g. basic, AMR and HH vs NHH), and that their associated workload costs (e.g., external screw fix, -digs, or internal) are different across companies and time.

4.342 First, the PR19 under-delivery estimate is poorly motivated and goes against regulatory best-practice by introducing an unjustified, one-sided risk to companies for the following reasons:

- Companies' PR19 meter replacement forecasts were not based on their eventual base cost allowances, but the (generally higher) planned expenditure submitted in their initial business plans. At most, using Ofwat's logic for the PR24 What Base Buys estimate, companies were funded to achieve whatever was implicitly allowed through the Base cost models at PR19 final Determination
- Unlike PR24, companies did not receive specifically allocated funding for meter upgrades or replacements (in the form of a BCA, enhancement allowances or price control deliverables) to deliver specific levels of meter replacements at PR19. Instead, companies were funded for their Base expenditure activities to achieve certain outcomes (like demand reduction targets) and provided with the discretion to achieve these as best they could with their efficient cost allowances (and related outcome delivery incentives)
- Ofwat will be introducing a one-sided risk to companies and setting a poor regulatory precedent, in effect penalising notional 'under-delivery' while not similarly rewarding 'over-delivery'.

4.343 Second, the what Base buys estimate for PR24 is not comparing on a like-for-like basis. In addition to the overarching issues raised above, the meter replacement rate used should at least:

- be based on the benchmarking period
- be on a smart-meter equivalent basis
- account for the fact that companies still need to conduct like-for-like meter replacements at PR24 and beyond.

4.344 As in other areas where Ofwat is employing a similar WBB analysis (such as mains renewals), Ofwat is incorrect to assume that this implicitly funded rate is based on the average activity in the modelling period. While Ofwat uses data over 2011 - 2023 to estimate its cost models, it benchmarks costs using company performance over the last five years of outturn data (2018 - 2023 at draft Determinations). Meter replacement activity is not included in Ofwat's cost models, i.e. it is an omitted variable. In its WBB analysis, Ofwat assumes that this omitted variable is uncorrelated with the cost drivers included in its cost model (if correlated, the implicit funding could differ by company). Following Ofwat's assumption, the cost impact of the omitted variable (i.e. meter replacement activity) feeds into the constant in the regression. However, the constant in the regression is adjusted based on the performance of companies in the benchmarking period, such that the benchmarking period (not the modelling period) is the determinant of what is implicitly funded. This is further discussed in Section A3 of appendix AFW102 - Review of Ofwat's smart metering assessment at PR24.

4.345 Illustratively, for Household meters:

- Ofwat's current WBB total implied replacement rate is 0.85%. That is, the industry average 52.7% penetration rate multiplied by the 1.6% renewal rate over 2011–23. See Section A3 of appendix AFW102 - Review of Ofwat's smart metering assessment at PR24
- based on the more appropriate 2018–23 benchmarking period, this is 0.86%. Over which there was a higher industry average penetration rate (58.22%) but lower replacement rate (1.48%)
- if one further accounts for the fact that a large share of historical replacements were basic-to-basic meter replacements undertaken at lower cost (based on the latest three years of APR data, basic meter renewals cost c. £106 per meter, 84% of the average cost of AMR and AMI meter renewals over the same period), the notional smart meter equivalent replacement rate would be at most 0.83%. The discounted total replacement rate accounts for the fact that basic-to-basic replacement costs are 84% of AMR and AMI renewals, and the fact that these replacements were at least 33% of total replacements over from 2020/21 and earlier. Given a lack of disaggregated cost data by meter type over the full historical period, this is based on the industry weighted average renewal cost for meter renewals over 2021/22–23/24 and some (conservative) simplifying assumptions, to illustrate the point. The smart meter equivalent calculation is discussed in more detail in Section A4 of Review of Ofwat's smart metering assessment at PR24.

4.346 Table 4.59 Allowances for upgrades across alternative models shows the impact of moderating Ofwat's assumptions on estimates of the volume of relevant metering activity that is implicitly funded. The table also shows illustrative £m values based on (i) Ofwat's inappropriate unit cost of £128.89 per meter and (ii) the median unit cost of £144.33 when excluding outliers. Specifically:

- Ofwat currently provides BCA allowances for 5.81m (or 75%) of the 7.71m planned meter upgrades over PR24
- removing the PR19 under-delivery component expands the BCA's funding to 6.45m meters (c. 83% of planned upgrades). The impact is similar when applying Ofwat's WBB analysis to the PR19 base cost models. The BCA funding would cover 6.38m meters in this case (also 83% of total requested), with the PR19 WBB implicit allowance based on the PR19 base cost models' benchmark period (2014 - 15-2018 - 19)
- using the benchmark period (2018 - 2023) and accounting for the fact that historical replacement rates should be on a smart-meter equivalent basis expands the BCA funding to cover 6.50m meters (84% of the industry's total planned).

4.347 Lastly, the historical industry average replacement rate that Ofwat uses to construct the WBB estimate includes both like-for-like replacements and upgrades. Otherwise, Ofwat would implicitly require a higher total replacement rate at PR24, with like-for-like replacements remaining unfunded. Should Ofwat require companies to achieve the same historical rate at PR24, it should recognise what like-for-like replacements contribute to achieving this replacement rate (and remain necessary for companies, and areas where smart meter rollout has not occurred yet).

4.348 Further, Ofwat needs to revisit its median unit cost derivation to:

- take into account company-specific complexity of workloads and costs of different meter types
- exclude other outliers with extremely low derived base unit costs to deal with reporting concerns (especially if Ofwat is not able to conduct the more granular assessment based on companies' specific meter types and workload mixes discussed above).

4.349 The data to correct for company-specific workloads and meter types is not publicly available, so we focus on the impact of excluding outliers here. However, we note that based on a bottom-up assessment, Affinity Water estimates that they would require £229.32 per meter for like-for-like meter replacements (post Ofwat's job-and programme cost reallocations), given their relatively more complex workloads.

4.350 Regarding outliers, in addition to WSH (that has a base unit cost of £35.93), there are two other companies with similarly low meter replacement costs of £44.06 and £45.50 per meter (SSC and SES, respectively). Both SSC and SES also have very low TOTEX unit costs of £122.55 and £123.99 per meter, respectively. Comparable to WSH's £112.42 per meter (which is based on a programme of only upgrading to lower cost AMR meters). These rates are significantly lower than Ofwat's current derived base unit costs for other companies, which ranges between £77.84 to £265.79 per meter (when excluding WSH, SSC and SES).

4.351 SSC and SES's derived base unit costs are also much lower than the industry average unit cost for basic HH meter renewals over the last three years (2022–24) of £106.72 per meter. This suggests that SSC and SES's planned unit costs, as a weighted average across all types of like-for-like replacements (HH/NHH, AMR/AMI, etc.), are less than half the current actual least cost type of meter replacement (over the last three years' outturn). These companies may have mis-calibrated their costs and/or there are reporting inconsistencies and errors that need to be corrected to ensure that the like-for-like replacement programme can be funded at the appropriate unit cost.

4.352 Excluding SSC and SES as outliers would increase Ofwat's median derived unit costs to £144.33 per meter. Applying this rate to the BCA would change the amount of funding from Ofwat's current BCA to the industry by 12% (and up to 25% when including the corrections to the implied volume allowance discussed above).

4.353 We summarise the combined impact of the total improvements proposed in Table 4.59 Allowances for upgrades across alternative models (and in more detail across the scenarios in table A5 of appendix AFW102 - Review of Ofwat's smart metering assessment at PR24).

Scenario [1]	Period	WBB benchmark	PR19 'under-delivery'	Unit cost	BCA funded	
				(£)	('000s)	(£m)
1. Total submitted					347.39	
2. BCA funded						
Ofwat	2011 - 2023	Industry	PR19 forecast	Ofwat (128.89)	215.43	27.77
Oxera proposal	2018 - 2023	Industry (smart meter eq.)	None	Excl. outliers (144.33)	278.34	40.17
Oxera proposal + Affinity Water rate	2018 - 2023	Industry (smart meter eq.)	PR19 WBB ' funded'	Afffinity Water unit rate (229.32	278.34	63.83

Table 4.59 Allowances for upgrades across alternative models

1 Source : Oxera analysis based on Ofwat BCA model and APR data

4.354 Finally, we have also submitted 7,525 like-for-like meter renewals that are not accounted for above. The total meter renewals over 2025–30 reported in Affinity Water's 2023 business plan, line CW7.9 are 338,913, of which 331,388 are the upgrades reported under lines CW7.11-14. Only the latter are assessed under Ofwat's BCA assessment (note that this excludes the 16,000 Accelerated programme meters, which takes Affinity Water's total under the BCA to 347,388). We understand that these like-for-like AMR replacements are in areas where the digital infrastructure upgrades required for AMI metering is not possible.

4.355 Based on Ofwat's current BCA, like-for-like meter replacement cost of £128.89 per meter, Affinity Water would thus require another £0.97m of funding for these additional replacements. As discussed above, these meters are over-and-above what is required by Ofwat's WBB implicit allowance (which is based on the total historical meter renewal rate and should thus include these meters).

Our Representation - Conclusion

4.356 Ofwat has not provided efficient Enhancement costs within the draft Determination, risking the delivery of this critical programme and creating perverse incentives for short-termism within the delivery. Our analysis demonstrates this through comparison to a detailed bottom-up approach, using efficient costs that consider work mix and the latest actual market rates. It is also clear that Ofwat's modelled approach has significant flaws, which have led to this significant variance between proposed draft Determination allowance and efficient costs. We have therefore included the original Enhancement costs from our September 2023 business plan, accepting reallocations to Base expenditure. We would welcome further direct engagement with Ofwat to better explore how to accurately access these costs.

4.357 The Base cost adjustment (BCA) for replacements and upgrades does not appropriately account for the number of meters that should be included or provide an efficient unit cost for these. Again, this has been demonstrated through both bottom-up comparison of efficient costs and assessment of flaws within the modelling. Given the materiality of this shortfall, unaddressed this would diminish our ability to delivery customer outcomes meet maintain resilient services over the long term through wider base allowance. We have therefore reflected an uplift within this BCA within our Representation.

4.2.6 Connect 2050 - Interconnectors

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Connect 2050 - Transfer water from Egham to Harefield inc. BPS upgrade	60.97	40.78	61.3
Connect 2050 - Increase DO Egham/Chertsey/Walton	7.71	4.55	7.52

Table 4.60 Connect 2050 - Interconnectors

4.358 Ofwat's comments on Connect 2050 in 'PR24 draft Determinations: Total expenditure allowances - by company' are that [19] :

4.359 *"The company's proposed costs are higher than our efficient cost benchmark for supply interconnectors. The company needs to provide additional evidence that the costs of its supply interconnector schemes are efficient in an industry context. Based on cost benchmarks for interconnectors the company receives 62% of its request. We allow £42 million of the £69 million proposed by the company."*

Our Representation

4.360 We do not agree with Ofwat's 41% overall reduction in allowed expenditure for this business case, resulting from a challenge on cost efficiency arising from the application of Ofwat's Supply Interconnector model. We note that there are two schemes that have been assessed together, one of which is a treatment scheme that has received no cost allowance as it does not have an associated trunk main length. We have revised our CW8 table (see appendix AFW105 - Data tables v7 August) to clarify this and propose this is assessed through the supply model accordingly. We provide a summary of our position and evidence regarding the interconnector scheme below.

4.361 The draft Determination allowances for the Egham to Harefield interconnector are materially less than the required costs to adequately undertake this scheme. Our investment process has ensured we put forward the best option for customers at efficient costs, with base overlap appropriately accounted for. The consequence of the reduced allowance is therefore risking the outcome of the scheme, which underpins the future resilience of supplies to customers across much of our central region and our ability to implement the statutory abstraction reductions set within our WINEP.

4.362 On page 79 of the Expenditure allowances – Enhancement cost modelling appendix [20], Ofwat state, "Given the small number of outliers we identified we conducted an engineering deep dive of each scheme to assess if the company presented compelling evidence to demonstrate that the costs are efficient from an engineering perspective." However, in response to query OFW-IBQ-AFW-010, Ofwat stated that this was an error and, "this statement is incorrectly applied to Supply interconnectors" and that no such assessments have taken place as they were not deemed necessary. We are concerned by the misleading and opaque nature of the assessment description, and equally that a 41% cost challenges to schemes critical to the future supplies of our region are not deemed to warrant any engineering assessment of the validity of the scheme costs.

19. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Expenditure-allowances-to-upload.pdf
20. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Expenditure-allowances-Enhancement-cost-modelling-appendix.pdf

4.363 It is clear from our analysis that the simplistic nature of the Interconnector models, with only two variables (length and flow benefit), underestimates the costs of complex interventions. The model does not include exogenous variables which can account for the complexity of a scheme which has dozens of trenchless and major crossings (including the M25, M4, railway lines, aqueducts, and Heathrow Airport Expansion land).

4.364 We have two main criticisms of Ofwat's modelling approach. First, Ofwat does not maintain a consistent set of schemes used in the model estimation approach in subsequent steps (i.e. bias correction, aggregation, benchmark estimation). Such inconsistencies are unexplained and result in a material bias in Ofwat's assessment, particularly so for Affinity Water, Second, Ofwat has not robustly investigated the reliability of its analysis and considered necessary normalisations given the overly simple models it has employed. Specifically, there are several clear indicators of the complexity of Affinity Water's 'Egham to Iver' scheme (e.g. pipe diameter, terrain features such as surface type, urbanicity and number of major rail/road crossings to be managed) that are not correlated with the drivers considered in Ofwat's model. Accounting for these results in the scheme being deemed efficient.

4.365 Statistical diagnostic tests on Ofwat's model, similar to the robustness tests considered for base cost models, confirm that significant variations exist in the interconnector schemes in terms of costs and project sizes, resulting in a wide range of efficiency estimates at the scheme level. Moreover, the regression outputs are significantly influenced by individual schemes, confirming scheme-specific attributes that are insufficiently normalised. In the absence of refining the model specification through additional normalisation factors, aggregating the results to the company level can mitigate misspecification risks to some extent. While Ofwat has aggregated results to the company level, the aggregation approach needs to be aligned with the underlying regression sample, especially where we are dealing with a small and heterogenous dataset. This is particularly problematic for Affinity Water that has only one supply interconnector scheme, and the misspecification errors in its estimation from Ofwat's simple model are not offset through aggregation with other interconnector schemes that are reallocated prior to aggregation.

4.366 Given these factors, we have restated our original scheme costs within our representation and propose the following adjustments to Ofwat's cost assessment approach:

a. Adjustment to the model to more accurately account for material drivers of costs.
b. Apply the model consistently across all interconnectors, allowing the averaging to partially account for the simplicity of the model.
c. Undertake a post-modelling adjustment to account for the clear engineering complexities of the WMRP interconnector scheme driven by exogenous factors.
d. Undertake a separate assessment of the increased deployable output (DO) scheme using the supply model, to account for this treatment scheme currently not funded due to no trunk main length.

4.367 In the following section we provide additional engineering evidence to support the, including;

- evidence that we have put forward efficient costs, to support the need for a post-modelling adjustment to account for the material exogenous factors
- a summary of the specific concerns and potential remedies of the modelling approach (with further detail provided within appendix AFW103 - Connect 2050 supply interconnector modelling critique.

4.368 PCD - We are not providing representations on the draft Determination approach to use Ml/d of water available for use (WAFU) as the metric to measure successful delivery of the WRMP supply interconnectors schemes.

Summary of Evidence

4.369 For consistency, we have provided our evidence of efficient costs in the format of the Deep Dive assessment that has been applied to interconnectors on other drivers. This evidence demonstrates the robustness of our approach in developing and costing our approach, providing supplementary information to the original business case provided within appendix AFW14a - Enhancement investment cases and appendix AFW14b - Enhancement investment cases.

4.370 We have also provided a summary document giving the context and background to the overall Connect 2050 programme of interventions within appendix AFW146 - Connect 2050 explainer to further clarify the integrated nature of the programme, which further reinforces the arbitrary nature of the differing cost assessment approach Ofwat has taken to cost assessment of interconnectors across differing drivers.

Connect 2050 need

4.371 At present, we have sufficient water available for use (WAFU) and acceptable headroom to supply our customers. However, this target headroom will erode over the coming years due to various factors, severely impacting certain Water Resource Zones (WRZs). In the short-term (by 2030), this erosion will cause several WRZs to fall into a headroom deficit without intervention.

4.372 Factors contributing to this include the application of sustainability reductions in line with our environmental destination, supported by the Environment Agency, which will reduce the available deployable output (DO) in our Central region as we protect our chalk streams.

4.373 Additionally, significant population growth will further stress the remaining DO. In the long-term, this deficit will be exacerbated if no interventions are implemented, as we experience further impacts of population growth and climate change on our local environment.

4.374 To ensure we can provide our customers with clean and safe water while protecting our precious local environment through our Sustainability Reduction programme, we have taken a systems-based approach and designed our Connect 2050 programme.

4.375 We must implement these interventions in 2025 - 2030. Without them, several WRZs will fall into a deficit, and we will not be able to guarantee clean and safe water to our customers from 2030 or progress with our Sustainability Reduction programme in 2025 - 2030 and beyond. This Egham to Harefield scheme underpins the meeting of future demand across several of our WRZs and is the most essential component of our optimised programme of interventions within the Connect 2050 programme. A more detailed explanation is available in the appendix AFW146 - Connect 2050 explainer provided with our representation.

4.376 The assumptions we have made to allocate investments to Base or Enhancement are outlined in Table 4.61 Our assumptions around Base and Enhancement investments. We assume that continuing our current business-as-usual activities, which deliver on asset health improvement needs from previous periods, will be covered by Base investment. This includes operational costs for maintaining the water distribution network, existing treatment works, and storage reservoirs. It also encompasses low-cost, high-benefit incremental improvements for customers.

Base	Enhancement
• Maintenance of the ongoing of existing storage reservoir, water network and treatment processes • Business-as-usual incremental improvements (e.g., minor improvement during refurbishment) • 2020 - 2025 Enhancement carry over	Installation of additional assets driven by WRMP statutory drivers, including new pumping station and pipeline that do not replace existing assets.

Table 4.61 Our assumptions around Base and Enhancement investments

4.377 All enhancement investments listed under the Connect 2050 business cases are for new assets. These investments address our statutory needs and have not been funded in previous price reviews.

Connect 2050 options

4.378 While some of our broader supply-demand interventions (as detailed in our WRMP24) will improve the deficit position that will arise from sustainability reductions on abstractions (including leakage improvement, metering deployment, etc.), the Connect 2050 programme is necessary to move water from new resource options to areas where it can address the remaining deficit. The Connect 2050 programme effectively balances cost and benefit through a comprehensive solution development and optioneering process, accounting for the changes in the strategic supply network required to facilitate abstraction reductions and new supply-side resources. We ensured that all options developed were viable through an extensive understanding of the need, assessed via extensive network modelling. We modelled the effect of each option with 20,000 permutations (considering type and timing of intervention) to assess the impact on our network using consistent measures to establish the best value option.

4.379 The chosen option proposed for 2025 - 2030 has been calculated as the best value one to take forward for our Connect 2050 programme. It comprises a series of interventions that use our ability to increase our DO in some of our more southerly WRZs and then use a combination of our existing infrastructure (where capacity permits) and new infrastructure to move water around our Central region to meet the WRMP24 target headroom in all WRZs. This approach represents the best value early development of cost-effective upgrades that can support system changes once the Strategic Resource Options (SROs) come online, starting in 2032. By taking this whole-system view of balancing the delivery of clean and safe water across our network with our obligation to protect our natural environment, we have ensured the best value outcome for our customers.

4.380 For our options development process, we have consistently proposed best value solutions using rigorous optioneering. We have followed a structured process to identify a wide range of potential options captured in the unconstrained list.

Optioneering approach

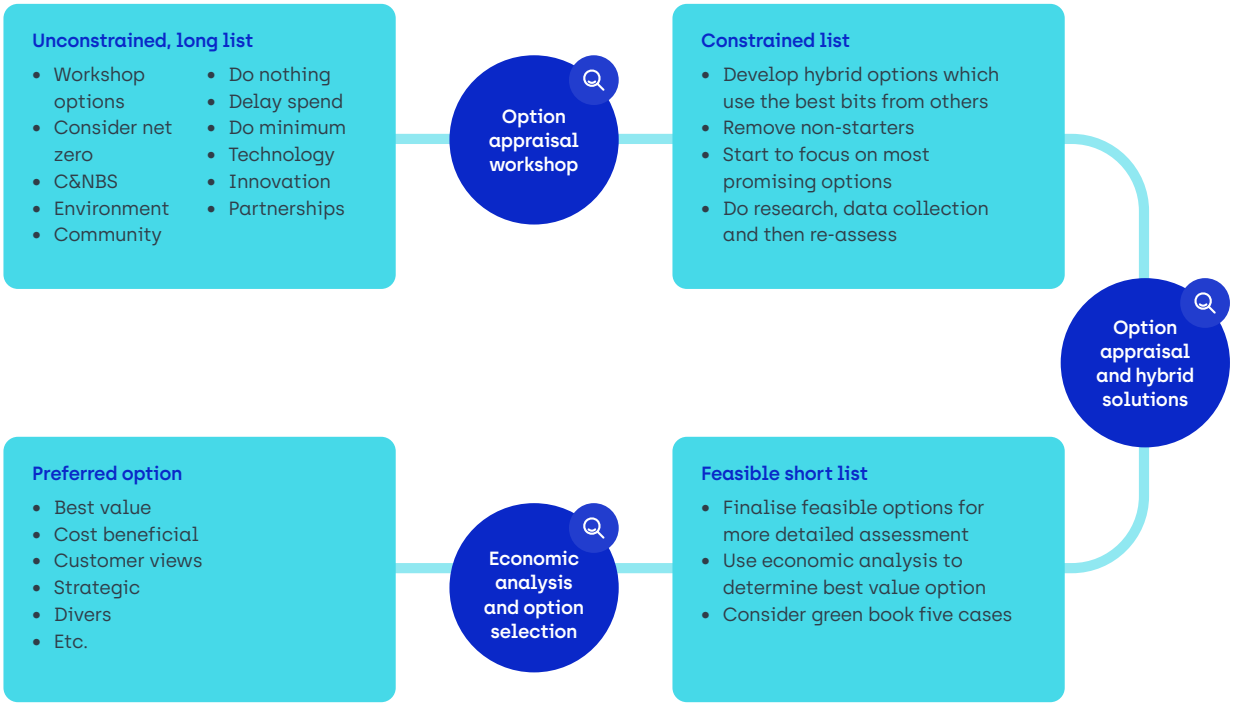


Figure 4.18 Our optioneering approach

Root causes identified

4.381 In line with established asset management planning practice, we began by undertaking root cause analysis for Needs, as this ensures that our proposed interventions will be both allocatively and dynamically efficient.

Not in our control	Planned for 2025 - 2030 and already set as very challenging PCLs/assumed 2025 - 2030 ambition is achieved	Remaining root causes
The following root causes have not been selected for intervention as they are not in our control: • New development • Climate change • Reduction of abstraction under WFD WINEP initiative	The following root causes have not been selected as they are already planned for 2025 - 2030 and set as very challenging PCLs. By addressing these root causes at a company level, we are contributing to achieving the outcomes intended by the SR driver i.e. leaving water in the aquatic environment where this is cost beneficial. This will enable us to reduce average demand however if done in isolation they will expose the customer to a supply shortfall in peak demand conditions: • Per Capita Consumption (PCC) • Leakage	The following are the remaining root causes that we will specifically address as part of our 2025-2030 plan for Network Connectivity • Lack of treatment capacity • Lack of water transfer capability and capacity • Raw water deterioration

Table 4.62 . Root cause analysis

4.382 In our optioneering, we had to ensure that the intervention options proposed would address the key risks summarised in Table 4.63 Key risks.

	Risk 1	Risk 2	Risk 3	Risk 4
Risk description	Hydraulic Modelling shows that by 2030, Affinity Water will have a deficit of 56 Ml/d of water.	Insufficient network capacity of 56 Ml/d in zone 6 to 4	Insufficient network capacity of 3Ml/d and 10Ml/d in zone 2-1,	Insufficient network capacity of 19Ml/d in zones 2-4

Table 4.63 Key risks

4.383 Stepping through the optioneering (below) showed that there is no single intervention, and only two option combinations (#8 and #15), which enables us to fully address these risks.

4.384 As part of our options appraisal, we evaluated an **unconstrained list** of options, summarised in Table 4.64 Consideration of unconstrained options for Connect 2050 - Interconnectors.

Options	Meets statutory needs	Technically feasible	Comments/ reason for discarding
Imports from other water companies	Yes	No	**Discarded** - No feasible, not enough water in the region
Stop SEW export	No	No	**Discarded** - Does not solve the problem and is not feasible due to agreements
Accelerate GUC project	Yes	No	**Discarded** - We cannot build it earlier.
Create new sources of water or new licence	Yes	No	**Discarded** - Not feasible, EA does not allow new licences.
Maximise current licences with additional treatment capacity	Partially	Yes	There is a programme of works for AMP8 for £10m under SR. **Assumption is happening.**
Grey water, recycling water	Yes	No	**Discarded** - Not feasible due to scale and practicality.
Desalination plants and link with SE and East.	Yes	No	**Discarded** - Not feasible under the timescale
Import from Beckton sewage treatment works	Yes	No	**Discarded** - Not feasible under the timescale
Reduce PCC beyond our PCL target	Partially	Yes	**Discarded** - Assumption is that we meet our target. There is a separate programme of works. £80m.Already maximised
Reduce leakage beyond our PCL target	Partially	Yes	**Discarded** -Assumption is that we meet our target. There is a separate programme of works. £55m.Already maximised
New treatment plant at Iver			**Discarded** - Not feasible under the timescale
Increase DO in Wey (new treatment plant)	Partially	Yes	To explore further – taken forward as Option 1
Relocate average DO to Blackford Group	Partially	Yes	To explore further – taken forward as Option 2
Reinforced Link between Harefield and Harrow	Partially	Yes	To explore further – taken forward as Option 3
Heronsgate to Bovingdon reinforced link	Partially	Yes	To explore further – taken forward as Option 4
New link between Watford and Heronsgate	Partially	Yes	To explore further – taken forward as Option 5
Reinforced link zone 6 to 4	Partially	Yes	To explore further – taken forward as Option 6
Link Main between zone 6- Wey to 5- Stort	Partially	Yes	To explore further – taken forward as Option 7

Table 4.64 Consideration of unconstrained options for Connect 2050 - Interconnectors

4.385 The way in which the unconstrained set of options cluster is visualised in Figure 4.19 Unconstrained options shown as a cluster; only two option combinations (#8 and #15) enable us to fully address the risks.

Optioneering high level process

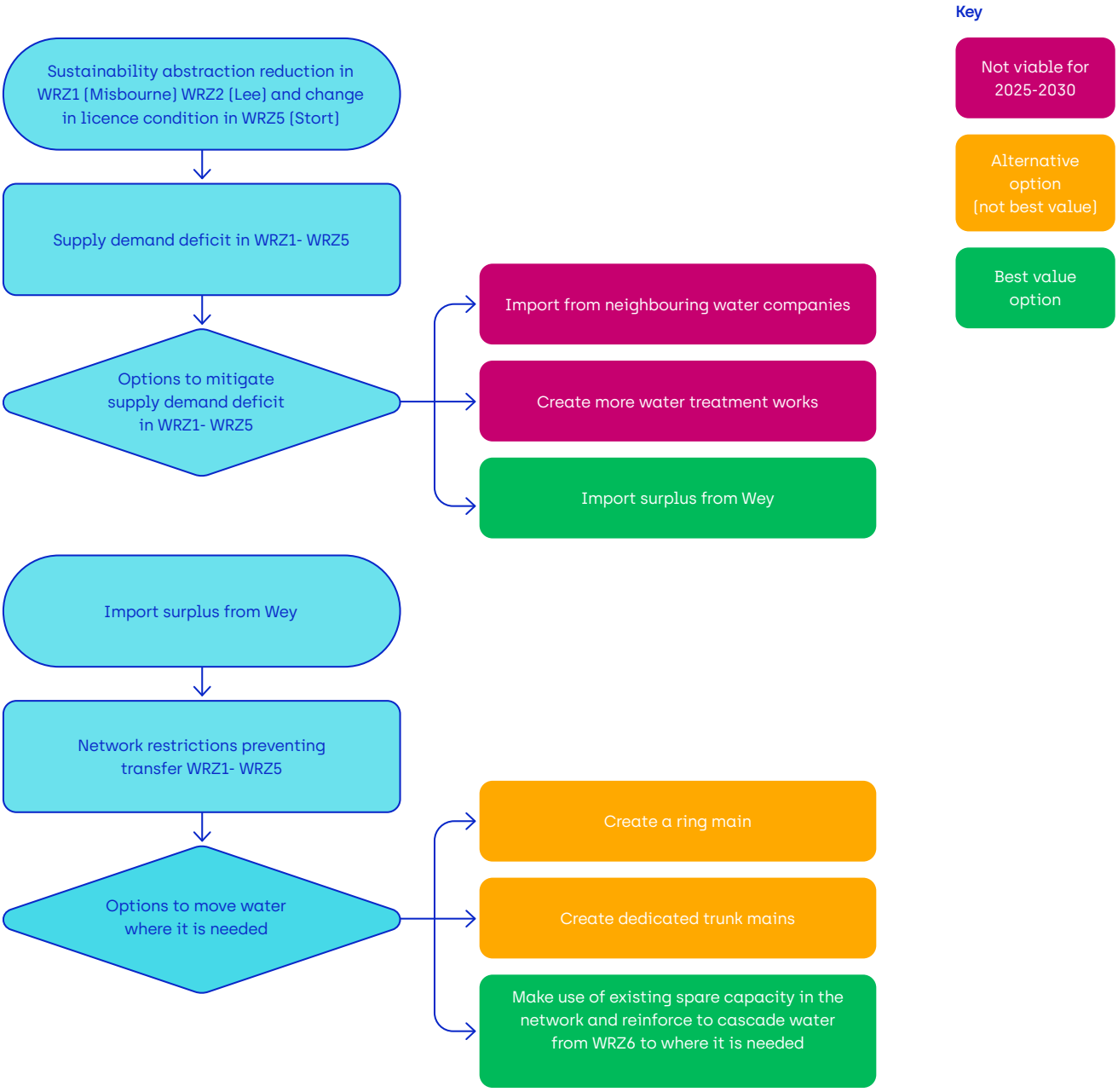


Figure 4.19 Unconstrained options shown as a cluster; only two option combinations (#8 and #15) enable us to fully address the risks

Option	Solution option description	Driver	Capex WLC	Opex WLC (25 years)	WLC	Starting risk value	Residual risk / opp	Risk reduction / opp attained
			(£m)	(£m)	(£m)	(£m)	(£m)	(£m)
1	Increase DO in Wey (new treatment plant)	WRMP	7	1.25	8.25	33.620	25.187	8.433
2	Relocate average DO to Blackford Group	WINEP SR	30	1.25	31.25	33.620	30.247	3.374
3	Reinforced Link between Harefield and Harrow	WINEP SR	35	25	60	33.620	33.620	£0.00

Option	Solution option description	Driver	Capex WLC	Opex WLC (25 years)	WLC	Starting risk value	Residual risk / opp	Risk reduction / opp attained
			(£m)	(£m)	(£m)	(£m)	(£m)	(£m)
4	Heronsgate to Bovingdon reinforced link	WINEP SR	30	7.5	37.5	33.620	33.620	£0.00
5	New link between Watford and Heronsgate	WRMP	30	15	18.2	33.620	33.620	£0.00
6	Reinforced link zone 6 to 4	WRMP	60	25	85	33.620	33.620	£0.00
7	Link Main between zone 6 to 5	WRMP	500	250	750	33.620	33.620	£0.00
8	Sol 8: 1+2+7		537	252.5	789.5	33.620	-	33.620
10	1+2+6		97	27.5	124.5	33.620	10.006	23.615
11	1+2+6+3		132	52.5	184.5	33.620	10.006	23.615
12	1+2+6+4		127	35	162	33.620	10.006	23.615
13	1+2+6+3+5		135.2	67.5	202.7	33.620	4.493	29.128
14	1+2+6+4+5		130.2	50	180.2	33.620	5.513	28.107
15	1+2+6+3+4+5		165.2	75	240.2	33.620	-	33,620.50

Table 4.65 All the options evaluated for the investment case; the preferred options are highlighted in green (option numbers 8 and 15)

4.386 Only two options combinations enable us to fully address the risks – the degree of risk mitigation is summarised in Table 4.66 Degree of risk mitigated by each option.

	Risk 1	Risk 2	Risk 3	Risk 4
	Hydraulic Modelling shows that by 2030, AW will have a deficit of 56 Ml/d of water.	Insufficient network capacity of 56 Ml/d in zone 6 to 4	Insufficient network capacity of 3 Ml/d +10 Ml/d in zone 2-1,	Insufficient network capacity of 19 Ml/d in zone 2-4
Increase DO in Wey (new treatment plant)	71%	0%	0%	0%
Relocate average DO to Blackford Group	29%	0%	0%	0%
Reinforced Link between Harefield and Harrow	0%	0%	0%	0%
Heronsgate to Bovingdon reinforced link	0%	0%	0%	0%
New link between Watford and Heronsgate	0%	0%	0%	0%
Reinforced link zone 6 to 4	0%	0%	0%	0%
Link Main between zone 6 to 5	0%	0%	0%	0%
Sol 8: 1+2+7	100%	100%	100%	100%
1+2+6	100%	100%	0%	0%
1+2+6+3	100%	100%	0%	0%
1+2+6+4	100%	100%	0%	0%

	Risk 1	Risk 2	Risk 3	Risk 4
	Hydraulic Modelling shows that by 2030, AW will have a deficit of 56 Ml/d of water.	Insufficient network capacity of 56 Ml/d in zone 6 to 4	Insufficient network capacity of 3 Ml/d +10 Ml/d in zone 2-1,	Insufficient network capacity of 19 Ml/d in zone 2-4
1+2+6+3+5	100%	100%	0%	100%
1+2+6+4+5	100%	100%	100%	0%
1+2+6+3+4+5	100%	100%	100%	100%

Table 4.66 Degree of risk mitigated by each option

4.387 This regional schematic shows the integration of 2025 - 2030 SR and Connect 2050 Interconnector interventions, and that these do not overlap with previous expenditure in 2020 - 2025.

4.388 Regional schematic ofAMP7 SR, AMP8 SR and AMP8 Connect 2050 Interconnector interventions.

4.389 Figure 6 in **appendix AFW150 - security sensitive maps**[21].

Cost efficiency

4.390 We are confident that the interconnector costs put forward are robust and represent efficient costs given the specific nature of the scheme. Below we outline our costing approach and provide further third party assurance of the resultant costs being efficient.

Methodology procedure - Cost estimate technique

4.391 The costs for each component of the programme have been determined using Affinity Water's PR24 cost curves wherever possible (2022 - 23 cost base). These models account for factors such as traffic management, lane rental, and are based on appropriate factors such as pipeline length and diameter, with coefficients tested for each factor. These models are informed by a combination of extensive outturn data and external benchmark cost data. The cost estimates were developed using industry best practice, with more detail provided on these below. Our cost models were used in conjunction with historical outturn costs for the special engineering challenges that these cannot account for, for example major crossings of motorways and railway lines.

4.392 We have significantly improved our understanding of the capital and operational expenditure costs across the business in developing a unit cost database (UCD). The process by which UCDs were developed and deployed in our decision support processes and tools is outlined schematically below (see appendix AFW08 - Our investment development process for a full narrative around the process steps).

21. Figure moved to appendix AFW-150 due to the redacted nature of the information shown

Our decision support process and how unit costs were developed and deployed

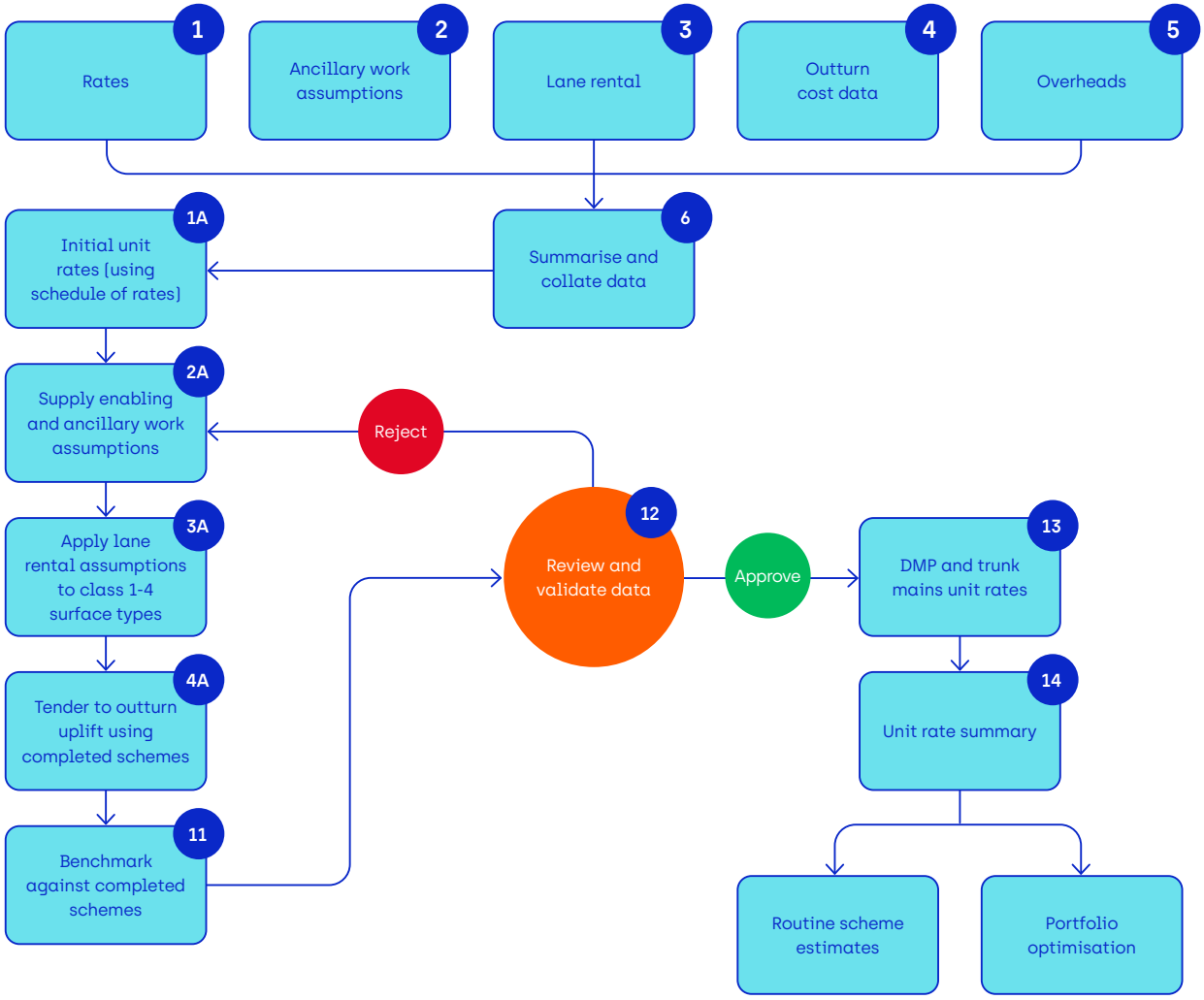


Figure 4.20 A schematic showing our decision support process and how unit costs were developed and deployed within the process

4.393 Our UCD has been built using information from a range of sources, such as our framework contracts and breakdowns from historic scheme outturn costs, supplemented by additional data and industry costs from Mott MacDonald and from TR61. The UC models for service reservoirs and for trunk mains include Mott MacDonald and TR61 external costs, meaning that cost benchmarking is intrinsic to our cost build up.

4.394 To ensure accuracy of our costs we have undertaken third party assurance and reconciled these costs against external benchmarking provided by Aqua Consultants and AtkinsRéalis, to ensure these are efficient.

Cost Structure

4.395 For the Egham to Iver (Harefield) interconnector scheme we used our UCD to provide a cost per km, that is specific to the urbanicity, diameter, material and land type of the scheme. Additional costs were applied to account for the 8 major road and rail crossings, including the M4 and M25 and major rail lines. The booster pumping station has also been costed using our UCD, which uses historic outturn and industry benchmarks to cost per Ml/d of maximum design capacity (i.e. to remain resilient for peak periods).

Cost Area	Unit Cost	Unit	Data Source
Trunk Main	£3.96m per km	10.642	UCD (with 10% uncertainty and optimism bias adjustment appropriate to scheme complexity)
Major Crossings	£1.13m per crossing	8	Average of AMP7 actual historic costs, including M1 and Wembley crossings (with 10% uncertainty and optimism bias adjustment appropriate to scheme complexity)
Booster	£5.15m	1	UCD (with 15% uncertainty and optimism bias adjustment appropriate to scheme complexity)

Table 4.67 Unit costs for the Egham to Iver interconnector scheme, as derived from our UCD

4.396 Uncertainty and optimum bias adjustments are in line with global best practice, taking the mid-point of the uncertainty ranges as laid out within table 1 of AACE International Recommended Practice No. 18R-97.

Cost Estimate Classification Matrix (AACE International Recommended Practice No. 18R-97)

	Primary Characteristic	*Secondary Characteristic*			
ESTIMATE CLASS	**LEVEL OF PROJECT DEFINITION** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges [a]	**PREPARATION EFFORT** Typical degree of effort relative to least cost index of
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/ Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes:

[a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency typically at a 50% level of confidence for given scope.

[b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

Figure 4.21 table 1 of AACE International Recommended Practice No. 18R-97.

4.397 Additional costs have then been applied to account for the new biodiversity net gain requirements for the booster station not accounted for within UCD. Additional corporate overheads of 8.58% (that are not captured within the UCD) have then been applied, in line with our standard accounting practices.

4.398 We note that this scheme has a high proportion of costs driven by complexity, for example urbanicity driving high unit cost per length and the number of major crossings and need for a large booster pumping station. We note that by comparison, Ofwat's more simplistic cost assessment approach does not directly account for these material exogenous factors, and propose that these be appropriately accounted for through adjustment to the modelling approach and post-modelling adjustment.

Governance and assurance

4.399 Additional costing assurance has been undertaken by AtkinsRéalis to ensure we continue to put forward efficient costs for this investment. This included assurance of our cost estimation approach, included in full within appendix AFW139 - Assurance of enhancement costs and 3rd party benchmarking.

4.400 Regarding our approach to cost estimation, AtkinsRéalis state,

4.401 *"We consider that the cost estimation process is reasonable but may result in an underestimate. The project development work undertaken since the estimate was developed has already added a further 12% to the pipeline length, (i.e. more than the 10% risk allowance) as well as 50% more major crossings. Many of the costs of previous crossing projects have been excluded from the costs used in the estimate suggesting that they will be underestimates. It is also understood that the example project from which the booster pumping station cost has been derived is now under contract and has seen costs increase by approximately 30%.*

4.402 *It is not surprising to us that the cost per km of this project is higher than other companies' inter-connector submissions given the congested location of the proposed pipeline in the vicinity of Heathrow airport with many major roads and railways. Given their effect on costs we recommend highlighting the cost of the crossings as a separate cost element as well as providing details of the updated pipeline length in Affinity Water's DD response."*

Modelling approach

4.403 In assessing companies' proposals for the interconnector schemes, Ofwat has developed scheme-level econometric cost models using two cost drivers (length and benefit) on historical and forecast data. In determining the cost allowances, results from historical and forecast data are triangulated post a bias correction [22] , and the scheme-level results of the supply interconnectors alone are aggregated to the company level. Ofwat reallocates the non-supply interconnector schemes to other enhancement categories (e.g. resilience) for further assessment [23] [24] . Applying an average benchmark to the company-level results, Ofwat concludes that Affinity Water's allowance for its supply interconnector scheme (Egham to Iver) should be £42.5m against a requested cost of £68.6m Ofwat (2024) [25] .

4.404 We have two main criticisms of Ofwat's approach.

4.405 First, Ofwat does not maintain a consistent set of schemes used in the model estimation approach in subsequent steps (i.e. bias correction, aggregation, benchmark estimation). Such inconsistencies are unexplained and result in a material bias in Ofwat's assessment, particularly so for Affinity Water. Correcting for these errors and adopting a consistent methodology results in our interconnector schemes to be deemed efficient.

22. As Ofwat models the scheme-level data in logarithms, transforming the results back in levels results in a significant bias at the scheme level. As at PR19, Ofwat corrects for this bias by applying an adjustment to the predicted costs equal to the ratio of submitted costs and predicted costs at the industry level

23. Ofwat (2024), 'PR24 draft determinations: Expenditure allowances - Enhancement cost modelling appendix', July.

24. Note that at PR19, Ofwat relied on business plan forecasts and used a combination of deep dives, shallow dives and unit cost assessments of supply interconnectors and other interconnector schemes across companies. Ofwat (2019), 'PR19 final determinations: Securing cost efficiency technical appendix', December

25. PR24 draft determinations: Expenditure allowances - Enhancement cost modelling appendix', July, Table 29.

4.406 Second, Ofwat has not robustly investigated the reliability of its analysis and considered necessary normalisations given the overly simple models it has employed. Specifically, there are several clear indicators of the complexity of our 'Egham to Iver' scheme (e.g. pipe diameter, terrain features such as surface type, urbanicity and number of major rail/road crossings to be managed) that are not correlated with the drivers considered in Ofwat's model. Normalising for these complexities and modelling our normalised scheme using Ofwat's model costs results in it being deemed efficient. This demonstrates that Ofwat should be cautious in solely relying on overly simple cost models to determine cost allowances and consider appropriate normalisation and robust post-modelling procedures (such as deep dive assessments) for schemes like Egham to Iver that are more complex.

4.407 More detailed analysis and detail of proposed changes to approach are provided within AFW-103 -Connect 2050 supply interconnector modelling critique.

4.2.7 Connect 2050 - Resilience

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Connect 2050 - Resilience	13.72	10.49	13.72

Table 4.68 Connect 2050 - Resilience scheme adjustments

4.408 Ofwat has proposed a 20% cost challenge to the Connect 2050 – Resilience scheme, based on a deep dive assessment. This includes a 10% adjustment due to the assessment of need for Enhancement investment and a further 10% due to the assessment of best option for customers.

Our Representation

4.409 This allowance is insufficient to deliver the required outcomes needed to protect the resilience of customers supplies. We therefore provide additional clarification and evidence relating to this assessment and include the original costs of the investment within our Representation.

Summary of evidence

Need

Ofwat's Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Need for Enhancement investment	The investment partly meets the criteria for Enhancement investment and additional customer funding. The company provides sufficient and convincing evidence of the need for the scheme but does not **demonstrate that parts of the scheme do not overlap with Base allowances.** • The company presents the investment as part of their "Connect 2050" plan, which the company states is a long-term initiative that aims to improve their ability to move water around the region. bringing together their water resource management plan (WRMP), Water Industry National Environmental Programme (WINEP), and resilience strategies. • The investment, which is for additional resilience against climate change, follows a consistent approach in needs identification for all components – risk, value and option development. **However, although the company claims to avoid overlap with existing base allowances, it fails to provide sufficient and convincing evidence for this.**	Partial pass	10%

Table 4.69 Ofwat's deep dive assessment of the need for Connect 2050 - Resilience

4.410 We note the concern of potential overlap with Base allowances and therefore provide additional detail on the specific nature of the investments and how these are discrete for Base allowances. All investment listed under the Connect 2050 – Resilience business case is to deliver new, additional assets. These investments address the increased risk of service outage resulting from increasing frequencies of extended periods of high demand driven by climate change and have not been funded in previous price reviews in either Base or Enhancement allowances.

Base	Enhancement	2020 - 2025 Enhancement Schemes
On-going maintenance of Storage reservoir	Step change significant increase in storage capacity driven by exogenous factor outside management control: extended period of high demand	There was no additional storage funded for the two sites within the previous period.
Repair and refurbishment of existing reservoir		40Ml additional Storage funding in 2020 - 2025 across Supply 2040 and SR are being delivered in Preston Additional and Chaul End sites
Incremental improvements		

Table 4.70 Base and enhancement investments

4.411 The assumptions we have made to allocate investment to Base or Enhancement are outlined in Table 4.71 Our assumptions around base and Enhancement investments. We assume that continuing our current business-as-usual activities that deliver improvements in asset health, based on needs identified in previous periods, will be covered by Base investment as operational costs and capital maintenance for maintaining the water distribution network. This approach includes low-cost, high-benefit incremental improvements (and/or avoidance of deterioration) for customers.

4.412 Additionally, we have not included net additional opex to maintain the new storage reservoirs at Hills and Hadham Mill. The new structures will enhance efficiency by allowing the existing site to be taken out of service for inspection and maintenance works, thereby near offsetting additional opex costs of the operation and maintenance of the new additional assets.

Base	Enhancement
Maintenance of the ongoing Storage reservoir Business-as-usual incremental improvements (e.g., minor improvement during refurbishment) 2020 - 2025 Enhancement carry over	Needs aligned with the Long-Term Delivery Strategy (LTDS) are driven by a significant shift outside management control: increased duration of high demand days due to climate change. Needs aligned with the WRMP, to mitigate the impact of climate change but it also needed in the future to support growth. We are taking advantage that Affinity already owns the land to deliver better value for customers

Table 4.71 Our assumptions around base and Enhancement investments

Best option for customers

Ofwat's Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Best option for customers	We have minor concerns whether the investment is the best option for customers. The company considers a range of alternative options **but does not provide sufficient and convincing evidence to demonstrate that the chosen options are the most cost beneficial in comparison to alternatives.** A clear and robust methodology is described for identifying options, assessing risk and cost benefit analysis. There is a line of sight from Water Resources South East (WRSE) regional planning through internal strategic planning to option development. A consistent approach to risk analysis taking account of relevant hazards is described and valuation takes account of carbon, biodiversity net gain and natural capital. The Company's Resilience Assessment Tool uses an asset-by-asset as well as a system-based approach in line with the 4R's methodology (resistance, Reliability, Redundancy, Response and Recovery) and assesses the risks from a broad range of hazards .	Minor concerns	10%

Table 4.72 Ofwat's deep dive assessment of the options for Connect 2050 - Resilience

4.413 We do not agree with the 10% adjustment Ofwat has made based on inadequate optioneering. We agree with Ofwat that the quality of a case needs to be proportionate to its materiality, in keeping with the UKWIR 2014 Framework for Expenditure Decision Making. Consequently, we undertook extensive optioneering in the development of this business case, as we outline below.

Optioneering for each business case

4.414 For our options development process, we have proposed best value solutions using rigorous optioneering. We have followed a structured process to identify a wide range of potential options captured in the unconstrained list.

Optioneering approach

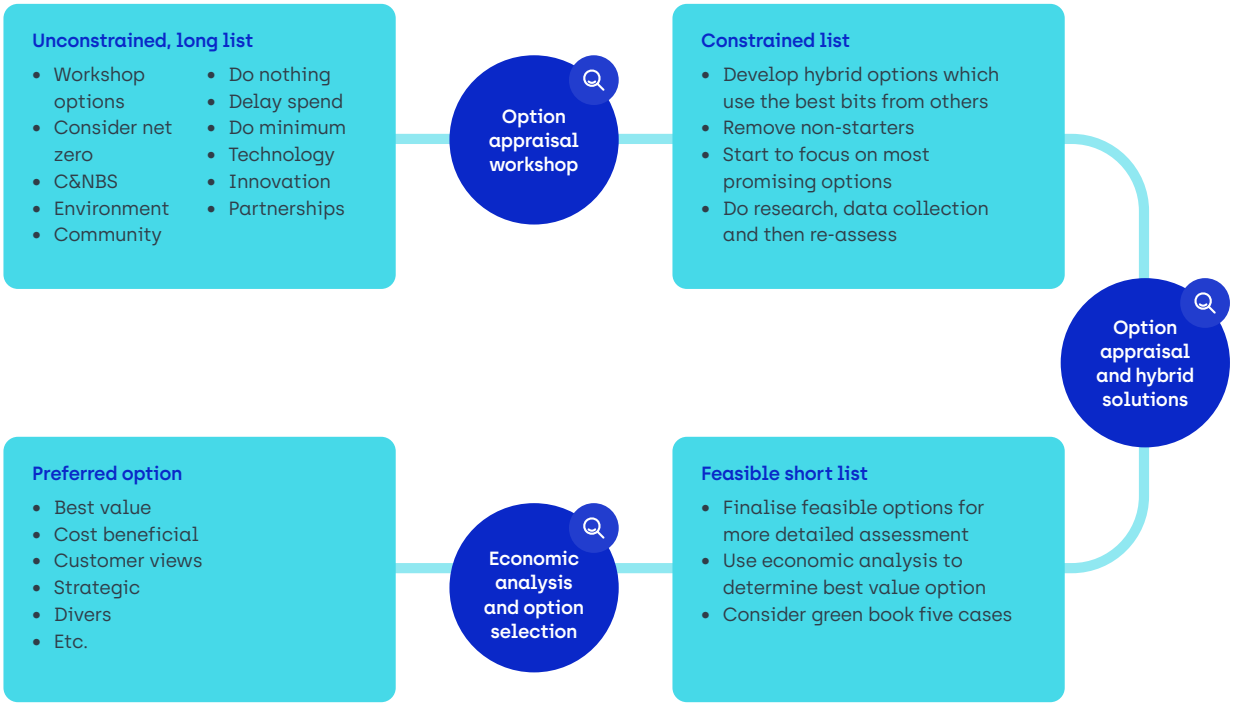


Figure 4.22 Our optioneering approach

Root causes identified

4.415 In line with established asset management planning practice, we began by undertaking root cause analysis for Needs, as this ensures that our proposed interventions will be both allocatively and dynamically efficient.

Not in our control	Planned for 2025 - 2030 and already set as very challenging PCLs/assumed 2025 - 2030 ambition is achieved	Remaining root causes
The following root causes have not been selected for intervention as they are not in our control: • Climate change • Reduction of abstraction under WFD WINEP initiative	The following root causes have not been selected as they are already planned for 2025 - 2030 and set as very challenging PCLs. By addressing these root causes at a company level, we are contributing to achieving the outcomes intended by the Sustainability Reductions driver i.e. leaving water in the aquatic environment where this is cost beneficial. This will enable us to reduce average demand however if done in isolation they will expose the customer to a supply shortfall in peak demand conditions: • Per Capita Consumption (PCC) • Leakage	The following are the remaining root causes that we will specifically address as part of our 2025 - 2030 plan for Network Connectivity: • Lack of treatment capacity • Lack of water transer capability and capacity • Raw water deterioration

Table 4.73 Root cause analysis

4.416 As part of our options appraisal, we have evaluated an **unconstrained** list of options, as summarised in Table 4.74 Consideration of unconstrained options for Connect 2050 – Resilience business case aimed at improving resilience to the extended peak periods of high demand driven by climate change in our two most vulnerable Water Resources Zone WRZ7 - Dour and WRZ5 - Stort.

Options	Meets outcomes needs	Technically feasible	Comments/ reason for discarding
Imports from other water companies	Yes	No	**Discarded** - Not feasible, not enough water in the region
Create new sources of water or new licence	Yes	No	**Discarded** - Not feasible, EA does not allow new licences.
Maximise current licences with additional treatment capacity	Partially	Yes	There is a programme of works for 2025 - 2030 for £10m under Sustainability Reductions. Assumption **is happening**.
Grey water, recycling water	Yes	No	**Discarded** - Not feasible due to scale, practicality and cost.
Desalination plants and link with SE and East.	Yes	No	**Discarded** - Not feasible under the timescale and cost
Reduce PCC beyond our PCL target	Partially	Yes	**Discarded** - Assumption is that we meet our target. There is a separate programme of works. £80m.Already maximised
Create additional interconnectors from where water is available to sustain increase peak in demand period	Yes	Yes	**Explore further**
Build additional Storage in the WRZ	Yes	Yes	**Explore further**

Table 4.74 Consideration of unconstrained options for Connect 2050 – Resilience business case

4.417 We followed our structured Risk and Value (R&V) process for optioneering, which leverages data to identify the best value solutions and opportunities. Our R&V process is grounded in the Service Measure Framework and utilises data from the Green Book to estimate the impact of potential service failures and risk scores. Further details of our R&V process can be found on page 86 of appendix AFW08 - Our investment development process.

4.418 For Hadham Mill, to improve resilience in WRZ5 -Stort the following options have been considered:

Option solution	Mitigation solution description	Initial risk value	Risk reduction	Residual risk value	Notes
		(£m)	**(£m)**	**(£m)**	
1	Build 20 Ml storage to provide 24 hours storage for additional 20-30 Ml/d demand in Stort in 15 years' time	22.90	18.30	4.60	**Explore further:** 80% of risk 1 and 2 mitigated and 50% of risk 3
2	Build 10 Ml storage to provide 24 hours storage for additional 10-15 Ml/d demand in Stort in 15 years' time	22.90	9.10	13.70	**Explore further:** 40% of risk 1 and 2 mitigated and 25% of risk 3
3	20 Ml storage at high ground location	22.90	18.30	4.60	**Explore further:** 80% of risk 1 and 2 mitigated and 50% of risk 3
4	10 Ml storage at high ground	22.90	9.10	13.70	**Explore further:** 40% of risk 1 and 2 mitigated and 25% of risk 3
5	New main from Preston to Hadham Mill (25Km reinforcement)	22.90	18.30	4.60	**Explore further:** It will mitigate similar risk as a new reservoir if the main is connected at the right place in Stort

Option solution	Mitigation solution description	Initial risk value	Risk reduction	Residual risk value	Notes
		(£m)	(£m)	(£m)	
6	Upsize Wicker Hall to Sibleys network (25 Km reinforcement)	22.90	6.90	16.00	**Discarded:** The water will reach Sibleys but don't solve the main issue
7	Build a new reservoir at Dunmow (highest demand area) 10Ml	22.90	6.90	16.00	**Discarded:** 30% of risk 1 and 2 mitigated and 10% of risk 3
8	Build a new reservoir at Dunmow (highest demand area) 20Ml	22.90	4.60	18.30	**Discarded -**20% of risk 1 and 2 mitigated and 10% of risk 3
9	Build storage at Bulls Green to booster water to Hadham Mill (20Ml)	22.90	2.30	20.60	**Discarded** - Just 10% of risk is mitigated, we are not solving the main issue
10	Build storage at Bulls Green to booster water to Hadham Mill (10Ml)	22.90	2.30	20.60	**Discarded -**Just 10% of risk is mitigated, we are not solving the main issue

Table 4.75 Constrained longlist of options for improving resilience in WRZ5 - Stort.

Constrained list

4.419 Table 4.76 Shortlist of feasible options for improving resilience in WRZ5 - Stort presents the shortlist of feasible options that passed the initial screening process and are considered effective for improving resilience in WRZ5 – Stort, particularly in response to the reduction in deployable output as part of our sustainability reductions and longer duration of peak demand driven by climate change.

	Solution option description	WLC	Starting risk value	Residual risk / opp	Risk reduction/ opp attained
Option		(£m)	(£m)	(£m)	(£m)
1	Build 20 Ml storage to provide 24 hours storage for additional 20-30 Ml/d demand in Stort in 15 years' time	12.20	22.90	4.60	18.30
2	Build 10 Ml storage to provide 24 hours storage for additional 10-15 Ml/d demand in Stort in 15 years' time	8.20	22.90	13.80	9.10
3	20 Ml storage at high ground location	25.20	22.90	4.60	18.30
4	10 Ml storage at high ground	23.20	22.90	13.70	9.10
5	New main from Preston to Hadham Mill (25Km reinforcement)	50.00	22.90	4.60	18.30

Table 4.76 Shortlist of feasible options for improving resilience in WRZ5 - Stort

	Solution option description	WLC	Starting risk value	Residual risk / opp	Risk reduction/ opp attained
Option		(£m)	(£m)	(£m)	(£m)
1	Build 20 Ml storage to provide 24 hours storage for additional 20-30 Ml/d demand in Stort in 15 years' time	12.20	22.90	4.60	183.00

Table 4.77 Selected option for Stort

4.420 We have selected the best-value option shown in Table 4.77 Selected option for Stort, which offers the second-lowest Whole Life Cost, the most significant risk reductions, and a superior NPV of £6.1 million for Option 1, compared to £800,000 for Option 2 (the lowest-cost option).

4.421 For Hills, to improve resilience in WRZ7 - Dour the following options have been considered:

Option	Mitigation solution description	Initial risk value	Risk reduction	Residual risk value	Notes
Solution		**(£m)**	**(£m)**	**(£m)**	
1	Build 10 Ml reservoir on site	19.40	15.40	4.00	Explore further: 80% of risk 1 and 2 and 50 % of risk 3 and 4 mitigated
2	Build 20 Ml reservoir on site	19.40	17.30	2.17	Explore further: 90% of risk 1 and 2 and 50 % of risk 3 and 4 mitigated
3	Build 10 Ml Reservoir off site	19.40	15.40	4.00	Explore further: 80% of risk 1 and 2 and 50 % of risk 3 and 4 mitigated
4	Build 20 Ml Reservoir off site	19.40	17.30	2.17	Explore further: 90% of risk 1 and 2 and 50 % of risk 3 and 4 mitigated
5	Network improvements main from Paddlesworth, lower Standon to Hills	19.40	7.50	11.89	Explore further: 40% of risk 1 and 2 mitigated
6	Split reservoir into two cells	19.40	0.03	19.40	Discarded – 50% of Risk 3 mitigated. 0.3% overall risk mitigated. We are not solving the main issue

Table 4.78 Constrained longlist of options for improving resilience in WRZ7 - Dour

4.422 A resilience workshop focused on storage in WRZ 7 – Dour was held on September 14, 2020. Following the workshop, at of our PR24 process the R&V template was updated to reflect the outcomes and evaluate options to improve resilience during extended periods of high demand driven by climate change. Attendees included the Infrastructure Asset Manager, Production Engineer, Production Lead, Storage Asset Manager, Head of Operations, Water Quality Operations Scientist, and Network Modellers.

Constrained list

4.423 Table 4.79 Shortlist of feasible options for improving resilience in WRZ7 - Dour presents the shortlist of feasible options that passed the initial screening process and are considered effective for improving resilience in WRZ7 – Dour, particularly in response to longer duration of peak demand driven by climate change.

Option	Solution option description	WLC	Starting risk value	Residual risk/ opp	Risk reduction/ opp attained
		(£m)	**(£m)**	**(£m)**	**(£m)**
1	Build 10 Ml reservoir on site	11.40	19.40	4.00	15.40
2	Build 20 Ml reservoir on site	14.20	19.40	2.17	17.30
3	Build 10 Ml Reservoir off site	15.40	19.40	4.00	15.40
4	Build 20 Ml Reservoir off site	19.00	19.40	2.17	17.30

Option	Solution option description	WLC	Starting risk value	Residual risk/ opp	Risk reduction/ opp attained
		(£m)	(£m)	(£m)	(£m)
5	Network improvements main from Paddlesworth, lower Standon to Hills	61.70	19.40	11.89	7.50

Table 4.79 Shortlist of feasible options for improving resilience in WRZ7 - Dour

	Solution option description	WLC	Starting risk value	Residual risk / opp	Risk reduction/ opp attained
Option		£(m)	£(m)	£(m)	£(m)
1	Build 10 l reservoir on site	11.40	19.40	4.00	15.40

Table 4.80 Selected option for Dour

4.424 We have selected the best-value option, which offers the lowest whole life cost, the most significant risk reductions, and a superior NPV of £4 million for Option 1, compared to £3.1million for option 2.

4.2.8 SEMD - Emergency planning

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
SEMD- Emergency planning	4.34	1.43	3.93

Table 4.81 . SEMD - Emergency planning scheme adjustments

Our Representation

4.425 Ofwat have proposed a 60% cost challenge to emergency planning based on a deep dive assessment. This allowance is insufficient to deliver the statutory outcomes required and associated improvement to resilience for customers. We have therefore included appropriate costs within our draft Determination Representation, with evidence and clarification provided below.

4.426 These investments are driven by statutory drivers, DWI section 19 Undertakings (Reference AFW-2023-00006 and AFW-2023-00007) and SEMD 2022, that must be delivered in 2025 - 2030. These cover the new measures needed to meet the additional requirements imposed by the new legislation.

4.427 PCD - We are not providing representations on the draft Determination approach to use completion of DWI legal instruments as the metric to measure successful delivery of the SEMD – Emergency planning schemes.

Summary of evidence

Need

Ofwats Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Need for Enhancement investment	The investment partly meets the criteria for Enhancement investment and additional customer funding. • The company's proposed investment relates to addressing security, emergency planning and alternative water supplies measures, and is part of undertakings given by the company to address those risks. The Drinking Water Inspectorate (DWI) supports the need for the schemes under section 19 undertakings, accepted to meet the requirements of section 208 of the Water Industry Act 1991 (as amended), reference AFW-2023-00006 and AFW-2023-00007, that the investments are the most appropriate steps to address security, emergency planning and alternative water supplies risks within the 2025 - 2030 period. • The company does not provide sufficient and convincing evidence that there are no overlaps with base allowances and previously funded enhancement schemes. • The company states it is investing in base to continue to strengthen its physical, personnel security and emergency planning and its enhancement investments are required to meet the new obligations • The company provides no clear evidence of the investment scope and how base overlap has been considered with the enhancement investment. • The company does not provide any reference or consideration to works in the previous periods.	Partial pass	10%

Table 4.82 Ofwat's deep dive assessment of the need for SEMD - Emergency planning

4.428 This Enhancement funding is to cover only new legislative requirements. There were no changes in requirements from 2015 - 2020 into 2020 - 2025 for SEMD, therefore there was no overlap from 2020 - 2025 Enhancement. All emergency planning activities, including alternative water supplies, were covered by Base allowances during this period.

4.429 The PR24 investment does not include any operation or maintenance costs of existing measures, these will continue to be provided through the Base allowance. For example, all current alternative water supplies, and the use of Arlington tanks.

4.430 There are a number of statutory requirements and uplifts under SEMD relating to emergency planning to which we must comply. Further exogenous factors require Enhancement investment to satisfy, such as retirement of Public Switched Telephone Network (PSTN) lines.

4.431 Below is a breakdown of which requirements have been considered for Base and Enhancement investment, including works in previous periods.

2020-2025	**No change in legislation from 2015-2025 or additional requirements, so all activities funded through base** • Population planning threshold (urban): 24 hour: 20,000 consumers, 3 day: 40,000 consumers • Local / site power outage plans • PSTN backup for communications should power fail affecting mobile network	**Base expenditure** • In house bottled water & Arlington tank stocks, supply chain tankering & additional bottled water stocks to satisfy existing population threshold • There was no previous enhancement funding - all 2020-2025 activity funded under base	
2025-2030	**Change in SEMD requirements** • Population planning threshold (1.5% of population): 56,5641 consumers (Y1) increasing to 64,1525 consumers (Y5) under new SEMD • New requirements from DEFRA for National Power Outage Planning (NPO) • Removal of PSTN lines by British Telecom		**Enhancement expenditure** • Bottled water to allow for uplift in regulatory requirements, additional housing area and logistics to facilitate uplift, supply chain tankering • Supply chain tankering to comply with new regulation allowing for lead times of in-house tankers • Additional mobile generators to increase resilience against NPOs • Satellite technology to mitigate NPOs and removal of PSTN back up • Training and exercising for smooth transition of new processes

Figure 4.23 Considerations for base and enhancement investment

Base and enhancement expenditure split for alternative water

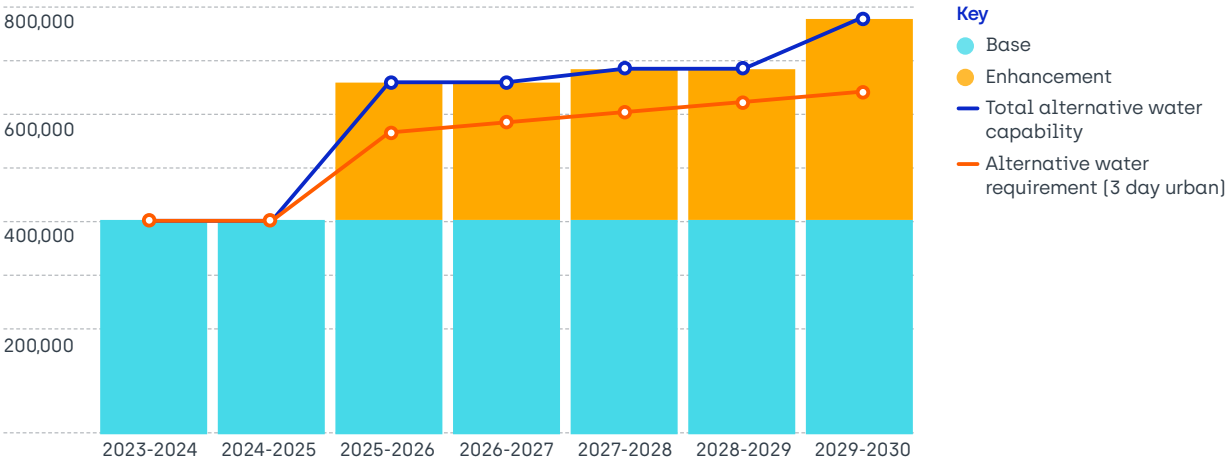


Figure 4.24 Base and enhancement expenditure split for alternative water

4.432 We will continue to fund the existing population threshold of 40,000 consumers through the Base allowance. The Enhancement funding will be used to fund the **additional** marginal uplift in population threshold planning, such as **new** tankers and a **new** centralised bottled water facility.

4.433 Additional resilience is needed to meet the **new** requirement of 7-day national power outage plans and mitigations. These will include **new** mobile power generators and **additional** plug in points.

4.434 Due to exogenous changes beyond management control, we need to install **new** alternative means of back up communication following the retirement of PSTN lines, alongside providing **additional** training to adapt our operations accordingly.

Best option for customers

Ofwats Enhancement assessment criteria grouping	Assessent comments	Criteria decision	% adjustment
Best option for Customers	Security classifications and requirements are applied in accordance with Security and Emergency Measures Direction (SEMD) 2022, associated Department for Environment, Food and Rural Affairs (Defra) Protective Security Guidance and National Protective Security Authority product specification standards. We note that the DWI have issued an acceptance notice for the 2025 - 2030 period to ensure the company meets its statutory requirements with considered best options, agreed steps and timescales for customers. • Some concerns: Emergency planning and alternative water supplies requirements are also applied in accordance with SEMD 2022 and associated Defra's Emergency Planning Guidance. We note that the DWI have issued an acceptance notice for the 2025 - 2030 period to ensure the company meets its statutory requirements with agreed steps and timescales for customers. • The company provides insufficient evidence and justification regarding the number of options and range of interventions. • The company also does not provide evidence on why the additional resources are the best option to meet the requirements. • (20% challenge has been applied to the Emergency planning and alternative water supplies enhancement expenditure, this translates to a 16.41% best option for customer challenge when applied to the total SEMD expenditure request)	Some concerns	20%

Table 4.83 Ofwat's deep dive assessment of the options for SEMD - Emergency planning

4.435 We followed our standard optioneering approach, considering an expansive unconstrained list, undertaking qualitative assessment and further economic assessment of a constrained range of options. The options we looked at were based on data, feedback and review of previous incidents experienced by Affinity Water and the likelihood of risk of incidents shared by other water companies. However, there are limited options available for consideration when it comes to tackling Alternative Water needs, these are:

- bottled water: In house / Contract
- tankering: In house / Contract
- alternative tanks, ie. Arlington tanks / bowser.

4.436 Additionally, there are limited feasible options to mitigate loss of power in an emergency event, these are:

- mobile / fixed generators
- communications – Satellite / radio.

4.437 For detail on our optioneering process, see optioneering section page 189 - 208 of business plan appendix AFW14b - Enhancement investment cases. Further detail and explanation on number of options, range of interventions and evidence regarding resources, is provided in Table 80. We selected the least cost option, that reduces reliance on supply chains as much as possible but that satisfies all the needs across our region.

Option	Activity	Activity/solution	Meets outcome	Feasible	Rationale for not taking option forward
			(Y/N)	(Y/N)	
Do nothing	Continue without any investment	Continue third party 'best endeavours' contract for tankers, do not upgrade bottled water storage facility and do	N	N	We would not meet the new legislative requirements set out in SEMD 2022

Option	Activity	Activity/solution	Meets outcome	Feasible	Rationale for not taking option forward
			(Y/N)	(Y/N)	
		no invest in resilience for power or comms			
Preferred (least cost)	A blend of options	Four tankers and enabling activities including drivers, training, housing area and disinfection New centralised bottled water storage facility to house uplift in required bottled water, Curtain side lorry with Moffett to move water around without the need for supply chain. SIM cards for existing satellite phones to enable communications during power outages / provide back up when PSTN is retired Mobile generators (x three) Plug in points for generators Training and exercising to cover the new processes associated with change in legislation	Y	Y	This is the best option that's been taken forward. This option meets the new legislative requirements for alternative water quantities and mitigates the new risks identified by DEFRA, supply chain risks and the PSTN retirement, whilst delivering the required benefits and needs of customers.
Option 4	Outsource to supply chain	Bottled water storage & tanker operations	N	Y	Past events have provided evidence that external supply chains have struggled during regional and national events, such as storm Arwen and the Beast from the East. This option does not offer us enough resilience against those events.
Other options (excluded)	All tankering	Four tankers and enabling activities, including drivers, training, housing area, disinfection Ten bowsers and four towing vehicles	N	N	There are areas where tankers cannot penetrate due to location and connectivity, tankering without other alternatives in place is therefore not a feasible option and will not provide sufficient resilience
Other options (excluded)	All bottled Water	New centralised bottled water storage facility (x three) to facilitate all regions Three curtain side lorries with mounted Moffet forklifts	N	N	Customers prefer water through their taps and bottled water isn't practical. It has a comparatively short shelf life and would incur a lot of waste, as well as a large carbon impact. This alone is not a feasible option that delivers the required benefits We need to be able to provide bottled water, but in combination with tankers and Arlingtons where possible to deliver a better customer experience.
Other options (excluded)	Network Modification	Injection points to inlet of all DMAs, injection points to all outlets of reservoirs Hydrant connection points New fast fill points	Y	Y	This was deemed too costly in relation to the perceived benefit. This option would significantly increase Opex through associated maintenance activity

Option	Activity	Activity/solution	Meets outcome	Feasible	Rationale for not taking option forward
			(Y/N)	(Y/N)	
Other options (excluded)	Incident Management	Refurbishment of Emergency room Incident management tool	Y	N	Refurbishment of emergency room has been absorbed under 2020 - 2025 base costs.
Other options (excluded	Communications	Long range radios and transmitters	Y	Y	Long-range radios and transmitters deemed too costly in relation to perceived benefit
Other options (excluded	Power & Fuel resilience	Fixed generators (x10) Fuel bunkers Fuel distribution bowsers	Y	N	Fuel bunkers deemed unrealistic and fixed generators too costly.

Table 4.84 Ofwat's deep dive assessment of the options for SEMD - Emergency planning

Cost benefit analysis

4.438 Table 4.85 Consideration of constrained options for emergency planning below identifies the cost benefit analysis undertaken on the feasible options identified above:

Option	2025-30 Cost	NPV Cost	Total NPV Benefits	Total NPV
	(£)	(£)	(£)	(£)
Do nothing	0	0	0	0
Preferred [1]	4,338,530	-3,885,821	5,119,197	1,233,376
Option 4	182,769	-687,757	673,579	14,178
Sensitivity analysis	4,489,757	-4,017,424	4,278,755	261,331

Table 4.85 Consideration of constrained options for emergency planning

1 original submission

Cost efficiency

Ofwats Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Cost efficiency	We have significant concerns whether the investment is efficient. The company does not provide sufficient and convincing evidence that the proposed costs are efficient. • The company states cost numbers used to formulate the proposal have been taken from current cost of services, using data taken from procurement, existing contracts and research. The costs derived for options are based on the 2015 - 2020 and 2020 - 2025 period costs and are deemed to be accurate and efficient. • The company does not provide sufficient evidence on the breakdown of costs • The process of how scopes are defined and costed • The company provides insufficient evidence of cost benchmarking or external assurance of costs to demonstrate that they are efficient.	Significant concerns	30%

Table 4.86 Ofwat's deep dive assessment of the cost efficiency for SEMD - Emergency planning

4.439 We address the key cost efficiency questions raised of our case in the following way;

Ofwat questions	Company response
Provide sufficient evidence on the breakdown of costs	We provide a more detailed breakdown of cost, along with explanation of the data sources and approaches used in the development of these costs
Process of how scopes are defined and costed	Our overall governance outlines the process for the scheme and scope development, with our process (methodologies) for costing laid out for each cost area
The company provides insufficient evidence of cost benchmarking or external assurance of costs to demonstrate that they are efficient	We provide further detail of our data sources, including where the most material costs have been externally benchmarked to ensure efficiency of the overall scheme costs

Table 4.87 Our response to cost efficiency questions

4.440 The cost estimates for this scheme were built using internal and industry data and benchmarking to determine the best solutions to ensure compliance with the new legislation under SEMD 20222. All activities were costed using detailed bottom up estimates, based on existing knowledge and data from the business or previous activities, or from quotes given by providers to benchmark against the latest market data. These cost estimates were scrutinised through a vigorous risk & value process. Within the below we provide further detail of our costing approach and analysis. We also provide corresponding supplier quotations within appendix AFW153 - Commercially sensitive information [26].

Governance Framework

4.441 All enhancement business cases are governed through the below governance framework, ensuring quality to control and importantly that an appropriate approach to costing has been followed, with efficient costs put forward.

26. This is a redacted appendix due to the nature of the information

Governance process diagram

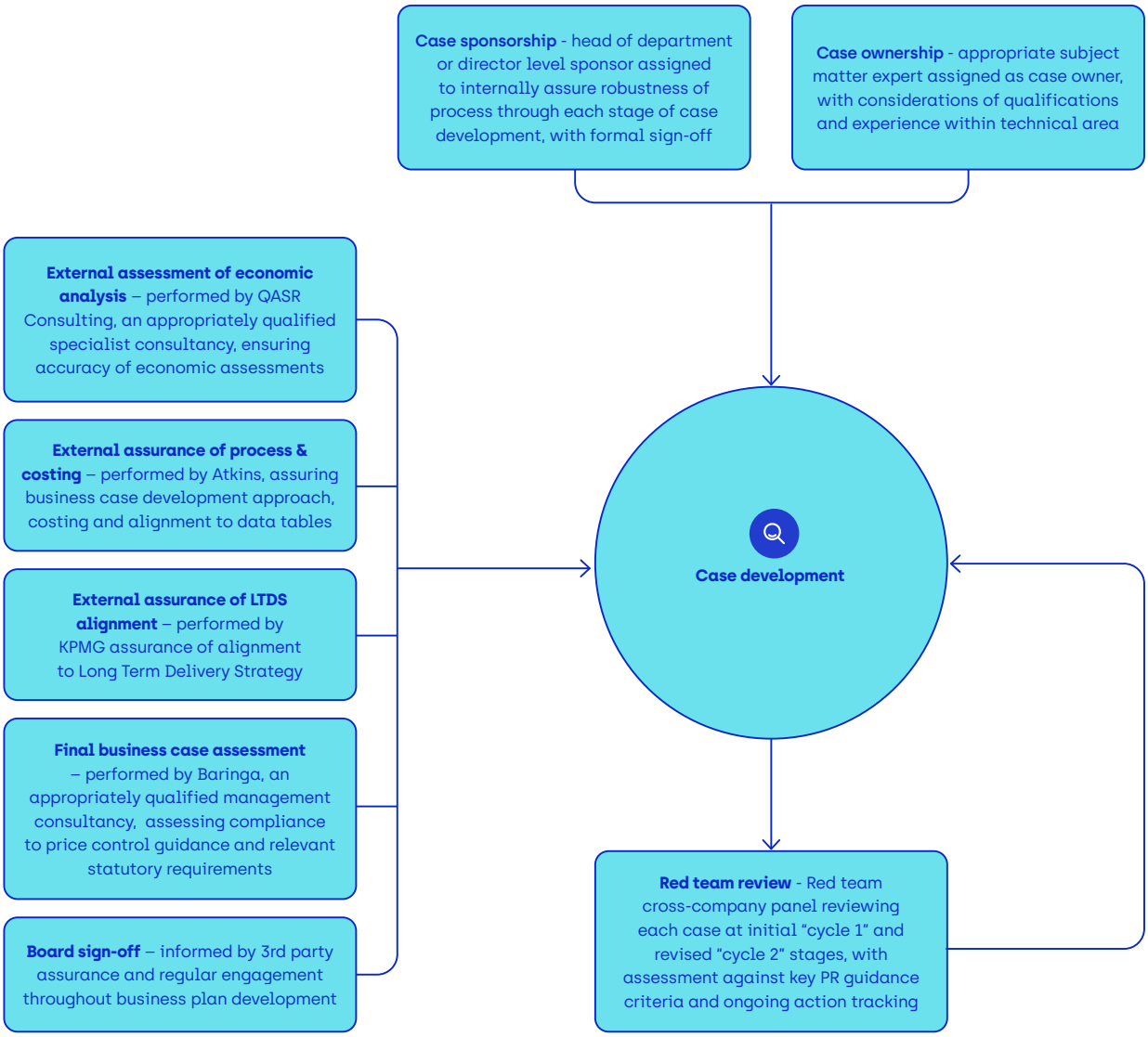


Figure 4.25 Our governance process

Cost structure

	Description	Capex	Opex	Totex
		(£k)	(£k)	(£k)
Tankering	Control Room Dispatch staff		720.00	
	Tanker Housing Area	30.00	15.00	45.00
	Operations Staff training		8.00	8.00
	Disinfection, Discharge & Sampling		60.00	60.00
	Cost of purchase 30,000l tanker (x four)	600.00		600.00
	In house driver		990.00	990.00
	In house driver training and exercising		36.00	36.00
	Recruitment costs		7.20	7.20
	Maintenance		180.00	180.00

	Description	Capex	Opex	Totex
		[£k]	[£k]	[£k]
	Kit (hoses /fittings / TM)	300.00	30.00	330.00
Bottled water	New centralised bottled water storage facility	50.00	30.00	80.00
	Lorry with Moffatt	90.00	75.00	165.00
Communications	SIM cards for satellite phones	2.55	180	182.55
Power resilience	Mobile generators (x three)	450.00	36.00	486.00
	Plug in points (x 30)	240.00	90.00	330.00
	Towing Vehicles (x three)		375.00	375.00

Table 4.88 Cost structure for SEMD - Emergency planning

Methodology procedure - Cost estimate technique

4.442 Below we lay out the approach and rationale for costing each component of the investment.

Cost Area	Costing Approach & Rationale
Increase in bottled water stocks and a suitable housing area for it	Use of historic actual data cross referenced against latest procurement prices. We already use bottled water and have areas, this element is to increase existing capacity, therefore we have confidence in our costings, as we have already been through our procurement process to get the best prices and options.
4 x potable tankers	As we have not previously procured potable tankers, we used a combination of cost for comparable activity and the latest market rates. • For the tankers, we used industry benchmark costs and checked these were efficient against supplier quotes to provide potable water tankers (which were marginally higher than our submitted costs for this component, provided within Appendix AFW150 [1]-) • For the enabling activities, such as recruitment costs and disinfection, we have used our own historical data to give bottom up estimates.
Communications	Our IT team gathered historic costs and the latest commercial quotes for satellite SIM cards
Power Resilience	We used bottom up estimates from previous projects, however these are estimates until we do more work on deciding the size of the required generators.
Training & Exercising	Using historic costs of comparable training programmes and exercises

Table 4.89 Cost estimate technique for SEMD - Emergency Planning

1 moved to appendix AFW150 due to the redacted nature of the information shown

4.443 The cost estimate for this programme was developed by the Emergency Planning team, working with Asset Strategy, IT and external providers to build up the costing. The programme has been peer reviewed by executive team members. Our costs have independently audited and benchmarking by AtkinsRéalis, with the assurance report provided to our Board as part of the overall Board assurance process for the Representation.

Documenting assumptions

Assumptions	Description	Purpose / mitigation
Cost assumptions	Costs were built over a year ago and inflation, availability and demand could increase prices. Industry demand for tankers also very high with limited supply	We have allowed for increased supply chain costs for years 1-3 to allow for procurement lead times
Commercial assumptions	Planning permission for tanker housing area not yet given	Pre-planning to be looked into

Table 4.90 Assumptions for SEMD - Emergency planning

Benchmarking

4.444 Given the disparate nature of this investment, its overall materiality and our high confidence in source data, we have not undertaken detailed benchmarking of each component. We have instead used quotations to benchmark our costs against market costs for the most significant investment items. These include Power Resilience, Tankers, SIMs & Satellite phones. Examples of these quotations are included within appendix AFW139 - Assurance of enhancement costs and 3rd party benchmarking.

4.2.9 SEMD - Physical security

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
SEMD- Physical security	0.95	0.77	0.95

Table 4.91 SEMD - Physical security scheme adjustments

Our Representation

4.445 Ofwat have proposed a 40% cost challenge to Physical security based on a deep dive assessment. This allowance is insufficient to deliver the statutory outcomes required and we have therefore submitted more appropriate costs, with evidence and clarification provided below.

4.446 These investments are driven by statutory drivers, DWI section 19 Undertakings (Reference AFW-2023-00006 and AFW-2023-00007) and SEMD 2022, that must be delivered in 2025 - 2030. These cover the reclassification by DWI of the site's security guidance for the Water Industry Jan 2023 (PSG version 6) and the Water UK Security Standards V 4.2 Jan 2023 (WUKSS).

4.447 PCD - We are not providing representations on the draft Determination approach to use completion of DWI legal instruments as the metric to measure successful delivery of the SEMD – Physical security schemes.

Summary of evidence

Need

Ofwat's Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Need for Enhancement investment	The investment partly meets the criteria for Enhancement investment and additional customer funding. • The company's proposed investment relates to addressing security, emergency planning and alternative water supplies measures, and is part of undertakings given by the company to address those risks. The Drinking Water Inspectorate (DWI) supports the need for the schemes under section 19 undertakings, accepted to meet the requirements of section 208 of the Water Industry Act 1991 (as amended), reference AFW-2023-00006 and AFW-2023-00007, that the investments are the most appropriate steps to address security, emergency planning and alternative water supplies risks within the 2025-2030 period • The company does not provide sufficient and convincing evidence that there are no overlaps with base allowances and previously funded enhancement schemes • The company states it is investing in base to continue to strengthen its physical, personnel security and emergency planning and its enhancement investments are required to meet the new obligations • The company provides no clear evidence of the investment scope and how base overlap has been considered with the enhancement investment • The company does not provide any reference or consideration to works in the previous periods	Partial pass	10%

Table 4.92 Ofwat's deep dive assessment of the need for SEMD - Physical security

4.448 The enhancement funding requested will fund the **additional** physical security requirements to the designated CNI sites under SEMD 2022, Egham WTW and Sunnymeads Intake.

4.449 The requested enhancement funding does not include maintaining existing security assets or replacement of faulty or inefficient systems, these activities will continue to be addressed through the Base allowance. For example, Enhancement funding has not been requested for our planned changes to gate access, replacement gates, alarm installation, training exercises and CCTV hatch covers. Previous 2020 - 2025 Enhancement schemes funded measures that addressed deficiencies in physical security, and those investments met the previous Enhanced+ standards and will be maintained through Base allowances. Further detail and clarification of this is provided below.

4.450 There are a number of statutory requirements under SEMD relating to Physical Security to which we must comply.Table 4.93 Base and enhancement investments by site shows a breakdown of which requirements have been considered for Base and Enhancement investment, including works in previous periods.

Site	Base	2020 - 2025 Enhancement schemes	2025 - 2030 Enhancement requirements
Egham WTW	Maintaining existing physical security systems to prevent unauthorised site entry	SEMD physical hardening to protect critical process areas to meet standard for Enhanced + site classification.· • 2.4m security fencing to form external site perimeter and internal perimeter to segregate Laboratory building	Regulatory change in site classification criteria – drives investment in appropriate security measures to sites which have not previously had CNI status e.g. • Analytical CCTV installation
	Replacement of faulty equipment or efficiency improvements to existing systems as technology advances.		

Site	Base	2020 - 2025 Enhancement schemes	2025 - 2030 Enhancement requirements
		• Hardening of process areas including; • Security rated doors with ID card access control. Window bars • Security rated Hatch covers with tamper alarms • Building Intruder alarms CCTV systems • Security rated detection • Palisade Installation of physical measures to meet physical segregation of Laboratory building from Process area	• New highway access point and associated security fencing
Sunnymead	Maintaining existing physical security systems to prevent unauthorised site entry	SEMD program implemented to meet requirements for the Enhanced + site classification	Regulatory change in site classification criteria – drives investment in appropriate security measures to sites which have not previously had CNI status, e.g. • CCTV, Security doors and access controls
	Replacement of faulty equipment or efficiency improvements to existing systems as technology advances.		

Table 4.93 Base and enhancement investments by site

4.451 As per Table 4.93 Base and enhancement investments by site, ongoing maintenance and capital replacements of existing security measures at both sites (and all other sites) are included within existing operating expenditure, there is no overlap between 2025 - 2030 Enhancement and base costs or investments from previous periods. 2025 - 2030 Enhancement funding will cover the necessary scope of works required to meet the standard demanded for CNI Category 3 site compliance.

Cost efficiency

Ofwat's Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Cost efficiency	We have significant concerns whether the investment is efficient. The company does not provide sufficient and convincing evidence that the proposed costs are efficient. • The company states cost numbers used to formulate the proposal have been taken from current cost of services, using data taken from procurement, existing con tracts and research. The costs derived for options are based on the 2015 - 2020 and 2020 - 2025 period costs and are deemed to be accurate and efficient • The company does not provide sufficient evidence on the breakdown of costs or the process of how scopes are defined and costed • The company provides insufficient evidence of cost benchmarking or external assurance of costs to demonstrate that they are efficient	Significant concerns	30%

Table 4.94 Ofwat's deep dive assessment of the cost efficiency for SEMD - Physical security

4.452 We are concerned that Ofwat have not deemed our costs as efficient, given the robust approach and the scrutiny and challenge these costs faced before our business plan. Below we lay out the additional evidence relating to the comments made within the assessment, which we first summarise within Table 4.93 Base and enhancement investments by site.

Ofwat question	Company response
Provide sufficient evidence on the breakdown of costs	We provide a more detailed breakdown of cost, along with explanation of the data sources and approaches used in the development of these costs
Process of how scopes are defined and costed.	Our overall governance outlines the process for the scheme and scope development, with our process (methodologies) for costing laid out for each cost area
The company provides insufficient evidence of cost benchmarking or external assurance of costs to demonstrate that they are efficient.	We provide further detail of our data sources, including where the most material costs have been externally benchmarked to ensure efficiency of the overall scheme costs

Table 4.95 Our response to cost efficiency questions

Governance framework

4.453 All Enhancement business cases are governed through the below governance framework, ensuring quality to control and importantly that an appropriate approach to costing has been followed, with efficient costs put forward. This approach scrutinises and challenges costs to ensure those we put forward are ambitiously efficient whilst remaining deliverable.

Governance process diagram

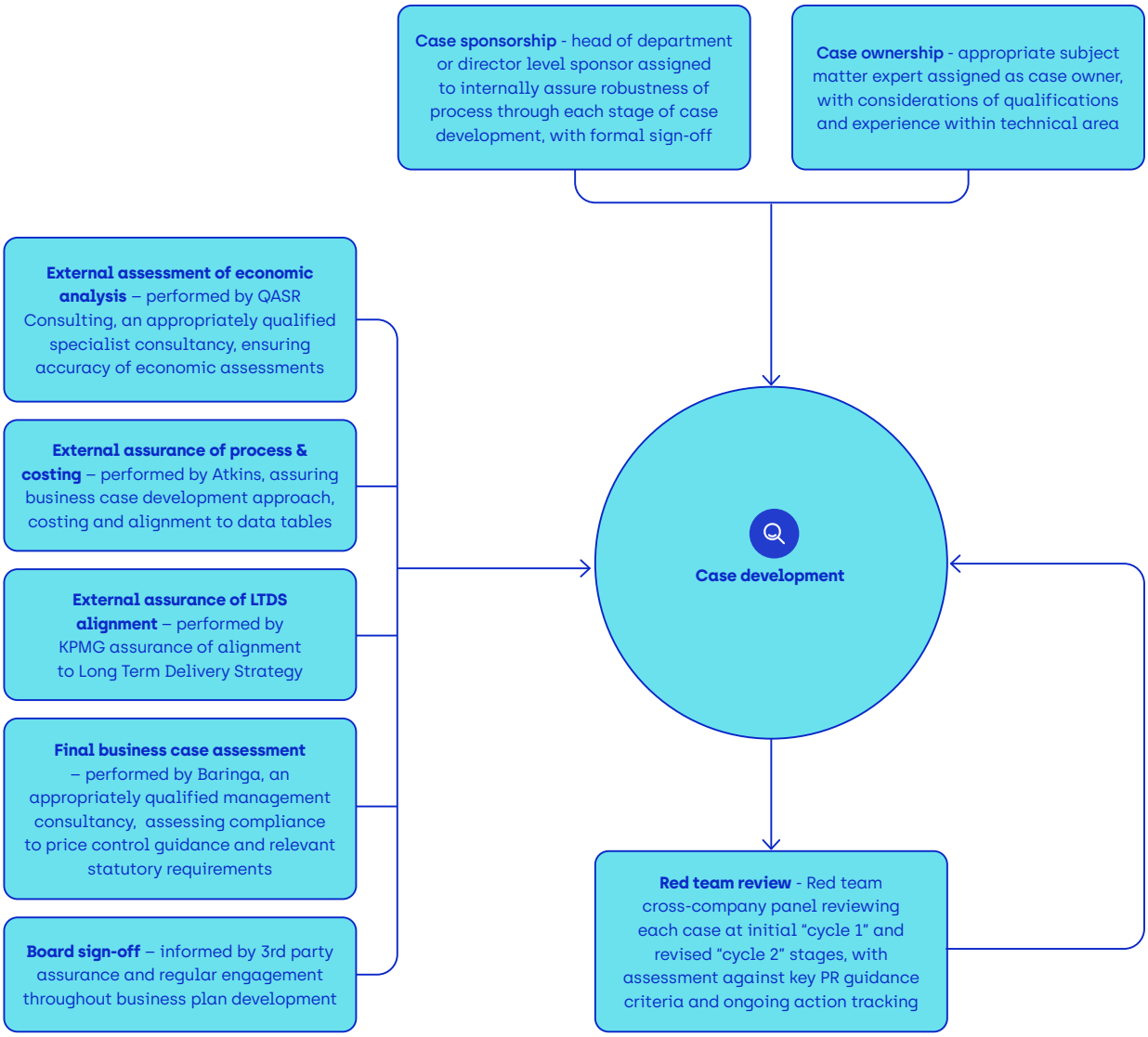


Figure 4.26 Our governance process

4.454 Given the specific nature of this scheme type, further detail is provided as to how these have been internally reviewed and externally benchmarked.

4.455 To provide confidence that the cost estimate is accurate, the following steps have been taken:

1. Check and reviewed by functional team, including formal sign off
2. Technical peer review by project team (project manager), including formal sign off
3. Benchmark costs against externally provided quotations and framework rates
4. Technical assurance for the identified solution to segregate the CNI areas from the
5. Final approval by accountable project sponsor, including formal sign off.

4.456 Multiple options have been considered with and have the support of key stakeholders across the business as part of the strategic review of the requirements.

Methodology procedure - Cost estimate technique

4.457 The cost estimates for this project were developed using historical data and specialist external estimates and were used in the cost-benefit analysis. Given the specific nature of this investment, detailed bottom-up cost estimates have then been developed for all items.

4.458 The cost estimate for this project was developed using the schedule of rates for current Frameworks Providers which have gone through our robust Procurement processes. The cost estimates for S.278 highway works have been provided by our specialist external consultant and verified in line with Building Cost Information Service (BCIS) rates. The cost estimation was subjected to robust internal assurance through a regular peer reviewed and technical challenge along with external benchmarking.

4.459 Data sources used are provided in Table 4.95 Our response to cost efficiency questions.

Data source	Description	Identification of Limitations & gaps Impact	Assessment of Limitation & gaps
1. Affinity Water Procurement Framework Contracts Schedule of rates for installation of Fencing, Gates, Access Control, CCTV systems, Intruder Alarm systems, Security Doors, Hatches, Civils etc	Procurement-led tendering exercise to appoint specialist Framework Service Providers with schedule rate card. Benchmarking and competitive tendering exercises for significant cost projects ensure most cost-effective solution. Outturn costs for similar works, e.g. installation of mechanical gates.	Outline design only completed to identify baseline estimate for PR24 submission based on Planning Approval being granted. Detailed design exercise may be impacted by conditions imposed by Planning Department.	Low impact Confidence in the accuracy of the outline design scope and installation costs for the additional measures is high. (85%)
2. Cost Breakdown of Security Installations supporting HS2 works. Replacement, enhancement works conducted as Base spend at other Affinity Water sites. Schedule of rates for installation of Fencing, Gates, Access Control, CCTV systems, Intruder Alarm systems, Security Doors, Hatches, Civils etc	Review of quotations and Invoiced works for physical security works, at multiple locations over a significant period. Schedule of rates based on actual costs for same work elements as will be required at Egham and Sunnymeads. Independent cost data to the built, environment, for construction, insurance and life cycle costing.	As above.	As above.
3. Specialist Highways Planners The Civil Engineering Practice Building Cost Information Service (BCIS) rates	Detailed design to reroute existing services, form new entrance onto main Highway and grading into yard area as level lower than road. Desk-top assessment of plant, materials and labour required to form site entrance. Highways fees, traffic control, Consultancy and Utilities diversion costs.	Planning approval is not granted and may be subject to conditions which may impose additional requirements in respect of flood protection.	Medium impact The local and Utility searches have not given the Consultants any cause to suggest that planning approval will be denied. However, until planning approval is granted the final scope is unknown. Confidence in accuracy is medium. (65%)

Table 4.96 Data sources for SEMD - Physical security

Project	Cost header	Description	Unit cost	Data sources used (as per)
			(£k)	
SEMD Physical Security	Sunnymeads Intake capital expenditure	CCTV, hardening to VP's, power and data	141.2	1 & 2 Framework Suppliers rates, quotations from previous SEMD Installations
SEMD Physical Security	Egham WTW	a) Civils for formation of new access and associated works to yard areas, enabling, restoration*	453.8	3 Highway Consultants & Adenstar Construction quotations
		b) S.278 Highways agreement, planning, consultancy*	167.9	3 Highways Consultant
		c) Gates, access control, fencing, CCTV	355.6	1 & 2
SEMD Physical Security	Project	CDM, project management, supervision	60.0	1, 2 & 3
Total			1178.5	
Total		**With addition of internally applied 20% efficiency challenge**	**943.0**	

Table 4.97 Costing structure for SEMD - Physical security

4.460 In addition to use of internal and external robust data sources, we continually benchmarked costs against externally provided quotations to ensure these were efficient. We have provided the most recent quotation for Egham a) Civil and b) Highways activity, as the most material cost areas of this scheme. The quotation costs total £611k (2023 - 24 prices) vs the £497k (2022 - 23 prices) costs within the business plan, when including the internal cost efficiency challenge applied.The full quotation is provided within appendix AFW139 - Assurance of enhancement costs and 3rd party benchmarking .

4.461 The internal stretch efficiency has been applied to ensure efficient cost have been put forward within our plan, reflecting our ambition for cost efficiency wherever we believe it can feasibly be achieved.

4.2.10 Raw water deterioration

Scheme	Sep 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Surface Works - Iver Crypto (DWI)	46.47	26.87	46.47
Surface Works - Egham (DWI)	15.19	8.78	15.19
PFAS - Wheathampstead	0.49	0.45	0.45
PFAS - Bowring & Baldock Road	6.97	6.37	6.62
PFAS - Blackford	10.86	8.36	10.86
PFAS - Holywell	1.3	1.19	1.23
PFAS - Ardleigh	0.65	0.6	0.62
Stortford Resilience	1.96	1.82	1.88
Nitrates - Broome	5.37	6.14	6.4

Scheme	Sep 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
Nitrates - Kingsdown	4.48	6.2	6.42

Table 4.98 Raw water deterioration scheme adjustments

Our Representation

4.462 Ofwat have assessed the majority of site investments with modelled or shallow dive approaches, excluding three sites assessed through deep dive: Iver, Egham and Blackford.

4.463 Iver and Egham have been assessed together with a total cost challenge of 40% applied related to the "need for Enhancement" and "cost efficiency" assessments. Blackford was assessed individually, with a total cost challenge of 20% applied related to the "best option for customers" and "cost efficiency" assessments.

4.464 We accept the draft Determination assessments of all sites excluding Iver, Egham and Blackford. The proposed allowances for these three sites are materially less than the required costs to protect water quality for customers and comply with statutory Undertakings. We therefore provide additional clarification and evidence as relates to the deep dive assessments undertaken on these schemes.

4.465 PCD - We understand the rationale set out by Ofwat in the draft Determination to use completion of DWI legal instruments as the metric by which to measure successful delivery of these schemes.

4.466 However, it is not appropriate to include the Undertakings for lead and PFAS strategies as two additional PCDs. The works proposed for delivery in 2025 - 2030 from within both these strategies have already been included in specific enhancement expenditure business cases in appendix 14b - Enhancement investment cases, page 17-22 for PFAS and page 23-27 for Lead or are being submitted as part of our draft Determination response 4.2.11 PFAS - Additional business case attracting regular oversight from the Drinking Water Inspectorate. There is no additional customer benefit to be gained from also applying penalties to, and requiring monitoring of, the strategies themselves. Indeed, Ofwat came to the same conclusions when considering bespoke performance commitments in PR14 and PR19, so it is not clear why this approach is now necessary in the PCD framework.

Summary of evidence

Need - Iver crypto and surface water Egham

Ofwat's Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Need for Enhancement investment	The investment partly meets the criteria for enhancement investment and additional customer funding. The company does not provide sufficient and convincing evidence to show that the that they have considered overlap with base allowance or previous funding. • The company's proposed investment relates to addressing water quality risks. This is supported by the Drinking Water Inspectorate as it has served notices on the company under regulation 28(4) of the Water Supply (Water Quality) Regulations 2016 (as amended), references AFW-2020-00005 (Iver) and AFW-2020-00006 (Egham), that the investment is the most appropriate steps to address water quality risks within the 2025 - 2030 period. • The company does not provide sufficient and convincing evidence that this investment does not overlap with either activities funded by the base allowance or funded in previous periods. Several of the interventions are described as asset upgrades or optimisations which have the potential to overlap with base or may be a result of maintenance in previous periods. There is reference to increased treatment capacity requirements for some upgrades but the reasons and the before and after capacities are not described.	Partial pass	20%

Table 4.99 Ofwat's deep dive assessment of the need for Iver and Egham

Responding to Ofwat's challenge

4.467 The requirement to invest in new additional assets is driven by a DWI notice following a Cryptosporidium oocyst breakthrough into supply and increasing need for reliable output to meet future demand, in the face of deteriorating water quality. Whilst maintenance activity is planned at both Iver and Egham WTWs, all of this activity will be funded through our Base allowances and there is no overlap between the scope of Enhancement and activity accounted for within modelled base allowances, nor the scope of schemes from previous investment periods.Table 4.100 Summary comparison of enhancement need with base maintenance need summarises the three distinct areas of investment. Base maintenance requirements shown are as per our Pioneer deterioration modelling.

4.468 As demonstrated within these tables, there is no Base maintenance overlap between the assets proposed for the raw water deterioration Enhancement schemes and the Base maintenance requirement to 2030. Raw water deterioration solutions are either providing new assets, asset extensions or additional components within existing assets, i.e. no assets are being directly replaced within the scope of the enhancement activity. New assets to be constructed as part of the Iver WTW raw water deterioration enhancement scheme and New assets to be constructed as part of the Egham WTW raw water deterioration enhancement scheme illustrate where the additional assets are being installed on the two WTWs to highlight their discreteness from the existing asset base.

4.469 For each of the activities we draw Ofwat's attention to the fact that these are separate activities from the PR24 business case and are not included within the cost estimates, i.e. there is no overlap or duplication of funding between the two planning periods.

PR24 Raw Water Enhancement schemes	2020 - 2025 schemes	Base maintenance requirements 2025-2030
Iver and Egham Raw Water Deterioration £46.18m for Iver: • New GAC covers, • New RGFs and pumping, • New backwash tanks, and £15.09m for Egham: • New RGF filters, • New GAC backwash tanks, • New balance tank.	Iver Pesticides Removal (2015 - 2020 and 2020 - 2025)at £14.9m for a completely separate investment driver. Iver WTW - Validated UV irradiation system for the inactivation of Cryptosporidium oocysts, impacting different assets. No investment requested in PR24 business case. WTW - Optimisation of the clarification process, impacting different assets. No investment requested in PR24 business case. Egham WTW - Validated UV irradiation system for the inactivation of Cryptosporidium oocysts. No investment requested in PR24 business case	Egham WTW Filters at £2.2m. This includes £0.9m for media replacement. No overlap with Enhancement scope
		Egham WTW Sludge Treatment Plant at £1.7m, including replacement conveyors and motors. No overlap with Enhancement scope
		Egham WTW Clarifiers at £1.7m, including valves, flowmeters and motors. No overlap with Enhancement scope
		Iver WTW Sludge Treatment Plant at £2.3m, including flowmeters, conveyors and motors. No overlap with Enhancement scope

Table 4.100 Summary comparison of enhancement need with base maintenance need

Development of the Iver and Egham treatment plant PR24 business cases

Iver WTW

4.470 The treatment process chain at Iver WTW comprises direct river abstraction (with partial blending from TWUL reservoirs), pre-ozone dosing, clarification (pulsator clarifiers and Actiflo), inter-ozone dosing, granular activated carbon (GAC) adsorption, UV irradiation and chlorination with contact time is the final stage of disinfection, and orthophosphate dosing is added for plumbosolvency control, plus sludge, wash water handling and dewatering facilities.the new assets

4.471 In the 1990s, the rapid gravity filters (RGFs) that were in operation at Iver WTW were repurposed as granular activated carbon (GAC) contactors to address pesticides and taste and odour in the raw water source, along with use of ozone. The rapid gravity filtration stage was not replaced as this was assessed as best value in securing compliance for customers at that point in time. However, this means that the particle and Cryptosporidium oocyst removal capability at Iver is limited to 2.5-log reduction (99.7%).

4.472 This was sufficiently robust for the raw water quality previously encountered, as detailed in our Drinking Water Safety Plan (DWSP). Following the detection of *Cryptosporidium* in November 2018, which was a significant step change in the River Thames water quality, we reviewed our DWSP and concluded that it is no longer possible to supply water from the Iver WTW at the full site flow capacity without enhancing the level of treatment provided.

4.473 As a result of the deterioration in raw water quality in the River Thames, and in response to the DWI Notice, we conducted a detailed optioneering assessment to provide the required level of enhanced treatment at the Iver WTW. The outcome of the assessment is described in our business case and is inclusive of five main items as set out in the Table 4.101 Iver WTW 2020 - 2025 and 2025 -2030 Cryptosporidium risk mitigation schemes. The table also illustrates which solution items form part of the PR24 business case and which do not. Note that those delivered during the 2020 - 2025 period were not included in the Final Determination due to the timing of the requirements and so have been funded through efficiencies delivered in base expenditure during the current period.

Scheme solution item	Comment	Delivery period	Included in PR24 business case?	New asset
Validated UV irradiation system for the inactivation of Cryptosporidium oocysts	This was not included in the allowances in 2020 - 2025 due to timing as so has been funded through efficiencies in the overall 2020 - 2025 Base programme.	2020 - 2025	No	Yes
Optimisation of the clarification process	This is being delivered through base allowance.	2020 - 2025 and 2025 - 2030	No	No
Additional rapid gravity filters to treat full output of Iver WTW		2025 - 2030	Yes	Yes
Covers for the GAC filters	These are in direct response to the notice.	2025 - 2030	Yes	Yes
'Upgrade' of the wastewater treatment plant through installation of an additional holding tank	This is to treat the additional wastewater created by the new RGF filters listed above.	2025 - 2030	Yes	Additional holding tank. No replacements of existing assets.

Table 4.101 Iver WTW 2020 - 2025 and 2025 -2030 Cryptosporidium risk mitigation schemes

4.474 The new assets included in the PR24 business case are highlighted in red in New assets to be constructed as part of the Iver WTW raw water deterioration enhancement scheme anti-clockwise from top left:

- GAC covers incorporating solar panels on filters 13-26
- GAC covers incorporating solar panels on filters 1-12
- new RGF filters including the interstage pumping station
- new backwash tanks

4.475 The solution will add 18 RGFs to the site to improve solids removal. Clean backwash tanks and an intermediate pumping station are also required for this option.

4.476 The existing GAC filters need to be covered to prevent debris or contamination entering the filters as part of the DWI notice.

4.477 The capacity of the wastewater treatment sludge holding tank that accepts backwash and sludge flows from the other units on site needs to increase as the addition of RGFs will result in more flow to the waste stream.

4.478 Figure 7 in appendix AFW150 - Security sensitive maps [27] .

Egham WTW

4.479 The treatment process chain at Egham WTW comprises direct river abstraction (with partial blending from Queensmead Lake), pre-ozone dosing, coagulation and clarification, rapid sand filtration, inter-ozone dosing, GAC adsorption, UV irradiation and chlorination with contact is the final stage of disinfection, plus orthophosphate dosing for plumbosolvency control. There are also sludge and wash water handling and dewatering facilities.

4.480 Egham has an industry-standard approach for solids removal, where the clarification stage is followed by dedicated filtration, however the capacity to maintain 3-log removal of Cryptosporidium oocysts is limited by the following factors:

27. Figure moved to appendix AFW150 due to the redacted nature of the information shown

- above 120Ml/d the rapid gravity filtration stage (specifically RGF houses 4 and 5) would need to operate at higher than the recommended hydraulic loading rate with all filters in service
- above 120Ml/d the empty bed contact time (EBCT) on the GACs, with all contactors in service, is reduced to less than 15 minutes (our operational minimum standard when raw water quality is poor)
- above 120Ml/d the hydraulic loading rate on the flat-bottomed clarifiers (FBCs) exceeds the recommended value.

4.481 To date, when the raw water quality deteriorates, to maintain 3 log removal and manage the risk of Cryptosporidium oocysts progressing into supply with the existing assets we need to reduce the output from the plant. This operation was sufficiently robust for the raw water quality previously encountered as detailed in our Drinking Water Safety Plan (DWSP). Following the detection of Cryptosporidium oocysts in November 2018, which was a significant step change in the raw water quality of the River Thames, we reviewed our DWSP and concluded that it is no longer possible to supply water from our Egham WTW at the full site flow capacity without enhancing the level of treatment provided. This is the basis of the proposed additional assets to the site necessary to deliver the required drinking water quality standards at flows necessary to meet the supply demand balance requirements.

4.482 As a result of the above and in response to the DWI Notice, we conducted a detailed optioneering assessment to provide the required level of enhancement at our Egham WTW. The outcome of the assessment is described in our business case and is inclusive of eight main items as described in Table 4.102 Egham WTW 2020 - 2025 and 2025 - 2030 Cryptosporidium risk mitigation schemes in direct response to the notice.

Scheme solution item	Comment	Delivery period	Included in PR24 business case?	New asset
Validated UV irradiation system for the inactivation of Cryptosporidium oocysts	This was not included in the allowances in 2020 - 2025 due to timing so has been funded through efficiencies in the overall 2020 - 2025 programme.	2020 - 2025	No	Yes
Retrofitting an extension to FBC inlet channel to increase launder height to prevent overflow	Required to operate Egham above 120Ml/d under deteriorating raw water.	2025 - 2030	Yes	Extension to an existing asset. No overlap with Base the existing asset condition is unaffected, with no change to existing asset life.
Retrofitting lamella plates settlers into the FBCs to improve throughput and clarification. No maintenance or replacement of the existing asset.	Required to operate Egham above 120Ml/d under deteriorating raw water.	2025 - 2030	Yes	Additional asset. No overlap with Base, the existing asset condition is unaffected, with no change to asset life.
Build an additional RGF filter house (RGF 6), with four RGFs treating 24Ml/d.	Required to operate Egham above 120Ml/d under deteriorating raw water.	2025 - 2030	Yes	Yes
Addition of combined air and water scour to filter house 5.	Better value than building further RGFs to operate Egham above 120Mld under deteriorating raw water.	2025 - 2030	Yes	Additional asset. No overlap with Base, the existing asset condition is unaffected, with no change to asset life.
Addition of GAC capacity through installation of two GAC contactors	Required to operate Egham above 120Ml/d under deteriorating raw	2025 - 2030	Yes	Yes

Scheme solution item	Comment	Delivery period	Included in PR24 business case?	New asset
with UV reactors installed at each outlet. to provide 15 minutes Empty Bed Contact Time (EBCT) at all times (at 140Ml/d)	water. The additional two filters combined will have 28Ml/d capacity			
Install a new GAC wash water tank.	This is to treat the additional waste water created by the new GAC filters listed above.	2025 - 2030	Yes	Yes
An additional balance tank, thickener and centrifuge.	This is to treat the additional waste water created by the new RGF filters listed above.	2025 - 2030	Yes	Yes

Table 4.102 Egham WTW 2020 - 2025 and 2025 - 2030 Cryptosporidium risk mitigation schemes in direct response to the notice

4.483 The new assets are shown in 'red' in New assets to be constructed as part of the Egham WTW raw water deterioration enhancement scheme anti-clockwise from top left:

- new RGF filters
- new GAC backwash tanks
- new balance tank

4.484 Figure 8 in appendix AFW150 - Security sensitive maps [28].

4.485 The solution will add 4 RGFs to the site and enhance 4 filters to improve solids removal.

4.486 The existing flat bottom clarifiers will be augmented by addition of launder and lamella settling assets.

4.487 Additional GAC filters will be built to increase empty bed contact time.

4.488 The addition of RGFs and GAC filters will result in increased flows to the sludge treatment stream, requiring an additional sludge holding tank that accepts backwash and sludge flows on site, together with additional thickener and centrifuge capacity.

Options for Blackford WTW

Ofwat's Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Best option for customers	We have minor concerns whether the investment is the best option for customers. The company consider a range of reduction methods, however there is no clear evidence on how the best value option has been calculated. • The company provide no clear evidence demonstrating the efficacy of PFAS removal in the submitted documentation.	Minor concerns	10%

Table 4.103 Ofwat's deep dive assessment of the options for Blackford WTW

Response to Ofwat's concern

4.489 As previously detailed in our September 2023 submission, business case (appendix AFW14b - Enhancement investment cases Page 399-422) we followed the Risk and Value Process for option selection. The text from our business case is restated below.

Risk and Value

28. Figure moved to appendix AFW150 due to the redacted nature of the information shown

4.490 We followed our structured Risk and Value (R&V) process for optioneering, which is based on the utilisation of data to identify the best value solutions and/or opportunities.

4.491 The first phase of the R&V assessment is to fully determine the risks/opportunities for the service to our customers. Once a risk is fully defined, comprehensive root cause analysis is applied to determine the right source of the asset failures and the impact these have on the business. The next phase centres around solution optioneering which identifies alternative solution options, to mitigate/resolve identified risks and opportunities. The Whole Life Cost (WLC) and potential solutions are evaluated using historic costs, and contractor/supply chain knowledge. The WLC is the total cost of owning and operating an asset over its lifetime, calculated by adding the initial capital expenditure (capex) to the operating expenditure (opex) over 25 years. Finally, the solution options were evaluated using two key metrics: risk reduction and risk index.

4.492 Risk reduction measures the amount of risk that is removed by a proposed solution (i.e. initial risk minus percentage risk removed by solution option). Risk index measures the cost-effectiveness of a proposed solution (i.e. WLC of solution divided by residual risk). The lower the risk index the better; the solution with the lowest risk index is usually the best value option.

4.493 By utilising the key outputs from the R&V process the optimum solution can be identified and progressed. The stages and outputs from the R&V process are as follows:

- problem definition statement
- root cause analysis of identified risks
- unconstrained options – identification of any potential solution options to mitigate/resolve identified risks
- feasible options – selection of options to take forward based on practicality, efficacy, and affordability
- cost / benefit ratios, or risk index, for each solution.

4.494 As described above, we measure best value by calculating the ratio between WLC and risk reduction. We also ensure that the solution chosen is delivering sufficient risk reduction (minimum 75%). Therefore, when a solution has a low risk index but has a high residual risk it is discounted during the selection process used to determine the best value preferred option.

4.495 The R&V process was completed by a multi-discipline team comprising of:

- Asset Planning Engineer (Non-Infrastructure)
- Senior Asset Manager
- Senior Strategy Lead – Water Quality
- Strategic Asset Manager - Non-Infra & WQ,

4.496 Applying the approach to RWD Blackford involved completing an unconstrained consideration of nine options, including do nothing, blending and process technologies. These are listed in Table 4.104 Consideration of unconstrained options for Blackford WTW. At this early stage only one option was ruled out on the basis of deliverability within the timescales required for securing compliance.

Option no.	Option	Meets outcome	Feasible	Rationale for not taking option forward
		(Y/N)	(Y/N)	
1	Do Nothing	N (0% mitigation)	Y	The site would remain out of service and is needed to meet supply-demand balance in the area.
2	Blending: Dedicated main from Blackford to Harefield Reservoir.	N (30% mitigation)	Y	

Option no.	Option	Meets outcome	Feasible	Rationale for not taking option forward
		(Y/N)	(Y/N)	
3	Blending: Install flow meters and control valves in the lines from Blackford to the 12" and 30" mains to always ensure sufficient blending and dilution in both mains.	N (30% mitigation)	Y	
4	Blending: Relocation of the customer connection from the 12" main to the 30" main	N (40% mitigation)	Y	Not taken forward due to being potentially more costly than option 3
5	Blending: Install blending tank and re-lift pumps on site	N (40% mitigation)	Y	
6	Ion-Exchange: New PFAS-specific Ion-exchange plant, based on non-regenerable ion-exchange resin	Y (80% mitigation)	Y	
7	Granular activated carbon (GAC): install GAC on site at Blackford, with specialised PFAS removal media.	Y (90% mitigation)	Y	
8	Remediation at Source: Drill down into aquifer to treat PFAS pollution at source.	N (5% mitigation)	Y	
9	High Pressure Membranes (RO or NF)	Y (80% mitigation)	N	Not taken forward as technology is not as mature as GAC and gaining DWI Regulation 31 approval within the required timeframes would be an issue. Reduced DO due to waste water generated

Table 4.104 Consideration of unconstrained options for Blackford WTW

4.497 In line with our optioneering process, the unconstrained options were then appraised by subject matter experts based upon feasibility, efficacy, and deliverability to produce a constrained list. The options within the constrained list were costed and subjected to cost benefit assessment using net present benefits and costs to determine the best net present value scheme to take forward. The results are summarised in Table 4.105 Consideration of constrained options for Blackford WTW, the result being that the installation of additional GAC units offers best net present value to customers.

Option	2025-30 Cost	Net Present Cost	Net Present Benefits	Net Present Value
	(Totex £)	(Totex £)	(£)	(£)
Do nothing	0	0	0	0
GAC: install GAC plant on site at Blackford, with specialised PFAS removal media.	10,856,024	-11,466,563	22,703,609	11,237,046
Ion-Exchange: install PFAS-specific Ion-exchange plant, based on non-regenerable ion-exchange resin	11,731,200	-11,399,664	21,568,428	10,168,764
Blending: Install flow meters and control valves in the lines from Blackford to the 12" and 30" mains.	100,111	-103,854	227,036	123,183
Sensitivity analysis	10,848,024	-11,402,019	11,402,019	-

Table 4.105 Consideration of constrained options for Blackford WTW

4.498 Ofwat appear to have applied a reduction in allowance partially due to a concern regarding the evidence of efficacy of treatment for PFAS removal. *"The company provide no clear evidence demonstrating the efficacy of PFAS removal in the submitted documentation."* PFAS removal is a comparatively novel treatment requirement, inevitably resulting in an increased level of uncertainty in efficacy when compared to others, such as nitrates removal. As a result, we have adopted the most established and well proven

technology for which we can be most confident in the efficacy. As per our original business case, page 399 of appendix AFW14b - Enhancement investment cases, we evaluated a comprehensive range of technologies, assessing their performance (efficacy) and cross referenced this against the Global Water Intelligence assessment of PFAS treatment maturity levels, summarising the latest understanding of PFAS removal efficacy. Given the high concentrations within sourcea water, there is a pressing need to adopt proven technologies as quickly as possible to protect customers.

As laid out within the case, the solution also represents the lowest cost, with any uncertainty in efficacy potentially increasing costs. We are concerned that any perceived lack of evidence in efficacy has resulted in reductions to allowance. Given the material risk to customers we continue to undertake significant R&D in this area and horizon scan for the latest solutions for future investments. However, these will not result in a reduction in costs of the chosen option for Blackford, given the comparatively tight timescales for delivery.

We provide a summary of this evidence below. We have assessed each of the unconstrained options for process efficacy of PFAS treatment. The assessment is outlined in Table 4.106 Blackford WTW unconstrained options process efficacy assessment, with the conclusion being that the introduction of GAC at the site provides the required protection against PFAS compounds within the required timescales. Alternative Ion-exchange technologies potentially offer the required protection, but DWI Reg 31 approval for required resins is not yet in place, risking deliverability of the solution (in addition to significantly increased costs).

Option No.	Option	Efficacy	Risk mitigation comments
1	Do Nothing	0%	The site cannot be used, resulting inability to meet supply demand in the area, resulting in severe service impacts for customers.
2	Blending: Dedicated main from Blackford to Harefield Reservoir.	30%	Option 2. reduces supply resilience and poses the risk of not providing sufficient PFAS mitigation • Blending option introduces deployable output (DO) limitations. This is not an option for Blackford WTW because of 2025 - 2030 • licence relocation from other sites. As a result, average DO will increase from 16Ml/d to 20Ml/d. · • The proposed blended water is from Iver WTW, which is a surface water site and is considered moderate risk for PFAS compounds. So, the blending water would still be at risk of failing the wholesomeness guidance value.· • There are some customers directly supplied off the 12" main, prior to it combining with other larger mains heading to Harefield Reservoir. So, they would not receive blended water.
3	Blending: Install flow meters and control valves in the lines from Blackford to the 12" and 30" mains to always ensure sufficient blending and dilution in both mains.	30%	As option 2.
4	Blending: Relocation of the customer connection from the 12" main to the 30" main	40%	As option 2, except for the final point, i.e. this option would mitigate the customers directly supplied off the 12" main. Considered being potentially more costly than option 3.
5	Blending: Install blending tank and re-lift pumps on site	40%	Higher mitigation of risk than blend option 2 and 3, although it has same blending risks mentioned in option 4 and higher capex and opex costs for this variation of the blending option.
6	Ion-Exchange: New PFAS-specific Ion-exchange plant, based on non-regenerable ion-exchange resin	80%	Will offer robust long-term treatment and removal of any significant PFAS species. Contribute towards allowing Blackford PS DO to be maximised.Good for PFOA, which is the predominant PFAS species of concern at Blackford.Disadvantage: PFAS-specific ion exchange resin does not

Option No.	Option	Efficacy	Risk mitigation comments
			have DWI Regulation 31 approval, and there may be issues gaining this within the required timeframes.
7	Granular activated carbon (GAC): install GAC on site at Blackford, with specialised PFAS removal media.	90%	Will offer robust long-term treatment and removal of any significant PFAS species. Contribute towards allowing Blackford PS DO to be maximised.Good for PFOA, which is the predominant PFAS species of concern at Blackford. GAC media has DWI approval for use.
8	Remediation at Source: Drill down into aquifer to treat PFAS pollution at source.	5%	We will continue to pursue source remediation, but at this time no agreement is in place.
9	High Pressure Membranes (RO or NF)	80%	The technology is not as mature as GAC and gaining DWI Regulation 31 approval within the required timeframes would be an issue. Reduced DO due to waste water generated.

Table 4.106 Blackford WTW unconstrained options process efficacy assessment

Cost efficiency - Iver and Egham

Ofwats Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Cost efficiency	We have some concerns whether the investments are efficient. • The company provides a brief description of the costing methodology. However, there is no comparison of company presented costs against external benchmarks nor specific evidence of third-party assurance on cost efficiency (beyond a statement that third-party assurance had happened).	Some concerns	20%

Table 4.107 Ofwat's deep dive assessment of the cost efficiency for Iver and Egham

Response to Ofwat's concern

4.499 Due to the scale, complexity and timescale attached to the Iver and Egham schemes, we commissioned Stantec to conduct the feasibility work for Iver and Egham schemes. Once the options were agreed for both sites via a risk and value workshop, Stantec engaged the services of Aqua Consultants, commercial engineering consultants with extensive commercial and cost experience of the water industry. We note these are the same consultancy Ofwat and RAPID use to support in their understanding of costs of large scale projects.

4.500 Aqua Consultants were commissioned to produce cost and carbon estimates. Aqua Consultants holds a mature and extensive database of estimating material. Cost estimates have been prepared using a combination of cost models and unit costs based on experience within the Water Industry through AMP6 and AMP7, PR19 and PR24 as well as budget estimates from the market. The cost estimates are provided within appendix AFW139 - Assurance of enhancement costs and 3rd party benchmarking.

4.501 Using expert engineering and cost consultancy services we are confident that the estimates reflect industry best practice, are efficient, and reflected the latest industry benchmarks.

4.502 Aqua Consultants provided detailed bottom-up costs for all options at major asset level, and these were refined as the options matured. Key elements of the costs supplied by Aqua Consultants were subsequently compared with the Affinity Water process costing tool.

4.503 The RGF elements of the Aqua costs were itemised, with any common costs such as contractor overheads proportioned accordingly. These could then be compared directly with our Rapid Filtration Process Model within our UCD.

	Class	Inclusions	Exclusions
Filtration - Rapid	DK	Filer units, local panels and controllers , washwater and scouring system, building dedicated to filters only	Dirty washwater holding tanks (sludge treatment)

Table 4.108 Rapid Filtration UCD inclusions and exclusions

4.504 The data points used in the model were selected to ensure they are relevant for the type and scale of the project, for instance removing outliers.

4.505 The results in Table 4.109 Comparison of modelled costs for Iver and Egham show the Affinity Water modelled costs are 3.7% and 15.2% higher (with a 30% uncertainty factor applied to account for the early stage of the project) than the Aqua Consulting costs for the RGF process for Iver and Egham respectively. This demonstrates a good level of cost estimating accuracy at this point of project maturity.

Power curve	Iver	Egham
	(£)	(£)
AW modelled cost	34,44,438	4,952,416
Aqua for comparison	33,169826	4,300,272
Difference	**1,230,612**	**652,144**
process model % variation	**3.7%**	**15.2%**

Table 4.109 Comparison of modelled costs for Iver and Egham

4.506 Additional costing assurance has been undertaken by AtkinsRéalis to ensure we continue to put forward efficient costs for this investment. This included both assurance of our cost estimation approach included within appendix AFW139 - Assurance of enhancement costs and 3rd party benchmarking. We have not undertaken further benchmarking of costs as these were already developed based on third-party benchmarks by Aqua Consultants and cross referenced against our own cost modelling.

4.507 Regarding our approach to cost estimation, AtkinsRéalis state,

4.508 *"Our view is that the approach taken is reasonable. There are necessarily a number of significant assumptions made in a bottom-up approach (such as the indirect cost uplift) for a project at this stage of development. The company has added further benchmarking to validate these estimates against more top-down data."*

Cost efficiency - RWD Blackford

Ofwats Enhancement assessment criteria grouping	Assessment comments	Criteria decision	% adjustment
Cost efficiency	We have minor concerns whether the investment is efficient. • The company provide no clear evidence how option costs were calculated and no clear cost comparisons to other industry benchmarks or external assurance.	Minor concerns	10%

Table 4.110 Ofwat's deep dive assessment of the cost efficiency for Blackford WTW

Response to Ofwat's concerns

4.509 The Raw Water Deterioration PFAS Sites business case is driven by a statutory duty to maintain potable water quality at four of our sites in the context of deteriorating raw water quality conditions and a change in the wholesomeness threshold limit as defined by the DWI. At **Blackford WTW** we propose installing new GAC contactors to remove the PFOA present in the raw water.

4.510 We undertook each of the stages of cost estimation through the Risk and Value planning process, as follows:

1. High-level estimates used for initial optioneering during the Risk and Value process. These are attained by entering relevant yardstick [driver] values for the options, in this case Ml/d, into our process cost models. This indicates a delivered cost for a new process enabling quick comparison and screening of economically feasible options. This early estimation has a high level of uncertainty but offers an order of magnitude approach to optioneering
2. Refining of costs. Once feasible options have been agreed by our subject matter experts and stakeholders, the Asset Planning team identify any significant additional scope

items and associated costs for the options, such as land purchase, expanding power supply capacity, reconfiguration etc. This was used for six options at Blackford, enabling a more detailed comparison of the options costs and benefits in the form of a Risk Index. This step aims to clearly identify one or more preferred options that are taken forward for further cost estimating

3. Hybrid cost estimating [additional requirements added using unit cost models, quotations, similar project outturn costs]. This stage aims to capture the detail to key asset level for all requirements that do not fall within the process model costs for the preferred option[s]. It considers all costs that would be needed to integrate the new process such as ancillary assets, new site access requirements, SCADA integration, re-lift pumping, additional monitoring etc. ensuring internal delivery costs, operational costs, third party costs are also included.

We have significantly improved our understanding of the capital and operational expenditure costs across the business as a part of the development of a unit cost database (UCD). Our UCD has been built using information from a range of sources, such as our framework contracts and breakdowns from historical scheme outturn costs, supplemented by additional data and industry intelligence from Mott MacDonald.

Governance framework

4.511 The cost estimate for this business case was developed by our Asset Planning engineers and peer reviewed by our Senior Asset Manager. Water quality and scope information were subjected to technical peer-reviews by our Senior Strategy Lead – Water Quality and the Production team.

4.512 Our costs and approach to demonstrating cost efficiency have been independently assessed by Baringa with a risk report outcome provided to our Board for sign off. External consultants assessed our cost/benefit analysis and cost comparisons of options.

4.513 Subsequent stages of accountability and collaboration included alignment of costs between our Cost Benefit Analyses and the Copperleaf Portfolio optimisation suite, and sign-off by our Investment Programme management team. All business cases in our September 2023 business plan submission were peer reviewed and challenged through a multiple stage 'RED REVIEW' process, where experts from across the business challenged cases for need, robustness of case and cost efficiency.

Data Sources

4.514 The primary sources of costs used for the Blackford PFAS scheme were the Process Cost models, initially built and supplied by Mott Macdonald, and maintained by our in-house cost and value engineers.

4.515 In the process of accurately costing these schemes, the following steps were taken:

- analysed and used final account project costs from across the sector in 2015 - 2020 and 2020 - 2025 rebased to financial year 2022 - 3 to derive unit costs where applicable
- carried out various benchmarking exercises to ensure that costs produced align with recent outturn projects costs
- calculated all on-costs, overheads, and management fees from first principles using corporate finance data, whilst assuming levels of efficiency within our current operating model
- used applicable market rates in cases of insufficient cost data for some non-infrastructure assets
- used costs to update over 500 cost models, estimate over 12,000 individual unit costs and derive various cost curve formulae used to price the various elements of our business plan

- have had our costs independently audited and benchmarked by AtkinsRéalis with their due diligence and risk report provided to our Board
- carried out robust peer review and technical challenge sessions to continually review and revise costs through a rigorous internal assurance process with at least two levels of review to ensure consistency of approach and finalised costs.

4.516 For more information about data sources related to our Capital and operational expenditure cost (Infra and non infra) see appendix AFW08 - Our investment development process section 2.2 to 2.6.

4.517 Specific cost data sources applied to Blackford are shown in Table 4.111 Data sources for Blackford WTW.

Data source	Description	Identification of limitations & gaps	Impact assessment of limitation & gaps
Affinity Process cost models - GAC	These models were created for use by Asset Management and updated by Mott MacDonald for PR24. The GAC Process model describes the typical cost for building a new plant, with a defined asset inclusion and exclusion list. Included: GAC filter units, local panels and controllers, washwater and scouring system, building for filters only, WQ monitors directly associated with the process. Allowance for the associated labour, plant, materials, and delivery costs (contractor and Affinity Water; preliminaries, design, management, commissioning)	Exclusions of GAC process model: • Dirty wash water holding tanks (sludge treatment). • Additional land requirements and planning. • Pumping and re-lift assets • Some ancillary assets and integration with existing assets	Low impact. Excluded costs estimates accounted for separately, based on previous project costs.
Affinity Process cost models – Booster Pumping	Raw water intake pumping, borehole and transfer pumping, high lift and boosters, local controls and panels, instrumentation, dedicated pumping buildings and ancillaries	n/a	n/a
Affinity EGI Cost Model Summary	These models have been created for use by Asset Management and describe the typical cost of replacing the component described like-for-like, and include generic allowance for the associated labour, plant, materials, indirect costs (contractor and Affinity Water; preliminaries, design, management, commissioning)	Exclusions of Control Flow Meter process model: Pipework, chamber	Low impact. Contribution of the excluded costs negligible in comparison to the cost of the solution.
Actual Operating costs	Internal staff hourly rates	Estimated hours related to delivery of additional scope outside the process model inclusions	Low impact
Quotes from similar projects	HVAC cost derived from 2022 invoice for The Grove HVAC works (similar site Licence to Blackford 2025 - 2030). GAC media quotations		Low impact

Table 4.111 Data sources for Blackford WTW

Documenting assumptions

Assumption	Description	Purpose
R&V Opex costs assumptions	All solutions Opex costs were annualised. Approved by Asset Planning Manager.	Our risk and value assessment tool required annualise inputs for Opex costs in order to output risk scores.

Assumption	Description	Purpose
R&V WLC costs Capex assumptions	The lifespan of the options was assumed based on a combination of empirical average estimates and supplier information.	This was applied to the R&V assessment, set to a standard of 25 years for both GAC and Ionex treatment.
Solution Capex costs assumptions	All treatment and associated costs were based on the 0.1ug/L wholesomeness threshold (assumed at the time to be the DWI guidance limit for 2025 - 2030).	Additional/enhanced treatment options that otherwise would have been required (e.g. for a DWI-reduced threshold of 0.01ug/L), were left out, as were their associated costs.

Table 4.112 Assumptions for Blackford WTW

Methodology procedure - Cost estimate technique

4.518 The cost estimates were compiled using a range of sources including our unit cost model and process model tools. These models were developed by Mott MacDonald using industry data from third parties such as other water companies, as well as Affinity Water historical cost data. These are now part of our business as usual cost estimating process and are kept updated with new data by the PMO team. Where possible all estimates are compared with previous projects of a similar nature, and if recent quotations are available these are used.

4.519 This combined approach leads to a medium to high level of confidence at this project stage. In this way, the costs were verified both internally and externally a number of times throughout the stages of the assessment process, and therefore increasing confidence in our determined budget.

4.520 The cost model data has been based upon figures applicable to the 2022 - 2023 financial year, and both quotations and previous project costs are sourced within 2020 - 2025 . Previous project costs are based on comparable schemes recently delivered or still in delivery. These include Wheathampstead hexavalent chromium ion exchange treatment plant and Stonecross GAC treatment plant.

4.521 The cost estimation for this business case is based on a breakdown of the various components for each costed option. Each component has been costed using cost models, quotations and outturn costs. The cost structure for the preferred option (new GAC plant) for the Blackford site, is described as follows.

Cost structure

Cost Header	Description	Cost
		(£m)
Capital expenditure (Capex)	New GAC plant installation	8.200
	Virgin PFAS-suitable media	0.434
	Dirty wash water holding tank	0.130
	Wastewater process	0.135
	Fire protection system	0.0150
	Security infrastructure	0.150
	HVAC	0.0670
	Groundwork to allow tanker access/activities	0.022
	Set of new borehole pumps + VSDs	0.075
	Set of new relift pumps	0.150
	Upsizing of power supply/transformer	0.250

Cost Header	Description	Cost
		[£m]
	Purchase of additional land	0.070
Operation and Maintenance (Annual Opex)	New GAC plant operation	0.129
	Energy (HVAC, set of new borehole pumps + VSDs)	0.002
	0.05 FTE for Affinity Water staff running of plant	0.002

Table 4.113 Cost structure for Blackford WTW

4.522 A hybrid cost estimating technique was employed, using a mixture of bottom-up and top-down approaches due to the novel nature of the scheme, despite being at the early stages of development. For example, the top-down Process Cost model approach was supplemented by adding costs for site-specific assets and activity that would require further investment as part of this scheme.

4.523 The costs that form the basis of the economic assessments have been compiled using a range of sources including site asset information, cost model data including data from third parties such as other water companies, previous projects of a similar nature, and recent quotations, leading to a medium to high level of confidence at this project stage. The costs were verified both internally and externally the stages of the assessment process.

4.524 The cost model data has been based upon figures applicable to the 2022 - 2023 financial year, and both quotations and previous project costs sourced within 2020 - 2025. Previous project costs are based on comparable schemes recently delivered or still in delivery.

Appropriate cost estimating technique

Considerations	Assessment
Novelty and complexity of the scheme	Medium novelty + complexity
Maturity of the scheme design	Medium: Concept stages of project development, but based on known technology infrastructure
Availability of benchmark/ historic data for similar schemes, and the quality of this data	Limited availability (GAC plants), aside from industry process model data
The objective of the cost estimate	Determining budgets + comparing costs of competing solutions to inform decision making

Table 4.114 Considerations and assessment of cost estimating techniques

Calculation of the bases cost estimate, accounting for uncertainty, bias, and risk

Accounting for	Adjustments			
Uncertainty	A percentage uncertainty of 30% was applied to the process cost model input parameters, given the fairly early stages of development and the novel nature of PFAS-specific treatment. For the GAC process cost model, this returned a cost of £8.2M. In order to adjust for uncertainty, a two step approach was used.			
	• Comparison was made with similar projects in construction (albeit on a smaller scale) as a sense check for the GAC process model costs. These demonstrated much higher unit costs per Ml than the GAC process cost model.			
	• Tendered price data points were excluded from the model and this resulted in a model cost c. £0.91m higher than with including the tendered costs as tendered prices were shown to skew the curve downwards			
	As a result of this exercise, the cost estimate of £8.2M was retained but this reduces the uncertainty factor to only 13.7%, considered low at this early stage of project planning			
		Process model	**Cost estimate**	**% uncertainty**
	Incl tendered data	6, 432 , 363	8, 245, 072	30.0%
	Excl tendered data	7, 254, 152	8, 245, 072	13.7%

Accounting for	Adjustments
	For Blackford GAC plant, this makes up the majority of the capex costs for the preferred option.
Risk	There is no specific risk amount included in the cost estimate due to the early stage of the project. The uncertainty factor applied includes for any estimation error and unforeseen costs. Specific risk amounts will be considered during the design and build stages.
	Waste treatment and media regeneration for PFAS waste is an area of risk across the industry and has not been included as a specific risk cost.
Optimism Bias (when appropriate)	The cost estimates rely on economies of scale to achieve a lower unit cost per Ml than the comparable schemes currently in delivery. This may be too optimistic and result in a low cost estimate given the unit cost is around 65% lower for Blackford.

Table 4.115 Calculation of the cost estimate accounting for uncertainty, bias, and risk

Internal and external review and assurance

4.525 To provide confidence that the cost estimate is accurate, the following steps have been taken:

- check and review by Cost Estimate team
- technical peer review by project delivery team, Water Quality team and Asset Planning team
- technical assessment by external consultant (Baringa)
- assessment of cost benefit analysis (QASR Consulting)
- assessment of costing approach (AtkinsRéalis)
- final approval by Business Case Owner and Head of the Strategic Asset Management Department including sign off.

4.526 Additional costing assurance has been undertaken by AtkinsRéalis to ensure we continue to put forward efficient costs for this investment. This included both assurance of our cost estimation approach and 3rd party benchmarking of costs, included within appendix 139 - Assurance of enhancement costs and 3rd party benchmarking.

4.527 Regarding our approach to cost estimation, AtkinsRéalis state,

4.528 *"Our view is that the approach is reasonable for the stage of development of the project."*

4.529 Regarding 3rd party benchmarking of costs, Atkins Realis assessed over 95% of the scheme costs. This assessment found;

4.530 *"Affinity Water approach of utilising historic cost data, market testing and obtaining specialist third party quotations demonstrates a sound proactive approach to cost planning."*

4.531 *And that the cost benchmarked assessed to be within 5% of the benchmark values, "In light of this cost benchmarking work, it has been concluded that the benchmarked construction cost data is within a reasonable alignment with anticipated market rates."*

4.2.11 PFAS - Additional business case

Additional business case

Scheme	Sept 2023 submission	Draft Determination	Our Representation plan
	Totex (£m)	Totex (£m)	Totex (£m)
PFAS Tier 2	0	0	149.12

Table 4.116 PFAS business case

4.532 Following the submission of our September 2023 business plan, we received an assessment of our PFAS Strategy from the DWI. Whilst they were broadly supportive of our approach, they encouraged us to submit a statutory section 19 Undertaking applied consistently across the industry. We have now submitted this signed Undertaking. This has driven significantly additional investment requirements above those included in the September 2023 business plan and which we now include in within this business case and our wider Representation. Below we give a brief overview of the context of this case.

4.533 The Undertaking includes a requirement to progressively reduce PFAS concentrations in drinking water (e.g. through blending or treatment solutions) for all sources that fall into "Tier 2" risk category. Note that given the presence of PFAS within source water for these sources and uncertainty of future concentrations, to dependably " progressively reduce PFAS concentrations in drinking water" at this stage, treatment will be required. There are also a range of other requirements that will drive additional investment requirements, including catchment management and additional monitoring.

4.534 We have included these investments within our draft Determination Representation and applied customer protections to ensure costs are returned to customers should new information emerge, and treatment no longer be required. The additional investment is laid out within appendix AFW112 - PFAS business case.

4.535 Our high proportion of ground water from high risk catchments means we face significantly higher risk than most other companies in the industry. We have already undertaken a significant amount of sampling across our region and have seen a higher proportion of significant detections than the wider industry. This high level of risk drives the need for material investment across the 2025 - 30 period, as reflected within the business case. The total cost of these investments is £149m, which includes treatment at 'Tier 2'sites and meeting the additional requirements of the Undertaking that are not already accounted for within base allowances.

4.536 Given the materiality of this expenditure, we have carefully considered both the bill impact and customer protection. The total bill impact of this investment is +£5.20 by 2030. This is one of a number of factors impacting the increased bill within our Representation compared to our September 2023 business plan submission and draft Determination. We have tested both customer priorities and the total bill impact. The results of this engagement are summarised below:

- customers are aware of the emerging importance of removing PFAS from water, with 33% of customers aware and a further 33% vaguely aware of the issue. This also ranked highly (third) in customers' priorities and 63% liked our proposed solution quite, very or extremely well
- when asked about the bill profile as a result of this addition to our plan and the other changes in our Representations, 73% of customers thought it was a little or a lot more than they were expecting.

4.537 The Undertaking creates material cost uncertainty during 2025 - 30, with potential additional investment requirements for any other sites which could become Tier 2 during the period. Whilst this Undertaking is common across the industry, given the high proportion of groundwater sites for Affinity Water and high urban and industrial density within our region, the likelihood and consequence are particularly acute for Affinity Water. We lay out further evidence regarding the nature and scale of this uncertainty and a proposed approach for managing this within appendix AFW135 - Uncertainty mechanisms for PFAS (Notified item).

4.538 PCD - We recognise that, given the materiality of expenditure and uncertainty, appropriate customer protection is paramount for the expenditure to address current Tier 2 sites. PCDs provide an effective mechanism for this protection. The proposed PCD approach for the PFAS strategy outlined in the draft Determination would apply to this additional investment, however, given the materiality and singular nature of this existing PCD, we do not consider that it would appropriately account for the uncertainty or protect customers.

4.539 We therefore considered several potential designs of the PCD to accurately reflect the uncertainty and best protect customers. We examined PCDs across the industry and those Ofwat includes within draft Determinations for similar schemes. The three most appropriate options for the PCD unit were;

i. number of sites (where treatment has been installed and commissioned)
ii. treated Peak Week Production Capacity (PWPC protected by additional treatment installed and commissioned)
iii. DWI legal instrument approval.

4.540 As the PFAS investment primarily relates to treatment installations across 23 sites, with less material costs that could be included within the PCD, either within the unit rates for option i. and ii. or within the overall legal instrument for iii.

4.541 A brief summary of the considerations for different protections is included in appendix AFW135 - Uncertainty mechanism for PFAS (Notified item).

PCD unit considered	Advantage of approach in protection to customers	Alignment with current PCDs
i. Number of sites	Returning costs to customers on an average cost per site basis, regardless of the number of sites within a legal instrument	Does not align with Ofwat PCDs within the draft Determination
ii. Treated peak week production capacity	Returning costs to customers on a cost per treated flow may most accurately reflect the scheme costs, therefore providing protection most proportional to those allowed within the determination	Does not align with Ofwat PCDs within the draft Determination
iii. DWI Legal Instrument	The DWI Legal Instrument ensures we meet regulatory expectation. However, multiple sites many be included within a single Undertaking, limiting proportionality to allowances.	Aligns to Ofwat PCDs within the draft Determination

Table 4.117 Considerations for PCDs for the PFAS additional business case

4.542 Given the recent signing of the Undertaking, it is thus far unclear whether legal instruments will be applied to each individual site. We propose a PCD aligned to the DWI legal instrument, under the assumption that individual notices will be applied to each site prior to final Determination. Should all sites instead be covered by a single Undertaking, we propose reverting to a more proportional unit as per options i. or ii.

4.543 Below we provide a table of individual site costs and how differing units of PCDs could apply. The average variance at each site between investment cost and PCD rate should be as low as possible to best protect customers and manage uncertainty. We have therefore assessed this variance for both option i) and ii).

4.544 Option i) setting a standard rate for each site, creates an average variance of £4.31m per site. Whereas option ii) setting a rate based on capacity of the site, created a larger average variance of £8.34m.

4.545 We therefore propose that should no individual notices be applied to each site, the PCD is designed to using number of sites (where treatment has been installed and commissioned).

4.546 We also propose no time incentive, in line with draft Determination PCDs for all other raw water deterioration investments.

Site	Peak week production capacity	Enhancement expenditure within investment case	i) PCD value at unit rate per site	ii) PCD value at unit rate per treated Ml/d, Peak week production capacity	iii) PCD value at unit rate per legal instrument[1]
	(Ml/d)	(£m)	(£m)	(£m)	(£m)
Non-site specific expenditure	0	3.74	0	0	0
Batchworth	23.95	6.98	6.48	4.28	6.48
Broomin Green	2.56	0.13	6.48	0.46	6.48
Chertsey	59.55	1.65	6.48	10.64	6.48
Clay Lane	144.38	3.5	6.48	25.8	6.48
Dover Priory	5.59	19.16	6.48	1	6.48
East Hyde	6.43	0.19	6.48	1.15	6.48
Egham	137.4	5.7	6.48	24.55	6.48
Hart Lane (Crescent Road)	28.9	0.81	6.48	5.16	6.48
Holmestone	2.04	10.77	6.48	0.36	6.48
Hunton Bridge	8.85	3.73	6.48	1.58	6.48
Iver	225.58	6.72	6.48	40.31	6.48
Marlowes	6	5.78	6.48	1.07	6.48
Mill End	29.35	12.21	6.48	5.24	6.48
North Mymms	28.3	0.89	6.48	5.06	6.48
Northmoor	17.98	6.23	6.48	3.21	6.48
Roydon	10.81	3.98	6.48	1.93	6.48
Stansted	3.89	3.54	6.48	0.7	6.48
Walton	39.2	1.44	6.48	7	6.48
Watton Road	3.9	2.11	6.48	0.7	6.48
Baldock Road/ Bowring	6	10.65	6.48	1.07	6.48
Blackford	19.53	16.6	6.48	3.49	6.48
Holywell	19	18.19	6.48	3.39	6.48
Wheathampstead	5.37	4.42	6.48	0.96	6.48
Total	834.56	149.12	149.12	149.12	149.12

Table 4.118 PFAS additional business case costs and potential PCD unit rates

1 Provided legal instrument applies to each site

4.547 We welcome further engagement with Ofwat and the DWI on the best application of the PCD mechanism ahead of the final Determination.

4.3 Base investment

4.3.1 Energy Price Adjustment

4.548 We welcome Ofwat's recognition that power price volatility is a material consideration for price controls 2025 - 2030 and that it has proposed arrangements to reflect real price effects for energy alongside a power true-up mechanism to allocate risks. We further appreciate the difficulty of designing energy price arrangements however we are concerned that the design of the mechanism in the draft Determination contains flaws that require modification for the final Determination. These flaws are further described in appendix - AFW113 Water UK on treatment of energy costs in AMP8.

4.549 The most significant flaw is the inconsistency in what is being measured in the price series used in the analysis. Ofwat uses the historic DESNZ index of prices paid by industrial customers to produce an uplift factor and a different series of power prices to set RPE reductions to 2030. This is a material problem because the uplift factor reflects prices reported by participants in the DESNZ survey and therefore the hedging strategies employed by those participants. The true-up on the other hand reflects unhedged spot prices. Purchase prices based on hedged arrangements adjust far more slowly than spot prices since contracts need to expire before prices can change. For Ofwat's analysis, this flaw means that the uplift is not adequate to arrive at the correct starting point from which to apply RPEs based on expected spot prices. It further means that water companies' power costs are not likely to fall in line with the spot prices projected, so the RPE reduction is unrealistically aggressive.

4.550 These conclusions are supported in APR24 data, where water companies' power costs are seen to have risen in 2023 - 24 because of hedged purchases, even though spot prices overall were lower than in 2022 - 23. Further, the 2023 - 24 outturn DESNZ price, £303/MWh (2022 - 23 prices) is already seen to have exceeded the Ofwat/CEPA forecast, £220/MWh for the same year, evidencing the unsuitability of assuming that DESNZ prices can fall in line with spot prices, without time lags.

4.551 Updating the draft Determination uplift method for the additional year's DESNZ data now available increases the uplift factor from 1.641 to 1.734. This alters our draft Determination outcome of -£8.3m energy RPE to +£6.5m, as in the table below. However, even with the additional year's data, it is not clear that this uplift is sufficient to establish the correct starting point and it does not address the problem that forward spot prices result in RPEs that are too aggressive.

	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30	Total
	£m [1]	(£m)	(£m)	(£m)	(£m)	(£m)
DD24 Real Price Effect Energy	-0.9	-0.4	-1.5	-2.3	-3.2	-8.3
Affinity Water updated for 2023 - 24	2.1	2.8	1.5	0.6	-0.5	6.5

Table 4.119 Real price effects energy

1 all £m numbers are in 2022 - 23 price base

4.552 We consider that a more complete solution is to price energy adjustments on consistent price series. If the uplift is to be based on hedged DESNZ series, then RPE and true-ups should also be based on hedged series.

Other points

4.553 We also consider that the energy price true up could be done as an in-period adjustment, bringing settlement of cost variations closer to the time when energy price risks materialise. The alternative is as draft Determination sets out, to leave true-ups to 2030, which means that customers' bills could be catching up 6 years' worth of power price changes and mis-matching the timing of when companies incur power costs, with when those can be financed through customer revenues.

4.3.2 PFAS modelling

4.554 We request that Ofwat to revise the projections of treatment complexity used to project allowed base costs in the econometric models. This is to take into account changes to our forward treatment complexity, which has changed since our September 2023 business plan submission due to the inclusion of additional treatment stages for managing PFAS.

4.3.3 Base Uplift for Net Zero

4.555 Ofwat provides additional Base allowance for the industry-wide reallocation of net-zero costs from Enhancement. For Affinity Water, this equates to a further £1.05m of Base allowance (post frontier shift and real price effects).

4.556 Within our September 2023 business plan submission, we included Enhancement funding of £4.302m to continue the delivery of our Electric Vehicles transition programme, which included only those costs not included within modelled Base allowances (e.g. EV charging infrastructure). This programme is essential for us to deliver our ambitious operational greenhouse gas emissions performance commitment.

4.557 Ofwat has allowed an uplift that is less than a quarter of value of our required Enhancement investment. The £1.05m uplift will be used to as a contribution to deliver the programme. The additional £3.252m required to deliver the programme will be funded through the modelled Base allowances, as shown in the table below. We have reflected this within our Representation, under the assumption that the more material concerns with base allowances are addressed, providing us with the flexibility to deliver this investment without materially compromising our other outcomes.

Scheme	Enhancement funding requested	Enhancement funding allowed	Base uplift	Remaining to be invested from Base
	(£m)	(£m)	(£m)	(£m)
Electric vehicles	4.302	0	1.05	3.252

Table 4.120 Cost implications to the Enhancement and Base allowances following the Base uplift

The programme has been developed to assist our transition to Net Zero. 80% of applicable vehicles to be transitioned to EV within 2025 - 2030 through this programme. This programme provides the infrastructure to allow the transition to electric vehicles and includes:

- additional vehicle leasing costs
- depot charging at our offices and sites
- site and home infrastructure upgrades
- home charging units
- resource to deliver the programme
- the additional operational expenditure for running and maintenance costs.

4.558 The transition has the potential to reduce our GHG emissions by approximately 1,920 tonnes of CO^2e per year.

4.559 Further details of this programme, including a full breakdown of the individual components can be found within our September 2023 business plan submission (see page 62 - 90 of appendix AFW14a - Enhancement investment cases).

4.4 Retail investment

4.560 We note Ofwat has invited comments on two concerns outlined in the draft Determinations indicating that the residential retail expenditure allowances may not be sufficiently stretching. First, Ofwat comments that it is not certain that companies have reported residential retail expenditure in 2022 - 23 prices in business plan tables. This is surprising, as we would have expected Ofwat to have used the query process to establish the price base of business plan information to resolve this uncertainty ahead of the draft Determination publication.

4.561 Ofwat also refers to the difficulties experienced with the chosen retail models, namely circularity of bill size with costs. This is also surprising considering that exogeneity is one of Ofwat's stated principles for explanatory variables and the issue was highlighted in April 2023 by Sutton & East Surrey Water in its response [29] to Ofwat's Assessing Base Costs consultation where it said:

4.562 *"… potential endogeneity problem … models use revenue as a predictor of cost without stating any theoretical background or some kind of justification. One can argue that cost comes first and causes revenue instead of the other way around."*

4.563 We are somewhat disappointed to have passed the draft Determination stage of the price review with these questions unresolved.

4.564 On the first, we respectfully suggest that where Ofwat has doubts, it establishes the price base of the business plan information it has collected directly with the companies concerned. For the avoidance of doubt, we confirm that our business plan costs provided in tables RET1 and RET1a are expressed in 2022 - 23 price base appendix AFW105 - Data tables v7 - August.

4.565 On the second, Ofwat could explore using the average household wholesale bill as an explanatory variable, rather than the final bill which might ease the endogeneity problem somewhat. However, Ofwat has used average bill as a driver of retail allowed costs for over 10 years now, including at the last price review.

4.566 Regarding the stretch within allowed retail costs, we point toward evidence from the current price control period. Companies are highly incentivised to find efficiencies compared to the regulatory cost targets as they are 100% exposed to overspends but may also keep 100% of underspend. Even under these powerful incentives, only one company has outperformed the regulatory target costs. The average overspend accumulated over the 4 years of the price control so far is 25% nominal and as high as 60%.

29. https://www.ofwat.gov.uk/wp-content/uploads/2023/04/SES-PR24-base-cost-modelling-submission.pdf

Retail expenditure vs allowance - 2020 - 2035 by year and to date (nominal)

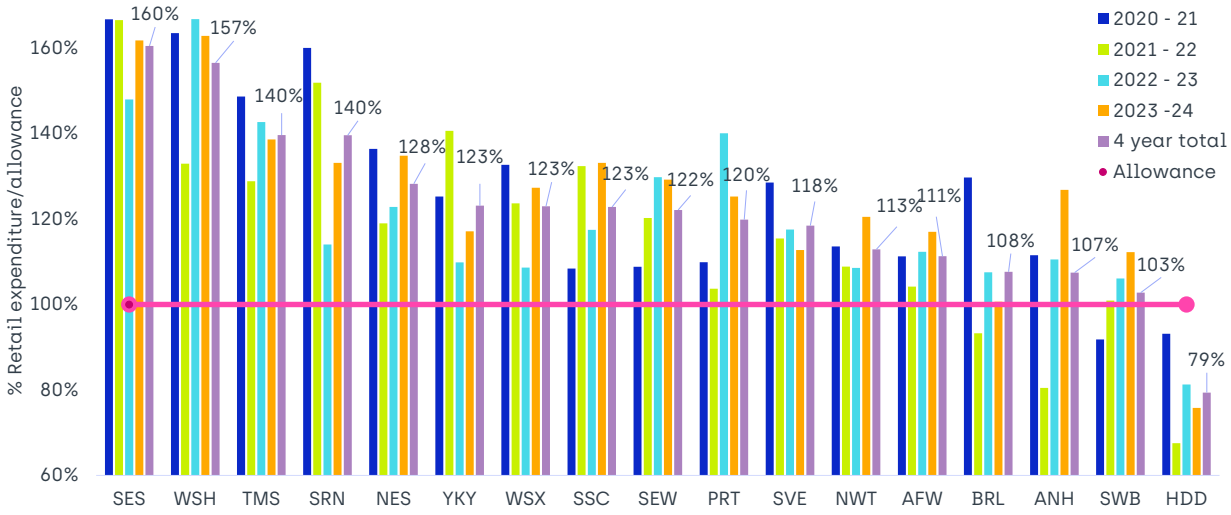


Figure 4.27 Retail expenditure vs allowance - 2020 - 2025 (nominal)

4.567 This evidence shows that the costs predicted by the models in 2019 were significantly stretching as well-incentivised companies have not been able to outperform them. The model specifications are similar in 2024 as they were in 2019 so there is no reason to think they will be any less demanding. We think the reason that allowed costs are higher in PR24 is that they reflect the higher outturn costs revealed in this price control period.

4.568 Ofwat has set the catch-up target to the upper quartile, which represents significant stretch. For instance, our nominal cost was £[33.8]m last year. Our first year allowed retail cost is £[33.8m]m in nominal prices, so we would need to absorb two years worth of inflation, two years of growth in customer numbers and any growth in bad debt costs from rising household bills to meet the current DD24 cost target. This is clearly a stretching cost target.

4.5 Cost Adjustment Claims

4.569 We are disappointed that Ofwat has not allowed our Base cost adjustment claims for regional wages and transience. We provided significant evidence in the September 2023 business plan submission to demonstrate these exogenous factors drive costs and do not consider the reasons outlined by Ofwat in the draft Determinations are sufficiently justified or compelling. We have therefore included the cost adjustment claims in our Representation.

4.6 Efficiency and real price effects

4.6.1 Frontier shift

4.570 We retain our business plan assessments that frontier shift efficiency is 0.5% p.a in wholesale and 0.45% p.a in the retail business, as evidenced in appendix AFW11 - Economic Insight - Frontier shift report. To inform draft Determination responses, a number of companies commissioned Economic Insight to reconsider the appropriate frontier shift value and address feedback provided by Ofwat in the draft Determination. The report addresses Europe Economics' critique and concludes that there is no strong evidence to revise previous assessments of frontier shift.

4.7 PCDs

4.571 Ofwat has introduced a new mechanism at PR24 for managing output of delivery which is the price control deliverable (PCD). Our assessment is that the application of PCDs has led to an entirely negative skew on RoRE ranges, most pronounced for those programs that incur time-incentive and non-delivery penalties, and also apply to elements of Base expenditure.

4.572 We welcome any system that provides enhanced protection for customers, however we require Ofwat to accommodate a number of specific changes and conditions, as stated in our draft Determination Representation, in order to reach the correct balance of risk and reward. These are:

- Ofwat must make some other allowance within the management of total risk range to account for the entirely negative skew generated by the time-incentive and non-delivery PCDs.
- Ofwat must reassess the Enhancement expenditure allowance as per our specific scheme responses as the schemes, as they stand, pose significant restrictions on our ability to deliver the outputs for customers.
- Smart metering PCD must be changed according to the specific feedback given in later sections.
- Ofwat must adjust the unit rate used for mains renewals before we will be able to accept the PCD on this element of base totex, to ensure that we have the flexibility to target the mains for renewals with greatest benefit to customers.

4.7.1 Key high - level concerns

Introduction of PCDs on Base expenditure

4.573 Whilst we remain committed to delivering outputs for customers within Base allowances, we note that Ofwat's proposed application of PCDs to Base expenditure items does create other issues. Most notably in our flexibility to optimise expenditure to achieve customer outcomes, and in the negative effects on the RoRE risk range.

4.574 For example, a 0.3% mains renewal PCD dictates approximately £90m of Base allowance should be spent on a given asset class. This imposes limitations on our ability to optimise expenditure to respond to emerging risks and deliver more efficient and beneficial outcomes. For example, adjacent assets such as air valves or service reservoirs may pose significantly greater risk to customers as potential sources of water ingress and therefore contamination. This PCD will likely increase capital maintenance expenditure on a comparatively low-risk asset class, and unintentionally significantly reduce capital expenditure on those higher risk assets, particularly given the overestimation of implicit allowances. We are also concerned that the PCD could create a perverse incentive whereby cheaper and easier to deliver mains renewal schemes are targeted over critical, but difficult to deliver schemes, particularly when combined with emerging risk within other asset classes and limited flexibility.

4.575 In addition, this base PCD carries with it the largest potential penalty of all the PCDs, due to the size of the associated totex and because it attracts both non-delivery and time incentive mechanisms. The combination of inflexibility of allowance and additional penalty risks driving inefficiency as timely delivery is put ahead of optimum investment and delivery risk management. As the application of a mains renewal PCD to base expenditure was not included in the Final Methodology, there has been no opportunity for companies to air these concerns and ensure a more effective approach is considered.

Negative skew to the RoRE risk range

4.576 Our analysis has shown that our likely RoRE risk range due to PCDs is -1.39% to -0.43% (P10 to P90) based on Ofwat's draft Determination decisions. See appendix AFW149 - Economic Insight- Full RoRE method write up.

4.577 Our view of the overall RoRE range provided in the draft Determination is significantly skewed to the downside. The introduction of PCDs contributes to this negative skew as both the 'time delivery' and the 'non delivery' elements have associated penalties above simply returning the cost of the scheme to customers.

4.578 To address the overall balance of risk and return, within the PCD risk range, we propose specific amendments to PCDs in our draft Determination representation. These include minor amendments to the specific conditions of the PCDs to avoid those conditions that materially increase risk without providing additional protections to customers.

4.579 Within the time-incentive mechanism, we accept the principle of awarding one quarter of the reward on timely delivery as opposed to full reward upon out-performance but believe further analysis should be done to demonstrate the optimum position on the asymmetry to correct the balance of risk and return. You can find more detail in Chapter 3. Risk, return and investability.

Effect of significant cost Enhancement challenge

4.580 Within the Enhancement cost assessment of the draft Determination, there are a number of key areas where accepting the cost challenges proposed represents a risk to key outcomes and meeting the requirements of the PCD. Ofwat has, in some instances, used overly simplistic or superficial approaches to assessing costs, for example failing to account for material exogenous factors within the comparative benchmark or modelled approaches. For deep dive assessments, it is clear that further clarification is required in some areas before an appropriate assessment of costs can be undertaken. This is understandable given the more limited two-way engagement between Ofwat and companies by this stage, compared to previous price controls, and we have provided this additional evidence in all instances of our Representations on deep dive costs.

4.581 As it stands, the allowances for Enhancement expenditure within the draft Determination result in additional risk to meeting the requirements of the PCDs and delivering key outcomes for our customers.

4.7.2 Scheme specific responses

Mains renewal (base)

4.582 As outlined in 4.7.1 Key high - level concerns, we remain committed to delivering our outputs within Base expenditure, however we provide Representations on two amendments to the Ofwat draft Determination PCD for mains renewals:

i. adjusted unit rate for mains renewals lengths
ii. adjusted delivery profile through 2025 - 2030.

4.583 We consider that the adjusted unit rate represents a more accurate median price point for mains renewals activities across our company area, thereby allowing us to truly target the highest risk sections of main, providing greatest outcomes for customers, in the program.

4.584 The adjusted delivery profile enables us to manage the delivery risks through the AMP and provides a glidepath from the position at which we end AMP7 to achieve the required 0.3% renewals through 2025 - 2030. This approach also allows us to achieve greater mains renewals in 2030 - 2035, in line with our long-term strategy.

4.585 We ask Ofwat to note, however, that we believe the implicit allowance for mains renewals has not been correctly calculated and introduces an additional cost challenge of around £30m in Base expenditure. The natural consequence of locking this funding in for replacement of this specific asset class is the reallocation of expenditure from other areas in base expenditure. Given the outcomes regime, and the significantly increased penalty incentives in that area, it will likely be in capital maintenance of other areas.

WRMP supply interconnectors

4.586 We are not providing Representations on the draft Determination approach to use Ml/d of water available for use (WAFU) as the metric to measure successful delivery of the WRMP supply interconnectors schemes.

WINEP - sustainability reductions interconnectors

4.587 We are not providing Representations on the draft Determination approach to use km mains delivered as the metric to measure successful delivery of the sustainability reductions interconnectors schemes.

WINEP – river restoration and catchment management

4.588 We accept that the PCD will be monitored using delivery of actions within the WINEP. However, the main concern we have is whether there will be adequate flexibility to alter timescales for delivery of WINEP actions mid-AMP. We do not understand well enough yet whether the alterations process managed by the EA will be reflected in the PCD target for a given year.

4.589 We understand that Ofwat is aware of this concern and is already working with the EA to create the required process, however these changes cannot currently be reflected, which adds uncertainty and risk to this program.

4.590 The WINEP programme will be monitored via a third layer of assessment under the AMP Environmental Performance Assessment (EPA) scorecard; it will be critical that the three processes are aligned and do not interfere with one another or cause competing pressures which could result in both EPA and PCD penalties. We are aware that this issue affects all companies and welcome the outcome of the discussions between the EA and Ofwat on how best to align the three measures to ensure companies are not exposed to unnecessary regulatory risk.

Smart metering

4.591 While we accept that the total number of smart meters included within the PCD is an appropriate measure, we consider that the strict controls around the number of each type of installation to be delivered in each year will stifle our ability to optimise delivery to maximise the desired output, which is reduction in customer demand.

4.592 In addition, the requirement to meet the specified performance metrics – 95% success rate at recording data at least once per hour and 95% success rate at transmitting that data once per 24 hours – are not a requirement of a successful program and are practically unachievable; they will significantly limit our ability to explore the market for best value solutions for customers. We would welcome further direct engagement with Ofwat to better explore how to appropriately measure successful delivery of this scheme.

4.593 Finally, the application of both a time-incentive and a non-delivery penalty to this program will create too much risk and does not allow flexibility for any smart metering programme to adapt to external factors, flexing delivery profiles within the AMP to achieve the required outcome for customers by 2030.

Raw Water deterioration

4.594 We understand the rationale set out by Ofwat in the draft Determination to use completion of DWI legal instruments as the metric by which to measure successful delivery of these schemes.

4.595 However, it is not appropriate to include the Undertakings for lead and PFAS strategies as two additional PCDs. The works proposed for delivery in 2025 -2030 from within both these strategies have already been included in specific Enhancement expenditure business cases [30] or are being submitted as part of our draft Determination response (see 4.2.11 PFAS - Additional business case), attracting regular oversight from the Drinking Water Inspectorate. There is no additional customer benefit to be gained from also applying penalties to, and requiring monitoring of, the strategies themselves. Indeed, Ofwat came to the same conclusions when considering bespoke performance commitments in PR14 and PR19, so it is not clear why this approach is now necessary in the PCD framework.

SEMD- physical security and emergency planning

4.596 We are not providing representations on the draft Determination approach to use completion of DWI legal instruments as the metric to measure successful delivery of the SEMD schemes.

Demand management

4.597 We are not providing representations on the draft Determination approach to use Ml/d as the metric to measure successful delivery of the demand management schemes.

30. Appendix AFW14-b, page 17-22 for PFAS and page 23-27 for Lead

05. Outcomes

5.1 Outcomes summary

Our September 2023 business plan submission

Our business plan set out an ambitious set of outcomes for our customers, delivering stretching performance, largely from base expenditure. We submitted three bespoke PCs (AIM, low pressure and whole life carbon) which addressed all early feedback provided by Ofwat. We recognised that our plan had a negative ODI skew and asked Ofwat to consider a number of options to overcome the asymmetrical balance of risk and return resulting from following the Ofwat PR24 Final Methodology on Outcomes.

Ofwat's draft Determination

We are pleased that Ofwat recognised that we passed both quality tests on the Outcomes element of the business plan, and was described, by Ofwat, as having high ambition in its proposals to deliver stretching performance from base expenditure.

Ofwat applied performance stretch in three of the PCs: PCC, operational GHG emissions and low pressure.

Two of the submitted bespoke PCs (AIM and whole life carbon) were rejected at the draft Determination.

The most significant intervention in the draft Determination was the changes to ODI rates from our business plan, with very large increases across the whole suite of PCs

As a result, the Outcome package for Affinity Water at draft Determination had the largest RoRE negative downside in the industry under Ofwat's own analysis.

Our representation

Our representations set out a number of changes needed to address the significant downside skew in the balance of risk and return in Affinity Water's Outcomes package

1. Bring the incentive framework in line with Ofwat's own principle that: "The amount of RoRE we allocate should represent a theoretical maximum amount of risk a company is exposed to through ODI payments ie if it was very significantly underperforming or outperforming on a PC."[31]. Ofwat's own analysis shows that the draft Determination is inconsistent with this across PCC, business demand, leakage, water supply interruptions, discharge permit compliance and compliance risk index. Third party performance analysis has also indicated that customer contacts about water quality would breach the % RoRE at risk designated for the PC
2. Revise the ODI methodology to remove the grouping of companies based on RCV size and deliver a fair and equitable approach for all companies
3. Update the ODI methodology for discharge permit compliance to set incentives appropriate to the environmental risk for water only companies
4. Insert appropriate customer and company protections for PCC, which is driving a very large negative skew and represents an unacceptable level of risk for the company on a measure that is not directly within the company's control and is already significantly incentivised through PCDs on smart metering
5. Removal of the underperformance only bespoke PC for Low pressure
6. Include a bespoke PC for embedded GHG emissions
7. Revise the methodology for C-MeX to a symmetric reward and penalty approach
8. Recognise revised figures for both operational GHG emissions and leakage

31. https://www.ofwat.gov.uk/wp-content/uploads/2023/08/PR24-Using-collaborative-customer-research-to-set-outcome-delivery-incentive-rates-.pdf

			September 23 business plan submission			Draft Determination			Company representation		
Performance commitment	Reward / penalty	Measure	2029-2030 forecast	ODI rate	Cap / collar	2029-30 target	ODI rate	Cap / collar	2029-30 target	ODI rate	Cap / collar
Leakage	Both	% Reduction from 2019-20	31%	£0.365m per Ml/d	No	31%	£0.909m per Ml/d	No	31%	£0.639m per Ml/d	No
PCC	Both	% Reduction from 2019-20	16%	£1.41m per l/h/d	No	18.3%	£0.74m per l/h/d	No	12.9%[1]	£0.432m per l/h/d	Cap and Collar (+/-0.4% RoRE)
Business demand	Both	% Reduction from 2019-20	11%	£0.365m per Ml/d)	Cap and Collar (+/- 0.5% RoRE)	11.0%	£0.254m per Ml/d	Cap and Collar (+/-0.5% RoRE)	11.0%	£0.199m per Ml/d	Cap and Collar (+/-0.5% RoRE)
Biodiversity	Both	Biodiversity units per hectare	2.7	Unknown	Cap and Collar (+/- 0.5% RoRE)	1.97	£0.903m per Biodiversity units per hectare	Cap and Collar (+/-0.5% RoRE)	1.73	£0.903m per Biodiversity units per hectare	Cap and Collar (+/-0.5% RoRE)
Operational GHG emissions	Both	Tonnes of CO_2e	55,859	Unknown	Cap and Collar (+/-0.5% RoRE)	51,776	£188 per tonne of CO_2e	Cap and Collar (+/-0.5% RoRE)	74,659	£188 per tonne of CO_2e	Cap and Collar (+/-0.5% RoRE)
Discharge permit compliance	Penalty only	% Compliance	100%	£0.168m per %	No	100%	£1.524m per %	No	100%	£0.156m per %	No
Serious pollution incidents	Penalty only	Number of Cat. 1 & 2 incidents	0	£1.36m per incident	No	0	£2.113m per incident	No	0	£1.08m per incident	No
AIM (bespoke)	Both	Reduction in Ml of abstraction across selected sources	0	£1,400 per Ml	Cap and Collar (proposing +/- 0.275% RoRE)	Rejected			Removed		
Whole life carbon (bespoke)[2]	Both	% reduction against baseline	14%	£0.28m per %	Cap and Collar (+/- 0.3% RoRE)	Rejected			14%	Outformance £188 Underperformance £94 per Tonne	Cap and Collar (+/-0.5% RoRE)
Mains repairs	Both	Number of repairs per 1,000km of mains	132	£0.148m per unit	Cap and Collar (-0.5% - +0.25% RoRE)	132	£0.128m per unit	Cap and collar (+/-0.5% RoRE)	132	£0.113m per unit	Cap and collar (+/-0.5% RoRE)

			September 23 business plan submission			Draft Determination			Company representation		
Performance commitment	Reward / penalty	Measure	2029-2030 forecast	ODI rate	Cap / collar	2029-30 target	ODI rate	Cap / collar	2029-30 target	ODI rate	Cap / collar
Unplanned outage	Both	% of peak week production capacity	2.14%	£1.63 per %	Cap and Collar (-0.5% - +0.25% RoRE)	2.14%	£3.817m per %	Cap and Collar (+/-0.5% RoRE)	2.14%	£2.605m per %	Cap and Collar (+/-0.5% RoRE)
C-MeX	Both	Score /100	n/a	League Table	+18% to -18% retail revenue	n/a	League Table	+/-0.5% RoRE	n/a	League Table	+/-0.5% RoRE
Water supply interruptions	Both	Time per property per year	00:03:40	£0.916 per minute	Collar Only (-0.5% RoRE)	00:05:00	£0.663 per minute	Collar Only (1.0% RoRE)	00:05:00	£0.525m per minute	Collar Only (-1.0% RoRE)
CRI	Penalty only	Numerical Score (Deadband of 2.0)	0 (0.9 forecast)	£0.982m per point	No	0 (Deadband of 1.0)	£1.247m per point	No	0[3]	£0.849m per point	No
D-MeX	Both	Score /100	n/a	League Table	+6% to -12% DS revenue	n/a	League Table	+/-0.25% RoRE	n/a	League Table	+/-0.25% RoRE
Customer contacts about WQ	Both	Number of contacts per 1,000 population	0.67	£9.874m per unit	No	0.67	£25.69m per unit	No	0.67	£17.44m per unit	No
BR-MeX	Both	Score /100	n/a	League Table	+0.5% to -1.0% wholesale revenue	n/a	League Table	+/-0.2% RoRE	n/a	League Table	+/-0.2% RoRE
Average time properties experience low pressure (Bespoke)	Penalty only	Time per property per year	01:43:43	£0.0165m per minute	Collar Only (-0.125% RoRE)	01:24:13	£0.03m per minute	Collar Only (-0.5% RoRE)	Removed		

Table 5.1 Our 2025 - 2030 PC summary

1 Deadband set at dry year level
2 Changed to Embedded GHG emissions in our response
3 Deadband of 1.0

5.2 Common performance commitments

5.2.1 PCC

Our September 2023 business plan submission

PCC details

Data table references:	OUT1.10 / OUT2.10 / OUT3.10 / OUT4.44-4.52.
Performance commitment description:	PCC is a common performance commitment, and we have adopted the standard definition. This is a continuation of the PR19 PC. Helping our customers to use less water is essential for our long-term plans. By reducing customer demand, we can better balance the supply/demand of water resources and reduce our water abstraction.
Unit for performance commitment:	Percentage reduction of three-year average PCC from 2019 - 20 baseline, the volumetric levels resulting from the application of the percentage reduction in litres/person/day (l/p/d).

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	12.5%	11.7%	13.9%	14.8%	15.5%	16.2%
% Improvement from 2024 - 25						3.7%[1]
Incentive rate	£1.412M per l/h/d					
Cap/Collar	No					

Table 5.2 PCC PCL : baseline figure (2019-20) : 154.0Ml/d - September 2023 business plan submission

1 Our forecast 2024 - 25 position is to achieve a 6.4% reduction against our 2017 - 20 baseline, therefore our expected improvement between 2024 - 25 and 2029 - 30 will be 9.8%

Ofwat's draft Determination

PCC details

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	2.4%	13.%	15.2%	16.2%	17.3%	18.3%
% Improvement from 2024 - 25						15.9%
Incentive rate	£0.707m per l/h/d					
Cap/Collar	No					

Table 5.3 PCC PCL : baseline figure (2019-20) : 154.0Ml/d - Ofwat's DD

Our Representation

5.1 Ofwat's approach to PCC in draft Determinations leads to a material downside skew on ODI RoRE.

5.2 Ofwat's principle for incentives states that: "The amount of RoRE we allocate should represent a theoretical maximum amount of risk a company is exposed to through ODI payments ie if it was very significantly underperforming or outperforming on a PC [32] .

32. https://www.ofwat.gov.uk/wp-content/uploads/2023/08/PR24-Using-collaborative-customer-research-to-set-outcome-delivery-incentive-rates-.pdf

5.3 The draft Determination for PCC is not consistent with Ofwat's principle and leads to RoRE at risk of 0.88% (Ofwat Monte Carlo 2025 - 26 analysis) or 1.39% (third party analysis) at P10, which is greater than the 0.6% indicated by Ofwat that should be at risk.

5.4 Our Representation supports Ofwat in updating their approach to PCC to deliver the following benefits:

- ensure companies are not penalised for exogenous factors that are not in their control, for example the impact of weather on consumption
- ensure incentives are appropriate for companies to deliver improving performance
- support the balancing of risk and return for both PCC and in the round
- ensure consistency with Ofwat's principles for setting incentives.

5.5 Our representation sets out the amendments needed, by:

- updating of ODI rates in line with our representations in 5.4 Incentive rates
- updating our PCL to align with our final WRMP
- the application of a deadband for PCC in line with the dry year forecasts submitted in business plan data tables and aligned to the Environment Agency's methodology in the Water Resource Management Plans
- the inclusion of a performance collar (and corresponding cap) at 0.4% RoRE in line with customer valuations. We have retained 0.6% RoRE in the ODI calculation to reflect the government priorities for Ofwat as described in the draft Determination.

5.6 PCC is a performance measure that is not directly within management control as it is entirely dependent on customers behaviour and the weather. While water companies can influence performance in this area through metering, customer behaviour campaigns and charging approaches, the amount of water a population choses to use is clearly not solely within a water company's control.

5.7 In the last five years we have demonstrated we can deliver improved performance most notably in water supply interruptions, CRI and leakage. Our inability to move the dial on PCC is not through a lack of effort, prioritisation, ambition or efficiency demonstrated by our award winning SOS campaign, the largest customer engagement activity the water industry has seen. Even with this focus, investment and our delivery track record, PCC has remained stubbornly high.

Deadband set at dry year target level

5.8 We have the largest difference between our normal year (NY) and dry year (DY) forecasts in the industry. Normal year and dry year are terms within the Water Resources Management Plan used to describe different conditions for scenario planning. Normal year is described as a year when temperature and rainfall values are at or close to their long term average. Dry years are described as those where the weather causes demand for water to be so high that it can only just be met by available supply. Using the published data tables from all companies' business plans we have reviewed the difference between normal year and dry year for the industry. See figure Figure 5.1 PCC : difference between normal year and dry year. We average the largest gap in the industry at a 9.0% difference over 2020-25 against an industry median of just 2.1%. Analysis of this data shows companies in the south east of England typically are those whose PCC is most affected by weather conditions with extreme temperatures relative to the rest of the UK and population demographics likely contributory factors.

PCC : difference between normal year and dry year

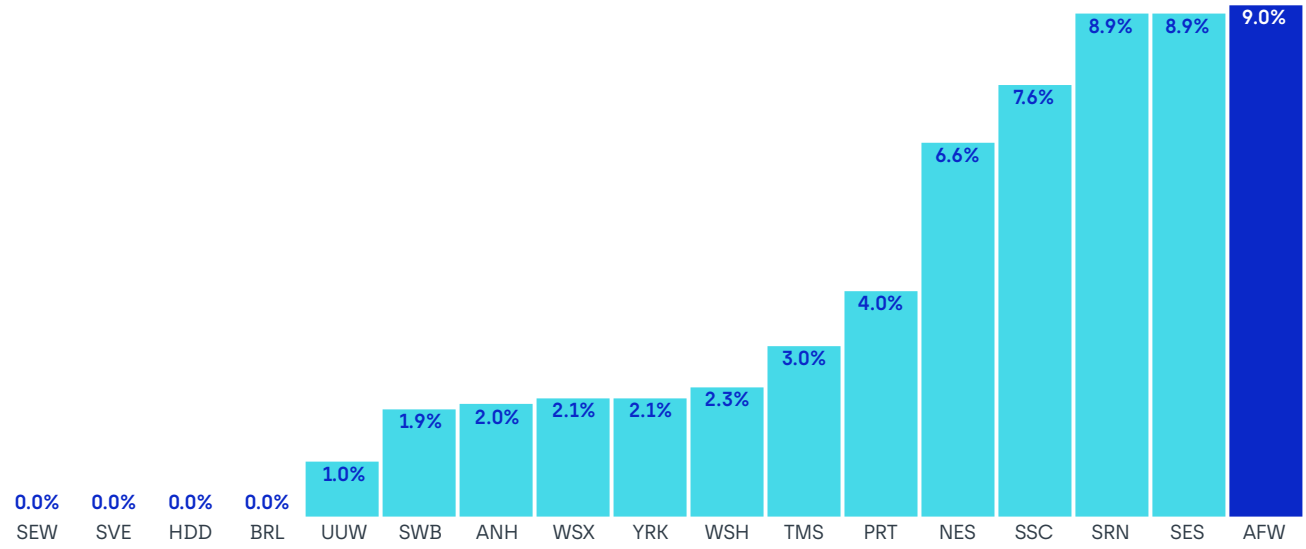


Figure 5.1 PCC : difference between normal year and dry year

5.9 Due to the effects of climate change we are also seeing more frequent dry years moving from an average of 1 in 10 years, to 1 in 2 years in the last 6 years. This means our WRMP assumptions which have fed business plan targets do not match the reality of the conditions which are operating under. The WRMP is an environmental modelling approach and the normal year assumptions, do not reflect real conditions and should not be assumed to do so. This process means that we are unduly penalised by exogenous factors out of our control such as weather. Our representation includes a deadband in our final determination set at the dry year level as submitted in our data tables. This can be applied universally across the industry or just to companies in a similar situation to ourselves where there is a large difference between NY and DY to ensure industry wide fairness. Our representation solves the problem of companies being penalised for how customers react to extreme weather conditions, which we cannot fully influence, and resolves any ongoing discussion around the appropriateness of using the normal year for target setting. In the draft Determination, Ofwat confirmed this correlation between PCC performance and the weather: "Companies' per capita consumption performance during the 2020-25 period will have been affected by many factors, including the weather..."[33] .

5.10 Following Defra feedback on our draft WRMP, we are in a position to publish our final WRMP in October. This includes an updated profile for our normal year PCC figure, which is the one used for setting PCC targets. We are forecasting a 4.8 l/h/d increase in the normal year figures from our submitted business plan profile. The change in this planning assumption demonstrates the uncertainty in this measure and is therefore appropriate for a performance deadband.

33. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Accounting-for-past-delivery.pdf

Performance Collar and Other Incentives

5.11 Even with this mitigation, PCC would negatively skew the whole outcomes package. For that reason, we have also applied a performance collar (and corresponding cap) to limit maximum penalty and reward in line with customer valuations of PCC at +/-0.4% RoRE. With the ODI rate set using 0.6% RoRE at risk, there is effective incentivisation to make progress to deliver every litre per person per day of benefit we can. However a collar enables an appropriate limit of risk to the company while still incentivising performance for customers.

5.12 We have submitted ambitious plans for smart metering, which already have customer protection through the PCD mechanism.Smart Metering is the most effective company intervention available to reduce PCC. We have reviewed data of where companies have multiple years of smart metering penetration data against their PCC performance.

5.13 Figure 5.2 PCC vs smart metering shows PCC performance for companies that have multiple years of smart metering penetration data. Each of the points on the graph represent annual performance, with each series showing the most recent four years on data, starting at 2020 - 21. The resulting trend shows a clear linear correlation between smart metering penetration and PCC, indicating that higher smart metering penetration directly reduces PCC. Through our data analysis we have not identified any other industry wide measure which has driven PCC downwards in this way.

PCC v smart metering

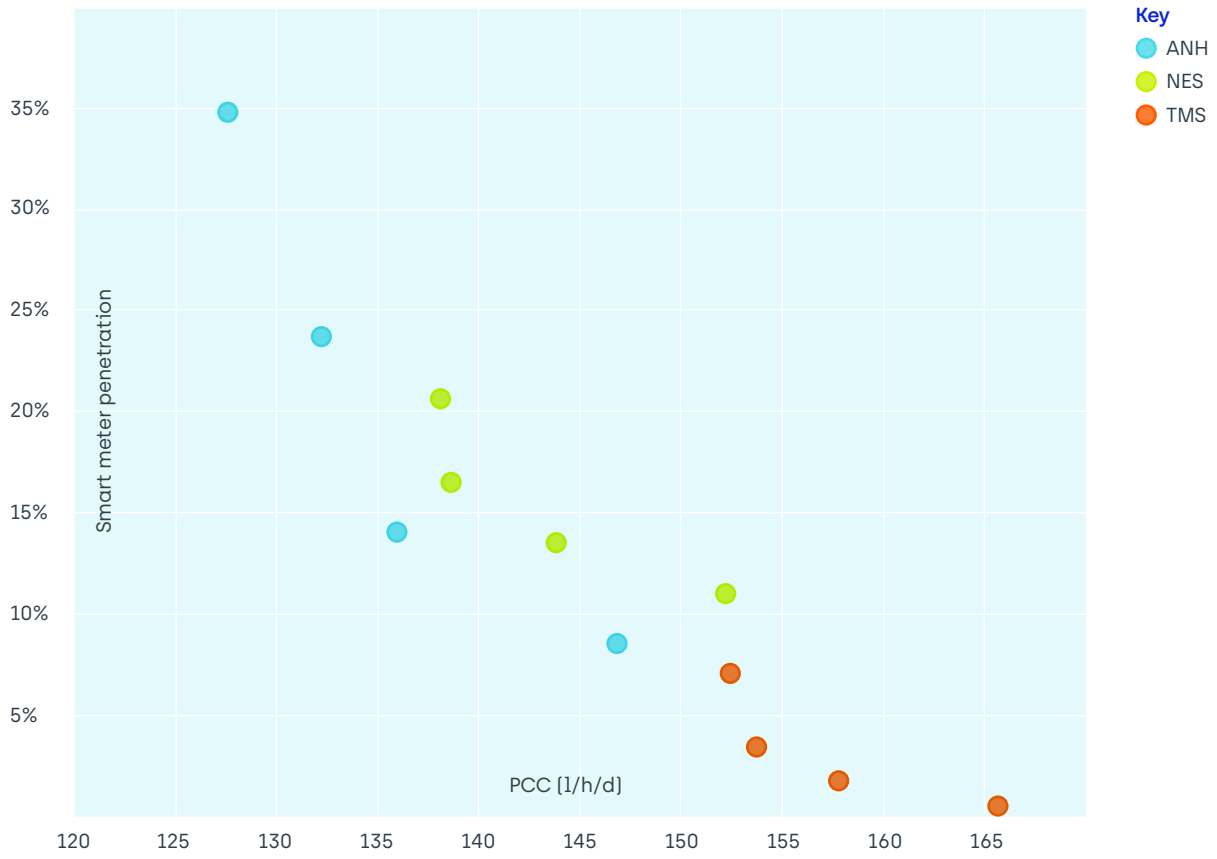


Figure 5.2 PCC vs smart metering

5.14 PCDs have been applied to smart metering to protect from the under-delivery, and include an element of customer benefit foregone in the penalty. The smart metering profile is extremely ambitious and ensures a drive to deliver in this area. We consider there is a double jeopardy where Ofwat is incentivising both the smart metering output and the associated PCC outcomes.

Our Representation plan

PCC details

2024 - 2030 performance commitment levels

5.15 Performance commitment levels have been updated to reflect our final WRMP.

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	2.4%	6.4%	10.2%	11.2%	12.1%	12.9%
% Improvement from 2024 - 25						10.5%
Deadband	n/a	6.4% - 17.0%	7.3% - 20.4%	7.9% - 21.6%	8.56% - 22.5%	9.23% - 23.1%
Incentive rate	£0.432m per l/h/d					
Cap/Collar	Cap and Collar(+/- 0.4% RoRE)					

Table 5.4 PCC PCL : baseline figure (2019-20) : 154.0Ml/d - representation plan

5.2.2 Greenhouse gas emissions

Our September 2023 business plan submission

Operational greenhouse gas emissions water details

Data table references:	OUT1.7 / OUT2.7 / OUT3.7 / OUT4.24-4.29.
Performance commitment description:	Operational greenhouse gas emissions is a common performance commitment, and we have adopted the standard definition. This is a new PC for PR24. This performance commitment incentivises the reduction of greenhouse gas emissions arising from our operational activities.
Unit for performance commitment:	Tonnes of CO_2e per Ml .

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	n/a	55.477	54.076	54.082	56.486	55.859
% Improvement from 2024 - 25						n/a
Incentive rate	To be confirmed					
Cap/Collar	Cap and Collar(+/- 0.5% RoRE)					

Table 5.5 Table 7.9 PCLs operational greenhouse gas emissions - September 2023 business plan submission plan

Ofwat's draft Determination

Operational greenhouse gas emissions water details

5.16 2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	57,124.24	55,662.39	55,082.27	54,487.94	53,792.59	51,776.54
% Improvement from 2024 - 25						9.4%
Incentive rate	£188 per Tonnes of CO_2e					
Cap/Collar	Cap and Collar(+/- 0.5% RoRE)					

Table 5.6 PCLs operational greenhouse gas emissions - Ofwat's DD

Our Representation

5.17 An updated carbon accounting workbook (CAW) has enabled us to recalculate our operational GHG emissions increasing the scope of emissions which we can now report on. These changes have had a significant change to our reporting, which we have reflected in our resubmitted data tables.

5.18 Due to a misunderstanding of how the OUT tables in the September 2023 submission would be used in the draft Determination, we have updated the assumptions for OUT3 in the representation. In our business plan data tables, we included increases from Enhancement in OUT2 and left OUT3 for benefit only. The increases in our plan, most notably in 2028-29 were added to our baseline performance rather than into OUT3. Due to how calculations were undertaken for the draft Determination, these increases are effectively ignored and replaced with a percentage reduction from the 2024-25 baseline.

5.19 A summary of the changes made:

1. Since the submission of our September 2023 business plan, we have increased the breadth of data available to our carbon calculations for our Scope 3 calculations, most notably for chemicals where we have access to more complete data in the latest CAW. We have used this new data to restate the historic figures back to 2020-21. Additionally, our 2024 - 25 Scope 2 emissions were based on a reduced need driven by distribution input (DI) reductions, however our performance to date has not delivered this and therefore we have revised our Scope 2 forecast for 2024 - 25. These changes have been reviewed and accepted by our third party assurers.
2. Following our September 2030 submission, new information has become available for the use of chemicals associated with our new Sundon conditioning plant, which was an enhancement scheme from PR19[34]. New design data has been made available which materially changing the emissions expected. With this information we have reprofiled our emissions.
3. Since the publication of our September 2023 submission, new PFAS requirements have emerged. Our preferred treatment process for PFAS is the use of granular activated carbon (GAC) filtration, however, to maintain effectiveness GAC requires carbon to be replaced or regenerated over its lifetime. PFAS treatment will require a step change in how we approach maintaining GAC effectiveness and will require more virgin carbon replacement over regeneration, this results in significantly higher emissions. We have included details of these schemes from the DWI enforcement notice.We have included these emissions in our Performance from Enhancement data tables which gives the final tonnes of CO_2e. Due to the emissions being accounted for at the time of purchase, and our strategy to buy in bulk in a single year, it creates a large spike in our profile for a single year before returning to levels similar to before.

5.20 Details of these interventions are including in our representation data table commentary document. All calculation steps have been subjected to third party assurance.

Our Representation plan

Operational greenhouse gas emissions water details

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	74,787.46	72,376.98	71,148.43	73,240.93	115,432.49	74,658.85
% Improvement from 2024 - 25						0.17%
Incentive rate	£188 per Tonne of CO_2e					
Cap/Collar	Cap and Collar(+/- 0.5% RoRE)					

Table 5.7 PCLs operational greenhouse gas emissions - representation plan

34. https://www.affinitywater.co.uk/docs/corporate/2023/AFW-AMP7-enhancement-spend-action-plan-March-2023.pdf

5.2.3 Leakage

Our September 2023 business plan submission

Leakage details

Data table references:	OUT1.9 / OUT2.9 / OUT3.9 / OUT4.32-4.35.
Performance commitment description:	Leakage is a common performance commitment, and we have adopted the standard definition. This is a continuation of the PR19 PC. Reducing leakage is a critical goal for us and our customers. Reducing leakage improves system resilience and benefits the supply/demand balance, reducing the need for abstraction.
Unit for performance commitment:	Percentage reduction of three-year average of leakage from 2019 - 20 baseline. The volumetric levels resulting from the application of the percentage reduction in megalitres per day (Ml/d).

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	20.0%	21.3%	23.9%	26.8%	29.3%	31.0%
% Improvement from 2024 - 25						11%
Incentive rate	£0.365m per Ml/d					
Cap/Collar	No					

Table 5.8 Leakage PCL : baseline figure (2019 - 20) : 187.7Ml/d - September 2023 business plan submission

Ofwat's draft Determination

Leakage details

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	20.0%	21.9%	23.9%	26.8%	29.3%	31.0%
% Improvement from 2024 - 25						11%
Incentive rate	£0.909m per Ml/d					
Cap/Collar	No					

Table 5.9 Leakage PCL : baseline figure (2019 - 20) : 187.7Ml/d - Ofwat's DD

Our Representation

5.21 We have updated our leakage data for year 4 of AMP7 for out turn data and year 5 with a more accurate forecast, both of which affect the three year rolling average calculation for 2025 - 2030. For the avoidance of doubt, this results in the same annual targets we proposed in our business plan and which were accepted by Ofwat in the draft Determination.

Our Representation plan

Leakage details

5.22 2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	20.0%	21.3%	23.9%	26.8%	29.3%	31.0%
% Improvement from 2024 - 25						11%
Incentive rate	£0.639m per Ml/d					
Cap/Collar	No					

Table 5.10 Leakage PCL : baseline figure (2019 - 20) : 187.7Ml/d - representation plan

5.2.4 Biodiversity

Our September 2023 business plan submission

Biodiversity details

Data table references:	OUT1.6 / OUT2.6 / OUT3.6 / OUT4.12-4.23.
Performance commitment description:	Biodiversity is a common performance commitment, and we have adopted the standard definition. This is a new PC for PR24. This performance commitment is designed to incentivise the conservation and enhancement of biodiversity in the exercise of our functions.
Unit for performance commitment:	Biodiversity units per 100km^2 of appointed business company land.

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	n/a	n/a	n/a	0.90	1.80	2.70
% Improvement from 2024 - 25						n/a
Incentive rate	TBC					
Cap/Collar	Cap and Collar[+/- 0.5% RoRE]					

Table 5.11 PCLs biodiversity - September 2023 business plan submission

Ofwat's draft Determination

Biodiversity details

2024 - 2030 performance commitment levels

5.23 For clarity, these figures were issued by Ofwat post-draft Determination in response to industry queries.

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	n/a	n/a	n/a	n/a	0.08	0.73
% Improvement from 2024 - 25						n/a
Incentive rate	£0.903m per unit per 1,000km2 of supply area					
Cap/Collar	Cap and Collar[+/- 0.5% RoRE]					

Table 5.12 PCLs biodiversity - Ofwat's DD

Our Representation

5.24 We are supportive of Ofwat's ambition for incentivising biodiversity. We have submitted ambitious delivery plans to improve the ecology of our sites and use our land for maximum environmental gain and we are pleased that Ofwat have set challenging but achievable targets for this PC. We support Ofwat's approach and are committed to delivery against this PC. We have been working proactively with our supply chain to develop plans and have made significant progress in baselining our land ready for 2025-30 and can see opportunities to change our land to improve biodiversity and environmental value.

Our representation plan

Biodiversity details
2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	n/a	n/a	n/a	0	0.08	0.73
% Improvement from 2024 - 25						n/a
Incentive rate	£0.903m per unit per 1,000km2 of supply area					
Cap/Collar	Cap and Collar(+/- 0.5% RoRE)					

Table 5.13 PCLs biodiversity - representation plan

5.3 Bespoke performance commitments

5.3.1 Whole life carbon

Our September 2023 business plan submission

Whole life carbon

Data table references:	n/a
Performance commitment description:	Whole life carbon is a bespoke performance commitment that we are proposing for PR24, it is a new PC for PR24. This PC incentivises reducing carbon emissions through the project lifecycle including embedded and operational emissions.
Unit for performance commitment:	Total percentage reduction of tonnes of CO2 e from project baselines

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	n/a	n/a	9%	11%	13%	14%
% Improvement from 2024 - 25						n/a
Incentive rate	£0.281m per %					
Cap/Collar	Cap and collar +0.3% to -0.3% RoRE					

Table 5.14 Whole life carbon PCL - September 2023 business plan submission

Ofwat's draft Determination

Whole life carbon details

5.25 Ofwat removed whole life carbon as a PC at draft Determination. The reasons given were due to the overlap with the operational GHG emissions PC and for definition clarifications such as the material inputs that would be measured and the inclusion of end of life emissions.

Our Representation

5.26 We have reflected on Ofwat's feedback and have submitted an adjusted bespoke PC definition for embedded GHG emissions only, removing the operational elements of the definition. We have also strengthened the detail on the material inputs that would be measured.

5.27 A summary of our response to Ofwat feedback is given in Table 5.15 Summary response to Ofwat feedback.

Ofwat draft Determination feedback	Affinity Water response
This is because the metric used to determine greenhouse gas (GHG) emissions overlaps with our common operational GHG emissions performance commitment particularly in the areas of chemicals and energy usage.	We note the potential for overlap between the two measures. We have therefore removed the operational element of the proposed PC
The proposal also does not make clear what material inputs would be measured to determine GHG emission levels for example which types of capital goods or services.	We have updated our definition to make clear and to align where possible with other bespoke PCs submitted by the industry to allow a level of performance comparison.

Ofwat draft Determination feedback	Affinity Water response
The proposal does not measure end-of-life GHG emissions as is implied by using the terminology 'whole life carbon' which is misleading.	Given the complexity and uncertainty in estimating the end of life emissions, we do not believe it is appropriate to be incentivised for this stage of the lifecycle. As above we have changed the name of the bespoke PC to reflect that this will only cover embedded GHG emissions.

Table 5.15 Summary response to Ofwat feedback

5.28 We have also noted Ofwat feedback to other companies that have been successful with embedded/embodied GHG emissions PCs and have included amendments to our PC definition accordingly.

5.29 We have retained our PC to maintain the link to governmental targets as submitted in our September 2023 submission and have included Ofwat's figures for other embedded emissions PCs across the industry.

5.30 We do not have data for the tonnes of CO_2e expected in sufficiently precise detail to set a PC using absolute tonnes of CO_2e. As we are still developing our capability around embedded carbon emissions, we are yet to forecast our potential emissions for 2025 - 2030. As noted in our September 2023 submission, following encouragement from Ofwat to submit a proposal for embedded emissions we have opted to develop a top-down target using the Climate Change Committee's 6th Carbon Budget approach which requires each individual project to be assessed for embedded emissions. However, it is infeasible at this stage, and therefore a baseline of tonnes of C02 cannot be set as this stage for our total capital programme. We also disagree that it is sensible to set a target on the absolute basis of tonnes of CO_2e at this stage of the investment planning approach. All companies engaging in good asset management practice will continually optimise investment programmes throughout the AMP period to deliver allocative and productive efficiency, as well as to adapt to emerging new requirements that were not present during the price review process. Setting ex-ante targets on tonnes of CO_2e does not recognise the inherent uncertainty and flexibility in delivery profiles and could result in excessive rewards/penalties. We would encourage Ofwat to reconsider the use of tonnes of CO_2e as the industry metric for this bespoke performance commitment.

5.31 In terms of resource efficiency we would complete baseline calculations as we progress through each individual project lifecycle. Unlike other bespoke PCs submitted we have attempted to maintain the broadest scope possible across our capital programme, however this comes at the expense of being able to set a baseline figure in tonnes.As we progress through the projects we will assess embedded emissions and record these figures, these will be subject to third party assurance.

Our Representation plan

Embedded GHG emissions

Data table references:	ADD22
Performance commitment description:	Embedded GHG emissions is a bespoke performance commitment that we are proposing for PR24, it is a new PC for PR24. This PC incentivises reducing carbon emissions through the project lifecycle.
Unit for performance commitment:	Total percentage reduction of tonnes of CO_2e from project baselines

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	n/a	n/a	9%	11%	13%	14%
% Improvement from 2024 - 25						n/a
Incentive rate	Outperformance: £188 per tonne Underperformance £94 per tonne					
Cap/Collar	Cap and Collar(+/- 0.5% RoRE)					

Table 5.16 Embedded GHG emissions PCL - representation plan

5.3.2 Average time properties experience low pressure

Our September 2023 business plan submission

Average time properties experience low pressure

Data table references:	OUT1.30 / OUT2.30 / OUT3.30 / OUT10.75-10.81.
Performance commitment description:	Average time properties experience low pressure is a bespoke performance commitment we are proposing for PR24, and is also one of our existing bespoke commitment for 2015 - 2020. We have agreed a minor change to the reporting of this metric, with previous reporting exclusions removed from the PR19 definition. This PC incentivises the need to improve water pressure for our customers in areas below 15m head and reduce the time that those properties experience low pressure.
Unit for performance commitment:	The average time (Hours:Minutes:Seconds) per property that water pressure is below 15 metres head.

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	08:42:00	01:55:56	01:53:58	01:47:41	01:45:41	01:43:43
% Improvement from 2024 - 25						80.5%
Incentive rate	£0.0165m per minute					
Cap/Collar	Collar -0.125% RoRE					

Table 5.17 Average time properties experience low pressure PCL - September 2023 business plan submission

Ofwat's draft Determination

Average time properties experience low pressure

2024 - 2030 performance commitment levels

	2024 - 25	2025 - 26	2026 - 27	2027 - 28	2028 - 29	2029 - 30
Performance commitment level	n/a	01:52:49	01:45:03	01:35:57	01:29:46	01:24:13
% Improvement from 2024 - 25						n/a
Incentive rate£	£0.03m per minute					
Cap/Collar	Collar -0.5% RoRE					

Table 5.18 Average time properties experience low pressure PCL - Ofwat's DD

Our Representation

5.32 We have removed the low pressure bespoke PC on the basis that:

1. It disproportionately penalises the company on a measure where there is considerable uncertainty in the comparability of industry data
2. Affinity Water is the only company in the industry to receive an under-performance only bespoke PC, and Ofwat has provided no evidence to suggest that we are the only company to require such special treatment

3. The overall balance of risk and return for Affinity Water's ODI package is significantly skewed to the downside, more so than any other company in the industry, and removal of this bespoke PC contributes to addressing the systemic risk issue
4. The alternative approach Ofwat has used to calculate a performance target lacks statistical credibility and does not reflect the evidence provided by the company in the business plan submission as to what is stretching but achievable performance

5.33 We have been unique in the industry in developing an under-performance PC in our outcomes package and feel that our engagement with the process has resulted in a worse outcome than if we had not engaged on this issue. We do not have comparable industry data on low pressure and we do not believe that we are a true outlier on this measure, only that we have invested in higher quality data and network visibility.

5.34 As described in our September 2023 submission, this leads to a position where we are the only company in the industry that are exposed to this risk and are the company with the largest negative ODI skew in the industry despite being an upper quartile performer on overall performance measures.

5.35 For these reasons we have removed low pressure from our outcomes package to bring us in line with the rest of the industry. This decision is further supported by serious concerns regarding the process that has been followed in setting both PCL and ODI levels.

PCL

5.36 A PCL has been set at draft Determination which expects significant and undeliverable stretch on performance. This has been derived using correlation analysis on four data points with an associated R squared of 0.1, which demonstrates the correlation is simply not robust enough to be relied on for setting targets. No allowance was made for outliers, for example data from 2020-21 which was heavily affected by Covid demand - inclusion of this data point at equal weighting materially changes the shape of Ofwat's curve and the subsequent PCL.

5.37 We consider that this approach should have been rejected, however this equation is then extrapolated through seven periods to gain a PCL for 2029 - 30. This is not a realistic or robust method to set targets and that Ofwat has applied a 50% weighting to this target suggests Ofwat has limited confidence in its own methodology.

5.38 Our September 2023 submission PCL was built up using an appropriate baseline, with our expected interventions applied, both general, systemic improvements and targeted asset investment to overcome specific problems to quantify and profile real and deliverable benefits.

ODI

5.39 We provided robust evidence to the customer valuation of low pressure both in our September 2023 submission and in response to Ofwat queries. As per the Quality and Ambition Assessment, Ofwat's Determination was that our customer research achieved the required quality standard.

5.40 In 'PR24 draft determinations: Affinity Water - Outcomes appendix [35] it states: "Affinity Water's proposed ODI rate is very low relative to its return on regulated equity (RoRE), which risks under-incentivising the company to improve its performance. We instead set the ODI rate using the RoRE methodology used to derive the indicative ODI rates for common performance commitments. This approach creates an ODI rate with the intended financial impact while reflecting customers' preferences."

35. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Affinity-Water-Outcomes-appendix.pdf

5.41 However, the draft Determination ODI rate does not reflect customers preferences as evidenced in our high-quality customer research. Moving to a % RoRE ODI setting devalues the inputs of our customer and contradicts the underlying principle of how ODIs are set.

5.42 Our September 2023 submissionvaluation sets a 24 hour period of low pressure at the value of £17.48 per customer, which is roughly equal to one month's average bill for our customers. This is a reasonable valuation and reflects an appropriate position, supported by customers.

5.43 Ofwat have moved to a %RoRE position, however we note there is no supporting evidence to where the 0.5%RoRE has been derived from and why is this figure has been selected or how it reflects customer preferences.

5.4 Incentive rates

5.44 We have serious concerns with the methods adopted by Ofwat to calculate ODI incentive rates in the draft Determination. We have provided an alternative approach in order to:

- **remove the disadvantage** to smaller companies in the Large and Small RCV groups. As described in Grant Thornton's "A review of Ofwat's PR24 approach to ODIs [36]: Under the current ODI rates, some companies have a level of equity at risk significantly above or below the level set by Ofwat. Ofwat should consider the actual equity at risk for companies, and the above tradeoff further"
- **correct the issues** with customer contacts about water quality and serious pollution incidents which currently give stronger penalties for higher performing companies
- deliver a **proportionate ODI rate for discharge permit compliance** which reflects the environmental risk of a non-compliance and is appropriate for WOCs that have very few permits compared to almost all WASCs

5.45 To deliver this, a more appropriate calculation for ODI rates has been applied, that

1. **Removes the grouping of companies** in ODI calculations as this only creates an illusion of parity of ODI rates, whilst a similar £ figure may be created it is not proportionate to the company size and therefore offers significant benefit to any company over the median. This is also one of the key drivers in the vast difference in RoRE ranges between Affinity Water (the largest RoRE risk range) and Thames Water (the second smallest RoRE risk range). Ofwat's conclusion that "setting ODI rates at a higher level but with greater balance than at PR19, including grouping companies by size to achieve consistency in both rates and risk"[37] is categorically not achieved with a very wide range of RoRE at risk based on the draft determination ODI rates. For the majority of PCs the ratio between highest and lowest % RoRE at risk is at least 3:1 with the highest variance at a ratio of 6:1.
2. **Corrects calculations penalising good performance**. Ofwat's model shows that for customer contacts about water quality and serious pollution incidents, higher performing companies receive higher penalties. To remove this perverse effect, we have taken a median of all companies' performance used in the respective calculations and then following the existing methodology, as set out in point 1.
3. Maintains Ofwat's methodology in setting out that PR24 incentives should be **at least as strong as** PR19. Following the calculation steps, two PCs (CRI and WSI) would be below this level. They are then increased to the PR19 level.
4. Updates the **discharge permit compliance calculation** to take the median WASC rate per incident in % RoRE terms and apply across all water only companies. We have also corrected the normalisation factor, as we have given up 13 permits in the last few years, and the ODI rate should only be calculated on the current permits held not a historical average as per Ofwat's methodology.

36. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/Grant-Thorntons-Review-of-Ofwats-approach-to-setting-ODIs-at-PR24-2.pdf
37. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/PR24-draft-determinations-Delivering-outcomes-for-customers-and-the-environment.pdf

Process

ODI model adjustments : all PCs except DPC

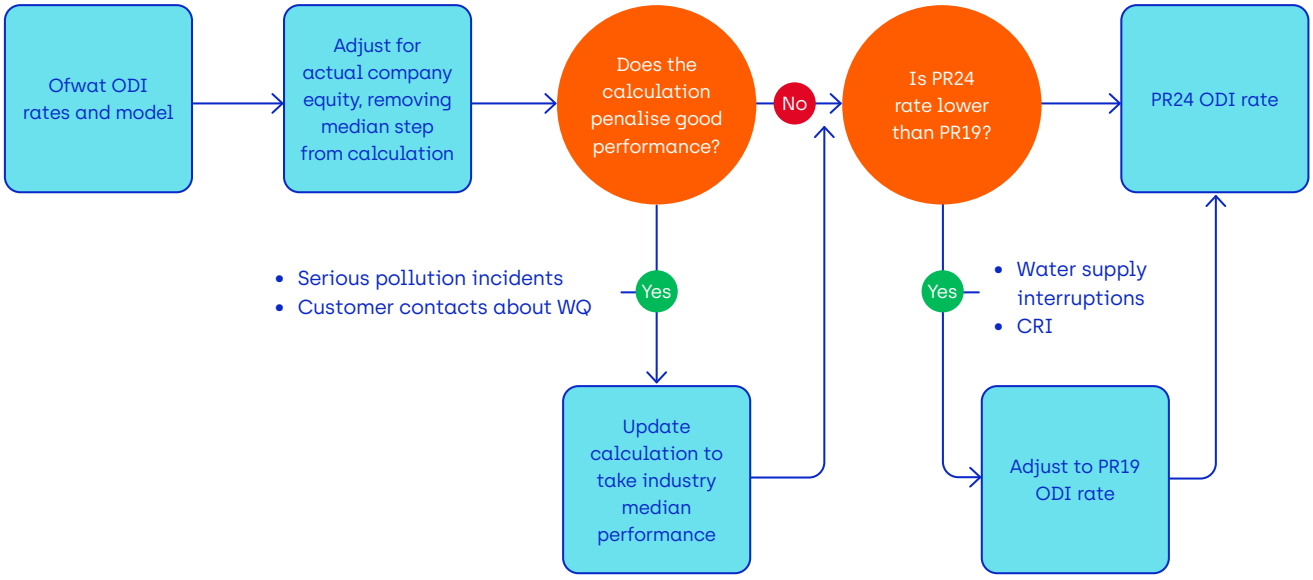


Figure 5.3 ODI model adjustments : all PCs except discharge permit compliance

5.46 These changes create fairness for the whole industry.

5.47 For Affinity Water, the following rates will apply, and have been submitted in our updated data tables:

PC	DD ODI	AFW ODI (Remove median step)	PR19 Rate	Median Performance	Discharge Permit Compliance	AFW DD
	£m	£m	£m	£m	£m	£m
WQ	25.687			17.440		17.44
CRI	1.247		0.849			0.849
WSI	0.663		0.525			0.525
SPL	2.113			1.080		1.080
DPC	1.525				0.156	0.156
LEA	0.909	0.639				0.639
PCC	0.740	0.432				0.432
NHH	0.254	0.199				0.199
MRP	0.128	0.113				0.113
UNO	3.817	2.605				2.605

Table 5.19 Incentive rates

5.48 On completion of this analysis, whilst the majority of ODI rates appear appropriate, we note that the ODI rate for customer contacts about water quality is very high and equates to over £4,000 per contact. This creates a disproportionate financial risk to the company for under-performance and to customers for out-performance. We note that Ofwat agree with this their letter: "Discharge permit compliance and Contacts ODI rates General Response" (August 2024). We support Ofwat's decision to review and adjust this ODI rate.

Example

5.49 To demonstrate the issue and solution we provide the example of leakage, however the same principle exists across all PCs. This method replicates the visuals used in the Grant Thornton report: "A review of Ofwat's PR24 approach to ODIs" [38].Leakage shows a common ODI rate for the 'large' RCV companies of £0.909m per Ml/d, but shown as a % of RoRE, there is clear range between the respective rates. Affinity Water is at 0.85% of RoRE at risk, compared to Ofwat's intended 0.6% RoRE at risk.

Leakage – draft Determination

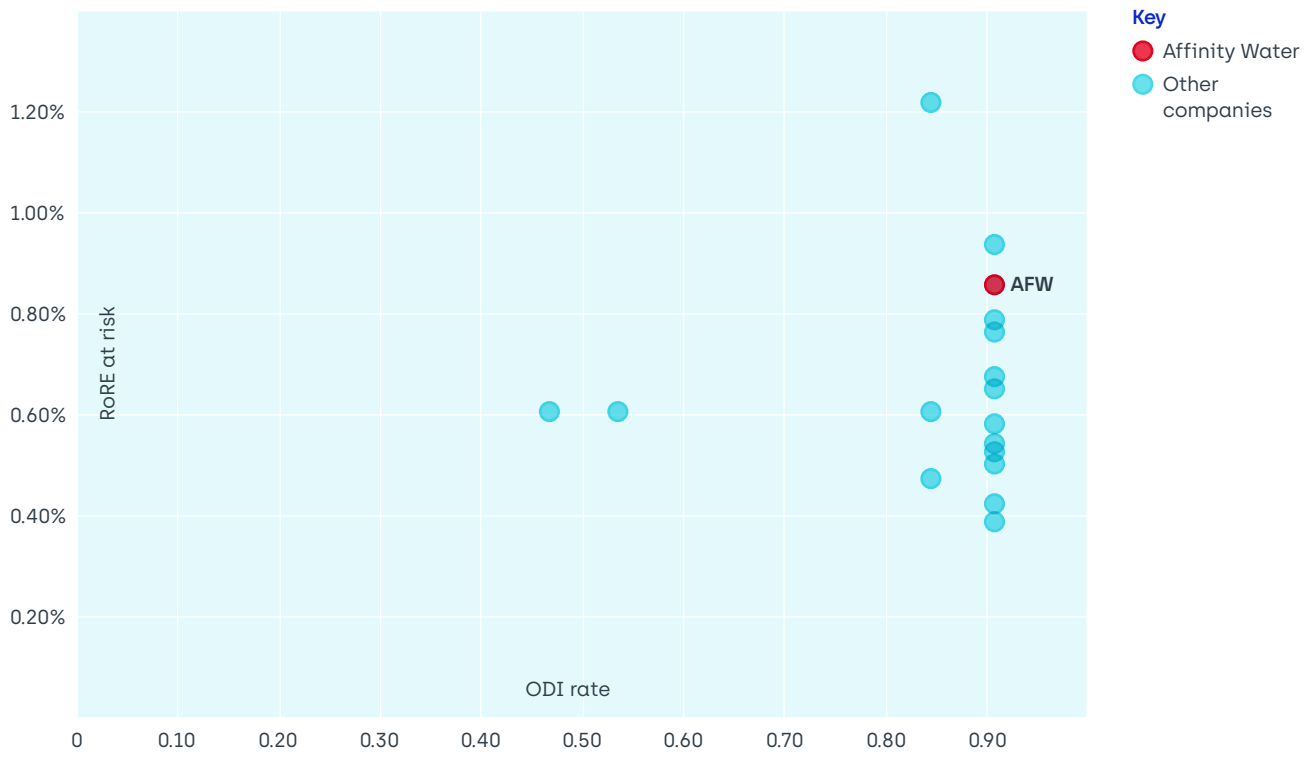


Figure 5.4 Leakage: draft Determination

5.50 Following our proposed changes, the same graph shows parity between all companies and meets Ofwat's desire to set fair ODIs across the sector.

38. https://www.ofwat.gov.uk/wp-content/uploads/2024/07/Grant-Thorntons-Review-of-Ofwats-approach-to-setting-ODIs-at-PR24-2.pdf

Leakage – draft Determination response

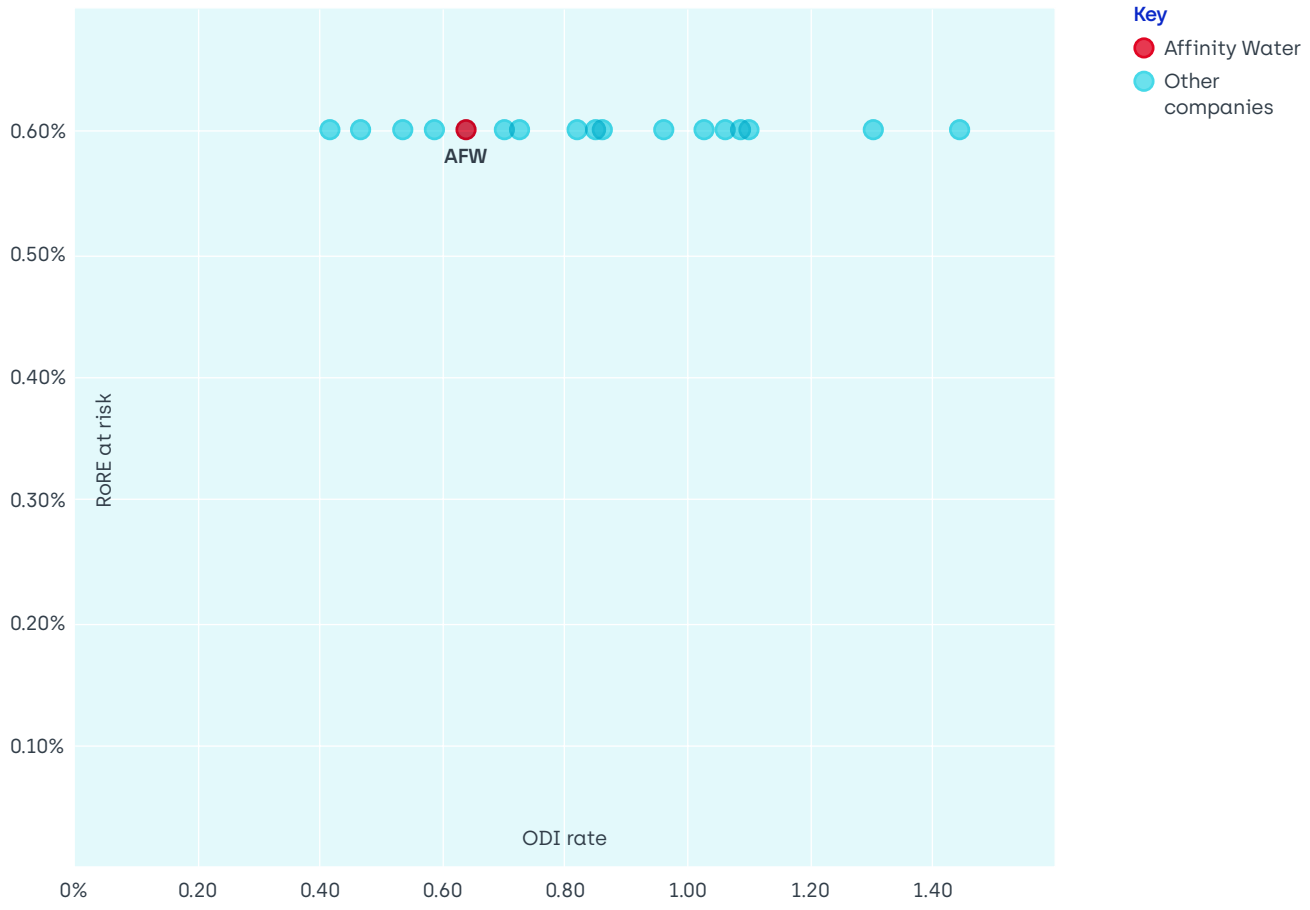


Figure 5.5 Leakage : draft Determination response

Discharge permit compliance

5.51 Discharge permit compliance (DPC) has been treated differently as the current methodology sets very high rates per incident for companies with a low number of permits. For a water only company, discharge permits are often in place for running to waste of untreated water or partially treated water - this is a common process in water treatment, especially during a site restart where the discharge of water is required to ensure only high quality water progresses through the treatment process and is supplied to customers. Returning this water to the environment will have negligible negative impact.

5.52 We also note that the other compliance measure (CRI) includes significantly more nuance than the pass/fail that comes with DPC, with a score generated based on the parameter, impact and an assessment of response from the DWI. Due to the nature of discharges, the environmental impact is likely to be very low and a non-compliance could even just be a technicality, such as a paperwork issue, with no environmental impact at all. We consider that a penalty in excess of £4m per incident is unreasonable and neither reflects the environmental impact of a water only company discharge to the environment, or the priority or valuation that a customer places on the event. We would encourage Ofwat to coordinate with colleagues as the Environment Agency to cross check assumptions about the appropriate size of penalty for water only discharge consent failures.

5.53 We note that Ofwat's letter: "Discharge permit compliance and Contacts ODI rates General Response" (August 2024) recognises the issue with this ODI rate. However the proposed solution would still result in a penalty of 0.5% RoRE (£4.31m) per incident, which remains disproportionate with the environmental risk and to the ODI risk facing a typical WASC for a single incident.

5.54 To provide more context around what a discharge consent failure is for a water only company, we have provided a case study from a recent event at Iver, Affinity Water's largest treatment works, below.

Discharge permit compliance - example

Background

In September 2019, we were informed by the Environment Agency of a breach to our discharge permit at Iver WTW. We have a discharge permit in place at this site which allows a chlorine reading of up to 0.2mg/l. Water from this discharge point enters a brook adjacent to the site.

For context, water from Iver is supplied between 0.6 and 0.8mg/l.

The discharge permit non-compliance was at a chlorine reading of 0.22mg/l. At this level there would be no environmental impact whatsoever with levels significantly below that of drinking water.

Conclusion

This example shows the sensitivity of discharge permits and how different they can be from an impactful pollution incident. A penalty of £4.31m is disproportionate to the risk of a permit non-compliance and, without the mechanism to assess severity and consequences of a breach, must be reconsidered.

Discharge channel into the brook

Figure 5.6 Discharge permit compliance

5.55 Our representation is a new methodology for discharge permit compliance which will create a fairer approach to incentivisation and appropriately reflect the environmental risk associated with operating under discharge permits.

ODI model adjustments : discharge permit compliance

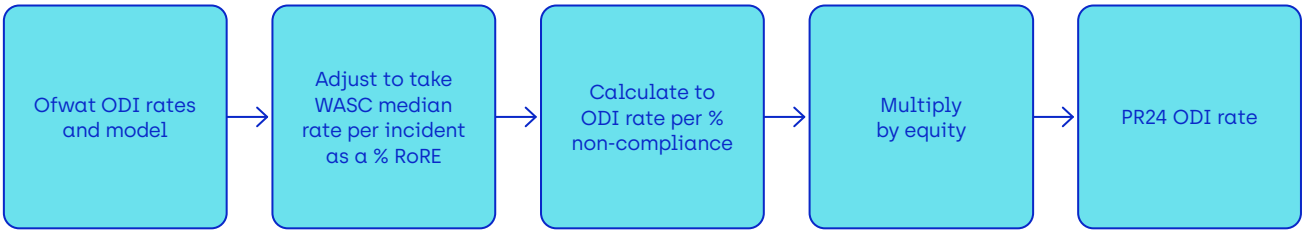


Figure 5.7 ODI model adjustments : discharge permit compliance

5.56 Using our methodology we have calculated the following rates for Water Only companies:

Company	Performance range	Equity - water	Equity used	Starting RoRE allocation	Equity at risk	Initial ODI rate	Number of discharges	RoRE per incident	Penalty per incident	Penalty per % non compliance
	P10	£m	£m	(customer prefs)	£m	£m	(3yr average)		£m	£m
AFW	2.528	861.62	861.62	0.5%	4.30	1.70	31	0.058%	0.503	**0.156**
BRL	2.528	314.28	314.28	0.5%	1.57	0.62	12	0.058%	0.184	**0.022**
PRT	2.528	115.30	115.30	0.5%	0.57	0.22	6	0.058%	0.067	**0.004**
SEW	2.528	790.55	790.55	0.5%	3.95	1.56	76	0.058%	0.462	**0.351**
SSC	2.528	281.24	281.24	0.5%	1.40	0.55	29	0.058%	0.164	**0.048**
SES	2.528	167.16	167.16	0.5%	0.83	0.33	5	0.058%	0.098	**0.005**

Table 5.20 Proposed incentive rates

5.57 Discharge permit compliance shows a number of companies well in excess of the 0.5% RoRE at risk from Ofwat and a very wide range between individual companies.

Discharge permit compliance – draft Determination

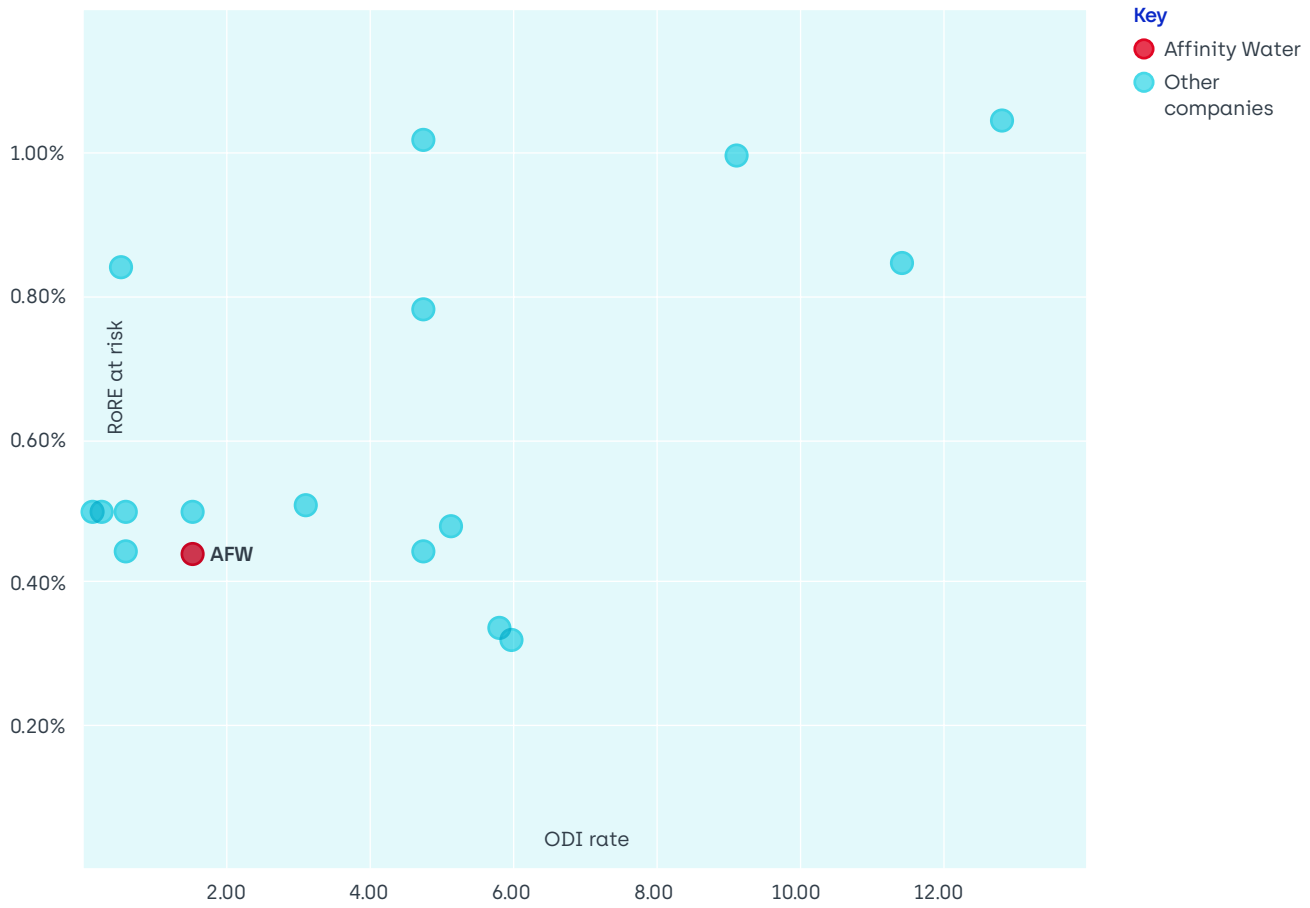


Figure 5.8 Discharge permit compliance : draft Determination

5.58 The updated methodology shows an equal position for WASCs, in line with Ofwat's 0.5% of RoRE at risk and an equal % RoRE at risk per incident for WOCs set at the average WASC level.

Discharge permit compliance – draft Determination response

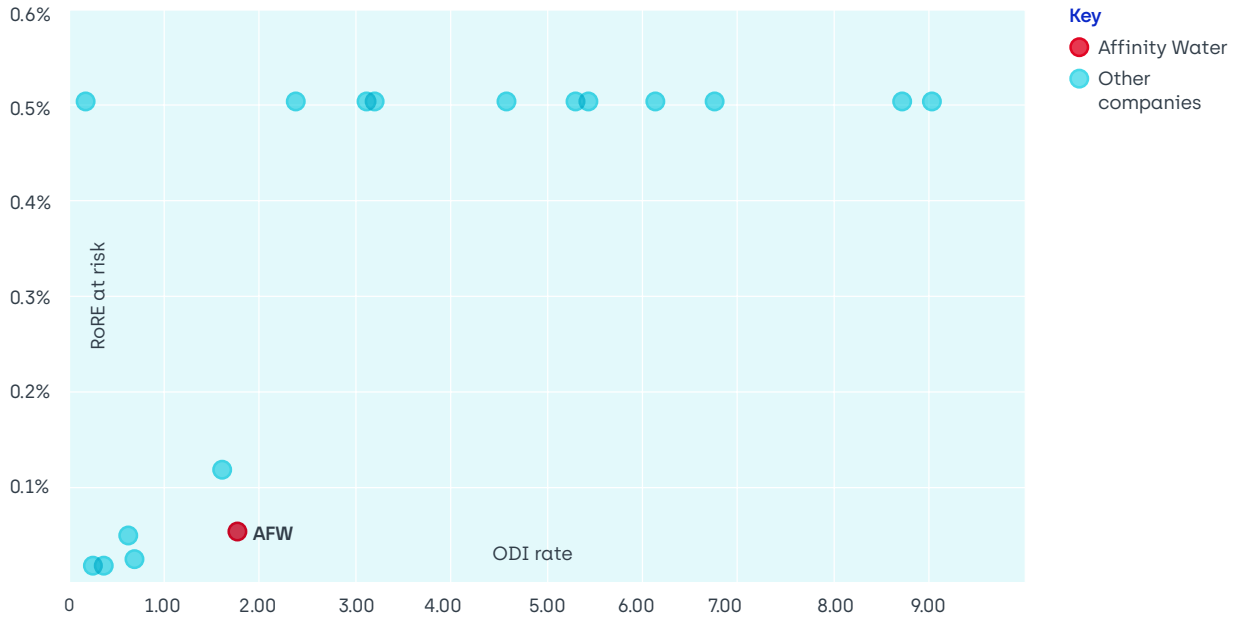


Figure 5.9 Discharge permit compliance : draft Determination response

06. Reconciliation adjustments

6.1 Reconciliation mechanisms

6.1 We have updated our reconciliation models for 2023 - 24 outturns, our updated inflation forecasts and for updates to our forecasts of 2024 - 25 outcomes. All of the models we are updating for this representation are appended [39] and reflected in updated tables PD11 & PD12 (appendix AFW105 - Data tables v7 August).

6.2 In a small number of cases we do not wish to represent on Ofwat's draft Determination reconciliation outcomes, so have not produced updated models for the following items:

- tax reconciliation
- gearing outperformance sharing mechanism
- cost of new debt

6.3 There are three items where updates are most material and we discuss those below.

6.2 Strategic Resources Options reconciliation

Overall

6.4 The draft Determination proposes SRO reconciliation amounts -£[44.087]m in 2017 - 18p including financing. Our view differs from this because we now have better evidence on scheme expenditure to end AMP7 drawn from the actuals reported in 2023 - 24 and forecasts for 2024 - 25. We also have greater certainty on gated progress. We have also reviewed our operation of the reconciliation model to account for the revised reconciliation model released in April 2024, revised guidance, explanations published as part of the models supporting the draft Determination and the workshops hosted by RAPID. We attach as appendix AFW126 - Strategic regional water resources reconciliation our revised SRO reconciliation model to provide the full details of our SRO reconciliation across each scheme.Table 6.1 SRO reconciliation amounts incl. financing £m 17/18p gives a high level summary.

	Ofwat DD	Our Representation
	(£m) [1]	(£m)
Water Resources RCV	-19.113	-14.056
Water Network Plus RCV	-4.454	-5.173
Water Resources Revenue	-12.719	-9.437
Water Network Plus Revenue	-7.801	-9.059
Total	-44.087	-37.726

Table 6.1 SRO reconciliation amounts incl. financing £m 17/18p

1 all £m numbers are in a 2017 -18 price base

39. (appendices AFW115, AFW116, AFW117, AFW118, AFW119, AFW120, AFW122, AFW124, AFW125, AFW126, AFW127, AFW128)

Evidence of expenditure

6.5 Table 6.2 Evidence of expenditure summarises actual expenditure to 2023 - 24, evidenced in APR and our projection of year 5 expenditure. Our year 5 forecast reflects the expenditure projected by scheme project managers, which itself reflects spending expected and already spent or committed YTD. The total expected expenditure in our reconciliation model is consistent with expected Enhancement projected in our updated tables.

	Actuals to end year 4 [1]	Forecast year 5 [2]	Total
	(£m) [3]	(£m)	(£m)
Total	21.618	13.940	35.558

Table 6.2 Evidence of expenditure

1 Table 4.F APR
2 Total as CW3.58
3 all £m numbers are in a 2017 -18 price base

6.3 Land Sales reconciliation mechanism

6.6 We completed our September 2023 business plan submission on the basis of intended land disposals as understood in June 2023. We anticipated £25m disposals proceeds over the 2020-25 period and which have been reflected in our draft determination. In outturn we have not achieved the disposals anticipated for year 4 as evidenced through reported proceeds in our APR24 Table 2L.1 In addition, we have reviewed our land disposal plans for 2024 - 25, revising them downwards and expect to accomplish £3.7m in that year, bringing the 2020 - 2025 total to £6.5m. We include a revised land sales reconciliation model appendix AFW124 - Land sales which updates the disposals position for year 4 actuals and revised year 5 forecast. We request that Ofwat use the revised model for its final determination.

6.4 Outcome delivery incentives reconciliation

6.7 We propose £15.9m revenue adjustment for ODIs in 2017 - 18 prices, which comprises actuals for 2023 - 24, our revised forecast of performance outcomes in 2024 - 25 and end-of-period adjustment for PCC including Covid adjustments. We also project that we will have achieved compliance with reporting methodology so we project to collect the deferred leakage rewards from prior years. These reward could not be taken in period so far, pending full compliance with reporting methodology. Table 6.3 Proposed ODI incentives analyses our proposed ODI incentives.

	2020 - 21	2021 - 22	2022 - 23	2023 - 24	2024 - 25
	£m	£m	£m	£m	£m
WRes ODIs 2023 - 24 Outturn excl PCC				0.203	
WN+ ODIs 2023 - 24 Outturn excl PCC				-4.478	
Retail ODIs 2023 - 24 Outturn excl PCC				0.159	
WRes ODIs 2024 - 25 F'cast excl PCC					0.286
WN+ ODIs 2023 - 24 F'cast excl PCC					0.044
Retail ODIs 2023 - 24 F'cast excl PCC					0.000
WR PCC Penalty, with Covid sdjustment	-0.260	-0.538	-0.858	-0.806	-1.405
WN+ PCC Penalty, with Covid adjustment	-0.607	-1.254	-2.003	-1.881	-3.277
Deferred Leakage reward reclaim (WN+)			0.439	0.333	

	2020 - 21	2021 - 22	2022 - 23	2023 - 24	2024 - 25
	£m	£m	£m	£m	£m
Total WR					-3.378
Total WN+					-12.684
Total Retail					0.159
Total					**-15.903**

Table 6.3 Proposed ODI incentives

07. Customer affordability

7.1 Customer affordability summary

Our September 2023 business plan submission

In our September 2023 submission we set out our affordability strategy which is based on ensuring our bills are as low as possible, providing customers with tools to manage consumption and hence bills, and providing support for those who struggle to pay their water bills.

Ofwat's draft determination

We are pleased that we passed the quality test in this area and were assessed as showing 'moderate' ambition in our plan. In the customer summary of our draft Determination, we note that Ofwat stated that:

"Affinity Water's shareholders will contribute £0.3 million to hardship funds and £1.49 million matching payments which are made by customers repaying debts. We propose to hold Affinity Water to account for these contributions through ourmonitoring and reporting, and through the customer-focused licence condition."

We have subsequently clarified through the query process that these amounts were derived from our data table SUP15, lines SUP15.32, SUP15.33, SUP15.36 and SUP15.37.

Our representation

We have accepted some of Ofwat's challenge on enhancement investment while for several key areas, we are proposing a number of representations to reinstate our original investment plans. In addition, new requirements from the DWI around treatment of Tier 2 sites for PFAS removal has added a significant amount (£149.1m) to our enhancement investment.

The result of these representations, and a number of other corrections and adjustments, and the increase in WACC, means that our customer bills are now predicted to rise by 25% between 2025 and 2030, up from 13% in our September 2023 plan. We recognise that this proposed increase may cause additional affordability concerns for some of our customers, and we commit to fully using the agreed cross subsidy, and will further increase our efforts to identify those who would benefit from being on a social tariff, and proactively identify customers who would benefit from one off credits to their water bills.

We clarify that while we agree with the amounts shown in the SUP15 data table, these schemes for hardship funds and matching customer payments are not funded by shareholders. Instead, these are part of the customer agreed cross subsidy that also funds our social tariffs. The amounts available for these schemes are as set out on the data tables, and it is important to note that actual amounts will be dependent on the extent of further uptake of social tariffs by customers, which defines the surplus available for these schemes.

Customer bills 2025 - 2030

7.1 In developing our September 2023 business plan submission, we ensured our strategies and plans were based on our customers' priorities, the benefits we envisaged delivering through our investment were informed by our customers' willingness to pay, and delivery incentives calibrated to customer valuations.

7.2 We developed and implemented a rigorous internal review process and independent third-party audit and challenge process to ensure that only costs that were necessary and deliver value to customers were included in our plans.

7.3 Our 2025 – 2030 plans were set within the longer-term requirements of our region as articulated in our Long-Term Delivery Strategy which saw bills linked to enhancement investment increase by smaller amounts over time, as key enhancements are delivered and then pass into normal operational use.

7.4 We were pleased that when business plans were published our bill increase was the second lowest increase, from the second lowest base bill for water services. Given our location in the south-east of England, with significant growth targets and a high level of environmental ambition in a water stressed area, this demonstrated our commitment to ensuring that no customer pays more for their water services in our area than necessary.

7.5 Since business plan submission in 2023, we have seen significant pressures on that customer bill profile. Water quality requirements continue to evolve with the need for us to introduce extensive treatment to remove PFAS from drinking water.

Real Average Customer Bill Movements FBP to Ofwat DD & DD Response

£/Customer in 2022/23 CPIH Year Average Price Base

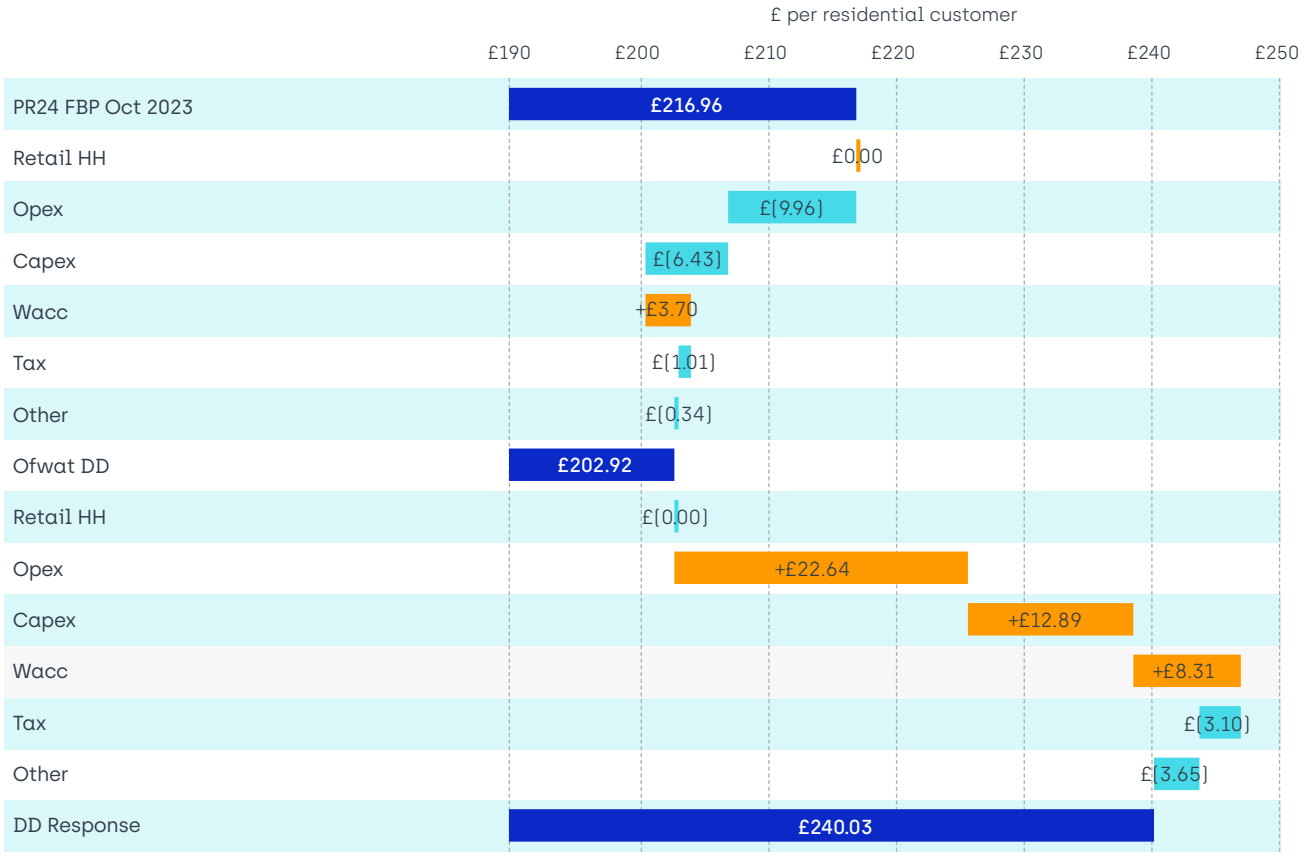


Figure 7.1 Average bill movements

7.6 We recognise the difficulties of a further proposed bill increase at this stage of the price review process. All the investment and costs in our representation plan are necessary and supported by customers.

7.7 We have engaged extensively with our customers throughout the development of our plans and have adapted and changed our plans as a result of feedback. Given the movement in bill profiles, we recognised the importance of carrying out further customer engagement and affordability support work to support our customers. Given the limited time available to develop representations, we have engaged with customers through our

Qualtrix platform which is a powerful engagement tool which allows us to turn customer feedback into actionable insights. We gained insights from 546 customers on our revised plans and associated bill profiles, and we are committed to continue working with our customers to develop further plans for affordability and vulnerability support ahead of bill increases in 2025.

7.8 Customers are aware of the emerging importance of removing PFAS from water, with 34% of customers aware and a further 33% vaguely aware of the issue. This also ranked highly (third) in customers' priorities and 63% liked our proposed solution quite, very or extremely well.

7.9 When asked about the bill profile as a result of this addition to our plan and the other changes in our Representations, 71% of customers thought it was a little or a lot more than they were expecting.

7.10 We are cognisant that our water bills represent one half of the bill from a customer perspective, with the majority of our customers wastewater providers being either Anglian Water or Thames Water. We have not been able to factor in revised bills from those companies within the short timescales.

7.11 Our plan represents excellent value for customers, delivering high quality drinking water to over 3.7 million people for 66p per day. We remain committed to supporting customers who struggle to pay their bills.

Affordability strategy

7.12 We are very aware that some customers struggle to pay their water bills, and this has become particularly acute in recent years with the Covid pandemic, swiftly followed by a cost-of-living crisis, affecting household budgets. We developed and set out our affordability strategy in our business plan, and we were pleased that Ofwat assessed us as having moderate ambition given the context that only one company was assessed as having high ambition.

7.13 Our affordability strategy is summarised below, and our full affordability strategy is set out on pages 59 to 63 in our September business plan submission [40].

40. document AFW01 found at https://www.affinitywater.co.uk/docs/PR24/Business_plan/AFW01.pdf

Affordability strategy 2025 -2030

7.14 In developing our representations, we have continued to challenge ourselves through the lens of customer affordability. We provide an update of new and additional actions we have taken since our business plan submission, and have focused on the first two layers of our affordability strategy as these are actions within our control, and we are strongly committed to taking all mitigation actions possible to help customers with affordability issues before we ask them to take action themselves.

Affordability strategy layer 1: Bills as low as possible

7.15 We are the benchmark company for base investment, which provides us with the confidence that our costs are efficient. We have revised our investment plans, accepting Ofwat's efficiency challenge for large parts of both our base and enhancement investment programmes, while making well-evidenced representations on a small number of key areas in our enhancement investment.

7.16 Where we have needed to increase investment due to new requirements, primarily to address PFAS levels in drinking water, we have sought third party assurance that the solutions and costs we are putting forward are the most efficient possible. Should investment not be required, we will hand that investment back to customers through either PCDs or the enhancement cost sharing mechanism.

Affordability strategy layer 2: Fairer bills through tariff innovation

7.17 We have been an enthusiastic and committed supporter of the social tariff from its inception in the water industry. We have the second highest take up of our social tariffs as a percentage of our customer base.

7.18 We recently re-tested customer willingness to pay and gained support for a £9.50 cross subsidy per customer. We have used this during 2023 - 24 to support 101,150 customers through the LIFT tariff, and 30,000 customers with a targeted £50 one off credit to their bills. By the end of 2024 - 25 we anticipate this will have increased the number of customers on the social tariff to 114,000 and a further 60,000 will have a one-off credit applied.

7.19 Although we have a mandate from customers for a maximum cross subsidy of £9.50, we have yet to fully apply this. **As a result of the subsequent bill rises in our draft Determination representation, we commit to full utilisation of the maximum cross subsidy from 1 April 2025**. We will also increase our efforts to identify customers who might benefit from help with their bills. This will be both widening our breadth and depth of communications to customers on what help is available, so customers can self-identify as being eligible, and also in proactively identifying customers who would benefit.

7.20 We have reprofiled the number of customers we anticipate helping in this way, starting at the current level of 60,000 and reducing by the same number as the increase in uptake of LIFT each year. The net effect is that we now propose to increase the total number of bill credits from 150,000 over the period 2025 - 2030 to nearly 162,000.

	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Line SUP15.38 original profile	0	0	0	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Line SUP15.38 new profile	0	0	0	30,000	60,000	.49,000	38,000	30,000	25,000	19,000

Table 7.1 Proposed number of one-off bill credits

We note that Ofwat does not require table SUP15 to be resubmitted with the Representations.

Our recent data sharing agreement with Southern Water means that customers who receive the Essential Tariff through Southern Water are now automatically assigned the Lift tariff without the need for any further applications. We already do the equivalent for our customers whose wastewater is supplied by Thames Water and Anglian Water.

Tariff trial : Case study

In October 2023, we became the first water company in England to trial a new-style tariff for how customers are charged based on how much water they use. We designed our rising block tariff, WaterSave, with a focus on affordability and over the two-year trial, we aim to see if it makes bills more affordable for our customers and to understand if it is a fairer way to pay.

Since the start of the trial, we have been gathering and monitoring a range of data - broadly around the areas of affordability, consumption, customer contact and sentiment. As we designed our trial to include a test group and control group, we are able to measure results within the test group and by comparing the test and control. At time of writing, we are only nine months into our data collection and therefore it is too early to draw any conclusions, however we have reported some tentative results that we will continue to monitor.

At the start of the trial, we estimated that at least two out of three customers would be better off on the WaterSave Tariff if usage remained unchanged. In January 2024, following the first set of quarterly meter reads, when we extrapolated the reads to the full year, the data showed that we could expect more like five out of six customers to see some reduction to their clean water bill. Whilst this was an early result that we have taken with caution, it did indicate that our tariff design was working as intended by supporting affordability improvement.

At the mid-point of the trial in October 2024, we will engage an accredited third party to conduct qualitative research with customers in the test group. Through techniques such as in-depth interviews and focus groups, we aim to get a detailed understanding of customer attitudes towards the new tariff. Whilst our regular reporting data will provide us with key evidence of how customers are responding to the tariff, we recognise that 'lived experience' qualitative data will be equally - if not more – telling in terms of customer acceptability and fairness. The findings from this customer research will help us to assess if the new tariff has met the aims of improving affordability and offering a fairer system of charging. The research will form a significant part of our evidence base and will be a key factor in our decision making at the end of the trial.

If the trial produces sufficient evidence of affordability improvement, we will explore extending the new tariff to more customers. Our data may indicate that adjustments to the current tariff design are needed, and we will be led by these findings. With regards to other tariff trials, we are currently reviewing the offering to Low-Income Fixed Tariff (LIFT) customers with the view to increasing the discount and/or extending the tariff to more customers in 2025/26. We are also considering a non-household seasonal tariff trial and are eager to see the findings and learnings of others in the industry who have embarked on business market trials.

Distribution of customers by percentage change in bill on WaterSave v standard tariff
Number of customers

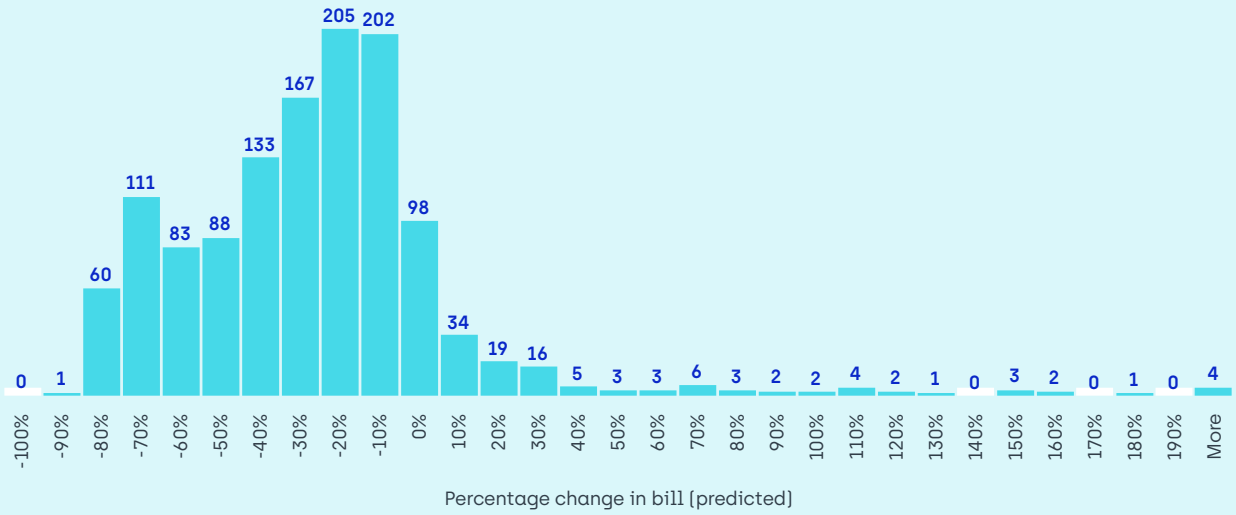


Figure 7.2 Distribution of customers by percentage change in bill

Debt Support Schemes

7.21 We provide debt support schemes to support customers who may be finding it hard to pay their water bill due to financial hardship or a recent change in circumstances. We help clear the debt for customers and give them a fresh start and a chance to get back into regular paying behaviour.

7.22 We will be enhancing this support, adding to our debt support schemes a 'payment matching' scheme. Where a customer is able to pay and maintain their payment plan for their current usage, and make a contribution towards the arrears, at the end of two years we will write off any remaining arrears on their account.

Community Funding

7.23 We have a partnership with National Debtline and have a joint branded help page. We support National Debtline each year with a donation for them to continue their work. We also support Stepchange with our fair share contribution and have recently provided a donation to CAB to support us with the training for their offices for the water assistance payment.

7.24 We also support local projects each year. We select projects where we can build relationships and help us to raise awareness with harder to reach communities. As we expand our strategic approach to 'Environment, Social and Governance' (ESG) activities, our partnership approach will be guided by the where we can deliver the best benefits to customers and communities.

Enhanced communications of our assistance available to customers

7.25 We are continually searching for new ways to identify and reach customers who may benefit from the affordability help that we can provide. We have set out some recent examples below. We also intend to proactively contact all the households that have told us that they depend on water, or are of pensionable age, to ensure that they are on the most appropriate tariff and provide guidance and assistance on water saving activities.

7.26 Customer Communications - We provide extensive training for our customer contact centre agents, such as providing case studies of customer personas, customer testimonies, colleague videos and trusted partner testimonies. This helps our colleagues spot potential opportunities to proactively assist customers with affordability issues.

7.27 Use of Data - We are using our data proactively to identify hotspots in our region where we believe there is a high level of deprivation but low awareness of support. We use publicly available Indices Of Multiple Deprivation data together with our own data to identify cohorts of customers that we wish to support. Our first work in Luton has identified over 6,500 households that we have supported with either reduced bill tariffs or cost of living support with a one off payment of £50 to the bill. We will continue to identify hotspots in this way on an ongoing basis.

7.28 Community Events - We provide a face-to-face presence at events in the community, for example the regular surgeries that we hold at Borehamwood Foodbank, where clients who are using the foodbank can also have their water bill checked to ensure that they are on the right tariff and are referred for the water assistance payment.

7.29 We also attend various community events in person which are focused on cost of living or health and wellbeing, as this gives up the opportunity to raise awareness of Priority Services register, affordability support and water saving.

Projects under consideration

7.30 We are continually developing new ways to help customers and to proactively identify customers who may benefit from help.

7.31 We are exploring including in our universal metered programme customer journey a check with DWP to determine if customers would benefit from our reduced bill tariff at the time the meter is installed. This means customers can benefit from the reduced bill immediately and we will also ensure that where their consumption indicates that the tariff is not beneficial for them, they will be moved to the standard volumetric tariff.

7.32 We are working with Transunion to explore affordability markers that can support us to tailor how we offer support to customers and to proactively identify households at risk of falling into debt.

7.33 We are developing a vulnerability panel that can help guide us in how we support customers in financial and non-financial difficulties. This can help us to ensure that the actions we take benefit the communities as we intended.

7.34 We are exploring how we can improve our signposting tools to offer customers support with a wide range of issues that may be impacting their lives.

7.35 We are exploring ensuring that all customers who have a medical dependency on water receiving a home water efficiency visit to offer water saving devices.

08. Board assurance statement

8.1 Board assurance summary

8.1 The Board of Affinity Water ("the Board") provides this Board Assurance Statement here setting out how the Board has overseen and governed the preparation of the Representation to ensure that it is high quality and addresses the key issues arising from the PR24 draft Determination.

8.2 In providing Representations on the draft Determination, the Board has maintained strategic oversight and leadership of all areas of development and sign off. The Board has maintained the assurance framework that was previously established for both the PR24 business plan and the Long-Term Delivery Strategy. This approach was recognised in Ofwat's Quality and Ambition Assessment, where Affinity Water passed the five tests for data, information and assurance.

8.3 The Board's leadership, governance and assurance has allowed it to satisfy itself that all elements of the Representations are of a high quality and deliverable.

Summary position

8.4 In preparing the Representation, the Board has carefully considered the implications of the significant gap between the company's 2023 business plan and the draft Determination.

8.5 Affinity Water's PR24 business plan has been thoughtfully constructed to strike a fair balance between the needs of customers and the environment, the requirement for significant investment in assets and fair returns to investors. The plan was developed against the backdrop of good overall performance in 2020 - 2025, demonstrable shareholder support and a need for significant enhancement investment to ensure the continued water security in the southeast of England.

8.6 It is the Board's view that the draft Determination does not achieve this fair balance. The draft Determination contains significant reductions in the allowed expenditure necessary for statutory requirements, material changes to Outcome Delivery Incentives without adequate risk protections and an overall balance of risk and return that is heavily skewed to the downside.

8.7 In considering the financeability of the draft Determination, the Board is satisfied that, based on independent assurance, Affinity Water (i.e. the 'actual' company) is financeable, from the perspective of debt financeability as stipulated by Ofwat's assessments. However, as a result of the draft Determination, neither the actual or notional company, is able to attract equity and maintain investors confidence to support the investment requirements of Affinity Water over 2025 – 2030 and beyond. On this broader definition of 'investability', the Board cannot provide assurance on the financeability of the notional or actual company.

8.8 In preparing the Representations, the Board has carefully considered the significant difference between the company's view of efficient costs in the 2023 business plan and those outlined in the draft Determination. In particular, the Board considers that the allowances for enhancement expenditure in the draft Determination would not enable the company to properly carry out statutory functions relating to the security of water supply, both in the short and long term. As a result, the company's Representations reinstate the 2023 business plan efficient expenditure relating to key enhancement investment programmes. The Representations directly addresses the feedback in the draft Determination, providing additional and new evidence where requested, and has been subject to independent assurance.

8.9 The Board has also considered the Outcome Delivery Incentives in the draft Determination. The Board was pleased to note that the ambition of the performance commitments in the 2023 business plan was recognised in the Quality and Ambition Assessment. However, the resulting overall balance of risk and return is significantly negatively skewed, offering little prospect for an efficient, good performing company to achieve a return commensurate with the level of risk inherent in the package. In particular, the lack of risk limitations on measures that are not wholly or even partially under management control, such as per capita consumption, exposes the company to severe downside.

8.10 The Board recognises that the draft Determination aims to address the inherent bias towards risk with aggregate sharing mechanisms on expenditure and performance. Nevertheless, the result remains a severe asymmetry in the overall risk and return balance. Affinity Water's Representation attempts to address this through individual corrections to Outcome Delivery Incentives, a recalibration of the aggregate sharing mechanisms across expenditure and performance, and increased WaCC based on updated market data.

8.11 The Board notes the request for views in the draft Determination on the potential introduction of additional restrictions relating to the company's ability to distribute returns through a gearing "cap" at 70%. While the intention of the proposal is justified on the basis of improvements to financial resilience, such an approach is unlikely to achieve any meaningful benefit for customers and, perversely, fundamentally undermines the ability to attract equity.

8.12 As a result, and alongside the lack of a fair and equitable balance of risk and return, the equity provision of £150m indicated in the Affinity Water 2023 business plan has been withdrawn as a consequence of the draft Determination.

8.13 The Board and Affinity Water shareholders remain committed to supporting the financial resilience of the company and consider that additional equity into the company, alongside appropriate levels of base returns and a fair balance of risk and return, provide the best outcomes for customers. The adjustments to the risk and return balance set out in the Representations improve the fundamental investability of the draft Determination and will enable this preferred outcome for the company and customers to be achieved.

8.14 The Board recognises that the consequential impact on customer bills of the changes in the Representation, including those relating to the additional enhancement investment required to address the new obligations around PFAS. The Board has directed management to extend the social tariff support for customers and to further develop support for customer affordability and for customers in vulnerable circumstances ahead of the implementation of the PR24 Final Determination in April 2025.

8.15 Extensive assurance and customer engagement work was previously carried out for the purposes of the September 2023 business plan submission to demonstrate that the plan is in the interests of customers and reflects a reasonable balance of customer and company interests. In developing the Representations, a range of contractors and consultants have been commissioned to provide supporting evidence, particularly relating to cost benchmarking and the calculation of RoRE risk and return.

8.16 The Board have supported the licence modification to allow an extension of the final Determination timetable until January 2025, on the basis that this will enable Ofwat to address the concerns raised in the Representation and use the additional time to meaningfully engage in resolving the issues outlined. The Board strongly encourages Ofwat to confirm any extension to the current final Determination publication date as early as possible to ensure that the company can manage any risks associated with implementing the final Determination through customer charges in April 2025.

8.17 The Board has provided comprehensive oversight of the response during the Representation period, convening four separate Board meetings throughout July and August 2024.

8.18 In addition to these formal meetings, several additional meetings took place within this period between the company management, shareholders and non-executive directors, focusing on key areas of the draft Determination and Representation.

Board meeting date	Meeting type	Board topics
19th July 2024	Special Board meeting	• Briefing on the draft Determination Outcome
24th July 2024	Standard Board agenda Iiem	• Development of the Representation response in key areas • Assurance approach and draft Board Assurance Statement
13th August 2024	Special Board meeting	• Finalisation of DD Representation
23rd August 2024	Special Board meeting	• Final Assurance and Board Assurance Statement on DD Representation

Table 8.1 Record of Affinity Water Board meetings related to the Representation submission

8.19 In addition to these formal meetings, several additional meetings took place within this period between the company, shareholders and non-executives, focusing on key areas of the draft Determination and Representations response.

8.2 Board governance

Board leadership

8.20 The full Board of Affinity Water comprises:

- an independent non-executive chairman
- three independent non-executive directors, including a senior non-executive director
- two executive directors
- three non-executive directors who are affiliated to shareholders.

Our Board of directors

Figure 8.1 Our Board of directors

8.21 The constitution of the Board ensures that there is robust independent challenge of management, and that effective communication is maintained with shareholders. This has resulted in plans that are in the best interests of our customers and have shareholder support for the company to maintain financial resilience in the period 2025 - 2030 and beyond.

8.22 The Board has been fully engaged in the development and preparation of the Representation, by using its formal and special Board meetings to lead and provide strategic direction to management. The Board has challenged management to ensure the Representations are supported by high quality evidence, will withstand scrutiny from an independent third party, and reflect the balance of customers and company interests. Additionally, the Board has directed management to fully consider the implications of the risk and return balance in the draft Determination on investability to prioritise the key areas of focus in the Representation.

Board action

8.23 The Board met formally on four occasions between 19th July and 23rd August 2024 to provide oversight, direction and instruction to management on the preparation of the Representation.

Governance Structure

8.24 The governance structure remains as it was when established in September 2021. This was outlined in the September 2023 business plan submission[41].

Assurance plan

8.25 The Board's Assurance Plan for the period 2020 - 2025 is published on Affinity Water's website. It sets out the Company's rigorous and tested approach to assurance. The plan establishes:

- the role of the Board
- the role of the Independent Challenge Group

41. https://www.affinitywater.co.uk/docs/PR24/Business_plan/AFW01.pdf

- the Board's Risk Management Framework
- our internal systems and processes
- how we comply with our legal and regulatory obligations.

8.26 The Board ensured that the plan's approach has been implemented through its PR24 business plan specific board governance and assurance framework requirements.

Providing robust assurance

8.27 The Board has ensured that the assurance and governance framework were properly deployed in the development and approval of the Representation submission.

8.28 Independent assurers supplied management with findings and actions required to produce a Representation supported by high-quality evidence. Particular attention was paid to independent assurance provided by third parties on the financeability and financial resilience of the company as set out in the Representation. This has been reported to the Board, which has then challenged management to complete outstanding actions and report satisfactory closure back to the Board. The Board has satisfied itself that there are no material and unmitigated outstanding assurance actions prior to submission of the Representation.

8.29 Where any challenge was made by the Board or risks and issues identified through the assurance process, the Board sought reassurance that actions have been taken to address them.

8.3 Data and information quality

8.30 The Board has satisfied itself that the data and information underpinning the Representation submission are of high quality.

8.31 Management has confirmed that all data and commentary has been provided by experts across the breadth of the company. Material risks and issues have been presented to the Board as part of the assurance process.

8.32 The Board has sought independent assurance on the completion of the draft Determination Representation data tables. This has been provided by AtkinsRéalis, KPMG and Economic Insight. All reports on the outcome of assurance activities have been provided to the Board.

8.33 Each data assurance provider has reviewed and checked their allocated data lines and has reported to the Board that all data is consistent with the reporting requirements. This has been prepared through rigorous analysis following clearly defined procedures. The Board has not identified any reporting risks through its assurance activities.

8.34 Assurance letters from AtkinsRéalis, KPMG and Economic Insight were provided. They can be found in appendix AFW134 - KPMG- Assurance of financial data tables, reconciliation models and financial model and appendix AFW138 - Atkins data tables assurance.

8.4 Costs and outcomes

8.35 The Board has challenged management to demonstrate that the outcomes and performance commitments within the Representation are stretching but achievable, incur only robust and efficient costs and are supported by customers. The Board has also challenged management to demonstrate that it has the necessary delivery plans, resources and suppliers in place to deliver the business plan as amended by the Representation. The Board has subjected these proposals to robust assurance. The Board provides its assurance that:

- the adjustments to the performance commitments in the Representation are stretching but achievable, reflect customer interests and ensure a fair balance of risk and return
- the Representations on expenditure considered Ofwat's feedback, are supported by evidence, are robust and efficient and are required to ensure the delivery of ongoing services and statutory requirements
- all new investment plans included in the draft Determination are required for statutory purposes, have been subject to assurance on cost efficiency and are in customers interests
- the needs for enhancement investment are new requirements that customers have not already funded, and are not accounted for in base expenditure
- the adjustments to the draft Determination included in the Representation are deliverable and that the company has put in place measures to ensure that they can be delivered. This includes setting out the steps the Board has taken to satisfy itself that supply chain risk is manageable, and delivery plans developed
- the investment requirements are affordable by customers and there is appropriate and sufficient affordability support for customers
- the investment requirements reflect customer views, and where appropriate are supported by customers.

Board action (costs and outcomes)

8.36 The Board has challenged management to demonstrate that the adjustments to the draft Determination in the Representation reflect customers' priorities, that they reflect the benefits expected from the entirety of the revised plan expenditure and ensure a fair balance of risk and return.

8.37 To maintain affordability the Board has challenged management to provide analysis to demonstrate that all expenditure is included for the purpose of achieving 2025 - 2030 performance commitment levels and the price control deliverable and that no investment is being requested for improvements included in previous price reviews. The Board has received and scrutinised analysis of the company's cost base relative to the sector, as set out in other business plans and draft Determinations and has ensured that management has reflected only efficient costs in the expenditure requirements for 2025 - 2030.

8.38 The Board has challenged management to undertake robust optioneering of the proposals for the strategic improvement programmes such as WRMP and WINEP quality enhancements to ensure that the best and most efficient options over the near- and long-term have been incorporated into the adjusted plan.

8.39 The Board has challenged management to ensure that investment for all new statutory requirements that have arisen since the business plan submission in September 2023 have been included in the draft Determination Representation. In particular, the Board have ensured management have included investment plans in the Representation to address the full scope of the new DWI Undertaking on PFAS that has arisen since the business plan submission in September 2023.

8.40 The Board has received assurance from the management team that the performance commitment levels have been calculated robustly and reflect customer priorities, that project optioneering has been completed for investments, that efficiency modelling has informed the costs within the plan, the company and its supply chain consider the plan to be deliverable and that customers are protected against under delivery by Outcome Delivery Incentives and Price Control Deliverables. The Board also considered the Representations from the perspective of the risk and return balance and challenged management to ensure that this is addressed in the Representation.

8.41 The Board has received independent assurance confirming that its costs are efficient, and that no investment is being duplicated from those that were included in the previous Price Review. Additional independent assurance has been provided to the Board on the Representation costs, particularly where they address feedback provided by Ofwat in the draft Determination.

8.42 The Board has reviewed the extensive customer and stakeholder insight produced as part of the business planning process to assure itself that the Representations remain aligned with customers priorities.

8.43 The Board has reviewed the customer bill impact resulting from the Representation and the plans put in place by the management team to ensure that there is sufficient and appropriate affordability support for customers using existing social tariffs and payment support. The Board has directed management to extend the use of cross subsidies, as supported by customers through recent 'willingness to pay' research, to its fullest extent in recognition of the increased average bill resulting from the Representation.

8.44 The Board has challenged management to further develop support for customer affordability and for customers in vulnerable circumstances ahead of the implementation of the PR24 final Determination in April 2025. Given the constricted timescales to submit the draft Determination Representation, the Board has directed management to continue to develop these proposals ahead of the final Determination.

8.5 Financeability

8.45 The Board has carefully considered the financeability of Affinity Water based on the draft Determination. The Board is satisfied that, based on independent assurance provided by Centrus, Affinity Water (i.e. the 'actual' company) is financeable and financially resilient from the perspective of debt financeability, as stipulated by Ofwat's assessments in 2025-30 and beyond. The Board notes this was specifically requested by Ofwat in the draft Determination.

8.46 However, as a result of the draft Determination, neither the actual or notional company is able to attract equity and maintain investor confidence to support the investment requirements of Affinity Water over 2025 - 2030 and beyond. On this broader understanding of 'investability', the Board cannot provide assurance on the financeability of the notional or actual company.

8.47 The draft Determination does not provide the necessary conditions for an efficient company, notional or actual, to attract equity. The reasons for this include:

- substantial and material reductions to enhancement expenditure in the draft Determination, which do not enable the company to meet its statutory requirements relating to water supply
- severe downside skew in Outcome Delivery Incentives, which falls far short of providing a fair balance of risk and return
- suppressed cost of equity and ultimately low WACC due to selective use of accepted methodologies for component parts of the calculation
- deterioration in the predictability and stability of the regulatory environment, introducing uncertainty and risk for equity investors due to potential additional restrictions relating to financial resilience, including the potential consideration of a gearing 'cap' at 70%.

8.48 Whilst equity financeability (investability) is the key concern, there are also legitimate concerns around debt financeability, particularly:

- the ability of the notional company to maintain Baa1/BBB+ ratings at 60% gearing (60% gearing being the PR19 and CMA redetermination notional gearing)

- the ability of the notional company to maintain Baa1/BBB+ ratings in the less predictable and less stable environment resulting from the draft Determination
- the ability of the notional company to withstand downside scenarios
- the allowed cost of debt not reflecting the market and the current gap between iboxx and water company debt issuances.

8.49 The Representations outlines the conditions necessary to ensure real world investability and provide that, in the round, the Price Review represents a reasonable prospect for an efficient Affinity Water to be able to earn an appropriate base return for equity investors (i.e. a 'fair bet').

Board action (financeability)

8.50 The Board has requested management to assess if the company is financeable based on the notional capital structure, incorporating Ofwat's updated view on the allowed return on capital in the draft Determination.

8.51 Management has demonstrated to the Board that draft Determination does not meet Ofwat's equity financeability threshold and that there are legitimate concerns over the ability of the notional company to maintain Baa1/BBB+ credit ratings at a 60% gearing level.

8.6 Financial resilience

8.52 The Board is responsible for ensuring the financial resilience of the company under the actual capital structure in the context of the draft Determination. The Board has rigorously tested the near-and long-term financial resilience based on the actual capital structure of the company, incorporating the base case and downside scenarios.

8.53 As outlined above, the equity injection (£150m) indicated in the PR24 business plan has been removed from the Representation as a result of the draft Determination. To support the delivery of the investment plan, our dividends have been restricted in our draft Determination Representation. Affinity Water is still able to meet the priorities to support investment for customers, provide financial headroom and maintain strong credit ratings without the planned equity injection.

8.54 The Board provides its assurance that:

- the actual company is financially resilient over the 2025 - 2030 period and beyond
- the actual company would be rated Baa1/BBB+ in the base case
- the actual company remains financially resilient in testing of the base case and downside scenarios
- where it has identified a financial risk, the company has robust mitigating actions in place to address the challenges of the downside scenarios included within the Representation
- external assurance has been conducted on the financial resilience analysis

8.55 The Board has received independent assurance from KPMG confirming that the financial modelling of the actual company structures has been completed in line with Ofwat's requirements (appendix AFW143 - KPMG- Assurance of financial data tables, reconciliation models and financial model).

8.56 The Board has also received independent assurance from Centrus (appendix AFW143 - Centrus report) confirming the financial resilience of the actual company.

Board action (Financial resilience)

8.57 The Board has set the expectation for management that the company should be financially resilient over the period 2025 - 2030 and beyond, based on the Representation:

- the Board has received the outcome of the financial modelling and financial stress testing of the base case and 11 downside scenarios
- of these downside scenarios, 8 are consistent with Ofwat's recommendations for stress testing and the remaining 3 represent bespoke combination scenarios which generally have a more significant downside impact compared to Ofwat's approach. The bespoke downside scenarios have been established by internal experts based upon real world experience, business risks and annual testing in the Long Term Viability Statement (LTVS) from the Annual Report
- the Board has considered both likely credit rating outcomes and the ability to meet the financial covenants contained in the Whole Business Securitisation agreements
- the Representation sets out adjustments to the draft Determinations that provide a fairer and more equitable balance of risk and return. However, even with these adjustments, there is still a significant downside skew in the overall package of risk and return which undermines equity financeability and could lead to a deterioration in financial resilience
- the Board has satisfied itself that under the downside scenarios the actual company would maintain the minimum investment grade credit ratings of Baa3/BBB

09. Water resources, water networks and retail controls

9.1 The price control summary

Item	September 23 business plan submission	Draft Determinations	Representation plan
	£m	£ m	£m
PAYG	136.72	114.59	140.989
RCV Run Off	60.715	52.81	59.928
Allowed Return on capital	41.928	41.29	53.918
Revenue adjustments for PR19 reconciliations	-24.070	-39.49	-39.414
Quality and ambition assessment (QAA) reward / penalty	0	0.00	0.000
Tax	0	0.00	0.000
Grants and contributions after adjustment for income offset (price control)	0	0.00	0.000
Deduct non-price control income	0	0.00	0.000
Innovation competition	0	0.00	0.000
Revenue re-profiling	0	0.00	0.000
Final allowed revenues	214.645	169.19	215.421

Table 9.1 Calculation of allowed revenue (£ million) for Water Network Plus

Item	September 23 business plan submission	Draft Determinations	Representation plan
	£m	£m	£m
PAYG	920.687	837.215	994.637
RCV Run Off	376.379	356.041	387.225
Allowed Return on capital	278.178	297.937	372.902
Revenue adjustments for PR19 reconciliations	22.295	23.786	12.925
Quality and ambition assessment (QAA) reward / penalty	0	0.000	0.000
Tax	0	0.000	0.000
Grants and contributions after adjustment for income offset (price control)	69,829	27.351	36.288
Deduct non-price control income	-15,000	-15.000	-15.000
Innovation competition	0	11.408	0.000
Revenue re-profiling	0	0.000	0.000
Final allowed revenues	1,652.368	1538.738	1788.978

Table 9.2 Calculation of allowed revenue (£ million) for Water Resources

Item	September 23 business plan submission	Draft Determinations	Representation plan
	£m	£m	£m
Total wholesale revenue - nominal (£m)	1,949.774	1949.774	2249.508
Proportion of wholesale revenue allocated to residential (%)	80.26%	0.803	0.803
Residential retail costs (£m)	170.966	170.966	182.345

Item	September 23 business plan submission	Draft Determinations	Representation plan
	£m	£m	£m
Total retail costs (£m)	1,735.850	1735.850	1987.888
Residential retail net margin (%)	1%	0.010	0.012
Residential retail net margin (£m)	17.534	17.534	24.144
Residential retail adjustments (£m)	-1.834	-1.834	-3.270
Residential retail revenue (£m)	186.666	186.666	203.220

Table 9.3 Retail margins, 2020 - 2025 (nominal price base)

Affinity Water