

A practical approach to ‘what base buys’ for the asset health cost change process

Report for Water UK

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Economic
Insight

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Executive summary

It is now widely recognised that the system of regulation in the water industry should place greater focus on the level of investment needed to ensure the long-term resilience of assets. This was highlighted last year in the landmark review of the sector by the Independent Water Commission (IWC), which stated “*that the regulatory approach to infrastructure resilience is not delivering a system that is sufficiently resilient to short-term shocks and long-term pressures.*”¹ In addition, the National Audit Office (NAO),² UK Government,³ and the National Infrastructure and Service Transformation Authority (NISTA) have separately raised asset health as a significant issue in the water sector that requires immediate action.⁴

In response, Ofwat (and the Competition and Markets Authority (CMA)) have highlighted the ‘**cost change process**’ as a tool for companies to boost their investment in asset health during the 2025/26-2029/30 price control period (AMP8), where needed. The cost change process enables companies to apply for additional cost allowances to support the delivery of priority investments which may not be fully accounted for in the allowances set at Ofwat’s (or the CMA’s) final determinations. In 2026, companies can request approval for additional expenditure on seven priority assets.

As part of its assessment for asset health cost change applications, Ofwat has said that it will take account of expenditure that companies can already make on the priority assets using their existing base cost allowances. This step is known as the ‘**what base buys**’ (**WBB**) **adjustment**. Ofwat’s rationale for the WBB adjustment is to avoid the risk of customers ‘paying twice’ for expenditure, ensuring that the new cost allowances are truly additional to what companies have already been allowed to spend through their base allowances. The main steps involved in the cost change process for asset health are summarised in the figure overleaf. As illustrated, the ability of companies to make the investment is limited first by Ofwat’s overall judgement of the application and then by the WBB adjustment.

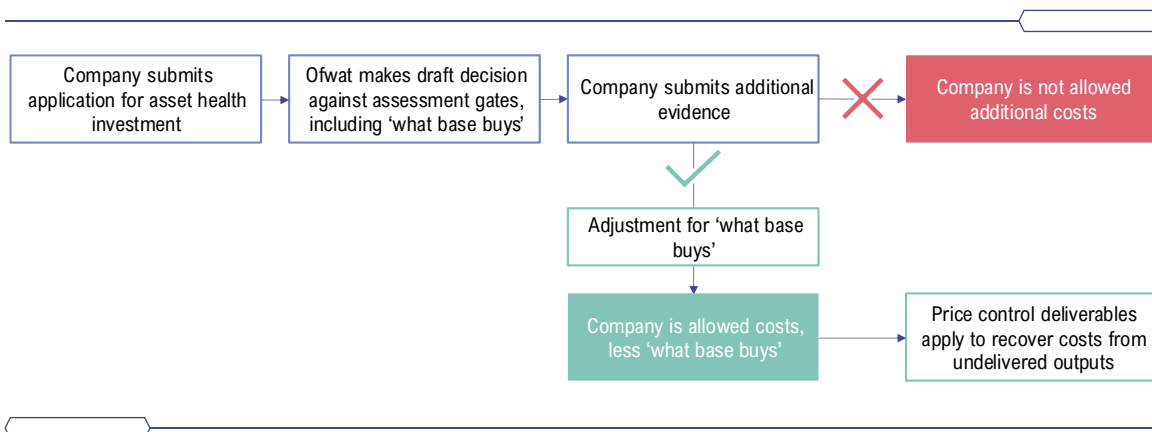
WBB is a critical issue as it has the potential to materially influence the scale of investment that companies can make in assets during AMP8. For example, Ofwat made a WBB adjustment for network reinforcement costs in its final determinations worth £256m in water and £240m in wastewater across the industry. Set too high, and WBB may lead to insufficient (or no) additional investment since companies will not have enough funding to cover the cost. But, on the contrary, if WBB is set too low then there is an increased risk of customers paying twice.

¹ ‘[Independent Water Commission: Summary Report](#)’. Independent Water Commission (2025); paragraph 200.

² ‘[Regulating for investment and outcomes in the water sector](#)’. NAO (2025)

³ ‘[A New Vision for Water](#)’. UK Government (2026); pages 18 and 38.

⁴ ‘[Letter to Ofwat on asset management](#)’. NIC (2023); pages 9 and 12.

Figure 1: Main stages of the cost change process

Source: 'PR24 Cost change process: Asset health investment assessment guidance'. Ofwat (2025).

This trade-off highlights a fundamental complication that means **calculating WBB is challenging**. That is, in practice, WBB is not only about protecting customers from paying twice. It simultaneously needs to balance the competing priority of delivering the urgent investment that is needed, making the approach to the calculation a delicate, nuanced issue.

Evidence indicates that the risk from the cost change process leading to customers paying twice is low relative to the risk from not delivering the required asset health investment and the benefits to customers that it would bring. This means that calculating WBB requires care and attention, something which is emphasised by two further complications:

- It is difficult to estimate WBB with any accuracy because:
 - The principle of estimating WBB for specific assets is inconsistent with the totex approach within the existing regulatory framework, as base costs do not 'buy' investment in specific assets. Rather, companies are incentivised to efficiently allocate spending across their network of assets to reflect their individual contexts.
 - As a result of companies having this discretion, the level of WBB will (efficiently) vary both between companies and over time (particularly at a disaggregated level for specific assets). For example, data from the PR19 period shows that Northumbrian Water used 17.7% of its base on gravity sewers and just 0.2% on boreholes. Whereas Severn Trent Water spent a materially smaller proportion on gravity sewers (6.6% of base) but relatively more on boreholes (1.7% of base). Similarly, there are a myriad of factors that determine the level of expenditure needed for an asset at a given point in time, meaning past expenditure will not necessarily reflect future requirements.
- The issues with making a WBB adjustment are exacerbated by the fact that the base allowances themselves are derived using econometric models which 'bake in' the low investment in asset health from the past. Additionally, as Ofwat also recognises, these models have inherent limitations (such as being unable to fully capture company-specific characteristics) and which mean there is uncertainty in the sufficiency of the cost allowances they produce.

In light of these challenges, and consistent with the recommendations from the IWC's sector review, **the optimal solution to estimating WBB would be one that is tailored to each company's circumstances** (i.e. in line with a more supervisory approach to regulation). This could involve drawing on a range of evidence for the company and testing different methods, thereby avoiding

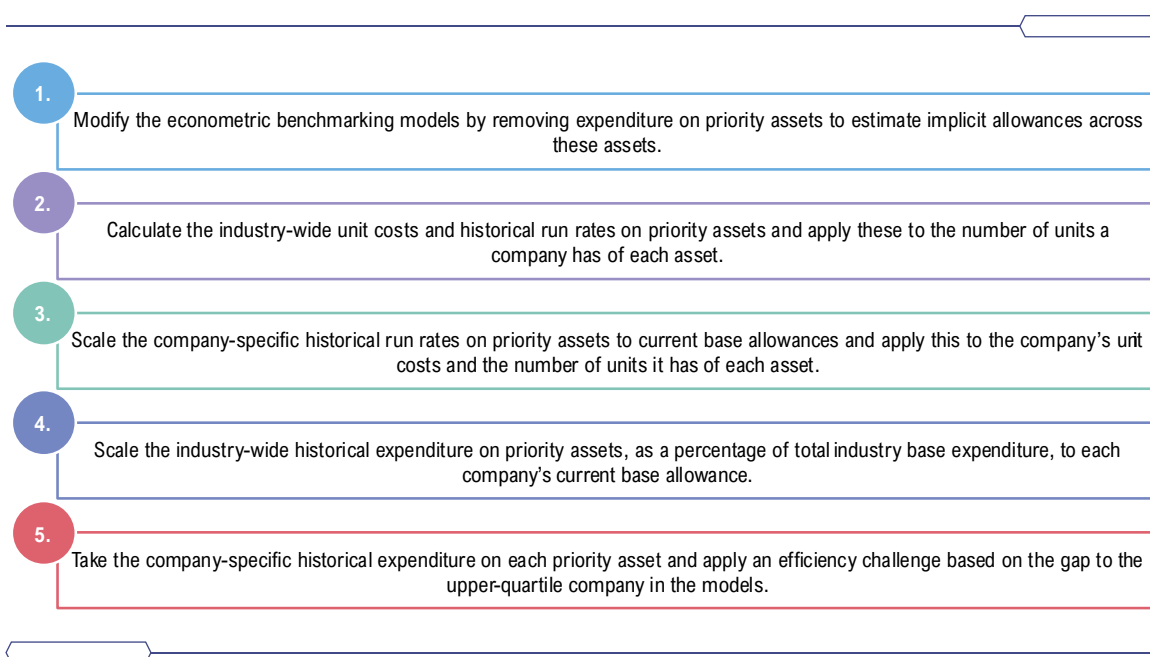
being overly mechanistic. The result would be varying (and, perhaps for some assets, potentially zero) WBB adjustments across companies and assets.

To assist Ofwat and companies in making decisions around how to estimate WBB and understand the circumstances in which one approach may be more favourable than another, we have developed a conceptual framework based on five guiding principles that the approach to WBB should aim to fulfil. These are:

- (a) Principle 1: avoid constraining investment.
- (b) Principle 2: protect customers from the risk of paying twice.
- (c) Principle 3: reflect operational realities.
- (d) Principle 4: not create perverse incentives.
- (e) Principle 5: be practically implementable and robust.

There are five options for calculating WBB that have been put forward so far by Ofwat and companies, summarised in Figure 2. To understand the strengths and weaknesses of each option, we have assessed the extent to which they adhere to the five guiding principles, and considered the different underlying analytical decisions that they involve.

Figure 2: Options we have assessed for calculating 'what base buys'



Source: Economic Insight analysis.

Overall, we find that each option has distinct strengths and weaknesses and that **the most appropriate option may vary across companies (and asset classes) depending on their specific circumstances.**

In this context, given the need for urgent investment in asset health, it is worth considering whether *any* WBB adjustment adequately protects customers. Removing WBB would provide certainty that the urgent investment in asset health is delivered. There may be specific circumstances in which this is appropriate, such as if a company had planned to spend little or no base allowance on an asset, but

due to a change of events the asset requires additional spending which the company obtains through the cost change process. While removing the WBB adjustment may give rise to a risk of customers paying twice, this risk is relatively low and could be addressed with other mechanisms such as use-it-or-lose-it allowances, further assurance requirements, or gated assessments.

Considering the points set out above, **we make the following recommendations.**

- (a) We suggest that Ofwat reflects carefully on the role of WBB and how it balances different priorities. This should consider the wider context of the substantial asset health gap in the sector, accounting for the fact that WBB needs to address concerns beyond Ofwat's primary aim of mitigating the risk of customers paying twice – particularly as this risk is relatively low.
- (b) We recommend that Ofwat tailors the approach for WBB to each company's circumstances and considers pathways for making WBB less mechanistic, so that: (i) it is not automatically applied to all assets for all companies within the cost change applications; and (ii) where it is applied, the method is chosen based on what is most appropriate given the company and asset in question. This could involve case-by-case assessments, whereby companies can put forward evidence to demonstrate which method is most appropriate given their specific circumstances, or indeed that WBB should not be applied to specific assets (such as where any investment is truly additional). In addition, where WBB is not applied, other tools can be adopted to protect customers from the risk of paying twice without constraining investment to the same degree as WBB.
- (c) Immediately after the 2026 cost change application window (May 2026), we recommend that the industry (Ofwat and companies) works to refine the best way of implementing – or developing an alternative to – WBB that can be used for the 2026 final decisions and in future years of the cost change process.

The remainder of this report is structured as follows.

- Section 2 provides further context on asset health in the water industry and the motivation for this report.
- Section 3 explains the inherent challenges associated with WBB and what this implies for how it is estimated.
- Section 4 sets out our five guiding principles for designing an approach to WBB and assessment of the proposed options for the calculation.
- Section 5 concludes with our final recommendations.

2 Context

Ensuring sufficient asset health investment is an urgent priority at PR24

Customers in England and Wales depend on the water network every day and, therefore, require good quality and reliable services at present and into the future. As an infrastructure-intensive industry, for water companies to deliver these reliable services into the future, they require resilient assets and, therefore, sufficient investment in long-term asset health. There is a growing and urgent need for the industry to focus more on asset health investment and develop approaches to ensure the long-term resilience of assets, as has been highlighted by:

- **The IWC**, which proposed 'infrastructure and asset health' as one of five strategic themes for future primary legislation in the sector, after concluding *"that the regulatory approach to infrastructure resilience is not delivering a system that is sufficiently resilient to short-term shocks and long-term pressures."*⁵
- **The Government**, as part of its response to the IWC report, stated that a key objective of the new regulator will be to *"[p]rovide robust oversight of water companies to maintain and enhance the long-term health and resilience of their infrastructure."* As part of this, the regulator will *"implement a series of changes to the Price Control process to ensure sufficient funding is allocated to maintaining and improving asset resilience."*⁶
- **NISTA (formerly National Infrastructure Commission)**, which in 2023 wrote to Ofwat about the current approach to understanding the condition of network assets. It stated that currently *"There does not appear to be a comprehensive and consistent understanding of asset condition across the sector and how this may change in the future. A more complete view of asset health in the sector would support a multi-AMP view of the investment required to maintain asset health and, consequently, service performance and reliability."*⁷
- **NAO**, as part of its review of the effectiveness of the regulatory regime in delivering long-term objectives, found that *"[t]he regulators [Ofwat, EA, and DWI] do not have a shared understanding of the condition of water and wastewater assets, and the level of funding needed to maintain them."* It also recommended that *"Ofwat should develop a view on how to identify and plan for investment needs over the long term."*⁸
- **Defra**, as part of its strategic priorities for Ofwat, highlighted asset health as a key factor in creating a resilient water sector. Defra stated that *"effective management of assets will support future resilience of service and provide benefits to the environment and society through, for example, reduced environmental harm and fewer flooding and pollution incidents."*⁹
- **The CMA**, which acknowledged investment in assets as a significant industry-wide issue in its PR24 redeterminations, specifically highlighted the cost change process as a mechanism for enabling greater investment.¹⁰ Even at the PR19 redeterminations, the CMA recommended improved, forward-looking approaches to monitoring asset health (albeit this did not materialise as hoped).¹¹
- The scale of the issue has been further exemplified in analysis by Economic Insight which applied the Water Industry Commission for Scotland's (WICS) bottom-up approach to estimating the sustainable level of asset replacement expenditure for six participating companies in England and Wales. This found that the long-term sustainable level of asset

⁵ *'Independent Water Commission: Summary Report'*. Independent Water Commission (2025); paragraph 200.

⁶ *'A New Vision for Water'*. UK Government (2026); pages 18 and 38.

⁷ *'Letter to Ofwat on asset management'*. NIC (2023); pages 9 and 12.

⁸ *'Regulating for investment and outcomes in the water sector'*. NAO (2025)

⁹ *'February 2022: The government's strategic priorities for Ofwat'*. Defra Policy paper (2022).

¹⁰ *'Water PR24 references: final determinations – summary'*. CMA (2026); paragraph 51 and *'Water PR24 references: final determinations – volume 1'*. CMA (2026); paragraphs 3.37–3.38 and 4.7c.

¹¹ *'Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: final report'*. CMA (2021); paragraph 4.293.

replacement expenditure is between 40% and 250%¹² higher than Ofwat's implicit capex allowances¹³ (depending on the company).¹⁴

At PR24, Ofwat committed to work with the industry to consider asset health needs more closely. As part of the final determinations, amongst other things, Ofwat:

- increased base costs allowances by 19% relative to PR19 allowances (which themselves were 12% below outturn expenditure);
- provided targeted allowances (with some WBB deductions) for two areas of asset maintenance where it considered there to be sufficient evidence of a gap in historical investment: mains repairs and network reinforcement; and
- made provision for additional asset health costs on top of these allowances through the **cost change process**, enabling companies to deliver specific investments where needed.¹⁵

The cost change process is pivotal to delivering this asset health investment now

Given the urgent need for an increase in investment, the cost change process provides the only avenue to deliver additional spending over AMP8. This is because cost allowances are largely fixed at the start of the period, whereas the cost change process enables companies to increase their spending during the price control in response to emerging needs, or pre-existing needs not accounted for in the final determinations. In addition, following the recommendations in the IWC's review of the sector, Defra's Water White Paper has promised to place asset health at the heart of the new regulator's responsibilities.¹⁶ However, this will take a number of years to become operational. Until that time, there is an opportunity to start enacting those recommendations through the tools that are currently available – i.e. the cost change process.

As such, the cost change process is being relied upon by industry stakeholders to deliver the required additional investment in asset health in the near term. The importance of the cost change process was highlighted in the CMA's PR24 redeterminations, which stated that the CMA would not intervene on the industry-wide asset health-related issues identified in Defra's Water White Paper, "*as they are better dealt with through the CCP [cost change process], the Asset Health Roadmap and longer-term reform.*"¹⁷

By facilitating this investment, the cost change process offers a way of protecting customers from the substantial risks and consequences of failing assets. The benefits of this are wide ranging, applying to

¹² These figures are for water service assets only. For wastewater service assets, the report found that the long-term sustainable level of asset replacement expenditure is between 20% and 170% higher than Ofwat's implicit allowance.

¹³ A like-for-like comparison between the bottom-up estimates of sustainable replacement expenditure and Ofwat's allowances is not possible as Ofwat does not identify how much of its allowances are intended to fund replacement activities. The closest comparison to the bottom-up estimates of asset replacement expenditure available are Ofwat's implicit capex allowances, estimated in line with Ofwat's approach in its financial models. This involves applying the capex share of requested base costs from companies' draft determination representations (DDRs) to Ofwat's FD allowances. See: '[Estimating asset replacement expenditure in the water industry](#)'. Economic Insight (2026); chapter 4.

¹⁴ '[Estimating asset replacement expenditure in the water industry](#)'. Economic Insight (2026).

¹⁵ Additional costs are permitted for spending on seven priority assets: water network storage assets (service reservoirs, water towers, contact tanks and final water tanks); rapid gravity filters at water treatment works; boreholes; activated sludge plants at wastewater treatment works; trickle filters at wastewater treatment works; settlement tanks at wastewater treatment works; gravity sewers.

¹⁶ '[A New Vision for Water](#)'. Defra (2026).

¹⁷ '[PR19 Redeterminations: Final Report](#)'. CMA (2021); paragraph 4.229.

current and future customers, as well as addressing potential variation in asset health across regions. This variation exists because, while there is an industry-wide gap in asset health, the scale of this gap will inevitably differ between companies as a result of them historically making different (efficient) decisions around which assets to invest and the scale of this investment – noting that these decisions are constrained by the allowances set by Ofwat.

Given the high priority of improving asset health and the importance of the cost change process in delivering this, it is vital that the cost change process is implemented effectively so as to facilitate the necessary investment.

Whether the cost change process facilitates the necessary investment partly depends on the adjustment for WBB

Ofwat's guidance for the asset health cost change process expects companies to evidence their investment cases by demonstrating:

- (i) the overall expenditure required on each relevant priority asset over AMP8;
- (ii) how much of this is already funded through base costs (i.e. 'what base buys' already); and, therefore
- (iii) the level of additional costs required from the cost change process.

Step (ii) represents the WBB adjustment, which could have the effect of reducing the final allowances companies receive.

Ofwat's cost change process guidance indicates various ways in which this adjustment could be calculated and the regulator has not prescribed a single approach. However, an indication of how WBB may be implemented is provided through Ofwat's calculation of the sector-wide cost adjustment claims (CACs) at the PR24 final determinations, three of which (mains renewal, meter replacement and network reinforcement) involved a WBB adjustment. The approaches used by Ofwat are summarised in the box overleaf.

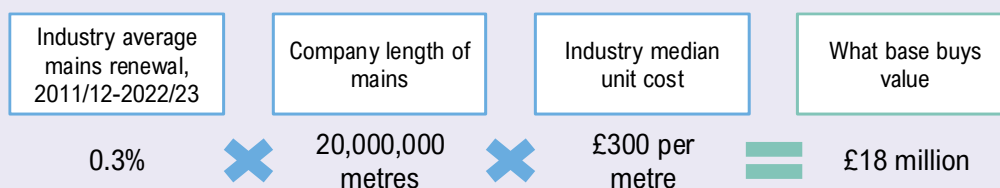
Ofwat suggests that the motivation for the WBB adjustment is primarily to avoid the risk of customers 'paying twice' for the same investment, whereby customers may be double charged for a single investment – first through base allowances and then through any cost change allowance.

However, this concern needs to be balanced against the priority of ensuring the required investment in asset health happens and provides the associated benefits to customers. In other words, while Ofwat's principle of protecting customers from the risk of paying twice is sound, it should not be considered in isolation but rather needs to balance the costs and benefits of over/underinvestment. To the extent that the investment is reduced in order to ensure customers are protected, this needs to be based on a robust assessment to be confident that any trade-off is justified.

The WBB calculation will have a material effect on the result of the cost change process – for example, the WBB adjustment for network reinforcement costs under the approach described above was worth £256m in water and £240m in wastewater across the industry. Given the high importance of the cost change process in the context of asset health as set out above, it is important to give adequate thought to the WBB calculation so that it facilitates the necessary investment.

Box 1: Ofwat's approaches to calculation WBB for sector-wide CACsApproach 1 – Mains renewal (and meter replacement¹⁸)

This approach focussed on calculating the *level of activity* funded by base costs, which can then be scaled up into a cost figure. Ultimately, it assumed that the level of activity previously delivered by base costs would persist in future. Ofwat calculated the historical activity level using the industry average renewal rate over 2011/12 to 2022/23.¹⁹ To convert this into a cost figure, the rate can be multiplied by a company's total mains and then by a unit cost estimate. The unit cost was based on the industry median figure.²⁰ An illustrative example is set out below.

Approach 2 – Network reinforcement

For network reinforcement, Ofwat calculated WBB by taking the average result of two approaches:

- The future annual level of WBB is equal to the company-specific historical average expenditure over the last five years, with a upper quartile (UQ) efficiency challenge applied (based on the UQ from the base cost models).
- Calculate the industry average expenditure on network reinforcement as a percentage of base costs over 2011/12 to 2022/23. Apply this percentage to the company-specific base allowance for PR24.

CMA updates

The CMA made some changes to Ofwat's method at the redeterminations, as follows:

- For mains renewal and meter replacement, instead of the simple industry average, the CMA calculated the mean for each company over the same period and then took the median of those mean figures.
- The unit costs for mains renewal and meter replacement were adjusted to account for regional wage differences.
- For network reinforcement, the CMA only applied the industry-wide expenditure step, rather than the company-specific calculation.

3

Conceptual and practical challenges with the WBB adjustment

Due to several conceptual and practical complications, as set out below, calculating WBB is not simple. Considering that WBB is a key determinant of the level of additional investment in asset health over AMP8, while also being an important tool for protecting customers, care therefore needs to be given to how WBB is implemented. To overcome these challenges and develop a robust approach to WBB for future years, we recommend that Ofwat looks closely at the different options available, and works with companies and Water UK to reach a view on the approach that best fits the

¹⁸ For the purposes of this report, meter replacement is not considered an asset health activity, but the WBB adjustment for meter replacement costs served the same function as for the asset health cost change applications, meaning the calculation is comparable.

¹⁹ A higher WBB mains renewal rate was applied to companies with below average asset health levels, on the assumption that they should be able to deliver more with future base allowances to make up for past under-delivery.

²⁰ A higher unit cost was applied to Thames due to its more expensive operating area.

investment needs of water infrastructure and meets government objectives (such as those outlined in Defra's Water White Paper).

WBB needs to carefully balance two competing priorities

The risk of customers paying twice – which underpins WBB – arises when companies are over-funded relative to the efficient cost associated with the level of activity required. However, in relative terms, the risk of customers paying twice is low, indicating that greater weight should be given to ensuring that the necessary investment is made. This is because:

- It is well-recognised that there is a material gap in asset health investment in the industry. Put simply, at this stage, to fulfil customers' needs of ensuring reliable services into the future, more investment in asset health is required.
- This is despite the fact that at previous price controls, on average across the industry and across time, companies have: exceeded their total cost allowances; spent more on their assets than they are implicitly funded for in the base models;²¹ and earned returns in line with overall allowed returns. Together, this indicates that at the industry level, allowances are insufficient to deliver the level of investment in asset health that is needed. We demonstrate this point with data later in this section.
- Therefore, any additional investment in asset health delivered through the cost change process would be expected to benefit customers. For example, even if an efficient Company A was planning to spend £10m on Priority Asset 1 from its base cost allowances, providing it an additional £10m through the cost change process could allow it to reprioritise the available £10m towards addressing gaps in asset health investment elsewhere (and Ofwat could put in place mechanisms to ensure that it does so, e.g. use-it-or-lose-it allowances²²). Therefore, for efficient Company A, there is limited risk of being over-funded at an aggregate level.
- In turn, the risk of customers paying twice is low. By comparison, the potential risks and consequences to customers of not delivering the investment are substantial.

The WBB adjustment is therefore not simply a matter of mitigating the risk of customers paying twice, but rather a more delicate issue that needs to manage both competing priorities.

The importance of ensuring companies are sufficiently funded as opposed to simply focussing on customers not paying twice is demonstrated by: (a) the scale of the asset health gap relative to allowances; and (b) the fact that, on average across the industry, companies have been exceeding cost allowances and earning returns in line with the allowed regulatory return (and so are not cutting spending in order to outperform on totex or earn a higher return), yet have still fallen short of the level of investment needed.

The size of the gap in asset health investment means the risk of companies being over-funded appears relatively low

The scale of investment required for achieving a sustainable level of asset health is demonstrated by the approach developed by WICS. This quantified the sustainable level of asset replacement expenditure using a bottom-up approach. The results indicated that, for Scottish Water to replace its

²¹ Albeit, as we explain below, this comparison is complicated under the totex regime.

²² We discuss these mechanisms further in section 4.

assets at a sustainable rate, future asset replacement expenditure would need to increase to more than double the previous price control.

Analysis by Economic Insight, which applied the WICS approach to six participating companies in England and Wales, reached similar conclusions. This analysis found that the long-term sustainable level of asset replacement expenditure (not including other forms of capital maintenance) is between 40% and 250%²³ greater than Ofwat's existing implicit capex²⁴ allowances, depending on the company. With this in mind, the risk of companies being over-funded and customers thereby paying twice is evidently small when compared to the scale of investment required.²⁵

Companies have historically been investing more in asset health than their implicit allowances

On average across the industry, companies have historically been spending more than their full allowances and earning a rate of return in line with the allowed regulatory returns, yet the level of investment in assets has been insufficient. This suggests that the industry is not intentionally reducing spending on assets in order to improve performance on totex or increase returns. The fact that this is the case across the industry indicates that insufficient investment is therefore not an issue of individual company behaviour; rather, it reflects that the allowances have been too low.

We demonstrate this by reviewing industry-wide expenditure over previous price control periods. Due to the nature of the totex framework, we cannot analyse exactly what companies have spent relative to allowances on the seven priority assets that are eligible in the 2026 round of the cost change process, or even on asset health overall, since allowances are not set at that level of granularity. Instead, we first consider spending at the totex level. This shows that, despite being incentivised to spend efficiently, on average across the industry, companies are overspending relative to their base cost allowances. Simultaneously, and partly because of this overspend, companies have not earned excessive returns.²⁶ Specifically:

- **The industry is overspending on totex.**²⁷ The NAO found that in “the PR14 control period, the total cumulative overspend was less than 1% of allowed spend”, while during the “PR19 control period, companies have overspent every year so far...totalling...12% of allowed expenditure”.²⁸ The NAO's report was released prior to the final year of the PR19 period and, therefore, does not include it. However, more recent analysis by Ofwat confirmed that during the entire PR19 period there was sector-wide overspend. Specifically, Ofwat found that “companies generally overspent their wholesale base expenditure allowance” (as Figure 3 illustrates) and “[a]t a sector level, companies spent 13.5% more than their base allowance. This variance is equal to £4.6 billion” [emphasis added].²⁹

²³ As we explain at footnote 12, this range is for water service assets only. The equivalent range for wastewater service assets only is 20% to 170%.

²⁴ As we explain at footnote 13, the implicit allowances are calculated in line with the approach in Ofwat's financial models and involves applying the capex share of requested base costs from DDRs to Ofwat's FD allowances.

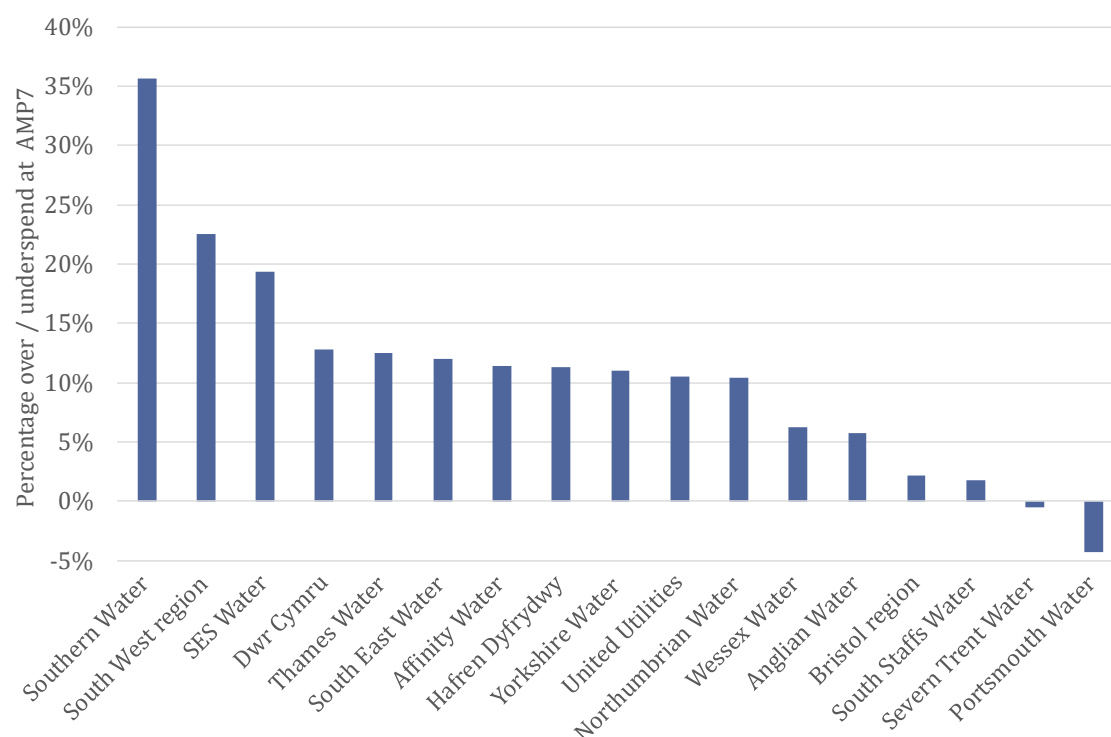
²⁵ ‘Estimating asset replacement expenditure in the water industry’ Economic Insight (2026).

²⁶ Totex over- or underspend and the rate of return are related issues which reflect two sides of the same coin, where higher totex overspend is linked to lower returns, and vice-versa.

²⁷ Ofwat and CMA claims that this is because of the energy shock from the Russia/Ukraine war but, in practice, this is impossible to disentangle.

²⁸ ‘Regulating for investment and outcomes in the water sector’ National Audit Office (2025); paragraph 3.13.

²⁹ ‘Water company performance report 2024-25’ Ofwat (2025); page 43.

Figure 3: Total base expenditure compared to allowances over the 2020–2025 period (2017–18 prices)

Source: Economic Insight analysis of Ofwat's Water company performance report 2024–25.

Notes: Positive percentages reflect overspend; negative percentages reflect underspend.

- The industry – on average – is making returns in line with the regulated weighted average cost of capital (WACC).** This is illustrated in Figure 4, which compares the return on capital employed (ROCE) to the WACC in the last four price control periods at an industry level. As is shown, industry-wide returns have historically been close to the average vanilla WACC, falling below the WACC at PR19. Crucially, based on Ofwat's latest Monitoring Financial Resilience Report, companies' returns in the PR19 period were driven by outperformance on financing, rather than operational performance. Specifically, the average return on regulated equity (RORE)³⁰ in the PR19 period was pushed up by 1.87% by financing outperformance, while simultaneously being reduced by 4.26% due to operational performance.³¹ This indicates that part of the reason companies were able to overspend during this period was due to increased investment funding. However, a key driver of the financing outperformance was higher than expected inflation (which may not endure). As such, the recent rate of return and expenditure may not be sustainable and, should companies' financing outperformance dissipate (as is likely to happen), they will be less able to maintain (or increase) investment in assets while achieving the allowed rate of return.

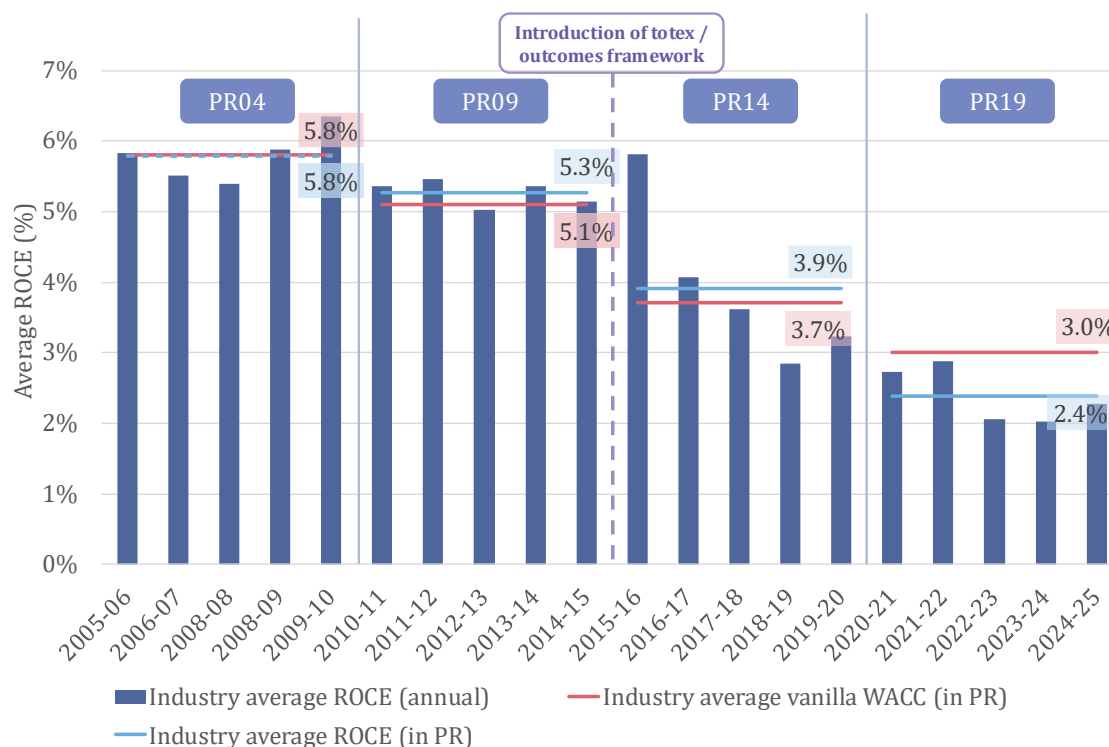
While there will be variation between companies in these metrics, with some individual companies spending less than their allowance or achieving above-WACC returns, it is more appropriate to draw

³⁰ RORE provides another measure of company returns alongside ROCE, but focuses on how shareholder returns vary depending on company performance.

³¹ 'Monitoring Financial Resilience Report 2024–25'. Ofwat (2025); page 28.

conclusions from the industry level so that we can assess the regulatory settlement as a whole and what this has enabled companies to deliver.

Figure 4: Industry average ROCE performance against the real vanilla WACC in each price review period (2005–06 to 2023–24)



Source: Economic Insight analysis of water company data.

Notes: (i) The industry average ROCE performance and the average real vanilla WACC are calculated as an RCV-weighted average across all companies. (ii) The averages for each period are calculated as simple averages across each individual year.

A closer indication of how companies are using their allowances to invest in asset health specifically can be provided by focussing on capital maintenance expenditure ('base capex') – which is the most relevant subcategory of base costs. Despite companies not having a specific allowance for base capex (in line with the totex approach) we can estimate the implicit allowance by applying the proportion of base capex within business plan (BP) requested base costs to Ofwat's base cost allowances. We find that over PR14 and PR19, the industry overspent its implicit base capex allowance by 5% in water and 18% in wastewater, as shown in Table 1.

The finding that companies are already spending more on their assets than they are implicitly funded for in the base models, further supports the conclusion that any additional investment in asset health delivered through the cost change process would be expected to benefit customers (either through more investment on the priority assets or reallocated investment on other assets). The importance of the cost change process in delivering this investment is heightened by the fact that the past overspend levels cannot be relied on to continue, due to them being largely funded by investment that may not be sustainable. Making the WBB adjustment is therefore a careful balance between facilitating this investment and mitigating the risk of customers paying twice.

Table 1: Industry total capital investment and maintenance implied overspends, PR14 and PR19 (2022–23 prices)

	Wholesale water	Wholesale wastewater
Capital maintenance implicit allowance (£m)	£19,904	£17,394
Capital maintenance expenditure (£m)	£20,926	£20,592
Capital maintenance overspend (% of allowance)	5%	18%

Source: Economic Insight analysis of Ofwat data.

Notes: (i) Capital maintenance expenditure is defined as including renewals for both water and wastewater. (ii) Capital maintenance allowances are calculated using the portion of base capex (i.e. excluding plus capex) within Business Plan requested base allowances, applied to Ofwat base cost allowances. For PR14, the average of Northumbrian's and Wessex's proportion of requested capital maintenance is used for other companies as we do not have access to the data for the other companies. Allowances are then uplifted using the portion of actual expenditure on renewals in order to account for renewals expenditure. (iii) The values differ slightly from a previous version of this analysis submitted in the CMA redeterminations as we now have outturn data for 2024/25.

The totex approach means that base does not 'buy' investment in any specific asset – rather, companies are incentivised to deliver efficient investment optimised for their specific contexts

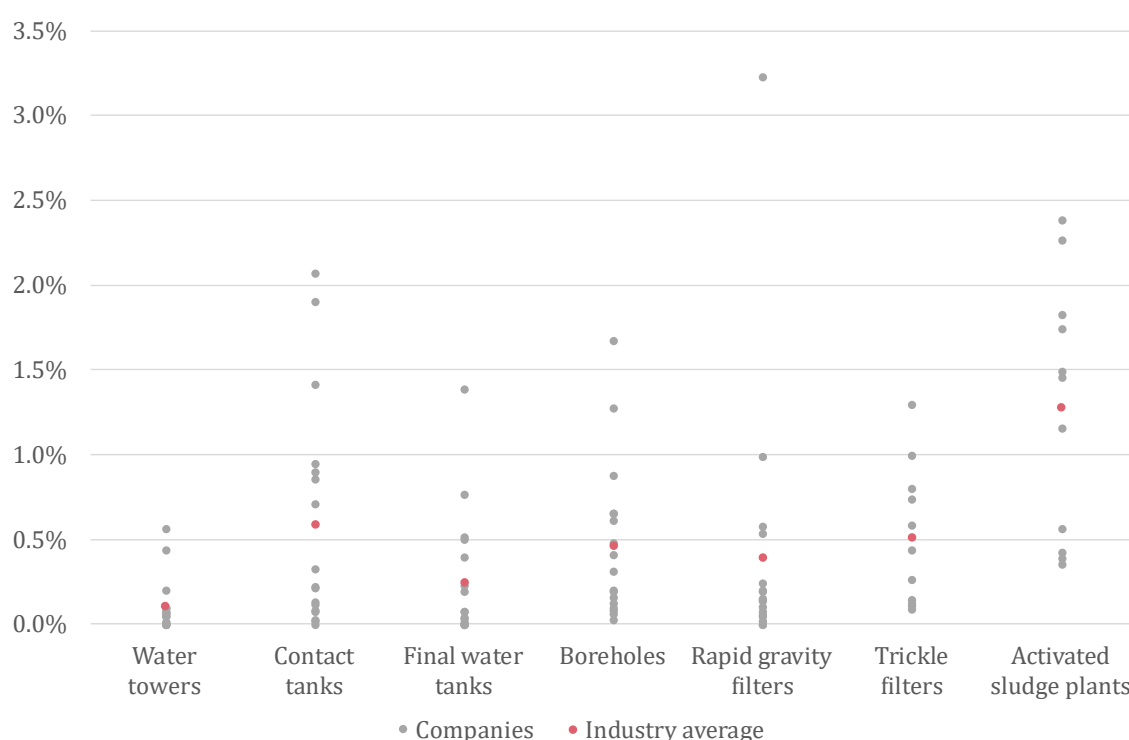
Quantifying WBB is made more challenging by the fact that it goes against the grain of how allowances are set in reality and, by extension, how companies operate. Under the totex approach to regulation, water companies have cost allowances set at an aggregate level. They are then incentivised to spend the allowances efficiently but have discretion over how the allowance is allocated across different areas. While companies will all have the same general categories of expenditure within these allowances (including asset health-related activities), the efficient distribution of the allowance between these categories will vary depend on their individual circumstances. Therefore, by definition there is no set level of WBB for asset health and so any calculation of it must, at best, be an imperfect estimate.

For example, over PR19, South West Water spent 5.3% of its wastewater base allowances on the seven priority assets in the 2026 cost change process, whereas Northumbrian Water spent 23.6%. Within the same period, Northumbrian's own annual investment in priority assets ranged from 19.7% to 27.3%. Given that both of these companies were incentivised to use their allowances efficiently, we cannot say with any certainty if one company 'should' have been spending more or less, i.e. we therefore cannot know exactly how much companies 'should' be spending on these areas. This is further exaggerated by the fact that there is also considerable variation between companies' asset bases.

This issue becomes more challenging when considering disaggregated expenditure for individual assets – as is required in the cost change process. Estimating WBB for each priority asset requires a more granular assessment of asset health spending by companies than is provided by the totex regime. However, because companies have discretion over what assets to spend money on at what point in time, WBB becomes a moving target that varies (i) between companies, and (ii) over time. For example, for a company that has a relatively large proportion of gravity sewers in its asset base, it might be efficient to spend 20% of base cost allowances on this asset; whereas a company with fewer gravity sewers may only need to spend 5% of its allowance. Similarly, if a company has replaced or maintained a large proportion of its gravity sewers in recent years, then in upcoming years it will likely spend less on this asset.

The *between-company* variation in the split of spend between assets arises because companies operate in different environments and have different priorities that affect how they allocate expenditure. The extent of this variation is shown in Figure 5, which sets out the proportion of expenditure allocated to selected priority assets per company over PR19.³² The equivalent data for the remaining assets is provided in Figure 9 in the annex. As shown by the wide spread of data points, there is little consistency in the level of spending per asset. For example, this data implies that Northumbrian used 17.7% of its base to 'buy' gravity sewers (see Figure 9) and just 0.2% on boreholes. Whereas Severn Trent spent a materially smaller proportion on gravity sewers (6.6% of base) but relatively more on boreholes (1.7% of base). As such, any credible estimate of WBB must attempt to account for this variation between companies.

Figure 5: Expenditure on selected priority assets as proportion of total base expenditure over PR19



Source: Economic Insight analysis of workload and expenditure dataset and Ofwat base cost models.

Note: For water service assets, we present expenditure as a proportion of total wholesale water base expenditure, while for wastewater service assets, we present expenditure as a proportion of total wastewater network plus and bioresources base expenditure.

As well as differences between companies, there is also variation *over time* in how a company allocates its expenditure on assets. Indeed, Ofwat raises this point itself in its WBB guidance, stating that the approach to WBB should acknowledge “*that spend on an asset class across periods is likely to vary over time*”.³³ The efficient choice of which assets to invest in at a given point in time will depend on which assets are most in need of maintenance or replacement. This, in turn, will hinge on a myriad of factors including investment decisions made in the past – since assets which have recently

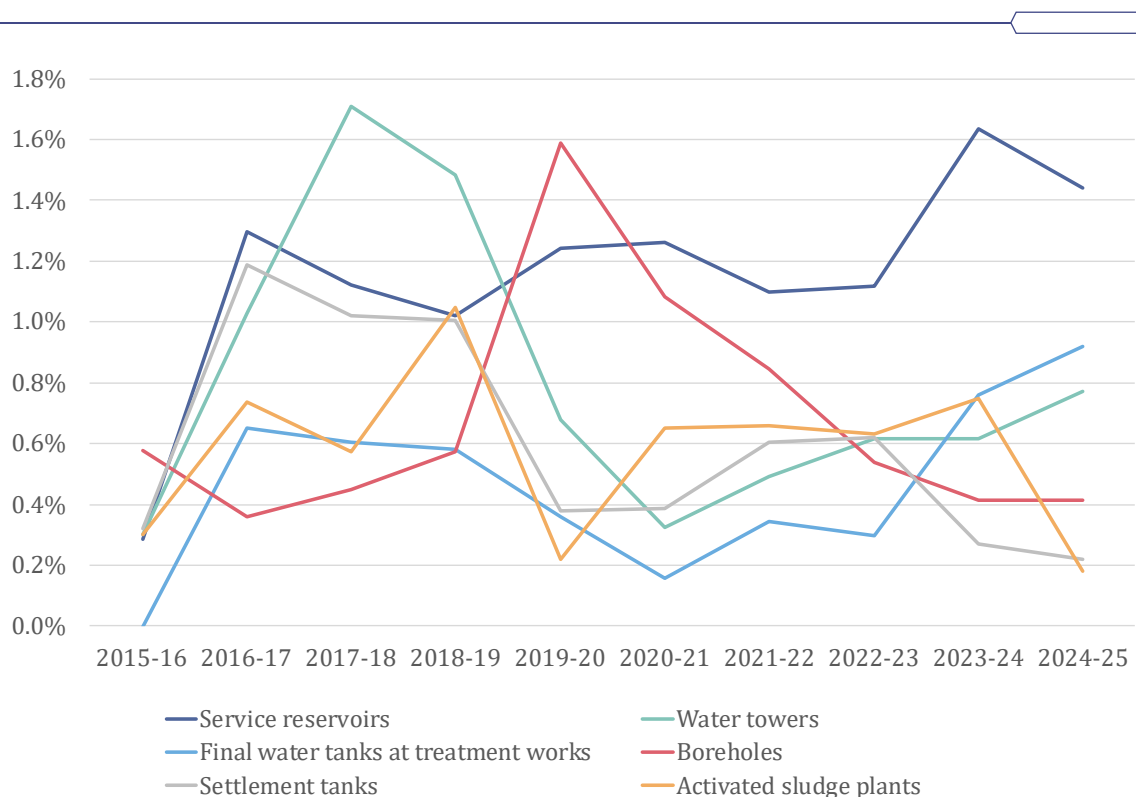
³² We have used the proportion of base costs rather than the total pounds figure in order to allow direct comparisons between companies. We have divided the priority assets between two charts for readability.

³³ ‘PR24 Cost change process: Asset health investment assessment guidance’. Ofwat (2025); page 21.

been maintained are less likely to need further investment in the next period. Historical expenditure will not necessarily mirror future requirements.

To demonstrate this, Figure 6 below shows Anglian's spending on a subset of priority assets over 2015/16 to 2024/25.³⁴ This shows clearly that annual expenditure per asset varies substantially year-on-year, making it unlikely that any estimate of WBB will be accurate. For instance, looking at the spending on boreholes in 2019/20 would suggest that Anglian uses a relatively large proportion of base costs on boreholes – implying a large WBB adjustment. However, looking at the other years, it is clear that this was something of an outlier. Even taking an average over this period does not provide an accurate indication of the likely expenditure on boreholes in a given year, as each individual year strays from the average by around 40%.

Figure 6: Anglian Water's expenditure on priority assets over time as a proportion of base expenditure



Source: Economic Insight analysis of workload and expenditure data.

Notes: (i) Gravity sewers are excluded for readability. (ii) Expenditure on priority assets relating to the water service are presented as a proportion of total base expenditure for wholesale water, while expenditure on priority assets relating to the wastewater are presented as a proportion of total base expenditure for wastewater network plus and bioresources.

The application of WBB rests on base cost models which themselves are uncertain

Since WBB draws from companies' base cost allowances, it is relevant that there are several concerns with these models:

³⁴ We have excluded the assets with the highest and lowest shares of expenditure to improve readability.

- The models are based on historical data from a period when there is widely recognised to have been a material gap in asset health spending. It follows that this gap in asset health funding will be 'baked' into current base cost allowances. Further to this, historical data is not necessarily a strong predictor of the future. As highlighted above, companies' spending priorities will vary over time and so we cannot rely on historical trends to tell us what companies require now.
- The IWC criticised the modelling approach for over-generalising companies' spending needs, stating that *"Ofwat has relied too heavily on a data-driven, econometric approach, and has not taken sufficient account of company-specific conditions and challenges."*³⁵
- The cost allowances are benchmarked at the UQ efficiency level based on the model results. However, in the context of the above concerns with the benchmarking models, several companies argued at PR24 and the CMA appeals for a less strict benchmark, claiming that the UQ was overly stretching and may understate the costs required.

The five companies that appealed to the CMA had their base cost allowances determined by different models. These ultimately calculate base costs using the same steps as Ofwat's (i.e. estimated using historical data and then projected forward with a UQ efficiency challenge) and so do not overcome the issues described above. In addition, there are other complications that the CMA's models give rise to in the context of WBB.

- The CMA relied on a more data-based, computational approach to defining and selecting the cost drivers, which risks moving further away from reflecting the true operating environment of the companies. Understanding the key cost drivers requires both data and input from operational experts.
- Compared to Ofwat's models which were developed over several years with opportunities for input and stress-testing from companies and other third parties, the CMA's approach received less scrutiny, making it potentially less reliable.
- The base cost allowances for the five appealing companies are derived differently to those of the others, making a consistent WBB calculation across companies even more challenging.

Given that the base cost models are unlikely to fully capture each company's future cost requirements, to the extent that these allowances are uncertain, any WBB estimate drawn from them will also be uncertain. This serves to compound the existing limitations in WBB arising from the inherent challenges described in the previous subsection.

4

The guiding principles for WBB and assessment of proposed options

In light of these challenges, it is clear that WBB is not a trivial matter and care should be given to ensure the approach used satisfies Ofwat and the companies, and delivers the best outcome for customers. The optimal WBB adjustment would be one that reflects each company's specific circumstances, as this is the most reliable way to realistically overcome the complexities described above. This would also align with the IWC's recommendations for adopting a more supervisory approach to handling asset health and the regulatory system more broadly. Making the WBB adjustment in this way may involve moving away from a purely data-based approach (as in Ofwat's approach to the sector-wide CACs) and instead drawing on a range of evidence to understand how WBB for a specific company differs across assets and over time. This may also include testing (or

³⁵ *'Independent Water Commission: Final Report'*, Independent Water Commission (2025); paragraph 417.

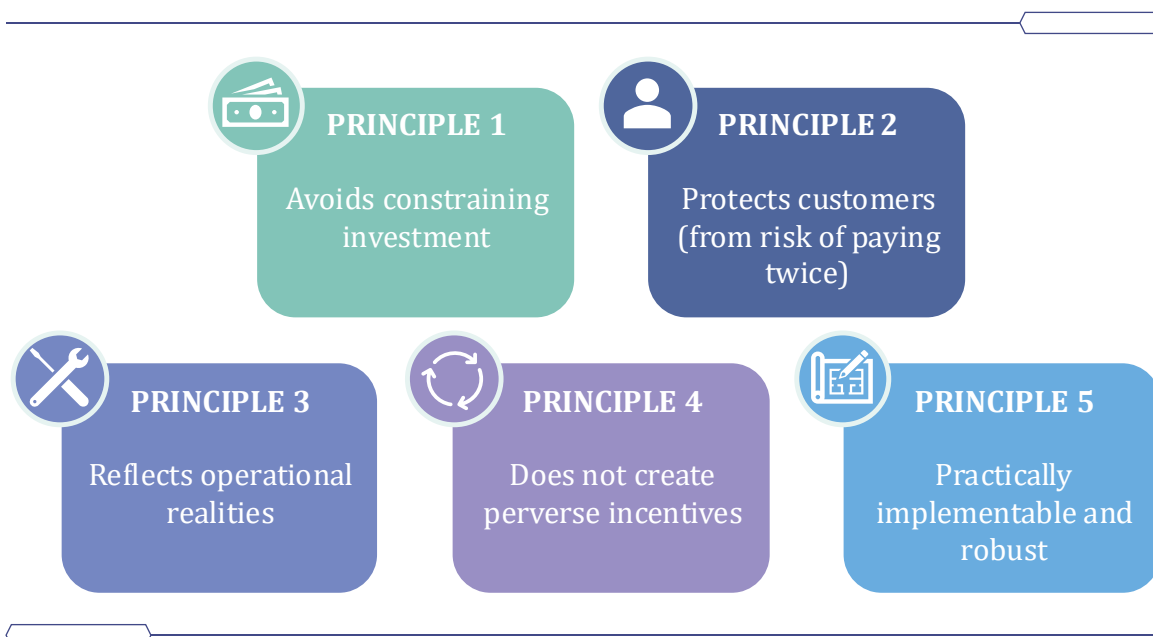
combining) different methods and selecting the one that best balances the risks at stake and addresses the challenges set out above. The result of such an approach would be varying (and, in some cases, zero) WBB adjustments across companies and assets, calibrated in a way that delivers the best outcomes for customers.

To support Ofwat and companies in understanding which approach to WBB (within the confines of the cost change process guidance) is likely to deliver the best outcomes for customers, in this section we: (a) set out a conceptual framework to guide the development of the approach consisting of five guiding principles; and (b) assess the options currently available for calculating WBB to understand how they could contribute to the solution for WBB, including the key analytical decisions involved. We do this through six steps:

- First, reflecting the discussion in section 3, we consider the guiding principles that the approach to WBB should adhere to.
- Second, we set out the current options that have been proposed for estimating WBB.
- Third, we consider and make recommendations on the key analytical decisions that these options entail.
- Fourth, we assess each option for estimating WBB against the principles in step 1 to understand their relative strengths and weaknesses, and the circumstances in which some options may be more or less appropriate.
- Fifth, recognising that any approach to WBB is inherently limited, we discuss potential alternatives to the WBB adjustment.
- Finally, we discuss the key implications of our assessment for the solutions to WBB.

The guiding principles for a workable approach

We have developed a framework to guide the development of a workable approach to WBB, drawing on the concerns set out in section 3 and the principles in Ofwat's guidance (noting that these are non-exhaustive). We consider that there are five principles that the approach to WBB should take into account, which we summarise in Figure 7 and explain below.

Figure 7: Guiding principles for a working approach to WBB

Source: Economic Insight.

Principle 1: Avoids constraining investment

The key priority for the cost change process – and, by extension, WBB – is to minimise the extent to which it risks constraining the delivery of investment in asset health. Making any adjustment for WBB risks constraining investment to some degree because the size of the adjustment is inherently uncertain, as explained in section 3. It follows that there is a risk of overestimating the level of WBB, leaving companies with insufficient funding to deliver the proposed investments in asset health. Given that WBB cannot be calculated perfectly, approaches that tend to result in smaller adjustments will be more likely to fulfil this principle and avoid constraining investment.

However, for the purposes of this report, our assessment is primarily conceptual (i.e. we are not estimating the size of adjustment from each option). Therefore, we cannot determine which approach results in the lower adjustment in practice. Instead, we consider that approaches which align more closely with how individual companies intend to allocate funding are less likely to constrain investment, compared to approaches which challenge companies to allocate funding according to industry-wide benchmarks (that will not reflect company-specific circumstances or priorities).

Principle 2: Protects customers (from risk of paying twice)

It is worth noting that protecting customers can be considered a broad aim that encompasses facilitating investment (as per Principle 1 above). This is because delivering critical investments that maintain service levels over the long-term is in current and future customers' best interests. However, for the purpose of assessing the options for WBB, we will consider protecting customers purely from the narrow perspective of *reducing the risk of paying twice*, which aligns with Ofwat's motivation for applying the WBB adjustment, and differentiates from Principle 1.

The practical challenges of calculating WBB mean there is a trade-off between Principle 1 and Principle 2. If WBB could be calculated perfectly, then companies would be funded to deliver the precise investments they need to. This means there would be no risk of customers paying twice and

companies would be able to deliver the critical investments in asset health they are proposing. However, because WBB cannot be calculated perfectly, there is a trade-off between providing either:

- (a) **greater certainty that investment is delivered** (i.e. prioritising that companies receive sufficient funding to deliver proposed investment while accepting some risk that customers may pay twice); or
- (b) **greater certainty customers do not pay twice** (i.e. minimising the risk customers pay twice at the risk companies do not receive enough funding to deliver proposed investments).

Developing a practical approach to WBB involves navigating this core trade-off by making a judgement about the appropriate balance of risk between the two options. As set out in section 3, we consider that the risk of customers paying twice is low in the current context given the scale of investment required and risks to customers of it not being delivered. Therefore, in balancing the trade-off above, more weight should be placed on ensuring greater certainty that the investment is delivered (i.e. Principle 1).

Principle 3: Reflects operational realities of the totex regime

Consistent with the design of the totex regime, assets should not be considered in silos because, in reality, companies face trade-offs where increasing expenditure on one asset implies reducing it elsewhere. As a result of these trade-offs, companies must make strategic decisions around which assets to prioritise for investment.

As identified in section 3, the approach to WBB should recognise that these investment decisions differ both:

- **Between companies.** Under a totex regime, companies should direct investment efficiently given their network requirements and regional characteristics. Therefore, it can be both efficient and in customers' best interests for the allocation of investment to vary between different companies. Suppose Company A allocates 3% of its base allowance to maintaining boreholes and 8% to gravity sewers, while Company B allocates 5% to boreholes and 6% to gravity sewers. Both companies could be operating efficiently and in their customers' interests given their individual circumstances, despite 'buying' different things with their base allowances. Crucially, these variations can be driven by regional factors which are outside of company control, and so companies are limited in their ability to change their spending to match an industry-wide level – as implied by Ofwat's approach to WBB for the industry-wide CACs.
- **Across time.** Even within a company, there can also be variation in how expenditure should be optimally allocated over time, reflecting which assets are in most need of maintenance. For example, Company A may have historically allocated 8% of its base allowance to maintaining gravity sewers. As a result of its historical spending, its gravity sewers may now be in relatively good condition, and the company will only allocate 5% of its base allowances to them going forward. This would be the efficient thing for the company to do for its customers.

Principle 4: Does not create perverse incentives

The approach should avoid creating perverse incentives whereby prudent investment decisions (historical or planned) are penalised and/or poor investment decisions are rewarded. For instance, a company that has historically spent a relatively high amount maintaining an asset should not necessarily receive a large adjustment for WBB as this risks penalising, and therefore disincentivising, prudent historical investment decisions. This is illustrated by the example of

Company A above. As it is efficient for Company A to spend 5% of its base allowances on gravity sewers in the upcoming period, some approaches to WBB may risk incentivising Company A to defer a portion of this investment so that it can increase its future allowances for gravity sewers through the cost change process. This would result in the cost change process failing to meet the need for urgent investment.

Principle 5: Practically implementable and robust

There are two key aspects to identifying a workable approach for the cost change process:

- The approach should be simple and transparent such that there is a clear link between WBB, output levels, and current cost allowances. Overly mechanistic approaches are therefore less suitable.
- The approach should also lead to credible and robust results and not give implausible estimates (e.g. negative estimates for WBB). However, as the focus of this report is on the conceptual properties of the approach, we have not directly assessed this.

Up to now, five different options for estimating WBB have been put forward

Option 1: Modifying econometric benchmarking models to estimate implicit allowances for priority assets

Severn Trent Water has proposed a method to calculating WBB along the following steps. Ofwat has endorsed this approach in the asset health cost change guidance.

- **Step 1:** remove historical expenditure on priority assets – for which the company is applying for additional funding – from the dependent variable of the econometric benchmarking models.³⁶
- **Step 2:** re-estimate the econometric models with this new dependent variable to provide an estimate of what allowances would have been without the priority assets.
- **Step 3:** take the difference between the results of the re-estimated models and current allowances (which are inclusive of the priority assets) to provide an estimate of the implicit allowance for the relevant priority assets.

Option 2: Scaling industry-wide run rates and unit costs to company-specific asset bases

As explained in box 1, Ofwat employed three different approaches to calculating WBB for the sector-wide CACs at PR24. The first of these (used for mains renewal and meter replacement) works as follows.

- **Step 1:** calculate the historical industry average replacement rate per priority asset in percentage terms.
- **Step 2:** calculate an industry-wide unit cost of replacing the asset.
- **Step 3:** multiply the values from steps 1 and 2 by the number of units of the asset each company has to provide an estimate of WBB.

³⁶ Severn Trent's initial proposal, as stated in the asset health guidance document, indicates that as well as costs, relevant cost drivers could also be removed from the models. For simplicity, we have focussed on the removal of costs only.

Option 3: Scaling company-specific historical run rates to current allowances

Anglian has offered an approach which, like Option 2, also makes use of historical asset replacement activity levels, but adjusted for changes in base allowances. We anticipate this would involve the following steps.

- **Step 1:** calculate the historical company-specific replacement rate per priority asset in percentage terms.
- **Step 2:** project a future replacement rate from this based on the percentage difference between historical expenditure and PR24 base cost allowances.
- **Step 3:** apply this percentage to the number of units of the priority asset the company has and multiply this by the unit cost to provide an estimate of WBB for that priority asset.

Option 4: Scaling industry-wide historical expenditure to current allowances

This option was proposed by Thames Water for the cost change process and Ofwat has encouraged companies to use it. It was also used by Ofwat as part of the network reinforcement WBB calculation described in box 1. It is based on the proportion of base costs that have been historically spent on priority assets, assuming that the same proportion will be spent in future.

- **Step 1:** identify the average proportion of base expenditure, across the industry, that has historically been allocated to the relevant priority assets for which additional funding is being requested.
- **Step 2:** apply this proportion to each company's PR24 base cost allowances to estimate the level of WBB for the relevant priority assets (i.e. those for which the company is applying for additional funding).

Option 5: Applying an efficiency challenge to company-specific historical expenditure

Alongside the method described under Option 4, Ofwat also calculated WBB for network reinforcement using company-specific data. This could be applied within the cost change process as follows.

- **Step 1:** calculate the company-specific average annual expenditure on the relevant priority assets for which additional funding is being requested.
- **Step 2:** deduct from this the percentage efficiency gap between the company and the UQ according to the base cost models to estimate the annual level of WBB for the relevant priority assets (i.e. those for which the company is applying for additional funding).

Each approach will involve making analytical decisions that may influence the result

As Ofwat has allowed companies some freedom over which method they use, before assessing the options it is important to consider the best way to implement each method. Depending on the approach taken, within the calculation there may be analytical decisions to be made which could potentially have a material impact on the resulting figure.³⁷ Therefore, below we briefly discuss these

³⁷ Initial testing by Northumbrian Water indicates that the decisions around the choice of averaging method and time period can affect the adjustment by hundreds of millions of pounds per asset (across the industry).

decisions and advise on the conceptually best choice – but noting that some decisions may only be fully understood once data has been applied, which is outside the scope of this work.

Understanding these decisions makes it easier to assess the five options because: (i) some options require fewer decisions to be made than others (thereby making them less sensitive to these choices); and (ii) our recommendations on each decision may help inform the circumstances in which one option may be favoured over another (e.g. when to use company-specific measures versus industry-wide). These factors are taken into consideration when making our assessment in the following section.

Econometric versus scaling approaches

At a high level, WBB can either be calculated by making direct adjustments to the econometric models used to determine base allowances, or by deriving a figure from the original results of the models. Reflecting on the five guiding principles set out above, we consider that approaches that use econometrics are generally less desirable. This is because econometric-based approaches:

- are not fully transparent (thereby performing poorly on Principle 5);
- reflect a top-down assessment which means that any WBB adjustments would be removed from the operational realities of investment in (specific) assets (thereby performing poorly on Principle 3); and
- risk constraining investment, since they rely more heavily on the base cost models, which as explained above, have inherent limitations (thereby performing poorly on Principle 1).

Shifting away from econometric-based methods is consistent with the IWC's recommendations for future regulation. For instance, the IWC concluded that Ofwat's current approach to regulation *"has relied too heavily on a data-driven, econometric approach, and has not taken sufficient account of company-specific conditions and challenges."*³⁸

Measures of activity levels versus costs

We consider that WBB should, in most cases, be calculated based on expenditure levels rather than activity levels. Defining WBB using activities risks introducing inconsistencies into the calculation and therefore increasing the risk of companies being under- or over-funded. This is because:

- (a) The overall approach to regulation is built around providing companies with set cost allowances, within which they make efficient decisions around the level and type of activity to undertake. Setting WBB according to activity levels is therefore inconsistent with the operational reality that companies face.
- (b) The efficient unit costs of a given asset health-related activity will vary over time and between companies, making it difficult to reliably estimate the costs required for a specific activity level.
- (c) Within a particular priority asset, there may be different types of activity that companies need to undertake depending on their specific circumstances. These activities may have different (efficient) unit costs and activity levels but are equally important – for example, replacing one rapid gravity filter (RGF) that is near the point of failure may cost the same and be of equal

³⁸ *'Independent Water Commission: Final Report'*, Independent Water Commission (2025); paragraph 417.

priority as repairing six newer RGFs. Calculating WBB using a fixed activity level would fail to account for this distinction and may result in a poorly estimated WBB.

We recognise that the extent to which these points apply may vary between different asset types, as activity levels may be more consistent / clearly defined for some than others. As such, there may be exceptions in which activity levels are suitable.

Company-specific versus industry-wide benchmarks

WBB estimates based on company-specific data are usually preferred to those which use a fixed level of activity/expenditure based on industry-wide benchmarks such as the UQ or industry average. WBB is driven by each company's specific needs, including the current condition and characteristics of its assets. Estimating WBB as fixed industry-wide adjustment fails to reflect these differences and risks implausible estimates. Further, adopting more tailored approaches aligns with the IWC's recommendations for a supervisory system of regulation and managing asset health.

The importance of using company-specific measures is illustrated by considering the examples of Anglian and Northumbrian's expenditure from section 3. While Northumbrian spent 6.3% (£59m) of its PR19 base costs on settlement tanks, Anglian spent less than 1% (£21m). Clearly no single figure can reflect both companies' spending allocation, let alone that of 15 other companies.

However, there may be situations in which, for a specific company and asset, an industry-wide measure is used. Most obviously, this would be the case if a company's historical asset health expenditure is demonstrably different from its planned spending in AMP8, meaning that using its specific data would result in an unrealistic WBB estimate.

Unit costs

Notwithstanding our recommendation to use expenditure over activity levels in the calculation, Options 2 and 3 use activity levels as the foundation of the calculation rather than expenditure. To be converted into a WBB figure they therefore require an estimate of the unit cost of replacing/repairing assets. Consistent with the previous point, industry-wide measures of unit costs would not be suitable; it is unrealistic to assume that the unit cost is identical across all companies (something which the CMA acknowledged in its updates to the unit cost estimates for WBB at the redeterminations). Where unit costs are required, we recommend that companies use their own well-evidenced and assured estimates.

Method of averaging

Notwithstanding our recommendation to avoid using industry-wide benchmarks, Options 2 and 4 for calculating WBB involve a step of averaging across the industry, which also requires consideration. Although a simple step, there is an important decision over which form of average is used: the mean or median. This decision is not trivial. For example, in line with the Option 4 approach, the industry mean expenditure on service reservoirs in PR19 was 5.1%, whereas the median was 2.8%. The impact of this choice across the industry as a whole would be in the hundreds of millions.

Given the material impact of this one choice, we do not consider it appropriate to make a recommendation from a purely conceptual standpoint (reflecting the scope of the current phase of this report). Rather, the decision should be based on which method yields more plausible results. In light of the urgent need for additional investment in asset health, we advise that the choice of averaging method should turn on whichever approach provides the best balance between the risks of not delivering the investment and of customers paying twice – that is, whichever approach results in the lower WBB adjustment.

Aggregation across priority assets

Reflecting the structure of the totex regime (i.e. Principle 3), WBB is more appropriately assessed at a more aggregate level, rather than on an asset-by-asset basis. This recognises that companies are funded in aggregate and should be given freedom to make trade-offs, consistent with the wider regulatory framework. In the context of the cost change process, this implies that the adjustment to WBB should, where possible, be estimated in a way that aggregates across the priority assets *for which funding is being requested* (or, in the case of Ofwat's final decision, for which funding *has been approved*).

Choice of time period

Similarly to the averaging method, the choice of time period (where the method uses historical data to inform future spending levels) has the potential to materially influence the result, and, since there is no clear 'correct' time period, we do not consider it appropriate to prescribe a single approach. Instead, we recommend that companies choose a time period which they consider provides the best reflection of future investment needs. This should be supported by evidence to demonstrate why certain historical years should or should not be used to estimate future levels of WBB. For example, this may include evidence demonstrating that a historical period had abnormally high/low levels of investment, or that at the start of PR24 the company had planned on materially changing its level of expenditure on a specific asset compared to the past.

In cases where it is unclear which time period to use, we recommend using either the catch-up period (2019/20 to 2023/24) or the full modelling period (2011/12 to 2023/24). The main argument for using the former is that the catch-up period is the time period used to determine the efficient level of costs. So, by using this, there is consistency between allowed costs and the implicit activity levels funded by those allowances (i.e. WBB). In other words, if the total base cost allowances are estimated over a given period, the implicit level of activity funded by those allowances should logically be estimated over the same time period. By contrast, the primary advantage of using the longer modelling period is that it may better represent the long-term average expenditure level and, due to covering more years, is less likely to be skewed by a one-off year of particularly high or low spending.

However, in light of there being no clear conceptually preferable option, we recommend that the choice is taken based on whichever approach results in the lower WBB adjustment (consistent with our recommendation on the method of averaging).³⁹

RPEs and frontier shift

We consider that, where WBB is calculated using expenditure levels rather than activities, the calculation should include RPEs⁴⁰ and frontier shift.⁴¹ This is because the base cost allowances, and thus the investment in priority assets they are funded to deliver, are calculated after the application of RPEs and frontier shift.

³⁹ The time period should also be chosen to ensure there is consistency in the asset level data across all the years included.

⁴⁰ Ofwat and the CMA intend to true-up RPEs at the end of AMP8. As this is a retrospective adjustment, it does not affect the WBB estimates that companies will include in their cost change applications at present. There is, however, a question of whether the WBB adjustment should also be true-up at the end of the period. Conceptually, it would be appropriate to true-up the WBB adjustment along with RPEs, as this represents the final base cost allowances companies are provided with, and thus the investment in asset health they are funded to deliver. In practice, however, it may be disproportionate given the impact on the WBB calculation is likely to be immaterial.

⁴¹ For example, this would involve: (a) for Option 1, adjusting the implicit allowance in step 3 by RPEs and frontier shift; and (b) for Options 3 and 4, using the PR24 base cost allowances in step 2 after the application of RPEs and frontier shift.

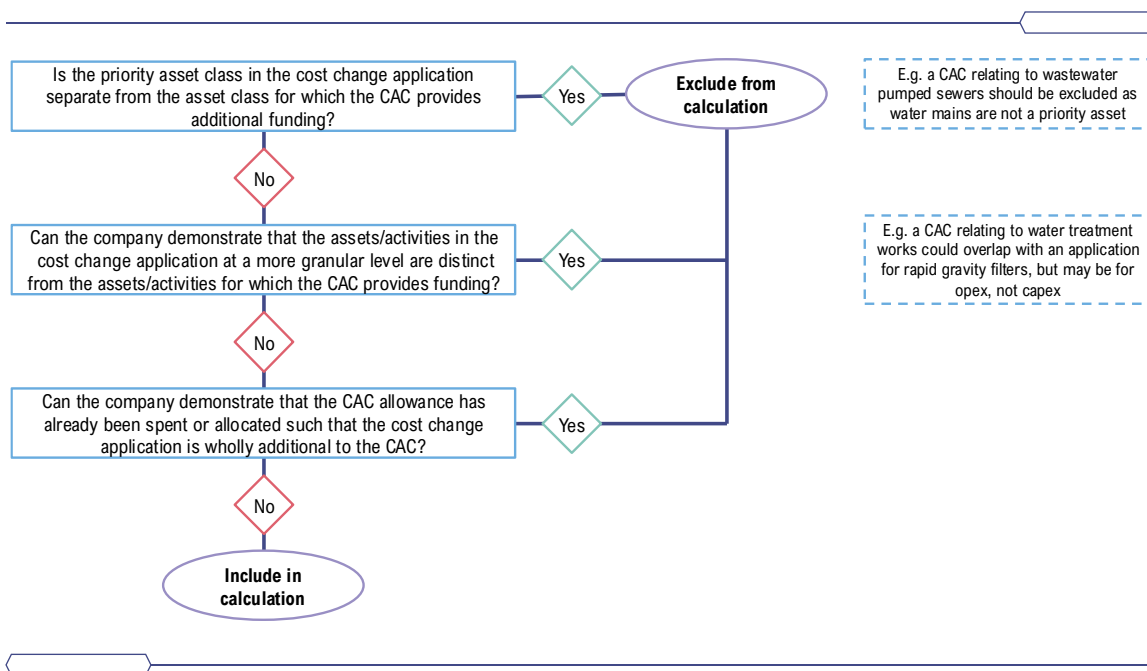
Unmodelled costs and industry-wide CACs

We consider that unmodelled costs and industry-wide CACs⁴² should be excluded from the AMP8 base cost allowances in approaches that allocate a proportion of those allowances to the priority asset.⁴³ This is because unmodelled costs and industry-wide CACs provide funding for specific cost areas that are distinct from the activities funded through the cost change process.⁴⁴ As such, the allowances provided for unmodelled costs and industry-wide CACs should not be considered to provide any implicit funding for the priority assets. Or, put differently, they do not 'buy' any investment in asset health for priority assets.

Company-specific CACs

For approaches that allocate a proportion of AMP8 base cost allowances to the priority asset, we consider that whether or not company-specific CACs should be included in the allowance is dependent on whether there is overlap between the CAC and the specific activities for which additional funding is being requested through the cost change process. We recommend that for each company-specific CAC and priority asset, the assessment should follow the steps set out in Figure 8 below.

Figure 8: Assessment for whether a company-specific CAC should be included in the WBB calculation



Source: Economic Insight analysis.

⁴² Ofwat allowed six industry-wide CACs for: energy costs, mains renewals, meter replacement, phosphorus removal, net zero, and network reinforcement.

⁴³ For example, the base cost allowance used in step 2 of Options 3 and 4. Similarly, we consider that the implicit allowance from econometric approaches (such as Option 1) does not need to be adjusted for unmodelled costs or industry-wide CACs.

⁴⁴ Unmodelled costs provide targeted funding for specific cost areas (e.g. business rates, abstraction charges, developer services), which are distinct from the activities funded through the cost change process. Industry-wide CACs provide targeted funding to address specific drivers of cost increases above historical levels (e.g. increased levels of mains renewals) which are also distinct from the activities funded through the cost change process.

Companies that appealed to the CMA

We consider that the WBB adjustments for the companies that appealed to the CMA should be based on the parameters set in the CMA's final determination. These determine those companies' base cost allowances and, therefore, what they are funded to deliver from base. This means that:

- The base cost allowances used in scaling approaches⁴⁵ should be from the CMA's final determination.
- The base cost models used in econometric approaches (like Option 1) should be from the CMA's final determination.
- The company-specific CACs considered in the above assessment should also be those from the CMA's final determination.
- Any application of frontier shift should use the CMA's final determination decision.⁴⁶

None of the options fulfil all five of the guiding principles, but each may be suitable under certain circumstances

In this section, reflecting the guiding principles and our recommendations for the key analytical decisions, we evaluate the five options that have been presented for WBB and consider the circumstances in which each option may be more or less appropriate. A summary of our assessment can be found in Table 2.

Assessment of Option 1: Modifying econometric benchmarking models to estimate an implicit allowance for each priority asset

As explained above, in general, scaling approaches are better suited than econometric approaches such as Option 1 for calculating WBB. Accordingly, we consider this option undesirable for estimating the WBB adjustment in most circumstances.

This option also aligns poorly with several of the guiding principles that we consider important for a robust approach to WBB, including:

- **Principle 1.** By relying on the econometric models, the approach is largely detached from what specific companies have been investing or plan to invest in priority assets. This means there is a material risk that the resulting WBB adjustment reflects unrealistic allocations for base expenditure for individual companies and constrains investment.
- **Principle 3.** The econometric models only reflect differences between companies to the extent that cost drivers explain expenditure on individual priority assets. We expect the explanatory power to be partial at best and, therefore, the approach is unlikely to accurately capture any companies' spending needs. It also relies on historical data, meaning it does not reflect how companies' needs change over time.
- **Principle 5.** The approach is overly mechanistic and therefore does not have a clear link to current output levels. Furthermore, it is sensitive to analytical decisions and has the potential to

⁴⁵ This includes the base cost allowances used in step 2 of Options 3 and 4.

⁴⁶ RPEs are incorporated directly into the models so do not need to be applied separately.

generate implausible estimates of WBB for some assets (e.g. negative estimates) according to initial testing.⁴⁷

That said, this approach may be more appropriate if there are certain priority assets for which the cost drivers have adequate explanatory power. This would mean it would better capture company-specific circumstances for those assets and thus perform better against Principle 1 and Principle 3.

Assessment of Option 2: Scaling industry-wide run rates and unit costs to company-specific asset bases

We consider that Option 2 is also undesirable for estimating the WBB adjustment in most circumstances, since it has several unfavourable features which cause it to perform poorly against some of the principles:

- **It relies on industry average replacement rates.** As a result, the approach does not reflect the unique circumstances that different companies face (and performs poorly against Principle 3). Furthermore, the approach risks constraining investment for companies where the industry average replacement rate is greater than what they would have delivered at AMP8 (and, therefore, performs poorly against Principle 1).
- **It relies on industry-wide unit costs.** As explained above, assuming unit costs are identical across all companies is unrealistic and doing so will exacerbate the issues resulting from using industry-wide replacement rates.
- **It is based on activity levels rather than expenditure.** For reasons set out above, calculating WBB using activity levels is less reflective of the operational reality of the totex regime than using costs, which further weakens the performance of this approach against Principle 3.
- **It is highly sensitive to analytical choices.** For example, the choice of using an industry mean or median has the potential to materially influence the results. This raises concerns over the robustness and reliability of the estimates and means the approach performs poorly against Principle 5.

There may be circumstances where Option 2 provides a viable method of calculating WBB, such as where:

- There is credible rationale that the industry average unit rate and replacement rate are reflective of the unit rate and replacement rate that the company faces for the priority asset in question. This would mean it better reflects company-specific circumstances and avoids constraining investment (and thus performs better on Principle 1 and Principle 3).
- The activity level for the priority asset in question is relatively consistent over time and clearly defined, so the limitation of using activity levels rather than expenditure is mitigated.

Assessment of Option 3: Scaling company-specific historical run rates to current allowances

An immediate advantage of Option 3 over the previous two approaches is that it uses company-specific rather than industry-wide data which, as explained above, better reflects that the efficient allocation of expenditure varies between companies. This aligns with Principle 3.

⁴⁷ *'Asset health expenditure and workload data – what base buys analysis'* Northumbrian Water (2026).

However, the drawback of using company-specific historical data is that it creates a perverse incentive (relating to Principle 4) whereby companies that made larger, efficient investments in the past are penalised by receiving a larger adjustment for WBB. This limitation was recognised by the CMA in its assessment of the network reinforcement CAC during the PR24 redeterminations.

An additional weakness of Option 3 is that – like Option 2 – it measures WBB using activity levels rather than costs. However, this could be fixed simply by amending the approach to use historical expenditure – in the same way as Option 4 but on a company-specific level. Not only would this be a better reflection of companies' operational reality, but it would also enable the WBB adjustment to be aggregated across priority assets. Aggregation may not be feasible when using activity levels since replacement/repair rates may not be directly comparable across assets, as well as there being variation in the unit cost for different assets.

Following from the above assessment, we consider this option to be more appropriate where a company's activity level for the priority asset is expected to remain consistent over time. This mitigates both:

- (a) the extent of the perverse incentive that is created by using company-specific historical data, as the company is likely to continue to deliver the same activity level from base allowances as implied by historical data; and
- (b) the extent to which the approach fails to reflect operational realities, as historical data would be a reasonable approximation of activity levels in the future.

Assessment of Option 4: Scaling industry-wide historical expenditure to current allowances

In its current form, Option 4's main shortcoming is that it relies on industry-wide data. This means that it suffers from the same limitations that we describe for Option 2 above and performs poorly against Principle 1 and Principle 3 as a result. However, this option has the benefit of using expenditure rather than activity levels to estimate WBB, meaning it avoids some of the pitfalls outlined under Options 2 and 3.

We consider that Option 4 may be more appropriate for priority assets where there is credible rationale that the share of expenditure allocated to them should be broadly consistent across the industry, or where company-specific historical approaches are deemed inappropriate due to the perverse incentives created.

The main limitation of Option 4 can be resolved by adapting it to use company-specific rather than industry-wide data. This adapted version of Option 4 would assume that each company continues to allocate the same proportion of its base costs to the priority assets as it has done historically. In effect, this combines the advantages of: (a) Option 3, in that it would be company-specific; and (b) Option 4, in that it would be based on expenditure levels. We provide an assessment of this adapted version of Option 4 below.⁴⁸

Assessment of adapted version of Option 4: Scaling company-specific historical expenditure to current allowances

The adapted version of Option 4 would be applied as follows:

⁴⁸ This version is, in effect, equivalent to our suggested alternative version of Option 3 which would also use company-specific historical expenditure.

- **Step 1:** identify the proportion of total base expenditure each company has historically allocated to the relevant priority assets for which additional funding is being requested.
- **Step 2:** apply this proportion to each company's PR24 base cost allowances to estimate the level of WBB for the relevant priority assets (i.e. those for which the company is applying for additional funding).

In relation to our five guiding principles, we consider this method performs as follows.

- **It has a medium performance against Principles 1, 2 and 3:**
 - The approach does not constrain investment (Principle 1) where, in the absence of the cost change process, companies would have allocated allowances in line with their historical spend. As such, it is less likely to prevent investment than a fixed industry-wide adjustment that fails to reflect company-specific differences. However, it may result in suboptimal allocations of investments if current investment needs differ from the past.
 - Insofar as an adjustment is made for WBB, customers are protected from the risk of paying twice (Principle 2). By using historical data companies are held to account based on what they have previously delivered, but by relying on company-specific data it provides less scrutiny than an industry-wide benchmark would.
 - The approach fulfils Principle 3 since it relies on company-specific data, which reflects that prudent investment decisions differ across companies. However, by using historical data it does not reflect that these decisions may change over time.
- **It has a poor performance on Principle 4**, primarily because it may penalise companies for prudent historical investment decisions, since companies who historically invested more will receive a larger adjustment for WBB.
- **It performs well on Principle 5** as it is likely to result in plausible estimates and is simple and transparent.

As such, this option performs reasonably against most guiding principles and, therefore, we consider it is a reasonable option for WBB in most circumstances. The key limitation, as discussed above, is that it penalises companies that have historically been prudent and directed a greater proportion of their allowances to the priority asset. Therefore, it may be less appropriate where companies have invested heavily in the priority asset in the past from their base allowances and intend to reduce this going forward.

Alternatively, *planned* expenditure data could be used in step 1 instead of historical to avoid the perverse incentive of penalising prudent past investment. This also has the advantage of accounting for differences between past and future allocations of expenditure across assets. However, we understand that, practically speaking, this version of the method may be unviable as companies generally did not set out planned expenditure at the individual asset level, as this was not required as part of the business plan guidelines. The alternative would be for companies to provide updated plans, however doing so may be burdensome and risks introducing perverse incentives whereby companies, in theory, could tactically set out their plans in order to maximise allowances from the cost change process.

Assessment of Option 5: Applying an efficiency challenge to company-specific historical expenditure

We consider that Option 5 is also reasonable option for estimating WBB in most circumstances. Taking each of our five principles in turn, Option 5:

- **Performs well against Principle 1** because it is largely company-specific and, therefore, does not risk constraining investment by assuming companies allocate their expenditure according to potentially unrealistic industry-benchmarks. Furthermore, the application of the efficiency challenge reduces the WBB adjustment, facilitating investment above what would be allowed if only company-specific historical data were used.
- **May not perform as well against Principle 2** as a result of the reduced WBB adjustment. However, as we explain in section 3, we do not consider this a significant limitation given the low risk of paying twice relative to the risk of not delivering critical investment.
- **Performs reasonably well against Principle 3** because it is largely company-specific, meaning it reflects operational realities to some degree. However, the application of the UQ benchmark may reduce the extent to which it reflects operational realities, because in practice, when setting allowances, the UQ is applied to base costs as a whole. In reality, it is unlikely that companies will reduce expenditure across all areas of expenditure by this exact proportion.
- **Performs poorly against Principle 4** because it creates a potentially undesirable incentive whereby an inefficient company (with a large efficiency gap) that historically spent very little on a priority asset would receive a small WBB adjustment. In contrast, highly efficient companies that have historically been prudent and directed large shares of base costs to the priority asset would receive large WBB adjustments.
- **Performs well against Principle 5.** It is a straightforward approach to apply that will lead to credible results.

Due to the reliance on company-specific historical data, like Option 4, this approach may be less appropriate where a company has invested heavily from its base allowances in the past and intends to reduce this going forward. This problem may be exacerbated, as a result of the incentive properties described above, where the company is also highly efficient.

Reflecting the discussion above, the table overleaf provides a summary of: (a) our assessment of the options, by assigning a Red-Amber-Green rating to indicate how each one performs against the principles; and (b) the circumstances when each option is likely to be most appropriate.

Table 2: Summary of assessment of options against principles

Option / Principle	1) Avoids constraining investment	2) Protects customers from risk of paying twice	3) Reflections operational realities	4) Does not create perverse incentives	5) Practically implementable and robust	Circumstances when option is likely to be most appropriate
Option 1						Cost drivers have adequate explanatory power for the priority asset.
Option 2						There is credible rationale that the industry average unit and replacement rate reflects the rate faced by the company for the priority asset in question. The activity level for the priority asset is consistent over time and clearly defined.
Option 3						The company's activity level for the priority asset is consistent over time and clearly defined.
Option 4						There is credible rationale that the share of expenditure allocated to priority asset should be broadly consistent across the industry. There is a particular need to avoid perverse incentives created by company-specific approaches.
Option 4 (modified)						The company does not expect to materially reduce the future allocation of base expenditure directed to the priority asset relative to historical levels.
Option 5						The company does not expect to materially reduce the future allocation of base expenditure directed to the priority asset relative to historical levels.

Source: Economic Insight.

There may be a case for having no WBB adjustment (at least for some assets)

None of these options overcome all the challenges set out in section 3 or fulfil all the guiding principles. Therefore, in the context of the need for urgent investment in asset health, it is worth considering whether *any* WBB adjustment provides adequate protection to customers in a way that supports their long-term interests. Removing WBB would be the most assured way of delivering the urgent investment that is needed. While it may give rise to a risk of customers paying twice, for reasons explained in section 3, this risk is low relative to the risk to customers of the asset health investment not being delivered. Instead, other mechanisms could be put in place to protect customers from this risk, for example:

- Use-it-or-lose-it allowances whereby companies must return any unspent allowance. This ensures that any additional allowances will genuinely go towards new asset health expenditure and companies cannot gain by avoiding the expenditure.
- Further assurance that the activity being funded is either: (i) new (i.e. not in the BP) and that the BP activities have already been undertaken; or (ii) part of the BP but the original allowance had to be directed towards new, high priority activities.
- Targeted allowances controlled through gated processes, whereby an allowance is set but accessed in stages once the company has successfully completed various assessment gates to demonstrate that the allowance is additional to existing base costs activities.

It should be borne in mind that as well as setting a WBB adjustment, the cost change process itself already provides the opportunity to protect customers through price control deliverables (PCDs). PCDs can hold companies to account to deliver the investment proposed through the cost change process by tying the costs to a specific number of outputs that they are expected to deliver, with companies having to return the costs associated with any undelivered outputs. This provides a degree of assurance that customers will not overpay (i.e. by paying for something that is not delivered). As this may be applied in combination with WBB, customers are protected twice over: once in the ex ante setting of allowances (through WBB) and again in the ex post assessment (through PCDs). This further brings into question the need for the WBB adjustment and whether the protection it provides is adequately balanced against the need for investment.

In addition, PCDs introduce a potential complication in the application of WBB that should be carefully considered. The interaction between the PCD and the WBB adjustment creates a possibility that the PCD could effectively clawback funding provided within company's original base allowances, potentially compounding the impact of any WBB adjustment. Moreover, there is a risk of this occurring purely due to miscalibration of the WBB adjustment, not due to genuine under-delivery. This is illustrated with an example in Table 3. In this example, the company has spent its full allowance on the priority asset (i.e. its view of WBB plus the final cost change allowance) but is unable to achieve the PCD with this level of expenditure and so still incurs the PCD clawback penalty. In short, from the company's view it has been funded for £30m in total expenditure on the asset, has spent £30m, and in addition must return £10m. For it to achieve the PCD and not return any funding, it may have to reallocate costs from elsewhere within its base allowance, which could mean cutting spending on other assets.

If a company efficiently spends its full implicit allowance on an asset, it should not be the case that it can also be penalised by the PCD. This disincentivises companies from submitting cost change applications as they are at risk of being in a worse financial position than if they had not applied. Therefore, the calculations of PCDs and WBB should take account of, but not interfere with, one another.

Table 3: Example of the compounding impact of WBB and PCDs

	Label	Calculation	Value
Company overall view of costs required	a	Example assumption	£50m
Company view of WBB	b	Example assumption	£20m
Company cost change request	c	$c = a - b$	£30m
Ofwat view of WBB	d	Example assumption	£40m
Final cost change allowance	e	$e = a - d$	£10m
Number of units to deliver	f	Example assumption	10
Unit cost	g	$g = a / f$	£5m
Number of units delivered by end of AMP8	h	$h = (b + e) / g$	6
Costs returned through PCD	i	$i = (f - h) * g$	£20m
Net revenue granted through cost change process	j	$j = e - i$	-£10m
Amount spent	k	$k = g * h$	£30m

Source: Economic Insight analysis.

To the extent that Ofwat retains WBB, we recommend that Ofwat considers taking a more tailored approach reflecting each company's circumstances (in line with the supervisory approach). This might involve allowing for certain cost change applications, i.e. for certain priority assets and/or certain companies to have no WBB adjustment, or a discounted adjustment, depending on company-specific circumstances. This could be permitted in situations such as where a company can demonstrate that:

- The asset can be considered 'new', such that it is not included in any historical expenditure.
- Planned expenditure on the asset at the start of PR24 was low (or zero), meaning that the base allowance has been fully allocated to other assets and the historical expenditure level vastly overstates what base was expected to 'buy' for that asset in PR24.
- High expenditure on the asset in the past was due to particular circumstances at that time and does not reflect the future, meaning the WBB adjustment should be reduced.
- Retrospectively, at the end of AMP8 it has efficiently allocated all its base allowances to planned activities and the additional activities funded through the cost change process are over and above this.

For example, Anglian could have planned to direct a larger share of its base allowance to investment in gravity sewers, while certain other priority assets would be funded primarily through the cost change process. In this case, a low or zero WBB adjustment would be appropriate for those specific other assets. If a WBB adjustment was made, then Anglian would be either unable to make any investment in those assets, or forced to reduce its spending on gravity sewers.

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Conclusion

Our overall recommendation is that whether and how an adjustment for WBB is made should be based on each company's specific circumstances

Our assessment shows that no single mechanistic approach to WBB satisfies all of the guiding principles or is likely to be appropriate in all circumstances, and there are likely to be cases in which applying no WBB adjustment is the most appropriate option. Accordingly, we recommend that Ofwat adopts a more tailored approach to WBB that reflects each company's specific circumstances. In practice, this could involve moving away from a mechanistic, one-size-fits-all framework and instead assessing WBB on a case-by-case basis. This approach could involve:

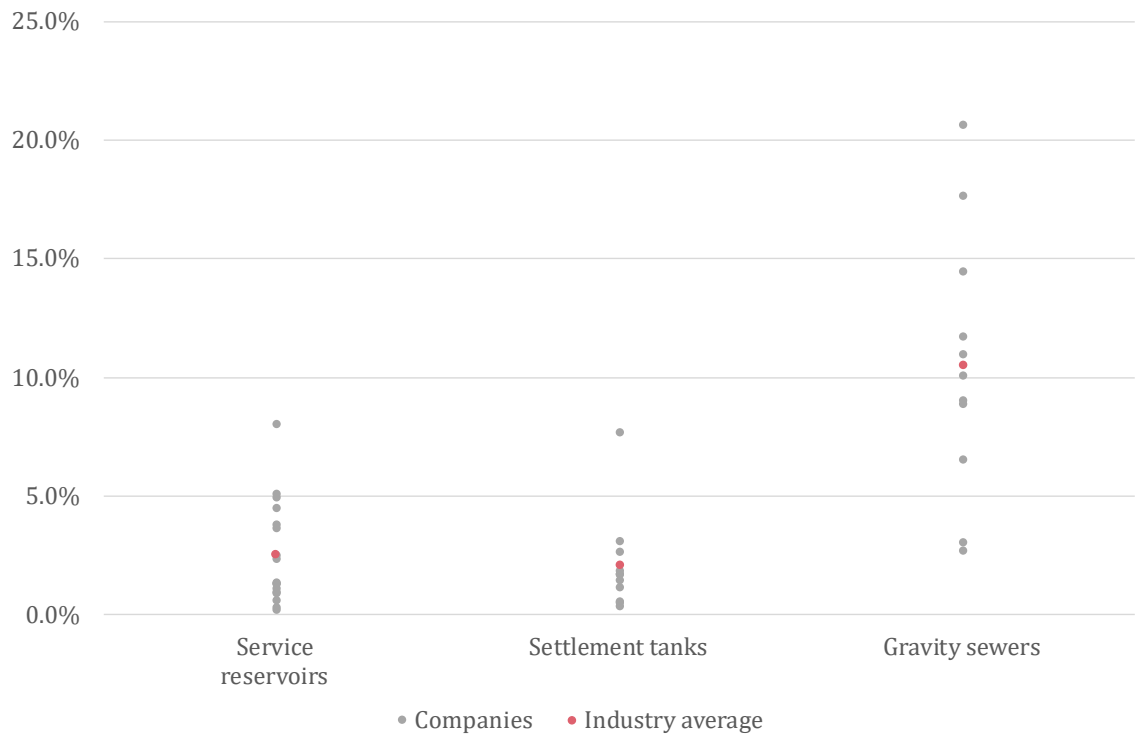
- First, considering whether any adjustment for WBB is appropriate for the company and priority asset in question, whereby the company can put forward evidence that the adjustment may not be required. If no adjustment for WBB is made, then the other mechanisms described above can be used instead to protect customers.
- Second, where an adjustment for WBB is considered appropriate, selecting the method (or combination of methods) that best reflects the company's specific circumstances and the characteristics of the priority asset in question. For example, the adapted version of Option 4 may be a reasonable option where a company's expenditure on a priority asset is expected to remain broadly consistent with historical levels. However, where this would unduly penalise companies for prudent historical investment, it may be more appropriate to consider industry-wide measures such as in the unmodified version of Option 4.

In making these decisions, Ofwat and companies may benefit from applying the five guiding principles set out here. Crucially, this should give careful consideration to the relative balance of: (a) reducing the risk of customers paying twice; and (b) ensuring the necessary investment takes place.

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Annex: Additional data on historical company spending per priority asset

Figure 9: Expenditure on selected priority assets as proportion of total base expenditure over PR19 (2)



Source: Economic Insight analysis of workload and expenditure dataset and Ofwat base cost models.

Note: For water service assets, we present expenditure as a proportion of total wholesale water base expenditure, while for wastewater service assets, we present expenditure as a proportion of total wastewater network plus and bioresources base expenditure.

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