



# The opportunities for a more coherent regulatory approach for Ofwat's funding of base expenditure and enhancements

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**Reckon** LLP  
Data analysis | Economic regulation | Competition law

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# 1. Introduction and summary

## Project background and scope

Reckon LLP was commissioned by Anglian Water, United Utilities and Wessex Water to carry out a project which concerned some challenging aspects of Ofwat's approach to wholesale cost assessment during its periodic reviews of water company price controls.

The approach to wholesale cost assessment has evolved in a way that has led to a lack of coherence between aspects of the assessment of base expenditure, the assessment of enhancement expenditure and the approach to performance commitments (PCs) and outcome delivery incentives (ODIs). In particular, tensions have arisen as the regulatory framework has gradually come to place greater emphasis on cross-company benchmarking (for expenditure and aspects of performance), while retaining legacy elements of company-specific assessments that developed in a different context.

The project explores a series of concerns about aspects of the PR19 approach to cost assessment which are linked to these underlying issues, and to identify opportunities to make progress in addressing – or at least reducing – these concerns as part of the PR24 price review. We have placed emphasis on looking for opportunities that are likely to be practical. We have recognised a need to work within, rather than overturning, fundamental aspects of Ofwat's regulatory approach.

This project is intended to achieve concrete progress by properly articulating the problems with the current arrangements and then putting forward credible policy responses to those problems that could be applied from PR24 onwards. It was not intended to deliver proposals that have been fully tested and reviewed, or to cover all aspects of their implementation. There may be benefit in a follow-up phase of work, which develops and reviews some of the options in greater detail.

The project is focused on issues arising from the interactions between base expenditure, enhancement expenditure and performance commitments. It does not cover all of the potential limitations of the PR19 approach to cost assessment, or all the ways in which cost assessment techniques and practices might be improved over time.

The scope of the project is primarily concerned with the concepts, tools and approaches that are used as part of the price control framework. It does not encompass empirical analysis to contribute to the information and evidence available for price control cost assessment. Nonetheless, the report provides insight on the types of empirical analysis and evidence that could be useful.

The bulk of the work on this project was done before Ofwat published its draft methodology consultation for PR24 and it is not intended to provide any form of review of that methodology or a consultation response. However, we had some opportunity to digest the PR24 draft methodology consultation before finalising the report and were able to refine aspects of it in light of some of the most relevant aspects of the draft methodology.

## Summary of key points

We provide a fuller summary of key points from the project in section 6 of this report. We have also prepared a separate [summary document](#) in slide format. Here, we briefly highlight a number of key points.

We identified a series of concerns with the PR19 regulatory approach, which are related to some underlying tensions in Ofwat's approach to cost assessment between the price control treatment of base expenditure, enhancement expenditure and performance expectations. We developed and refined our understanding of these concerns in light of the conceptual framework set out in section 2 of this report, discussions with the client companies, a targeted review of relevant literature, and simulation modelling analysis. We summarise these concerns as follows:

- Risks of an inefficient capex bias for enhancements, arising from less advantageous and more uncertain price control funding arrangements for the remuneration of the ongoing operating expenditure from enhancement initiatives compared to the remuneration of upfront capital enhancement expenditure.
- Risks that, across the industry, the efficient levels of capital maintenance expenditure arising from past capital enhancements may not be fully remunerated over time.
- What seems to be an unreasonable exclusion of enhancement operating expenditure from the expenditure data feeding into base-plus models, which will tend to under-fund companies for the costs of maintaining existing levels of performance.
- Concerns about the scale of improvements that Ofwat requires companies to achieve via funding from base-plus allowances, which relate in part to the complexities surrounding the question of what levels of performance (or performance improvement over time) are implicitly funded by allowances derived from base-plus models.
- The potential for double funding enhancement expenditure, to the detriment of customers, across the three main funding channels we identify for enhancement costs: explicit enhancement expenditure allowances; allowances derived from base-plus models; and funding from financial ODIs.
- Risks of under-funding better-performing companies, for instance in cases where such companies are required to maintain (or improve upon) relatively high levels of performance that are not adequately funded by explicit enhancement expenditure allowances, allowances derived from base-plus models or financial ODIs.

The regulatory framework for water companies cannot be expected to work perfectly. Problems will emerge – or come into sharper focus – as the framework evolves over time. What matters is not so much whether concerns or problems are identified, but whether the opportunities available to understand and tackle them are taken.

It does not seem possible to create a fully coherent regulatory approach across base expenditure allowances and enhancement allowances in the near term. But we see



opportunity for substantial improvement at PR24 – and little reason for Ofwat to stick close to the status quo.

A number of the suggested improvements that we present in this report can be understood as groundwork that lays the foundations for a more coherent and better-functioning regulatory approach. These involve, in particular:

- efforts to establish a sound conceptual framework relating to base expenditure and enhancement expenditure and the interactions of these with performance;
- an exercise to better understand and expose the relationships between specific enhancement expenditure categories and specific aspects of performance/outcomes;
- a need to recognise two different types of enhancement operating expenditure, and to treat these differently for cost assessment purposes; and
- refinements to regulatory reporting arrangements to better align with the conceptual framework and provide greater insight for future reviews.

Beyond these, we have given particular attention in this project to the risks of an inefficient bias towards capital expenditure in companies' planning, and subsequent delivery, of enhancement solutions, and how these risks might be tackled. This concern has been widely recognised by Ofwat and water companies, and represents unfinished business given Ofwat's ambitions to tackle the capex bias when it introduced major reforms to its regulatory approach at PR14. This seems to be a pressing matter for PR24.

The risks of an inefficient bias towards capital expenditure in companies' enhancement expenditure arises from a number of different factors, some of which are outside the scope of this project. Nonetheless, we consider that this project can make a valuable contribution to efforts to tackle these risks. For instance, we consider that the "adaptable multi-amp enhancement funding approach" that we describe in section 4 is a highly promising idea. This approach seems to provide a reasonable balance between water companies' desire for longer-term funding for opex-based enhancement initiatives and the likely regulatory desire for a degree of flexibility and adaptability over time in the interests of customers.

If there are concerns from Ofwat that a full-scale adoption of this new approach would be impractical, or too risky, at PR24 then a targeted application of it in specific areas might be used at PR24, with the potential for a more comprehensive adoption at PR29, with the arrangements refined in the light of practical experience from PR24.

The multi-amp enhancement funding approach is not the only potentially viable approach to help tackle the concerns about capex bias, and it might be applied alongside some other tools discussed in the report, although their applicability looks to be more limited.

Further to the groundwork above, and specific measures targeted at the capex bias, the other key policy option discussed in this report is the idea of an adjustment mechanism – or uncertainty mechanism – relating to industry-wide expenditure levels. This might cover, for

example, base expenditure and selected areas of enhancement spend, and would adjust allowances in light of outturn expenditure – and probably also net ODI performance.

The adjustment mechanism we outline seems capable of both improving the accuracy of cost assessment and regulatory remuneration, as well as improving incentives in any specific enhancement areas where it can be applied. For instance:

- It could provide a relatively simple funding channel for enhancement requirements that are broadly similar across the industry and not accounted for in the historical expenditure data feeding into base-plus models (or where differences between companies can be managed by financial ODIs on common PCs).
- It could help tackle concerns about the scale of required performance improvements over the forthcoming price control period which Ofwat treats as being funded by base expenditure allowances, for which there is considerable uncertainty and complexity.
- The mechanism could also tackle concerns about industry-wide under-funding of capital maintenance from past enhancements.

The introduction of this mechanism would not be a small change and there would be implementation issues to work through. We do not take a definitive position at this stage on the case for or against this mechanism, but our view is that this too could be a highly-promising response to several of the problems covered in this report – and indeed for issues beyond the scope of this project.

### **Structure of the report**

The remainder of this document is organised as follows:

- Section 2 provides a conceptual foundation for the rest of the report. It sets out and explains some key concepts and definitions relating to the distinction between base expenditure and enhancement expenditure. It provides an overview of the main types of funding channels for enhancement expenditure that are available under Ofwat's price control framework. And it discusses how one might think about the levels of performance (e.g. in terms of customer service or environmental outcomes) which are funded, implicitly, by Ofwat's allowances for base expenditure.
- Section 3 describes a number of specific concerns with the current approach to cost assessment. These relate closely to the interactions between base expenditure, enhancement expenditure and aspects of performance, and which are of central importance to the project.
- Section 4 considers potential changes to Ofwat's approach to cost assessment to help to reduce the potential bias in favour of capex-based enhancement initiatives. We agreed with the client companies that we would give this issue particular attention and we go into particular detail in this section on some of the more promising options identified.
- Section 5 section considers potential measures to help mitigate, to some degree at least, some of the other concerns with the current approach that were identified in section 3.

These concerns are interrelated, and the various measures discussed in this section are generally complements that could be applied together, as part of an overall package of improvements, rather than alternative options.

- Section 6 draws some implications from the project for Ofwat's approach at PR24.

In addition, the main body of the report is supported by three appendices:

- Appendix 1 presents outputs from some simulation modelling analysis we carried out as part of the project. We used the simulation analysis to help to: (a) illustrate and better understand some of the problems identified in section 3; (b) refine and test the conceptual framework that we present in section 2 of the report; and (c) test and illustrate some of the specific options for improvement that we identified.
- Appendix 2 provides some examples and discussion of what we define as "enhancement benefits metrics". The material in this appendix supports the description of how the multi-amp enhancement funding approach from section 4.4 of the main report would work, and has wider applicability.
- Appendix 3 provides some case study discussion for two areas of enhancement activity. It uses practical examples to illustrate some of the problems that may arise in practice and to describe how specific policy options that we have identified might be applied in these areas.

### **Notice and acknowledgements**

We are grateful for the highly valuable discussion, direction and feedback from staff at the three client companies involved in this project: Anglian Water, United Utilities and Wessex Water.

The report does not represent the views of those companies or any individuals within them. The contents of this report are the sole responsibility of Reckon LLP.

This report was produced for the exclusive use of the client companies, for the purposes specified in our agreements with those companies. Reckon LLP makes no representation or warranty about the suitability or reliability of this report for other purposes or other parties.

## 2. Conceptual foundation

### 2.1: Introduction

This section provides a conceptual foundation for the rest of the report. It takes three broad areas in turn:

- Section 2.2 introduces the distinction we draw between the concepts of base expenditure and enhancement expenditure. We have sought to ground these in what we understand to be the distinction that has been used historically in the water industry, adding clarification and refinement where necessary. We then define and discuss a series of further concepts that seem useful for the project, and for Ofwat's regulatory approach. In several cases this involves drawing distinctions between things that are closely related but not the same, and which pose risks of causing confusion if they are not separated conceptually.
- Section 2.3 provides an overview of the main funding channels for enhancement expenditure that are available under Ofwat's price control framework. These are: explicit allowances for enhancement expenditure; base-plus allowances; and financial ODIs applied to performance commitments.
- Section 2.4 considers, at a conceptual and theoretical level, the levels of performance (e.g. in terms of customer service or environmental impacts) which we might see as being funded by – or consistent with – a company's base-plus allowances (these allowances are largely derived from cross-company benchmarking models). This links to debates within the industry on "what base buys". Our focus here is on the principles at play, rather than the weight of evidence in favour of one view or another on what performance levels are funded by base-plus allowances in practice.

The material in the section is helpful background for understanding some of the problems and concerns raised with Ofwat's PR19 approach, and for providing the basis for an improved approach at PR24.

### 2.2: Key concepts and definitions

It is helpful to set out how the concepts of base expenditure and enhancement expenditure might be defined and used in a more coherent way than at PR19 and how these concepts would relate to key aspects of Ofwat's approach to cost assessment and its incentivisation and remuneration of improvements over time in customer service and environmental performance.

We see this conceptual work as one element of the remedy to some of the problems that have arisen in practice in relation to the interactions between base expenditure and enhancements. Part of the problem that we see at present is that the conceptual basis for the distinction between base expenditure and enhancement expenditure is not sufficiently well developed and defined, and that there are tensions and contradictions within some of the terms that get used.



Providing a firmer conceptual foundation for thinking about base expenditure and enhancements also helps make it easier to see and understand some of the more substantive problems that have arisen in practice from developments over time in Ofwat's approach to cost assessment.

On this basis, what we set out below is not intended as a description of how things are defined at present, but rather our initial proposals for how things should be defined, and what concepts should be used, for PR24 and beyond. In developing these proposals we have been mindful of the starting position and sought to limit change to where it is necessary. The starting point that we use should be familiar and uncontroversial. As we progress with the section, there is a need to introduce new concepts to tackle the limitations of some of the existing ones.

This section takes the following in turn:

- The core conceptual distinction between base and enhancements expenditure.
- The importance of the reference year within the conceptual distinction.
- The reference year applied for price review cost assessment.
- Enhancement expenditure and the duration of enhancement benefits.
- Distinguishing two types of enhancement-related operating expenditure.
- Flow chart for distinctions across base and enhancement expenditure.
- Reported enhancement expenditure versus conceptual enhancement expenditure.
- Econometric models of base-plus expenditure.
- Key distinctions relating to base expenditure.
- Allowances from base-plus models versus allowances for base expenditure.
- Potential reductions in the scope and quality of services.

### **The core conceptual distinction between base and enhancements expenditure**

Leaving aside the details of regulatory accounting guidelines, or how allowances have been set in practice, we feel that the history of price control regulation in the water industry over the last 20 years or so points to a helpful core conceptual distinction between base expenditure and enhancement expenditure which we summarise below. We recognise that this distinction may have become clouded or confused over time, but we consider that this core conceptual distinction on *expenditure* remains valid and useful for PR24.

First, the boundary between what constitutes base expenditure and enhancement expenditure is determined separately for each individual company, without any regard to the levels of quality or performance achieved by other water companies. The distinction between base expenditure and enhancements concerns changes over time, for a specific company, relative to a base year or reference year.

We adopt the terminology of reference year rather than base year because the term base year is used in other ways within Ofwat's price review processes which may cause confusion (e.g. the base year used as a price base for expenditure forecasts over a forthcoming price control period).

On that basis, we understand enhancement expenditure to be expenditure on one of the following broad types:

- **Improvements to performance levels.** The expenditure incurred (or to be incurred) to enable the company to provide a higher level of performance than it provided in the reference year. The concept of performance is a broad one, covering various aspects of service to customers, as well as the company's performance in terms of its impacts on the natural environment in which it operates.
- **Accommodating increased demands placed on water/wastewater services.** The expenditure incurred (or to be incurred) to enable the company to supply services to a greater number of customers or to accommodate increases in the scale of demand for the water company's services, compared to the reference year.<sup>1</sup> We adopt a broad interpretation of "demands placed on water/wastewater services" which covers not only direct customer demand but also changes in the demands placed on wastewater/drainage systems by changing weather patterns of climate change (e.g. more intense rainfall within the area to be drained by a wastewater company).

In the box below we elaborate on what we mean by performance levels, for the purposes of this definition in the first category above.

**Figure 1 Adopting a broad concept of performance for the purposes of the definitions**

We use the terms **level of performance** or **performance levels** to cover the broad range of ways in which water companies' performance, in areas outside their internal cost efficiency, can affect outcomes for customers and the environment. These include:

- Companies' performance in terms of the quality of service provided to customers (e.g. in terms of the incidence and severity of water supply interruptions or internal flooding events).
- Companies' performance in relation to the degree of risk arising from their activities in relation to potential adverse customer service incidents or environmental incidents.
- Companies' performance in terms of the environmental impacts or outcomes arising from their activities (e.g. the incidence and severity of various types of pollution events).

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<sup>1</sup> This definition might be specified to exclude what Ofwat currently categorises as "developer services expenditure" (which was formerly part of enhancement expenditure but is excluded from the scope of enhancement expenditure in RAG 4.10). This potential exclusion would help the definition provided here fit with the current regulatory reporting arrangements, but it seems far from ideal conceptually. It would make more sense to treat developer services expenditure as a sub-category of enhancement expenditure, but this is not the position in RAG 4.10. We propose in section 5.8 of this report that Ofwat refines its definitions of enhancement expenditure to ensure that developer services are recognised within it.

- Companies' performance in terms of their usage of ecosystem services or environmental inputs (e.g. a company that provides the same quality of potable water to customers when faced with lower quality raw water inputs, due to external factors, can be seen to have improved its performance – specifically its performance in transforming raw water inputs into customer-facing water supplies).

We recognise potential overlap between the third and fourth categories above, which both concern a water company's interactions with the natural environment. In some cases, one might either adopt the perspective of companies' performance in terms of the environmental outcomes from their activities or in terms of the environmental inputs (ecosystem services) that the company draws on to provide its services. We see value in the perspective of the fourth category, because it fits with broader Government initiatives in relation to natural capital and ecosystem services.

Relevant aspects of performance include those which are measured for the purposes of common and bespoke performance commitments. They also aspects of performance that are not measured consistently across companies and which do not have any performance commitments or ODIs attached to them.

This concept of performance does not directly cover the scale of services provided to customers (e.g. the number of customers supplied with potable water supplies). Nonetheless, it is relevant to issues around growth in customer numbers or their demand for services because, if a water company experiences such growth, it may need to incur enhancement expenditure in order to avoid deterioration in aspects of performance.

The concept of performance levels above is not intended to capture companies' cost efficiency. We recognise that this might be seen as an aspect of overall performance in some other contexts, but it is not appropriate to include it as part of performance for the purposes of this report.

In some cases, the improvements sought from enhancement expenditure may be required or constrained by legislation. In other cases there will be flexibility for the water company to exercise choice – though its choices are likely to be influenced by the regulatory arrangements.

We provide some examples of enhancement expenditure in Table 1. In practice, specific enhancement projects might straddle two or more of the categories above and some allocation may be needed.<sup>2</sup>

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<sup>2</sup> This may not be straightforward or consistent across companies and over time. We do not seek to cover issues around allocation and attribution of expenditure between different categories in this project.

**Table 1 Examples of enhancement expenditure**

Broad type of e	Examples
Improvement to customer service	<ul style="list-style-type: none"> <li>Reducing customer health risks relating to water supplies (e.g. risks arising from conveyance of water through lead pipes) compared to the level of risk in 2024/25.</li> <li>Reductions to the risk of customers experiencing water use restrictions such as hosepipe bans compared to the level of risk in 2024/25 (e.g. company action that leads to change in expectation of such restrictions from 1 in 20 years to 1 in 50 years).</li> <li>Reductions to the risk of water supplies being interrupted by potential terrorist attacks that might occur.</li> </ul>
Improvement to environmental outcomes or reductions in quality or use of ecosystem services	<ul style="list-style-type: none"> <li>Reducing the concentration of pollutants in effluent released from wastewater treatment works compared to the concentration achieved (or expected to be achieved) in 2024/25.</li> <li>Maintaining the quality of drinking water supplied to customers in a context where the quality of raw water inputs deteriorates in the years subsequent to 2024/25 (e.g. because of the effects of increased use of pesticides by farmers).</li> </ul>
Accommodating increased demands placed on water/wastewater services	<ul style="list-style-type: none"> <li>Investing in water treatment capacity to meet demand from increases in the local population served, compared to population 2024/25.</li> <li>Expansion of wastewater drainage system capacity to cope with increased frequency of high-volume rainfall, compared to weather patterns before 2024/25.</li> </ul>

Base expenditure can be defined as the residual: the part of total expenditure or totex that is not defined as enhancement expenditure or developer services expenditure (and excluding some other more minor cost items that are stripped out for price control purposes such as third party expenditure). Defining base expenditure formally as totex excluding enhancements (and some other minor excluded items), rather than in its own right, avoids the risk that an element of totex might unintentionally fall through the gaps and be neither base or enhancements or might be double counted between base expenditure and enhancements. Even with this formal definition, it can then be useful to elaborate on what base expenditure primarily involves (e.g. expenditure to operate and maintain the capability of systems that provide the same levels of performance as in the reference year). We generally use the term base expenditure in this report but recognise that Ofwat often uses the term base costs to refer to base expenditure.

### **The importance of the reference year within the conceptual distinction**

A crucial element of the distinction above between base expenditure and enhancement expenditure concerns the reference year.

We do not always see the reference year (or base year) being made explicit in definitions or discussions around the boundaries between enhancement expenditure and base expenditure, but we consider it essential to keep in mind for the conceptual distinction to be

meaningful. The reference year is a matter of the perspective from which enhancements are viewed, and perspective is everything when it comes to the boundary between base expenditure and enhancements.

We provide an example in the box below to illustrate these points.

**Figure 2 Example of how reference year affects the base/enhancements boundary**

We take the following very simple example. A water company invests £10m in 2017/18 to commission an asset which becomes operational at the start of 2018/19 and which enables the company to provide improved environmental performance compared to the levels it achieved in the period before 2018/19. This investment comprised a single asset which has an expected economic life of 10 years, and it is expected to cost £8m to renew the asset at the end of its life. The company incurs annual expenditure of £1m every year to operate and run the asset.

If the reference year is taken as 2014/15 (i.e. the end of AMP5) then under the definition of enhancement expenditure and base expenditure that we have set out above:

- All the expenditure relating to the asset, including upfront commissioning, operating expenditure and periodic asset renewal every 10 years, can be seen as enhancement expenditure.
- The enhancement expenditure on the asset *during* AMP6 will be £12m. This comprises upfront capital expenditure of £10m and two years of operating expenditure, at £1m per year, from the date the asset becomes operational to the end of AMP6.
- None of the expenditure relating to the asset is defined as base expenditure.

If the reference year is taken as 2019/20 (i.e. the end of AMP6)

- None of the expenditure relating to the asset is defined as enhancement expenditure.
- The annual operating expenditure incurred during AMP7 (£5m in total) will form part of base expenditure during AMP7.

If the reference year is taken as 2024/25 (i.e. the end of AMP7)

- None of the expenditure relating to the asset is defined as enhancement expenditure.
- The annual operating expenditure incurred during AMP8 (£5m in total) will form part of base expenditure (specifically the operating expenditure element of base expenditure) during AMP8.
- In addition, the asset renewal expenditure incurred during AMP8 (£8m in 2027/28) will form part of base expenditure (specifically the capital maintenance element of base expenditure) during AMP8.

This example shows how the boundary between base expenditure and enhancements is dependent on the reference year. For instance, expenditure that would be treated as enhancement expenditure if the base year is 2014/15 (e.g. operating expenditure and asset renewal during AMP8) become part of base expenditure if the reference year is 2024/25.



The fact that the conceptual boundary between base expenditure and enhancements is dependent on the reference year is not in itself a problem. But problems can arise if insufficient attention is given to the reference year for the purposes of the regulatory reporting arrangements for water company expenditure or the approaches used for cost assessment.

We suspect that a lack of attention to the reference year in discussions around enhancement expenditure may lie behind some of the problems experienced in practice. For instance, as discussed in section 3 of this report, we do not understand the logical basis for the approach taken to enhancement operating expenditure by both Ofwat and the CMA for the PR19 price review. One possible view is that some misunderstanding arose around the potential for double counting because of a failure to properly distinguish between the enhancement operating expenditure in respect of a 2014/15 reference year and the enhancement operating expenditure in respect of a 2019/20 reference year.

The importance of the reference years can also help make better sense of some of the interactions that arise between the different types of enhancements set out above. For example, suppose that a water company experiences substantial growth in local population in one of areas that it serves. Suppose that it does not take any steps to improve capacity in the distribution system used to supply water to these customers and, as a result, all customers in that local area experience a drop in pressure. The company then reacts to the drop in pressure a couple of years later by investing in the distribution system to restore pressure to the levels it was before the growth. If we take the reference year as that just before the company invested in improvements to distribution system, then the enhancement might be seen as one concerning an aspect of service quality: the investment increases pressure relative to the reference year. If we take the reference year as that before the population growth, then the enhancement might be seen as accommodating growth, while maintaining existing levels of service.

### **The reference year applied for price review cost assessment**

Particularly within the context of the periodic price review process, Ofwat and water companies tend to focus primarily on forecasts of, or proposals for, enhancement expenditure over a forthcoming price control period.

Under the definition of enhancement expenditure that we set out above, what Ofwat and companies typically mean by such forecasts or proposals is enhancement expenditure which:

- is defined using a reference year that comes just before the start of the forthcoming price control period;
- includes the capital expenditure and/or operating expenditure to be incurred during that price control period; and
- excludes any enhancement expenditure to be incurred in years subsequent to that price control period.

We see no conflict at all between the conceptual basis for the definition of enhancement expenditure that we have set out earlier in this section, and the way that water companies and Ofwat refer to forecasts of, or proposals for, enhancement expenditure for the purposes of price reviews.

Nonetheless, when it comes to Ofwat's approach to cost assessment process for enhancements, we should recognise that the focus is on the near-term expenditure on enhancements, rather than their longer-term expenditure or whole-life costs.

In effect, at each price review:

- The reference year for the scope of the cost assessment applied to enhancement expenditure is updated to be the year before start of the forthcoming price control period.
- The expenditure expected during the forthcoming price control period, which are attributable to past enhancements (e.g. expenditure which would be defined as enhancement expenditure if the reference year was five or ten years ago but are not enhancement expenditure given the updated reference year) is treated as part of base expenditure for the purposes of cost assessment.<sup>3</sup>

### **Enhancement expenditure and the duration of enhancement benefits**

It is useful for some of the discussion that follows to recognise a concept of "enhancement benefits". Enhancement benefits represent the benefits from enhancement activities.

Drawing on the introduction to enhancement expenditure provided earlier in this section, enhancement benefits might take two broad forms:

- An improvement to performance.
- Enabling the company to accommodate additional demand.

As with the definition of enhancement expenditure set out above, it is necessary to clarify the reference year to properly make sense of enhancement benefits. Enhancement benefits may represent, for example, improvements in service quality, relative to the level of service quality provided in a specific reference year.

One of the complications that arises in relation to enhancement expenditure, which is highly relevant when it comes to cost assessment, is that there can be important differences between the duration of the enhancement benefits arising from different types of enhancement expenditure.

By definition, we would expect any enhancement expenditure that is capitalised by a water company to provide enhancement benefits in subsequent years, rather than just in the year the expenditure was incurred or recognised. For example, investment in an asset with an

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<sup>3</sup> With the possible exception of expenditure carried over from a price control period for the completion of a programme of works that was funded at a previous price control period.

expected economic life of 20 years might bring, or support, enhancement benefits for 20 years. All capitalised expenditure would be expected to provide a stream of future benefits beyond the date in which it was incurred. Since different assets have different economic lives, the duration of benefits arising from capital expenditure can vary across enhancements.

The situation can be more complex for operating expenditure:

- In many cases, the enhancement benefits from activities whose expenditure are reported as operating expenditure may only fall within the year in which those activities were undertaken and that expenditure was incurred. For instance, these might be the annual running costs (e.g. for energy and process inputs) to operate assets that bring enhancement benefits.
- In some cases, the benefits from activities whose expenditure is reported as operating expenditure will be sustained many years after the year in which the activity was undertaken and the expenditure. The duration of these benefits may vary from case to case.

We highlighted the second of these types in a previous report concerning the treatment of enhancement operating expenditure at PR19, explaining as follows:<sup>4</sup>

*“.. in some cases, operating expenditure that is incurred in a particular year may enable an improvement in quality to be achieved and sustained over multiple future years. This type of operating expenditure has similar properties to capital enhancement expenditure, in the sense that once incurred in cash terms it produces a longer-term benefit rather than a benefit only in the year it is incurred. We see this as a special type of operating expenditure which is somewhat uncommon but is nonetheless relevant to consider as part of work on implicit allowances for enhancement operating expenditure.*

*One example relates to lead standards. A company might reduce the level of risk to customers arising from the conveyance of water through lead pipes by engaging in the replacement of lead supply pipes which are owned by customers. The company might record the pipe replacement costs as operating expenditure, as the company does not own the replacement pipe: it is not a company asset. But this operating expenditure would enable a reduction in the absolute value of lead pipe risk to be sustained for a long period of time (e.g. until the pipe needs replacement or perhaps permanently since we would not expect lead pipes to be reinstalled in the future).”*

Our view is that some of the problems – and sources of tension or dispute between water companies and Ofwat – that arise under Ofwat’s current regulatory approach relate to insufficient attention to the distinction between different types of operating expenditure

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<sup>4</sup> Reckon (2019) *Working paper on the approach to implicit allowances relating to enhancement operating expenditure*, page 26.

associated with enhancements. We elaborate on this distinction using the illustrative example in the box below.

**Figure 3 Example of different types of enhancement operating expenditure**

We take the following very simple example. A water company is engaging in a range of nature-based solutions and catchment management initiatives to help improve the quality of water in a river that one of its sewage treatment works discharges treated water into. The company identifies two different types of nature-based initiatives or solution which it considers to provide net benefits and which it intends to implement from the start of AMP8.

Under initiative A, the water company will pay farmers an annual fee in exchange for commitments from the farmers that they will, in each year they receive the fee, use alternative forms of fertilizer and farming practices which reduce the quantity of pollutants released into the river. Suppose for simplicity that the annual fee is £25,000 per farm (and ignore differences in size of farms, etc).

Under initiative B, the water company will pay the farmers a single upfront fee to fund farmers to make improvements to their onsite drainage systems which reduce the volume of water that drains either into the river (or the water company's own drainage system). The fee is conditional on commitments that the farmer will maintain the adequacy of its system for at least 15 years. The water company does not capitalise the fee paid to farmers for its internal accounting purposes because it does not meet the necessary accounting criteria (e.g. concerning creation of an asset owned by water company) despite the benefits from the fee lasting 15 years or more. Suppose for simplicity that the single upfront fee is £300,000 per farm.

If the reference year is 2024/25 (i.e. the end of AMP7) then:

- Under initiative A, the annual fee of £25,000 per farm translates as £125,000 per farm in enhancement expenditure during AMP8. There would be a further £125,000 of expenditure on each of these farms in AMP9, and again in AMP10, if the same level of benefits is to be maintained.
- Under initiative B, there would be enhancement expenditure of is £300,000 per farm in AMP8 and no further expenditure for these farms in AMP9 or AMP10. The benefits would be maintained for a period covering at least AMP8, AMP9 and AMP10.

There are several points of note on this:

- While all the expenditure incurred under the two initiatives take the form of operating expenditure, for initiative B the expenditure has similar economic properties to capital expenditure enhancements, bringing benefits over a series of subsequent years.
- It does not seem a good idea to benchmark the costs or relative efficiency of initiatives A and B simply by reference to the level of enhancement expenditure to be incurred in AMP8.
- An extrapolation of the expenditure incurred during AMP8 on initiative A might provide a reasonable a forecast of the approximate expenditure of maintaining the same scale and level of benefits during AMP9.

- An extrapolation of the expenditure incurred during AMP8 on initiative B would not provide a reasonable a forecast of the approximate expenditure of maintaining the same scale and level of benefits during AMP9.
- If the company had focused on initiative B for its enhancements during AMP8, and was to be funded during AMP9 for the same level of expenditure on these initiatives as during AMP8, it might be reasonable to expect the company to achieve the same scale of performance *improvement* during AMP9 as it achieved during AMP8.
- In terms of ensuring an appropriate balance of bills between current and future customers, it does not seem desirable to include totex allowances for the enhancement operating expenditure from initiative B within the calculation of the PAYG rate, but that would tend to be the consequence of treating such as expenditure as normal operating expenditure.

In the example above, we have focused on the scenario where the full upfront expenditure for initiative B is treated as operating expenditure in a single year. It is also possible that the full upfront payment under initiative B is not recognised as operating expenditure in the year in which it is incurred and is instead recognised for accounting purposes as a pre-payment, with annual operating expenses of £20,000 per year recorded over a 15 year-period. This would depend on details of the transaction and may be affected by internal accounting policies.

### Distinguishing two types of enhancement-related operating expenditure

In the light of the issues above, we consider that it is important to draw a conceptual distinction between two types of operating expenditure that might fall under the broader category of enhancement expenditure (as we have defined it). We propose the following working definitions:

- **Enhancement-investment operating expenditure.** This category captures the special type of operating expenditure where operating expenditure incurred in one year by a water company provides significant enhancement benefits over subsequent years. This type of operating expenditure shares some economic similarities with capital expenditure and might be seen as a form of investment (albeit one where the conditions for the expenditure to be capitalised by a water company are not met, e.g. relating to asset ownership).
- **Enhancement-running-cost operating expenditure.** This category captures all remaining operating expenditure that is incurred to provide enhancement benefits. It would generally include, for example, the ongoing running costs from both capex-based and opex-based enhancement initiatives.

As discussed further in section 5.4, our view is that the appropriate treatment of enhancement operating expenditure under the price control framework differs between these two categories.

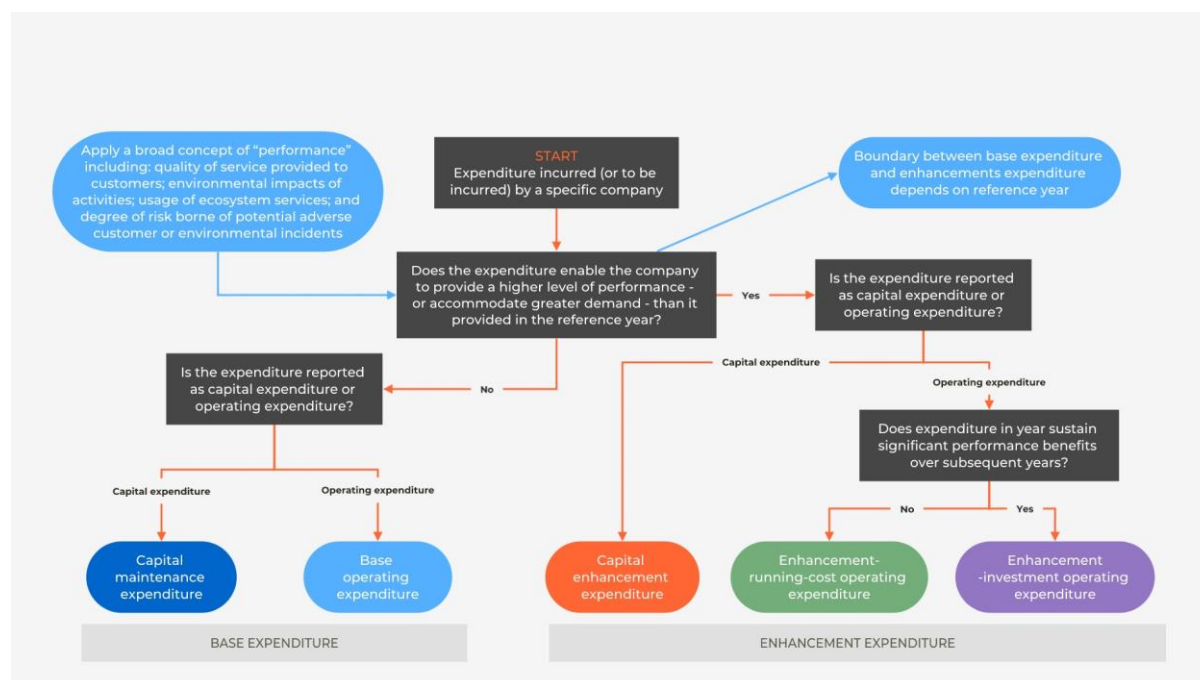
We imagine that further work to tighten the definitions above might be helpful, but the presentation above seems sufficient for the purposes of this report.



## Flow chart for distinctions across base and enhancement expenditure

Drawing on the material in the subsections above, we summarise our proposed definitions for the distinction between base and enhancement expenditure, and between different types of enhancement expenditure, in Figure 4.

Figure 4 Flow chart for proposed distinctions between different types of expenditure



## Reported enhancement expenditure versus conceptual enhancement expenditure

The conceptual definition of enhancement expenditure that we have presented above is broadly consistent with the definition of enhancement expenditure that is used for regulatory reporting activities, but it is not necessarily fully aligned with it.

For instance, RAG 4.10 describes enhancement expenditure as follows:<sup>5</sup> “*Enhancement expenditure is generally where there is a permanent increase or step change in the current level of service to a new “base” level and/or the provision to new customers of the current service level*”. It explains that, for enhancement expenditure “should be based from 1 April 2020”. This is broadly consistent with the conceptual definition we have proposed above, although we refer more directly to a reference year rather than a base level.

We are not confident that the expenditure reported by water companies as base expenditure only contains what is conceptually base expenditure. There are some reasons to think that

<sup>5</sup> Ofwat (2022) RAG 4.10 – Guideline for the table definitions in the annual performance report, page 163.

reported expenditure may also include, implicitly, some enhancement expenditure. For instance:

- The client water companies told us that they might be required or encouraged by Ofwat to report certain expenditure that they view as enhancement expenditure as base expenditure, in specific cases where no explicit enhancement allowance was provided at the price review. One example that the companies highlighted is leakage reduction expenditure during AMP7.
- Companies may make gradual improvements over time in their capabilities and performance as a result of expenditure incurred, without directly being able to trace that expenditure to specific enhancement categories for regulatory reporting purposes. There may be some unintentional and unnoticed under-reporting of enhancement expenditure relative to base expenditure.
- The regulatory reporting arrangements do not seem to require companies to report total enhancement expenditure directly (e.g. the broad definition quoted above seems to be provided in loose terms and is not tied to specific reporting lines). Instead enhancement expenditure is reported across a series of individual enhancement categories defined by purpose. These categories are not exhaustive and do not cover everything that might be treated as an enhancement activity. While the regulatory reporting arrangements provide scope for companies to report enhancement expenditure in other non-defined or freeform categories as additional lines, we wonder whether in practice these are used to the fullest extent possible by companies and whether there is actually any obligation for them to do so. As a result, some enhancement expenditure may be left to be reported as base expenditure.

Ofwat also seems to think that expenditure reported as base expenditure actually includes enhancement expenditure within it. For instance, it said in its PR24 draft methodology that historical base expenditure also includes “one-off investments to improve service”.<sup>6</sup> We cannot see why one-off investments to improve service should be anything other than enhancement expenditure, so this statement by Ofwat points to some practical problems with its regulatory reporting arrangements.

We have not identified a significant factor acting in the opposite direction (i.e. leading to expenditure which is conceptually base expenditure being reported as enhancement expenditure), but we do not discount this possibility. While RAG 4.10 provides guidance on the broad concept of enhancements, some of the reporting definitions for specific

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<sup>6</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*, page 77.

enhancement categories are defined in a way that does not seem to do a good job of limiting expenditure covered by that category to what we would see as enhancements.<sup>7</sup>

In this context, and for the purposes of the elaboration below, we consider it helpful to:

- Distinguish between “base expenditure” and “enhancement expenditure” as defined conceptually above, and “reported base expenditure” and “reported enhancement expenditure” as what is captured in the expenditure reported to Ofwat by companies.
- Introduce a concept of “embedded enhancement expenditure” to capture the idea of enhancement expenditure, as we have defined it in this section, which is reported as part of base expenditure for regulatory reporting purposes (i.e. in companies’ annual performance reports). We take no position on the scale of significant of such expenditure at this stage, but it seems useful to recognise the possibility of its existence.

### Econometric models of base-plus expenditure

At PR19, in its slow-track draft determinations, Ofwat introduced the concept of modelled “base plus” costs. These included: operating expenditure, capital maintenance expenditure, and expenditure on certain enhancement categories which Ofwat took to be driven by growth in population served or demand.<sup>8</sup> In both its draft and final determinations Ofwat’s econometric modelling of base expenditure also included growth-related enhancement expenditure.

At the time of its draft determinations, Ofwat explained why it wanted to incorporate certain growth-related enhancement expenditure in its base models, leading to the concept of base plus costs but then said: “*we will generally use the term ‘base’ to refer to base expenditure plus the [growth-related enhancement] activities [...]. We will use the term ‘base plus’ only when it is needed for clarity*”. In its final determinations Ofwat primarily used the term base cost models for models that also covered some reported enhancement expenditure.

On further reflection, and looking back at PR19, we think that the terminology of “base plus costs” was helpful and that it can be confusing to use the term “base costs” to refer to a set of costs/expenditure that includes base expenditure and some reported enhancement expenditure.

Our suggestion, for this project and beyond, is to try use the term base-plus expenditure (or base-plus costs) to refer to the category of expenditure covered by the core cross-company

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<sup>7</sup> Ofwat (2022) RAG 4.10 – *Guideline for the table definitions in the annual performance report*, includes an enhancement expenditure category for “Meeting lead standards” (in tale 4L) which is defined as “Expenditure to meet lead standards. This includes expenditure to deal with the conditioning of water before entering distribution to reduce plumbosolvency, expenditure on replacing lead communication pipes owned by the company and any other lead related work including investigations”. It also includes an enhancement category for “Invasive non-native species” which is defined as “Expenditure required to deal with invasive non-native species”. In both of these cases, the definitions do not seem to be expressed in a way that is focused on enhancement expenditure in the relevant area, and could be interpreted in a way that includes some base expenditure.

<sup>8</sup> Ofwat (2019) *PR19 draft determinations: Securing cost efficiency technical appendix*.

econometric benchmarking models, which includes some (but not all) of reported base expenditure and some (but not all) reported enhancement expenditure. The hyphen in base-plus makes this terminology a little more manageable.

Arguably, Ofwat's models of base expenditure since PR14 have always been models of base-plus expenditure, because there has been some element of embedded enhancement expenditure within these.

### Key distinctions relating to base expenditure

On the basis set out above, we can usefully distinguish three different sets of expenditure that are otherwise in danger of being conflated:

- **Base expenditure (or base costs).** This is expenditure that meets the conceptual definition of base expenditure set out earlier in this section.
- **Reported base expenditure.** This is expenditure that is reported as base expenditure in companies' annual performance reports. This comprises a combination of (a) base expenditure (as defined above) and (b) any embedded enhancement expenditure.
- **Modelled base-plus expenditure.** This is the set of expenditure taken as an input to the econometric models of historical expenditure that form the cornerstone of Ofwat's cost assessment process. This excludes expenditure which, for Ofwat's cost assessment purposes, is not covered by cross-company econometric benchmarking (e.g. local authority and cumulo rates). It includes all other reported base expenditure (which may include some embedded enhancement expenditure) as well as a subset of reported enhancement expenditure.

### Allowances from base-plus models versus allowances for base expenditure

We make a brief comment on one further aspect of language and terminology that has potential to cause confusion in relation to the concept of base expenditure.

During the PR24 process to date, Ofwat has referred to expectations of companies making improvements in aspects of performance that are "funded by base" or "funded by base expenditure".<sup>9</sup> This language strikes us as an unhelpful shorthand, which might cause confusion.

Under the definition of base expenditure we have set out above, and the high-level description of the difference between base expenditure and enhancement expenditure presented in RAG 4.10 and reported above, base expenditure does not contribute to ongoing improvements in performance over time. So it can be confusing to refer to performance improvements funded by base expenditure.

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<sup>9</sup> See for example Ofwat (2021) *Assessing base costs at PR24* and Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*. In some cases Ofwat refers to improvements funded by base expenditure allowances, rather than improvements from base expenditure, which is a little less problematic though still far from ideal.

What Ofwat really means is performance improvements that are, in its view at least, funded by allowances derived from the base-plus benchmarking models – or performance improvements achieved by companies making efficiency improvements over time.

We discuss this issue further in sections 2.3 and 2.4. In some specific circumstances, the allowances for a specific company that are derived from models of base-plus expenditure might be seen to fund some degree of enhancement improvements for that company. The key point at this stage is to recognise the difference between base expenditure, as we have defined it above, and (the expenditure covered by or funded by) the *allowances derived from models of base-plus expenditure (i.e. the base-plus allowances)*.

It does not make sense to talk of performance improvements funded by base expenditure, but it can make sense to talk about performance improvements funded by base-plus allowances.

It would be helpful, as far as possible, to avoid using the term base expenditure to refer to the *allowances* derived from base-plus models, and to avoid the idea of improvements or enhancements being funded by base expenditure or by base costs.

### **Potential reductions in the scope and quality of services**

In general, water companies tend to serve an increased customer base and to provide improved services to customers, and better environmental performance, over time.

Furthermore, in providing companies with explicit allowances for base expenditure, Ofwat might be seen to be enabling companies to maintain existing levels of service, and capability to meet existing levels of demand, and that companies should not allow a deterioration in aspects of service compared to historical levels (unless otherwise agreed).

Nonetheless, if our aim is to provide a better conceptual foundation for cost assessment across base expenditure and enhancement expenditure, we should recognise that the scale and quality of services could go down as well as up.

This means that, in principle, there are circumstances in which Ofwat might decide to set allowances for a water company, over a forthcoming price control period, at a level which recognises savings against base expenditure from the opportunity to avoid some costs by providing a lower scale or quality of service without breaching obligations or incurring ODI penalties.

This issue was not a priority for the project and we have not explored it further.

## **2.3: The funding channels for enhancement expenditure**

This section is intended to describe a number of different funding channels that we see for the remuneration of enhancement expenditure within Ofwat's price control framework and, in turn, funding performance improvements by companies over time.



This section is primarily introductory and descriptive. It is not the purpose at this stage to explain the problems that may arise in relation to this set of funding sources (we turn to those in section 3) or what modifications might be made (see sections 4 and 5).

We identify three key funding channels that feature in Ofwat's price control framework that seem capable, in principle, of funding enhancement expenditure and improvements in performance over time.<sup>10</sup> These are:

- explicit allowances for enhancement expenditure;
- base-plus allowances; and
- financial ODIs applied to performance commitments.

We discuss each of these in turn in the subsections that follow. In addition, we recognise the potential for performance improvements to be achieved – or funded – via efficiency improvements made over time, without drawing directly on these funding channels.

The final subsection pulls together these elements into a summary position on the level of performance that might reasonably be expected for a company under its price control determination.

### **Explicit allowances for enhancement expenditure**

A core part of Ofwat's established approach to cost assessment is to determine separate allowances for enhancement expenditure across a series of individual enhancement categories. We refer to these allowances as "explicit allowances for enhancement expenditure" or "explicit enhancement allowances", to differentiate them from other, less visible, forms of funding for enhancements.

The allowances for a specific company and enhancement category are typically intended to cover the total expenditure expected to be incurred by that company in that category during the price control period, assuming that it acts efficiently.

For its PR19 final determinations, these allowances covered what we would see as both enhancement capital expenditure and enhancement operating expenditure, using a concept of enhancements defined with a reference year just before the start of the forthcoming price control period. In an earlier stage of the PR19 process, Ofwat had omitted allowances for enhancement operating expenditure from its enhancement allowances.

An important aspect of explicit enhancement allowances is that these are not intended to provide an ongoing funding stream for a company to maintain, indefinitely, the improvements achieved from an enhancement initiative. Ofwat's established approach is that enhancement allowances cover expenditure within the AMP in which the enhancement is

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<sup>10</sup> We leave aside potential additional funding channels outside the main price review process, such as the allowances provided in respect of Green Economic Recovery investment or Ofwat's innovation competition fund.

made and not beyond it. This means that the duration of performance benefits funded by a past enhancement allowance is finite even if the company is expected to maintain that improved level of performance over time.

In short, explicit allowances for enhancement expenditure fund time-limited rather than permanent improvements to performance. The duration of the performance improvement will tend to vary from case to case.

For example, in a simple illustrative example, if Ofwat provided a company with an explicit enhancement allowance intended to cover the efficient costs of commissioning a capital asset with expected economic life of 20 years, then the increment to performance from that enhancement allowance would last for 20 years only.

### Base-plus allowances

Under Ofwat's approach at PR19, and its draft methodology for PR24, the total allowance that Ofwat sets for base expenditure is the sum of:

- The allowance for the forthcoming price control period that Ofwat derives from its suite of econometric models estimated on historical base-plus expenditure. Ofwat calls these models of base expenditure but in this report we refer to them as models of base-plus expenditure, because the input data feeding into these models includes true base expenditure, some expenditure that is reported as enhancement expenditure and probably also some expenditure which is reported as base expenditure but is conceptually enhancement expenditure (embedded enhancement expenditure).
- Any off-model adjustments or other cost adjustments applied to the allowance derived from those models.
- The allowance determined by Ofwat for what it calls unmodelled costs (which include, for example, allowances for business rates and cumulo rates or for abstraction charges).
- Adjustments to these expenditure allowances for expected efficiency improvements over time and for real price effects.

We refer to the aggregation of these as the base-plus allowances.

We have described in section 2.2 how the distinction between base expenditure and enhancement expenditure can be defined by reference to the scale or quality of service provision in a specific reference year, with enhancement expenditure representing expenditure to increase the scale or quality of service provision compared to levels in that reference year. This boundary point between base expenditure and enhancement expenditure is company-specific, reflecting each company's historical position in terms of scale and quality of service. This concept of base expenditure is fundamentally different to the expenditure that we might see as being funded by the *allowances* derived primarily from cross-company base-plus benchmarking models.

There may be cases where a particular company's *enhancement expenditure* (as defined in section 2.2) is funded – albeit implicitly – by its *base-plus allowances*. In particular:

- **Catch up to other companies' past performance levels.** In some circumstances, there may be grounds to consider that, for a specific company, the level of performance funded by its base-plus allowance is higher than what it achieved in the past, and that its base-plus allowance can be seen to fund an element of catch up towards the performance levels achieved by other companies.
- **Industry-wide improvement funded by base-plus allowances.** In some circumstances, there may be grounds to consider that the industry-wide level of performance that can be achieved from the base-plus allowances will be higher over the next price control period than in the past due to the inclusion of some enhancement expenditure in the set of expenditure across companies that feeds into base-plus models. This would mean that the base-plus allowances could cover some industry-wide enhancement expenditure.

In both of these cases, the base-plus allowances might be seen to include a funding stream for enhancement expenditure for a company to make performance improvements relative to its own historical performance levels. This might be described, using Ofwat's established terminology, as an implicit allowance for that expenditure.

We stress that in large part it is an empirical matter whether, for a specific company and a specific aspect of performance, there are reasonable grounds to expect either of the two implicit funding routes for enhancement expenditure to apply in practice. We discuss the levels of performance that might be expected from base-plus allowances in greater detail in section 2.4.

### **Financial ODIs applied to performance commitments**

In some cases, improvements over time in performance are remunerated by financial incentives (ODIs) applied to performance commitments, without any explicit enhancement funding.

In the simplest case, if the level of financial reward available to a water company from improvements in performance exceeds the enhancement expenditure that the company would incur to make and maintain those improvements, then the company will have a financial incentive, and a source of funding, to make and maintain those improvements.

At any point in time, the performance observed across companies could reflect differences between companies in the extent of performance improvements that are funded by ODIs. This could, for example, reflect differences between companies in ODI incentive rates and in terms of which areas in which companies face financial ODIs.

It is also relevant to consider how an ODI-based channel for funding improvements in performance over time might interact, over time, with allowances for base expenditure. One approach is as follows:

- At each price review, the performance commitment level set for the forthcoming price control period could be updated to reflect the level of performance that is consistent with the base-plus allowances for that period.

- During that price control period, improvements in performance, compared to that performance commitment level, might be funded by ODI revenues, without any explicit enhancement allowance.

Under this type of approach, base-plus allowances might be seen to fund the ongoing costs of maintaining the level of performance at the updated baseline and the financial ODI might be seen to fund performance improvements beyond that baseline.

As an aside, we highlight that using cross-company performance information to set performance commitment levels for each company, rather than basing these on each company's own past performance level, can contribute to the strength of long-term financial incentives for performance improvement. This can enhance the value of an ODI-based funding channel for enhancement expenditure, compared to a situation where performance commitment levels for each company are reset at each price review to match the level of improved performance achieved historically by that company. The opportunity for cross-company performance benchmarking depends, in part, on the strength of company-specific factors affecting the performance levels funded by base-plus allowances (see section 2.4) and any differences across companies in the performance funded by historical enhancement allowances, and the extent to which adjustments can be made to take proper account of these factors.

We recognise that, in practice, Ofwat may set performance commitment levels in a way that imposes a significant degree of stretch, requiring improvements in performance beyond the levels consistent with allowances derived from the base-plus econometric models before companies can breakeven on the financial ODI. It is not the purpose of this section to debate the validity of this approach and its reasonableness is likely to depend on the evidence relevant to each case.

What we would say is that such stretch does not by itself seem to be something that is funded by the financial ODIs. It might instead be funded by the other channels above (e.g. from base-plus allowances) or, in the absence of such channels, it might be treated as being expected from, or funded by, efficiency improvements. We turn to this next.

### **Efficiency improvements over time**

Water companies can be expected to make improvements to efficiency and productivity over time. These may arise from processes of experimentation, innovation, learning and imitation across companies. In practice, these improvements may be manifest in cost reductions or improvements to aspects of customer service and environmental performance or both.

There is no reason, in principle, why regulatory assumptions on productivity improvement should be applied only to levels of expenditure. It seems reasonable that, in setting price controls, Ofwat might take the view that some degree of improvement in certain aspects of customer service and environmental performance can be achieved.

These improvements might be achieved in different ways, without requiring additional price control funding, for example:

- They might be achieved with no material cost (e.g. from improvements in working practices that raise performance without additional expenditure).
- They might be achieved in ways that do involve additional expenditure, but where those expenditure are covered by efficiency savings made elsewhere in the business.

In the first of these there is no enhancement expenditure to be covered, while in the second there is enhancement expenditure but it would be offset by other savings elsewhere.

So, in principle, it may be reasonable for there to be regulatory assumptions for improvements over time in aspects of performance or quality, without these being supported by any of the three funding channels for enhancement expenditure set out earlier in this section.

There is then an empirical matter as to whether the overall set of regulatory assumptions on the scale of efficiency or productivity improvements be achieved over time, across expenditure and performance, is reasonable.

This issue is further complicated by what we see as an implicit regulatory practice, established over many years, of using what seem to be overly-demanding efficiency assumptions to offset what would otherwise be opportunities for net out-performance against the regulatory allowances for totex. Those opportunities arise from factors beyond companies' ability to make efficiency gains. This point is important because it may be the case that those opportunities are diminishing over time, for example as Ofwat strengthens broader aspects of its price control framework.

### **Implications for the performance levels funded under the price control**

Based on the exposition above, we adopt the view that, for any dimension of performance, the level of performance that is reasonably expected from a company under the price control determination reflects the combination of the following main components:

- The performance level funded by the base-plus allowances for that company. We define this concept in more detail in section 2.4 and the discuss what factors might influence it.
- The increment to the performance level funded by any explicit enhancement allowances determined by Ofwat for that company for the current or previous price control periods. This represents the improvement to performance that is reasonably expected to be achieved and maintained based on the company's enhancement allowances. Since Ofwat's enhancement allowances do not fund ongoing costs of enhancement initiatives,<sup>11</sup> the increment from past enhancement allowances has a finite life.
- A potential adjustment reflecting either the increment to the performance level that is funded by ODI rewards or a reduction in the performance level which is offset by ODI penalties (e.g. if the company chooses to operate at a lower level of performance

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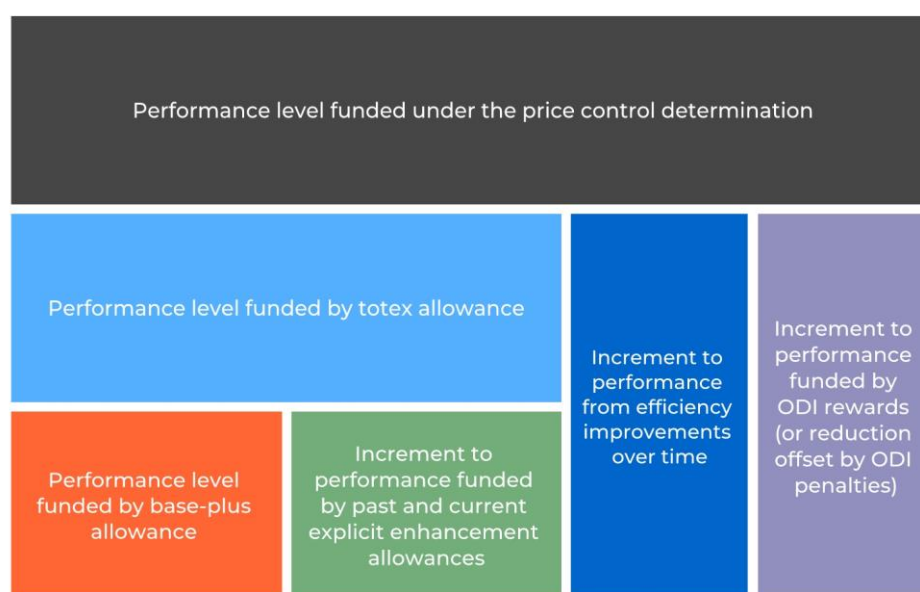
<sup>11</sup> Other than in very rare cases, and subject to any modifications of Ofwat's approach to enhancement allowances (e.g. some of the options we discuss in sections 4 and 5 of this report).

because the costs saved by doing so are more than the financial penalties under the ODI).

- Any improvement in performance levels arising from efficiency improvements that are reasonably expected in addition to the three elements above.

We summarise in the diagram below how the level of performance funded under the price control determination might be seen to arise from these components. We see these as the main components affecting the level of performance funded the price control determination, but we do not rule out the possibility of their being further influences beyond these.<sup>12</sup>

**Figure 5 Main elements feeding into performance funded under the price control**



One further point that is worth drawing attention to in this diagram is that we treat the potential contribution of efficiency improvements over time to increased performance levels as something that is separate from the performance levels funded by base-plus allowances. We see firm logical grounds for this separation, and it helps to avoid a situation where assumptions about efficiency improvements over time are mixed up with, or lost within, the complex set of issues surrounding the performance levels and performance improvements funded by base-plus allowances. As explained in section 2.4, we define the concept of the performance levels funded by base-plus allowances in a way that is intended to avoid incorporating efficiency improvements. However, we recognise that Ofwat's practice in the past, and its discussion in the PR24 draft methodology, may at times treat the opportunity for performance improvements to be achieved via efficiency improvements as part of the level of performance funded by base-plus allowances.

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<sup>12</sup> There may be other factors besides the above that affect the level of performance expected from the company, which are less closely linked to the components of the price control framework. For instance, a company might choose to operate at higher levels of performance because it values the reputational benefits that it derives.



## 2.4: Performance levels funded by base-plus allowances

Ofwat's use of econometric benchmarking models of base-plus expenditure is a cornerstone of its approach to cost assessment, both at PR19 and in its plans for PR24. In this section, we consider in more detail some of the implications that the use of base-plus benchmarking has for the levels of performance that we might reasonably expect from companies from the funding provided via base-plus allowances.

In its PR24 draft methodology, Ofwat refers to “the level of performance expected to be delivered from base expenditure allowances” and similarly “the level of performance that is funded by base expenditure allowances”, especially in relation to work to set performance commitment levels (PCLs) for common performance commitments. This is closely related to discussions within the industry, since at least PR19, as to “what base buys”.

This section is intended to help develop a better understanding of the level of performance that we can reasonably expect a company to deliver from base-plus allowances.

Throughout this section, we adopt a broad concept of performance levels and performance improvements: see section 2.2. Our interest in this section is on the performance levels funded by base-plus *allowances*. This is relevant to the setting of PCLs, as recognised by Ofwat in its PR24 draft methodology. But its applicability goes beyond aspects of performance that are captured by performance commitments. For instance:

- In areas of performance which are not covered by performance commitments, a company may face an explicit or implicit requirement to at least maintain existing levels of performance. Understanding what level of performance can reasonably be expected to be delivered from its base-plus allowances is relevant to gauging whether its price control allowances may under- or over-remunerate it for doing so. This could be relevant to cost adjustment claims in a context where base-plus allowances are determined primarily by cross-company benchmarking and where companies' historical levels of performance may differ.
- Where Ofwat is considering setting an explicit enhancement allowance for a company, an understanding of what level of performance can reasonably be expected to be delivered from its base-plus allowances is relevant to gauging the possibility that such an allowance might involve double counting when provided to the company. This could be relevant to the consideration of potential deductions for implicit allowances as part of the determination of the explicit enhancement allowance.<sup>13</sup>

As highlighted at the end of section 2.3, the level of performance funded by base-plus allowances is only part of the overall picture. The level of performance that we might reasonably expect from a water company, in a given price control period, depends also on other factors such as its own past enhancement allowances, any performance improvements funded by ODIs and opportunities for efficiency improvement over time. We

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<sup>13</sup> This is something that Ofwat considered to some degree in its “need for adjustment” assessment gate in enhancement deep dives at PR19. In its PR24 draft methodology Ofwat proposed to cover this issue under the enhancement assessment criterion for “need for enhancement investment”.

focus on the level of performance funded by base-plus allowances in this section because it is especially challenging and because we agreed with the client companies to give this issue particular attention as part of the project.

Our focus in this section is on conceptual and theoretical matters relevant to this project, rather than empirical analysis which might help inform on aspects of that debate. But the material in this section helps to guide what types of empirical analysis and evidence may be relevant and informative.

This section is organised as follows. First, we set out our conceptual definition of the performance level funded by base-plus allowances. We then provide an overview of a range of factors that we have identified as influencing the performance level funded by base-plus allowances and which would be relevant to attempts to estimate that level when setting price controls. The remainder of the section takes these factors in turn and elaborates on them.

### The concept of the performance levels funded by base-plus allowances

The concept of the performance level funded by base-plus allowances is an attractive one because it seems highly relevant to practical decisions that are faced when setting price controls for water companies (e.g. setting PCLs for common performance commitments or assessing whether companies should be provided with explicit enhancement allowances, on top of their base-plus allowances, to fund improvements in their performance).

However, while we have seen increasing discussion of this concept, we are not aware of any thorough explanation of it and limited recognition of the complexities surrounding it. We have found it a particularly challenging concept to understand and give meaning to. We feel that we have made progress on this, drawing in part on the simulation modelling analysis we carried out during this project which has called for a reasonably precise definition of the performance level funded by base-plus allowances.

To make the concept of the performance level funded by base-plus allowances meaningful and usable, we start by defining it as the level of performance that would reasonably be expected, in a given year, from a *notional efficient company* that has the set of hypothetical features presented in Table 2 and which spends in line with its base-plus allowances for that year (and which has spent in line with base-plus allowances in previous years and price control periods). Table 2 explains why it makes sense to adopt these assumptions for the purpose of considering the performance level funded by base-plus allowances.

**Table 2 Assumed features of notional company for performance levels funded by base-plus allowances**

Assumption	Explanation
<p><b>No enhancement expenditure outside base-plus model scope</b></p> <p>In relation to categories of enhancement expenditure that are <i>excluded</i> from the data used for the base-plus models, we assume a notional company that has</p>	<p>This helps to focus the concept on the performance levels funded by base-plus allowances on the right thing, separating it from the performance funded by explicit enhancement allowances, as envisaged in Figure 5 above.</p>

Assumption	Explanation
<p>not incurred any enhancement expenditure in the past.</p>	
<p><b>Industry-average mix of expenditure</b></p> <p>We assume a notional company that, for each AMP, has a mix of expenditure that is the same as the industry-average mix during the historical period from which the expenditure data feeding into the base-plus allowances for that AMP are taken.</p> <p>By mix of expenditure, we mean the mix across different types of expenditure (e.g. between operating expenditure, and capital maintenance expenditure, or between long-life and short-life investment), and mix of expenditure across the activities or actions that affect aspects of company performance.</p> <p>By industry-average mix, we mean the average of the mix across companies, not the industry-wide mix.</p>	<p>An assumption of this nature is needed to determine how a given level of base-plus allowance is directed, and the balance between spend that improves/sustains performance for a single year versus spend that improves/sustains performance over future years stretching into subsequent price control periods.</p> <p>This assumption recognises the effects of using cross-company econometric models of historical expenditure on the performance levels funded by allowances derived from those models. The types of models used do not distinguish between companies in terms of their past mix of expenditure, and so allowances derived from those models are effectively blind to those differences.</p>
<p><b>Notional efficient company with no ongoing productivity improvement</b></p> <p>Notional company operates efficiently at the start of the price control period covered by the base-plus allowances.</p> <p>Notional company does not benefit from any further productivity or efficiency improvements during that period.</p> <p>We also assume away any impacts of RPEs.</p>	<p>This means that we define the performance level funded by base-plus allowances in a way that excludes the impacts on the level of performances that each company could achieve that arise from differences across companies in efficiency, management quality and organisational competence. It is not the intended role of the performance funded by base-plus allowances concept to compensate companies for such differences.</p> <p>This assumption also acts to separate the concept of performance funded by base-plus allowances from the concept of performance achieved via efficiency improvements over time, as envisaged in Figure 5 above.</p>
<p><b>ODI regards and penalties</b></p> <p>Notional company does not benefit or lose financially from any ODI rewards or penalties relevant to the aspect of performance under consideration.</p>	<p>This helps to focus the concept on the performance levels funded by base-plus allowances on the right thing, separating it from the increment to performance funded by ODI rewards (or reduction offset by ODI penalties) as envisaged in Figure 5 above.</p>
<p><b>Potential inaccuracy in cost benchmarking</b></p> <p>Notional company does not benefit or lose out financially from any inaccuracies in the suite of econometric models used for benchmarking base-plus expenditure across companies that are not directly related to the aspect of performance under consideration (e.g. inaccuracy due to cost drivers not captured by explanatory variables in the models or due to the simplified relationships assumed by models between expenditure and explanatory variables).</p>	<p>This avoids the assessment of the performance levels funded by base-plus allowances spilling over into an assessment covering all potential sources of accuracy of base-plus models and their impacts on individual companies.</p> <p>We consider that any significant issues in that regard are better tackled either through the use of better econometric models or through the cost adjustment process.</p>

The notional company definition set out above represents a position we developed during the course of the project but is not intended as a final word on this matter. It is likely to benefit from further development and refinement.

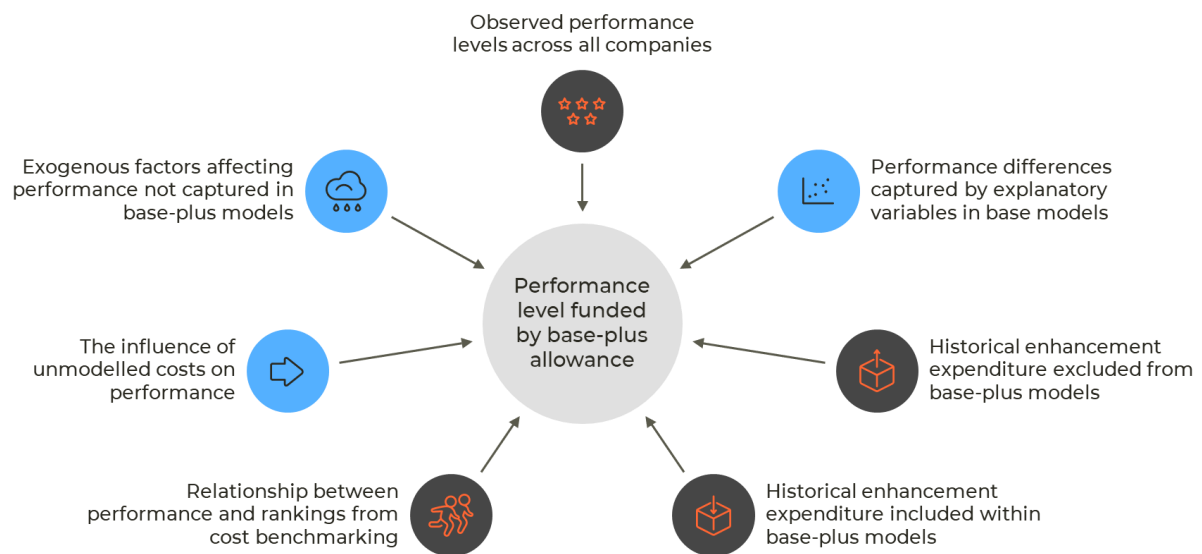
Our use of this notional efficient company concept here does not rule out any differences between companies in what performance level is funded by base-plus allowances. It just excludes from consideration certain potential sources of differences that do not seem relevant.

### Overview of influences on performance levels funded by base-plus allowances

Based on the definition provided above, we identified a range of factors that influence – and jointly determine – the level of performance funded by base-plus allowances for specific companies and specific aspects of performance.

We provide a summary of these factors in Figure 6. Those marked in a black circle are industry-wide influences that affect all companies in the same way. Those marked in a blue circle represent company-specific influences. In the absence of significant effects from the company-specific influences acting on a particular aspect of performance (i.e. the factors marked in blue), the level of performance funded by base-plus allowances would be the same for all companies for that aspect of performance.

**Figure 6** Overview of factors that influence performance funded by base-plus allowances



We elaborate on the factors in the subsections that follow. We start with the observed performance levels across all companies. This factor is likely to be relevant in all, or almost all, cases. Part of our discussion of the other six influences concerns how these factors would affect the level of performance funded by base-plus allowances, compared to the situation where the only influence at play was the observed performance levels across all companies.

This is a challenging area and we do not expect to have captured all possible influences. The discussion below is an attempt to shed more light on this topic than we have seen in the past, but it is likely to benefit from additional consideration and development in the future.

An important point to highlight here is that it is historical *enhancement expenditure* that has an effect on the levels of performance funded by base-plus allowances (and how those levels might differ from what performance levels are observed in practice). We see no direct influence of *enhancement allowances* on the level of performance funded by base-plus allowances. Instead, *enhancement allowances* are highly relevant to the broader question of what performance levels are funded by each company's *totex allowances*. As discussed in section 2.3, that involves considering both the performance funded by base-plus allowances and the incremental performance funded by current and historical enhancement allowances. That aspect could differ substantially across companies, even if the levels of performance funded by base-plus allowances are similar across companies.

### **The observed performance across all companies**

Because each company's base-plus allowances are determined primarily via cross-company econometric benchmarking models, rather than simply extrapolating its own historical expenditure, the scope and nature of expenditure covered by those allowances departs from the scope and nature of the company's historical expenditure.

There is no valid basis for thinking that the performance level funded by the base-plus allowances for a given company is determined primarily by its own historical levels of performance (or the trends in its own performance levels).

Instead, the performance level funded by the base-plus allowances for a company will be heavily influenced by the levels of performance of all other companies used for the econometric benchmarking that feeds into the base-plus allowances.

Our view is that, for practical purposes, a starting position on the performance levels funded by base-plus allowances would be some form of average of the levels of performance across the companies included in the benchmarking exercise. This is intended as a reasonable and convenient starting position, and the impact of all other factors discussed in the subsections below would then need to be taken into account.

In considering the levels of performance observed across companies, it would also be relevant to give attention to changes over time in performance levels. Where there have been differences in the levels of performance during the time period covered by the historical dataset, then the levels of performance relevant to base-plus allowances will depend on the details of econometric model specifications and how those models are used to set allowances. For example, and at the risk of over-simplification:

- If the econometric models used for base-plus benchmarking include a constant term and no time dummies or time trend, then the average performance levels over the full data period seem to be most relevant.

- If the econometric models used for base-plus benchmarking include time dummy variables for all years, and allowances derived from those models are calculated by applying the time dummies for a subset of years (e.g. the most recent five years) then the performance levels over that subset of years seem to be most relevant.

Something more complicated may apply if time trends are used in the econometric models, but we do not consider this here given the types of models used by Ofwat.

### **Historical enhancement expenditure excluded from base-plus models**

As set out above, we propose that the performance funded by base-plus allowances should be considered for a notional company that has not incurred any enhancement expenditure in those categories which are excluded from the scope of expenditure data feeding into the base-plus models. Under Ofwat's approach at PR19, enhancement expenditure in most enhancement categories was excluded from the base-plus models.

Where observed performance levels across companies have been driven, in part, by enhancement expenditure which is excluded from the base-plus models then the level of performance funded by base-plus allowances will tend to be below that observed in practice.

The greater the impact of historical enhancement expenditure on the levels of performance achieved by water companies, the larger would be the gap between the performance levels observed across the industry and the level of performance funded by base-plus allowances.

This is an important issue for PR24, especially given Ofwat's draft methodology relating to PCLs and the scale of historical enhancement expenditure across water companies.

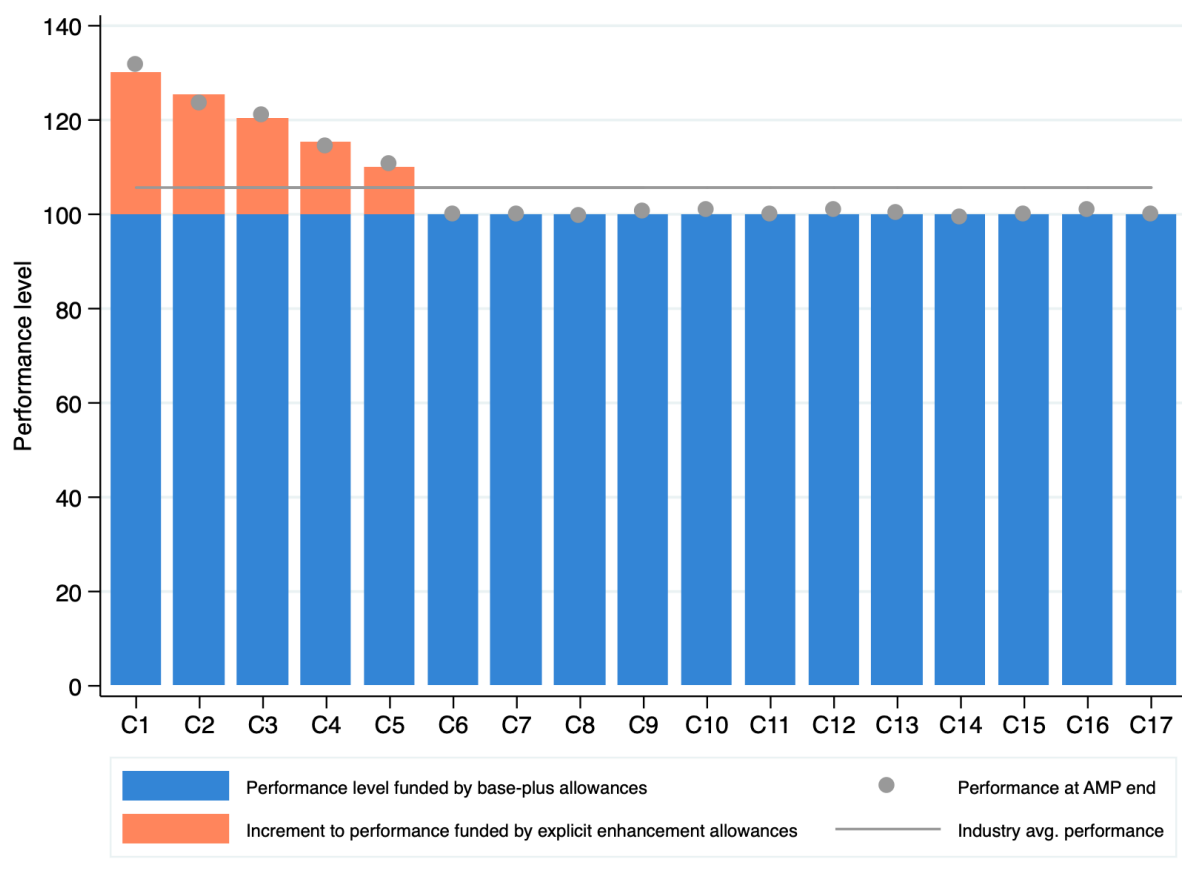
We considered this issue further as part of the simulation analysis presented in appendix 1. Figure 7 shows some results for a scenario from our simulation analysis where five companies (labelled C1 to C5) are funded for, and carry out, one-off capex-based enhancements in AMP7, with variation across companies in the scale of these enhancements. The AMP7 enhancement expenditure is excluded from the scope of base-plus models. The other 12 companies do not carry out any enhancements in AMP7 or subsequently. There were no enhancements prior to AMP7. For this hypothetical example, the chart provides a snapshot of performance for AMP8. It shows, for each company, the level of actual performance, the level of performance funded by base-plus allowance, the incremental performance funded by enhancement allowances as well as the average level of performance across companies.

As shown in the chart, the level of performance funded by base-plus allowances is the same across companies (for the simplified assumption made for the scenario). That level is below the average performance level observed across the industry because the capital enhancement expenditure that enabled the higher levels of performance by companies C1 to C5 is excluded from the base-plus models.

The chart also shows that, in AMP8, those companies who had carried out enhancement in AMP7, companies C1 through to C5, are fully funded for performance, via a combination of base-plus allowances and the explicit enhancement allowances.



**Figure 7 Example from simulation analysis of the impact of past enhancement expenditure on performance funded by base-plus allowances**



The simulation analysis is highly simplified but helps illustrate and explain the idea that, to the extent that current performance has been achieved by historical enhancement expenditure that is excluded from the base-plus models, this will tend to mean that performance funded by base-plus allowances is less than the average of current performance levels.

### Historical enhancement expenditure included within base-plus models

As discussed in section 2.2, the base-plus models used for PR19 final determinations, and those planned for PR24, will tend to draw on historical data that covers three broad types:

- Base expenditure (excluding unmodelled expenditure)
- Some enhancement categories which Ofwat has chosen to incorporate into the econometric benchmarking of base-plus expenditure.
- Some embedded enhancement expenditure (i.e. expenditure that is conceptually enhancement expenditure but reported as base expenditure).

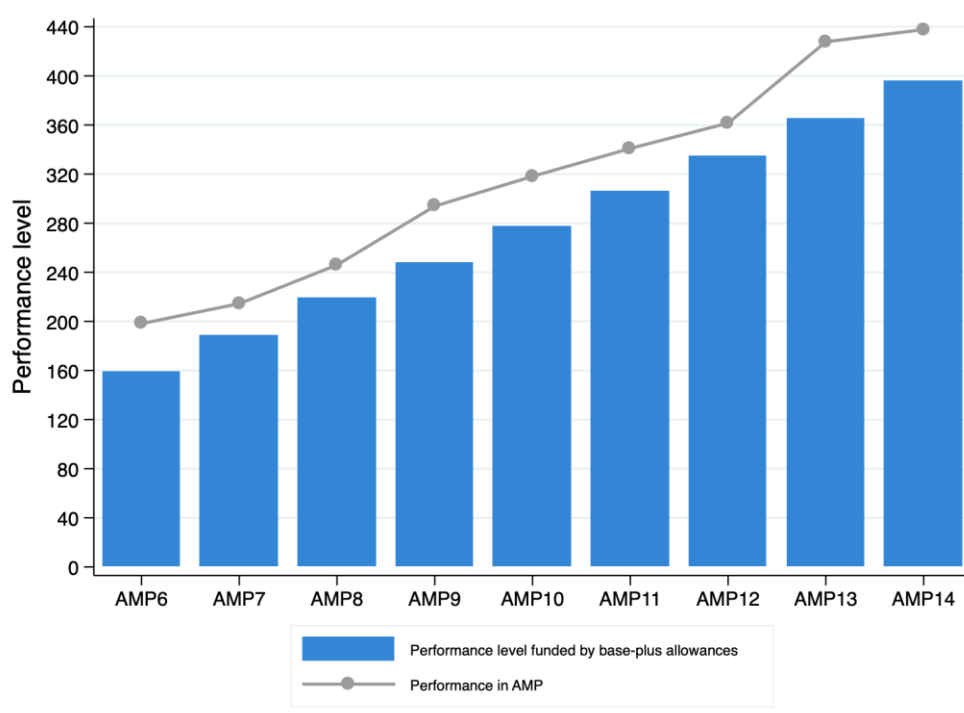
This means that some enhancement expenditure may be included – intentionally or unintentionally – with the scope of historical expenditure feeding into base-plus models.

The inclusion of enhancement expenditure within the base-plus models has implications for the level of performance funded by base-plus allowances provided that it is one of the following two types: (a) capital enhancement expenditure; or (b) investment-enhancement operating expenditure (as defined in section 2.2). These two types of expenditure sustain enhancement benefits, and performance improvements, in years subsequent to the years in which they are incurred. This means that incurring the same amount on these types of expenditure every year will lead to an ongoing trend of performance improvements.

Where either of these two types of enhancement expenditure are included in the base-plus models, then the performance level funded by base-plus allowances will tend to grow over time (even in periods where the level of base-plus allowances remains constant).

This is illustrated in the chart below, from the simulation analysis presented in appendix 1. This is for a scenario (see scenario S7) where all companies improve performance over time using capex-based enhancements and the capital expenditure from those enhancements is included in the scope of expenditure feeding into the base-plus models. As discussed in appendix 1, in this scenario the level of performance funded by base-plus allowances follows an upward trend although it does not match the level of performance observed in each period, due to the use of historical data in the base-plus models.

**Figure 8 Example from simulation analysis for capital enhancement expenditure**



The idea that the level of performance funded by base-plus allowances can be expected to follow an upward trend in performance is something that Ofwat has placed emphasis on in the past and in its PR24 draft methodology. However, given Ofwat’s regulatory accounting guidance, and its general practice (with some limited exceptions) of *excluding* capital enhancement expenditure and enhancement operating expenditure from the base-plus

models, there is no logic at all for expecting upward trends in the level of performance funded by base-plus allowances across all or most aspects of water company performance.

The inclusion of capital enhancement expenditure, or enhancement-investment operating expenditure, in base-plus models seems to be a special case rather than a reasonable starting assumption. In turn, the idea that continued upward trends in industry-wide performance are funded by base-plus allowances (and not by productivity) is a special case that ought to be justified whenever it is assumed.

The rate of improvement that was achieved across the industry historically might be a guide to the rate of improvement that can be achieved in the future – but this is subject to further consideration. The trend might have been driven by a combination of factors so it might not be appropriate to extrapolate it simply on the basis of a continuation of any one of them. In particular, where the trend has been driven in part by some enhancement expenditure that is outside the scope of the base-plus models, it would not be appropriate to simply extrapolate past trend in performance improvements. Furthermore, there may be cases of diminishing opportunities for improvement over time from the same levels of expenditure.

### **The relationship between performance and cost benchmarking rankings**

The discussion above has, so far, left aside and assumed away a relevant feature of Ofwat's approach to setting base-plus allowances. This is the practice of calculating the allowances derived from econometric models of base-plus expenditure by applying a downward adjustment for upper quartile efficiency (or a similar benchmark), rather than just using the predicted values from the econometric models which are likely to reflect industry-average levels of efficiency. This adjustment is sometimes presented as a catch-up efficiency challenge. It is somewhat misleading to interpret variations between companies' actual expenditure and the expenditure predicted for them by econometric models as largely indicative of efficiency differences between companies, but we stick with Ofwat's language for the purposes of discussion.

There was considerable debate during the PR19 process, and during the CMA references, around questions of the level of performance that should be expected from companies in a context where Ofwat applied an upper quartile efficiency challenge.

The application of an adjustment for upper-quartile cost efficiency adjustment (or similar catch-up efficiency adjustment), has implications for the level of performance funded from the base-plus allowances. We briefly discuss these implications below.<sup>14</sup>

Our view is that both of the following are quite possible in principle:

- In some cases, differences in the levels of performance observed across companies may be primarily driven by the quality and effectiveness of the companies' management,

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<sup>14</sup> We leave aside the separate questions of whether, why and when the use of an upper quartile adjustment might be reasonable when deriving allowances from base-plus modelling results; this is outside the scope of the project.

processes, working practices and culture, without giving rise to significant additional costs, such that those companies who seem to be relatively efficient (based on the econometric modelling results) are also those companies who achieve relatively high levels of performance.

- In some cases, differences in levels of performance observed across companies may be primarily driven by differences in the expenditure incurred by companies (for expenditure falling within the scope of the base-plus models) in relation to that aspect of performance and which are not properly accounted for in the base-plus models. If so, those companies who seem to be relatively efficient (based on the econometric modelling results) could be those who achieve relatively low levels of performance.

If, in practice, the performance differences observed across companies reflect the first case above, then the use of upper quartile cost benchmarks might be consistent with a view that the notional efficient company assumed for the setting of allowances is one that achieves better-than-average performance levels. It would be internally consistent in this case to expect the performance levels funded from base-plus allowances to be better than the average performance observed across companies (all else equal).

In contrast if, in practice, the performance differences observed across companies reflect the second case above, then it would be internally consistent to expect the performance levels funded from base-plus allowances to be lower than the average performance observed across companies (all else equal). In the absence of countervailing factors, it would not be internally consistent to expect average or above-average levels of performance from base-plus allowances set using an upper-quartile efficiency adjustment in these circumstances.

This is an empirical matter which may vary over time and across different dimensions of performance. At a conceptual level, we might be open to a range of possibilities and then leave this as something to be resolved in the light of analysis of any relationships between the ranking of companies from the suite of base-plus models and observed levels of performance across companies and over time.

Given the complications and challenges faced in bringing empirical analysis to bear on this issue (e.g. trying to isolate other factors such as past enhancements and dealing with the many different dimensions of performance) it may be quite difficult to find strong evidence one way or another. That can create a situation where Ofwat's starting position, or preconceptions on the balance across the two types of case highlighted above, dominates its regulatory decisions.

### **Performance differences captured by explanatory variables**

In general, Ofwat's econometric models of base-plus expenditure do not include explanatory variables relating to differences between companies in aspects of performance.

Nonetheless, there may be isolated cases where such performance differences are captured to some degree by explanatory variables in these models. For instance, at PR19:

- The wholesale water models included variables relating to water treatment complexity, which can be seen as a response to differences in the quality of raw water inputs that companies have access to.
- The wastewater models included variables relating to the ammonia consents applicable to treated effluent that is released into the environment. This variable captures, to some degree at least, differences between companies' impact on environmental outcomes relating to river quality or, seen differently, the companies' usage of ecosystem services.

In these cases, the performance levels funded by base-plus allowances will vary to some extent by company according to the values for those variables applied when calculating those allowances. In effect, the models control for differences in performance levels to some degree and the allowances derived from these models should be interpreted in a way that takes account of this.

This does not mean that the performance levels funded by base-plus allowances would be sufficient to cover the level of performance represented by the explanatory variable. For instance, if performance differences between companies are quite recent rather than long-standing, the coefficient on the explanatory variable might only reflect the operating expenditure arising from performance differences and not reflect capital expenditure (e.g. capital maintenance). There is no reason to expect that the coefficient would capture the full incremental costs of achieving and maintaining improvements in performance in all cases.

It is also relevant to keep in mind that the variables used in the econometric models might be focused on aspects of companies' inputs or processes (e.g. water treatment complexity) rather than outcomes for customers and the environment. In that case, the levels of performance funded through base-plus allowances would depend on the inputs or processes used by each company.

It is also possible that there is a strong correlation between an aspect of performance and a variable that is captured in the modelling, even where there is no intention for the model to control for that aspect of performance. If so, and if differences in that aspect of performance give rise to significant differences in base-plus expenditure between companies, then the estimated coefficient for that variable may inadvertently capture some of the relationship between expenditure and that aspect of performance. This might be seen, in statistical terms, as a form of omitted variable bias. This means that it is possible that models control for aspects of performance without this being immediately visible, and the level of performance funded by base-plus allowances for those models might reflect this.

### **Exogenous factors affecting performance differences between companies**

The level of performance that we might reasonably expect affect from a notional efficient company, from its base-plus allowances, may depend on exogenous factors that have a direct bearing on its performance (or its ability to perform well from a given level of funding) but which are not captured in the explanatory variables in the base-plus models. For example, the scale and intensity of rainfall in the area served by a company might be relevant to its performance in terms of sewer flooding incidents.

This is a company-specific issue. It might be a reason, in some cases, to treat the performance as funded by base-plus allowances as something that varies across companies around the observed industry-average level of performance, rather than assuming a common industry-wide level of performance funded by base-plus allowances.

### **The influence of unmodelled costs on performance**

We make one final comment in this section for the purposes of completeness, and coherence, although it may have limited practical relevance for PR24.

The base-plus allowances set by Ofwat are the combination of allowances derived from base-plus benchmarking models and allowances for what Ofwat calls unmodelled costs (which are a smaller component of the total). In principle, therefore, the levels of performance funded by base-plus allowances will be affected to some degree by the allowances for what Ofwat calls unmodelled costs as well as the benchmarked base-plus allowances which have been our main focus above.

If unmodelled costs have a significant influence on an aspect of performance, for example in terms of differences between companies or improvements over time, then the allowances set for these costs could affect the level of performance funded by base-plus allowances.

The allowances for unmodelled costs tend to be set in a way that places more emphasis on each company's own forecasts and historical expenditure than on cross-company benchmarking. This would tend to make each company's own performance levels more relevant to the level of performance funded by base-plus allowances, insofar as the unmodelled costs have a significant impact on performance. The greater is the influence of such costs on an aspect of performance for a specific company, the more the performance level funded by base-plus allowances will reflect that company's historical/forecast performance, rather than the observed performance across all companies.



## **3. Concerns with aspects of the PR19 approach**

### **3.1: Introduction**

In section 2 of this report we spent considerable time setting out some conceptual and analytical background to the project. This provides the foundation, we hope, for a clearer articulation of some of the concerns that arise with aspects of the PR19 approach to cost assessment, relating to interactions between base and enhancement expenditure and between these and performance. We turn to those concerns in this section.

Each of the concerns discussed in this section can be understood to reflect, to some degree, the tensions that have arisen as the regulatory framework has evolved, gradually over time, in a way that has placed greater emphasis on cross-company benchmarking (for expenditure and aspects of performance), while retaining legacy elements of company-specific assessment that developed in a different context.

In this section, we take the following issues in turn:

- Risks of an inefficient capex bias for enhancements.
- Industry-wide risks of under-funding capital maintenance from past enhancements.
- Unreasonable exclusion of enhancement opex from base-plus modelling.
- Concerns about the scale of improvements expected from base-plus allowances.
- Potential for double funding enhancement expenditure.
- Risks of under-funding better-performing companies.

We recognise that there are interactions between these issues. For instance, problems relating to potential under-funding have impacts on incentives and are in turn relevant to the first point above. But it is helpful for the purposes of exposition to discuss each in turn.

Of the concerns above, we agreed with the client companies to give lower priority to the last two items on this list, in terms of developing potential measures to tackle them (see section 5). These issues are linked to broader work that Ofwat is doing, and companies are actively engaging with, in relation to the performance levels that are funded by base cost allowances and how cost adjustments for base expenditure might be calculated to take account of differences between companies. We have not sought to duplicate that work, but have given these issues some consideration in the project.

### **3.2: Risks of an inefficient capex bias for enhancements**

One of the issues of particular interest to this project is the concern that the current approach to cost assessment, combined with other aspects of price control framework, provide financial incentives to water companies to favour enhancement solutions that involve a greater degree of capital expenditure relative to operating expenditure. This may act to

encourage companies to plan and deliver solutions that are less efficient than other feasible options, to the detriment of customers – or to adopt, in Ofwat’s language for PR24, solutions that deliver lower value for customers.

One particular area of concern is that nature-based solutions, which tend to call on operating rather than capital expenditure, may be discouraged even when these would be the best option for customers. But the problem is a broader one. We would expect even quite conventional enhancement solutions to involve design choices affecting the mix of operating expenditure to capital expenditure and any financial bias in favour of capital expenditure to risk inefficiency in these choices.

Ofwat has recognised this concern. For instance, in its consultation paper from May 2021 on its approach to the PR24 review, Ofwat said the following:<sup>15</sup>

*“We are considering how we can better incentivise nature based solutions and other opex-based solutions, through reducing the potential bias for capital-based solutions.”*

Ofwat elaborated a little further in its PR24 draft methodology:<sup>16</sup>

*“Our current regulatory approach provides less funding surety for schemes which are more reliant on operating expenditure, and so may have the unintended consequence of disadvantaging operating expenditure-based nature-based solutions compared to more traditional capital-intensive solutions.”*

United Utilities explained its concerns as follows<sup>17</sup>:

*“The move to totex has largely alleviated the prior capex-bias within botex (costs for delivering base service), however, the approach to cost assessment for enhancements still has an inherent bias towards capital solutions. This is because it only recognises expenditure needs in the same AMP as the enhancement is first required (and the approach tends to focus on historic end of pipe capital solutions), but does not recognise expenditure needed for ongoing management of a nature based solution over multiple AMPs. If this is not addressed, then it will act as a barrier and disincentivise companies to reveal potential nature based solutions and partnerships upfront in their business plans.”*

Our assessment is that the following features of the PR19 approach are particularly relevant to this concern:

- Ofwat’s general practice is to set explicit allowances for enhancements which are intended to cover the efficient level of enhancement expenditure that will be incurred

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<sup>15</sup> Ofwat (2021) *PR24 and Beyond: Creating tomorrow, together*, page 4.

<sup>16</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24*, page 82.

<sup>17</sup> United Utilities (2020) *Evolving the Water Industry National Environment Programme to deliver greater value*, page 12.

during the forthcoming price control period only. An approach of funding only the expenditure expected to be incurred in a single AMP means that such allowances will tend to cover a higher proportion of the long-term economic costs of enhancement initiatives (i.e. upfront expenditure plus subsequent operating and capital maintenance expenditure) if those solutions involve a relatively high degree of upfront capital expenditure relative to ongoing operating expenditure.

- The PR19 approach to benchmarking enhancement expenditure, as part of the determination of the efficient level of costs for explicit enhancement allowances, did not provide offsetting financial benefits for solutions that involve a greater proportion of operating expenditure and less upfront expenditure. For instance, where Ofwat used cost benchmarking in setting these allowances at PR19, it often set allowances as the lower of: (a) a cost benchmark derived from comparisons of measures of within-AMP expenditure across companies; and (b) the companies' forecast of efficient expenditure for the AMP from its business plan.
- The allowances derived from base-plus models do not make up, in any way, for the relative shortfall in funding arising if a company chooses an enhancement solution that involves more operating expenditure compared to one that involves more capital expenditure. The allowance derived from these models for a particular company will be the same regardless of the choices that this company has made about enhancement solutions in the past.
- Ofwat's price control framework remunerates companies financial risk exposure through the established practice of multiplying an industry-wide WACC to each companies' RCV. The more upfront capital expenditure there is in an enhancement solution, compared to operating expenditure, the greater is the opportunity for the company to grow its RCV through increases to the non-PAYG element of totex, and earn a WACC-based return on that element. That WACC-based return can be seen to remunerate the company for financial risk in relation to the enhancement (e.g. risk relating to potential over- or under-spend on upfront expenditure and risks around operational issues and subsequent expenditure). There is no corresponding remuneration for risk in relation to enhancements achieved via operating expenditure, but these may involve significant risk too. Despite the simplifications of the price control framework, a water company's actual cost of capital (in £m) is not simply proportional to the size of its RCV.

Overall, we think that there is a financial bias in favour of capital expenditure in respect of companies' enhancement activities.<sup>18</sup> This was a key issue for the project and something which we give particular attention to in section 4.

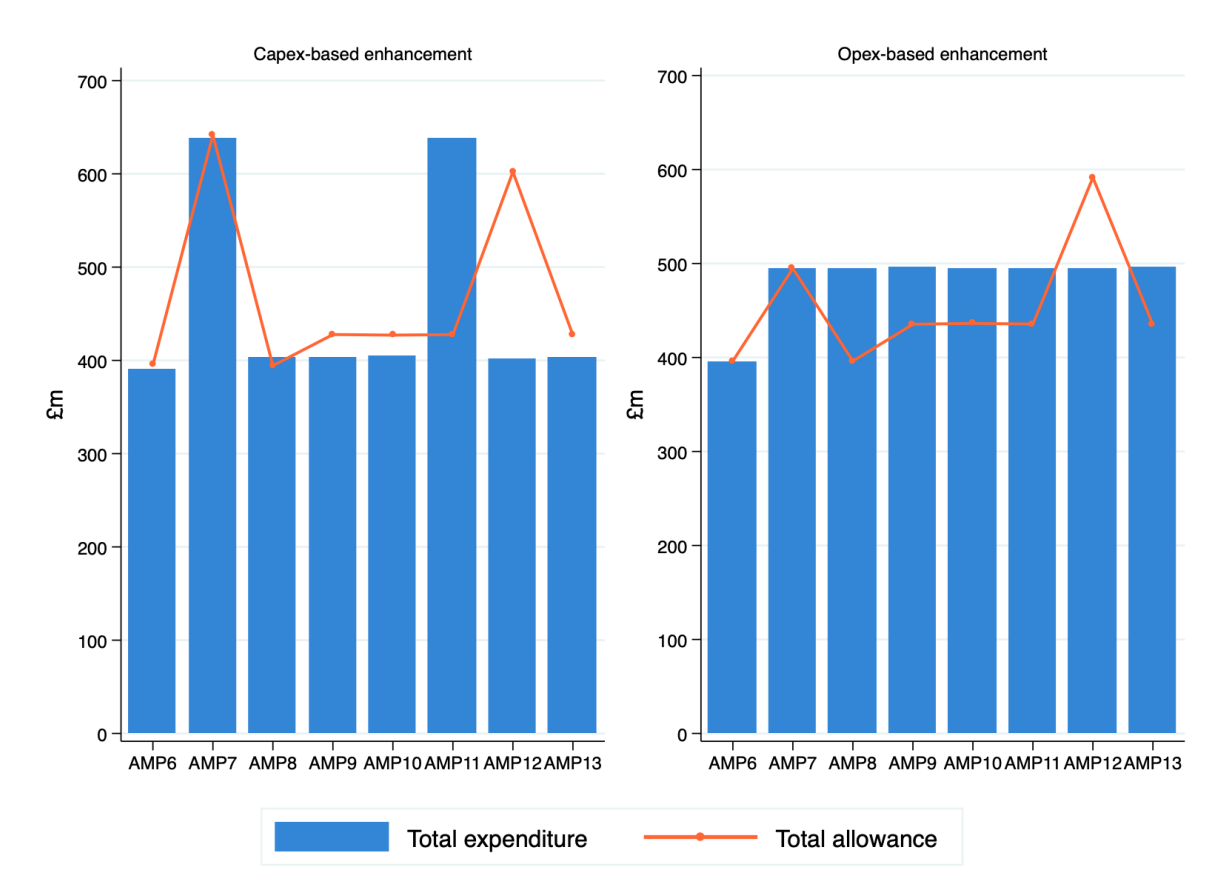
We further consider and illustrate the capex bias for enhancements as part of the simulation analysis in appendix 1 of this report. We reproduce below two charts from that analysis. These charts concern a scenario where all companies carry out a one-off enhancement project in AMP7. Most companies are assumed to do a capex-based enhancement, which involves upfront investment in an asset with 20-year life and some ongoing operating

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<sup>18</sup> And within this, a potential financial bias to investment in longer-life rather than shorter-life capital assets.

expenditure, while some carry out a similarly efficient opex-based enhancement which involves a stream of ongoing operating expenditure every year. The charts compare the assumed expenditure, and price control expenditure allowances, for a company doing a capex-based solution against those for a company doing the opex-based solution. In this example, we see that the allowances for the opex-based solution, are inadequate relative to expenditure, especially in AMPs 8 to 11, since only the AMP7 costs of the opex-based solution are fully funded by enhancement allowances. Comparisons of expenditure allowances relative to expenditure incurred shows a financial advantage for capex-based solution compared to the opex-based one. This financial advantage reflects the lack of funding for the ongoing costs of the opex-based solution after the initial AMP in which it was introduced and some element of over-remuneration for the companies who do a capex-based solution. See appendix 1 and, in particular, scenarios S3 and S5, for further explanation and discussion.

**Figure 9 Simulation analysis for illustrative scenario where some companies to one-off capex-based enhancements and some do one-off opex-based enhancements**



The risks of a capex bias that we identify arise for those areas of enhancement expenditure for which Ofwat determines company-specific explicit enhancement allowances. This is a key source of enhancement funding but, as explained in section 2.3, it is not the only way that Ofwat funds enhancements. For enhancements funded via the base-plus allowances or via ODIs we have not identified a similar source of capex bias.

A further point to highlight is that, in those categories of enhancement expenditure for which Ofwat determines company-specific explicit enhancement allowances, the risks of a capex bias arises first and foremost in relation to the proposals for enhancement initiatives that companies to put forward to Ofwat in their business plans, and in schemes or outputs agreed with the EA via the WINEP process. Once allowances have been set by Ofwat it is conceivable that companies might then have financial incentives to deliver opex-based enhancement solutions if these would be more efficient overall than the capex-based initiatives originally agreed. However, the opportunities for this substitution to happen in practice are likely to be limited by the arrangements for customer protection (e.g. ODIs or PCDs), and the WINEP obligations, that hold companies accountable to the delivery of specified assets or capex-based schemes – and perhaps also by potential reputational incentives not to deviate too far from delivery or the enhancement projects originally planned. In the absence of a truly outcomes-based regulatory approach, from Ofwat and the EA, a capex bias in the development and planning and agreement of enhancement projects is likely to feed through to a capex bias in enhancement delivery choices.

Beyond the financial bias, there are potentially a broader set of problems concerning nature-based solutions, which may lead to inefficient or sub-optimal choices, but which fall outside the primary scope of this project. For instance, if nature-based solutions provide a wider range of benefits than more traditional capital expenditure solutions, but their cost efficiency is assessed by Ofwat using benchmarking models that ignore these wider benefits, then solutions that provide a better ratio of benefits to costs could be foregone in favour of least-cost solutions. Furthermore, opex-based initiatives might have significant advantages over capex-based initiatives, in terms of their adaptability and flexibility over time, but the value of this – the option value – may get insufficient attention in regulatory benchmarking exercises and cost assessment processes. These broader issues for enhancement cost assessment and not something that we consider further in this report.

### **3.3: Industry-wide risks of under-funding capital maintenance from past enhancements**

The PR19 approach to cost assessment seems to lack a proper funding channel for the capital maintenance that arises from past enhancements. This is expenditure that would be counted as enhancement expenditure if the reference year is taken as a point in time before the enhancement is made, but which becomes capital maintenance expenditure (part of base expenditure) as the reference year is updated at successive price control reviews.

This issue arises from a number of features of the current arrangements acting together:

- It is not the intention, or effect, of Ofwat's explicit allowances for enhancement expenditure to cover the expenditure associated with enhancements that arises in later price control periods. These allowances are only meant to cover expenditure within the forthcoming price control period.

- There is no direct allowance, at the price review, for the capital maintenance expenditure that will be needed in the forthcoming price control period as a consequence of past enhancements.
- In some cases, the base-plus allowances might provide an implicit allowance for the capital maintenance expenditure for past enhancements through the explanatory variables used for base-plus models. For instance, this may be the case for enhancements relating directly to customer growth, given the use of explanatory variables capturing the scale of water companies' systems in the base-plus models (e.g. the number of connected properties or length of water mains or sewers). But this is very much a special case and whether the allowance is adequate would depend on the details of each case. Most aspects of companies' enhancement activities to improve customer service quality and environmental performance do not get recognised in the explanatory variables in the base-plus models.
- The capital maintenance expenditure incurred to maintain past enhancements across the industry will, over time, form part of the expenditure data feeding into the base-plus models. However, the allowances derived from base-plus models are estimated using historical data. There is a significant time lag before capital maintenance incurred in a given year feeds through to the allowances from the base-plus models. The allowances for one price control period tend to reflect the capital maintenance expenditure incurred historically (adjusted for any explanatory variables in the base-plus models: see point above) which, in terms of capital maintenance from enhancements, would tend to be less than the capital maintenance requirements faced today. Furthermore, Ofwat's approach to the base-plus models, which gives continuing weight to expenditure in the early years of the dataset and does not try to capture dynamics over time,<sup>19</sup> will tend to dilute the upward influence on base-plus allowances that arises from any increases over time in capital maintenance expenditure associated with past enhancements.
- In principle Ofwat's cost adjustment process, which it plans to retain and refine for PR24, provides a channel for companies to ask Ofwat for adjustments to their allowances if those from the base-plus models are not sufficient. However, there is no established precedent for successful cost adjustment claims in respect of the capital maintenance expenditure associated with past enhancements, as a means to address concerns that such expenditure is not funded in the base-plus models.

We further consider and illustrate the industry-wide risks of under-funding capital maintenance as part of the simulation analysis in appendix 1 of this report. We reproduce below some charts from that analysis. The first set of charts is for a simple example where all companies in the industry do one-off capex-based enhancements in AMP7, using assets

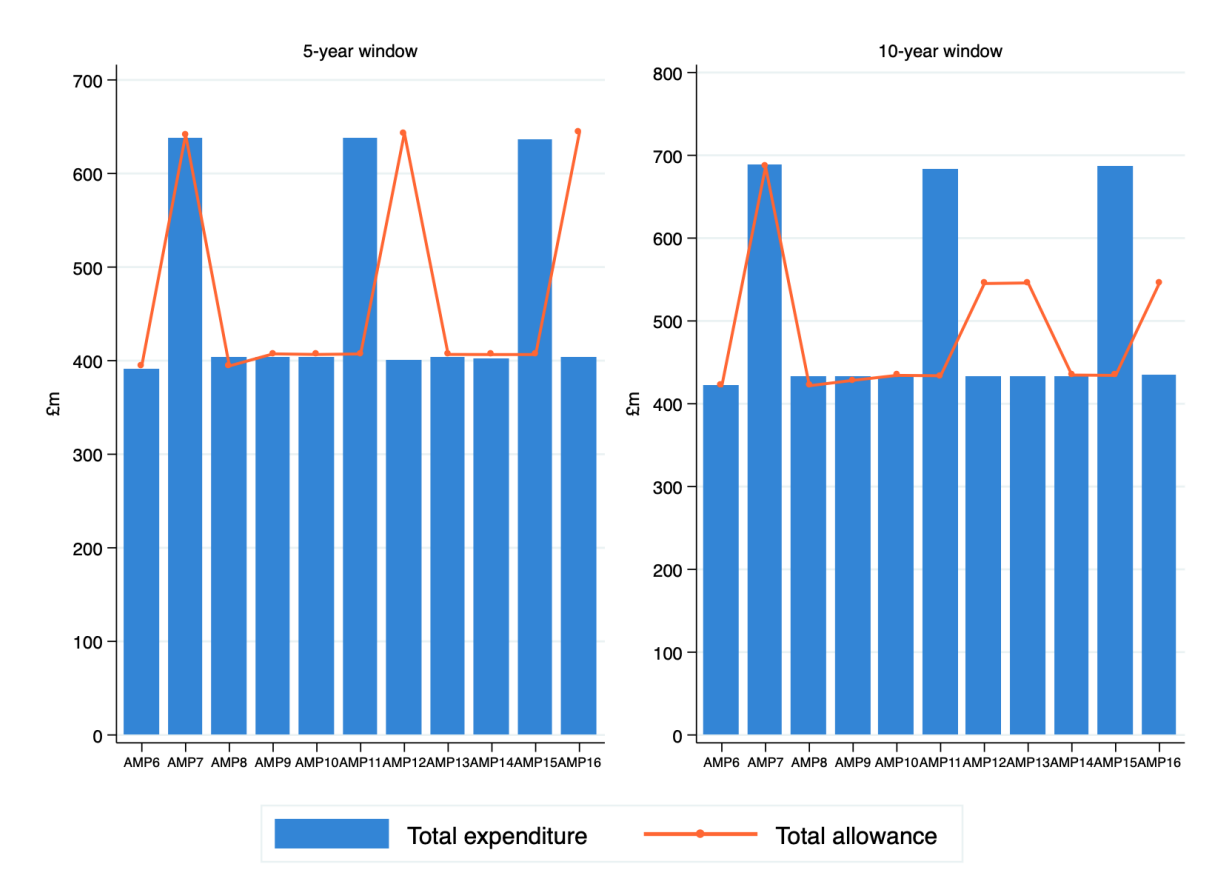
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<sup>19</sup> Ofwat's approach to the specification and use of econometric benchmarking models at PR19 meant that it took the longest time period of available data, rather than focusing on more recent data (e.g. the last five years). Ofwat has indicated that it plans a similar approach to the time period of data for PR24. Furthermore, its models did not use time dummy variables to (a) allow for changes over time in industry-wide expenditure (i.e. changes not associated with cost driver variables in the models) and (b) control for the weight given to different historical years in setting cost benchmarks for the coming price control period.



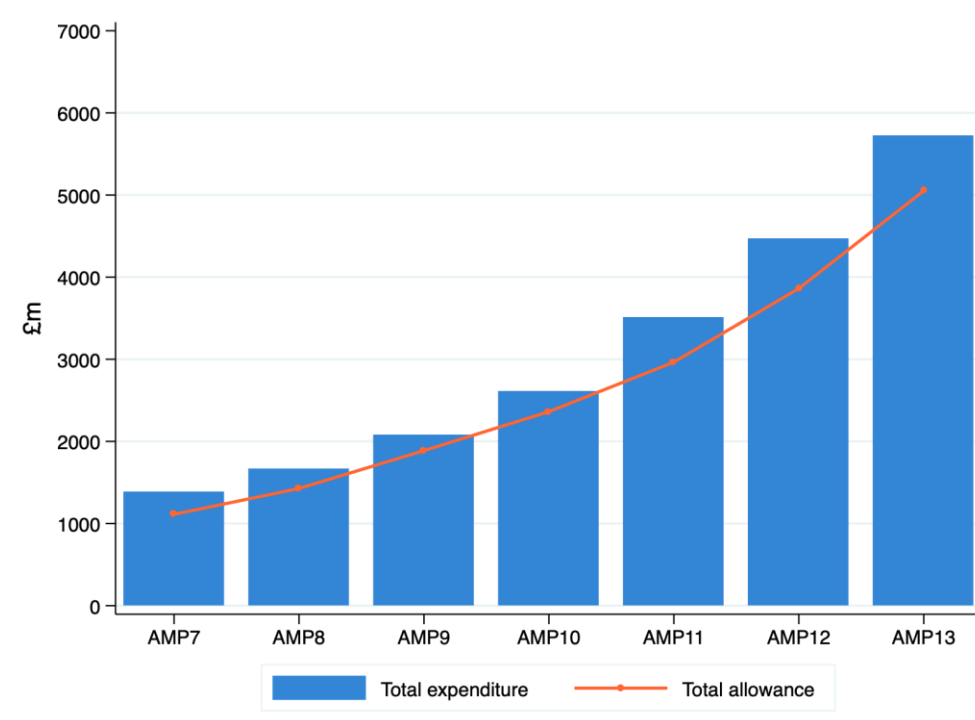
with a 20-year asset life (see scenario S8). In the chart on the left, the econometric models of base-plus expenditure draw on data from the previous five years and we can see a corresponding time lag before the capital maintenance expenditure incurred in AMP11 feeds through to base-plus allowances. In the chart on the right, the econometric models of base-plus expenditure draw on data from the previous ten years and it takes longer for the capital maintenance from AMP11 to feed through to allowances.

**Figure 10** Outputs from simulation analysis showing the impact of the time window used for econometric models of base-plus on remuneration of capital maintenance



The charts above concern a one-off enhancement. In practice, companies tend to do capex-based enhancements in every period. This creates a situation where in every period the base-plus allowance could be below the efficient level of expenditure requirements. This is illustrated in the chart below, which is for scenario S4 from appendix 1, where companies have been doing capex-based enhancements since AMP4 (note that part of the shortfall is also due to the under-funding of operating expenditure, discussed in section 3.4 below). This analysis assumes a five-year time window for the econometric models. This example shows that the concern is not simply a timing one (as might be implied by the two charts above) because the same funding problem arises in each AMP due to the effects of a stream of enhancements in previous AMPs.

**Figure 11 Example of simulation analysis for a scenario of ongoing performance improvements achieved via capex-based enhancements in every AMP**



This is an industry-wide issue, which is likely to affect all companies. Across the industry, there is a substantial amount of enhancement activity during each price control period, and limited offsetting reductions in the scope or quality of services. All else equal, the level of capital maintenance incurred historically will be that to maintain a somewhat smaller asset base than that which needs to be maintained today. Furthermore, some companies might lose out more than others, such as those who have incurred a greater scale of enhancement expenditure in the past.

Despite the issues above, whether this translates into under-funding of companies' efficient levels of expenditure during each price control period is a more complicated issue. For instance, there might be other factors which act to offset the impacts of funding shortfalls relating to past enhancements when it comes to the overall totex allowances, such as:

- Reductions in cash expenditure requirements if companies responded to the new incentives introduced at PR14 to move to asset management approaches that involve a greater use of operating expenditure rather than capital expenditure in relation to those activities covered by base expenditure.
- Potential opportunities to defer capital maintenance expenditure requirements to future price control periods, without immediate adverse effects (e.g. via managing near-term needs using opex-based solutions or investment in shorter-life and lower-cost assets).

The scope for these offsetting factors to apply may be decreasing over time (e.g. the first seems to be a transitory effect of changes to the framework at PR14). The issue of the capital maintenance implications of past enhancements could be a more significant concern in the future than it has been to date.

### 3.4: Unreasonable exclusion of enhancement opex from base-plus modelling

At PR19, Ofwat deducted an estimate of enhancement operating expenditure from the input data feeding into the models of base-plus expenditure. For PR24, Ofwat plans to exclude all enhancement operating expenditure reported for 2020-21 onwards from the scope of base-plus models.<sup>20</sup> Both the approach taken at PR19, and that proposed for PR24, seem to us to be mistaken.

Ofwat's approach to enhancement operating expenditure from PR19 was an approximation because it did not have data on any measures of enhancement operating expenditure reported separately within companies' reported operating expenditure. Instead, Ofwat sought information from companies which it then used to make estimates of the approximate scale of enhancement operating expenditure for each company in the past, and it deducted this from the operating expenditure data feeding into its base-plus models. Ofwat presented this as necessary to avoid double counting. Our reading of Ofwat's approach is that it intended that all enhancement operating expenditure should be deducted from the expenditure used for base-plus models.<sup>21</sup>

Ofwat said that the CMA had validated its PR19 approach.<sup>22</sup>

RAG 4.10 defines enhancement operating expenditure as follows (page 163):

*“expenditure incurred in the creation and running of new capital assets; and expenditure on operating solutions instead of (or alongside) capital solutions to deliver service enhancements.”*

The CMA in the PR19 references did not, in our view, seem to get to the bottom of this issue. The CMA seemed to readily accept the need for an adjustment to remove enhancement operating expenditure and it focused on what seemed to be more minor details of its calculation. The CMA explained its adjustment as follows, drawing quite heavily on what Ofwat had told it:<sup>23</sup>

*“Ofwat’s historical data collection approach contained no distinction between base operating expenditure (opex) and enhancement opex. This meant that the opex included in historical costs, which Ofwat used to model base costs, included both base opex and enhancement opex. Ofwat’s allowance for modelled base costs therefore implicitly included an allowance for enhancement opex, taking it beyond base costs. Since Ofwat set separate allowances for*

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<sup>20</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*, page 16.

<sup>21</sup> Ofwat (2019) *PR19 final determinations: Securing cost efficiency technical appendix*, pages 38-39.

<sup>22</sup> Ofwat (2021) *Assessing base costs at PR24*, page 27.

<sup>23</sup> CMA (2021) *Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations Final report*, page 33.

*base costs and enhancement activities, Ofwat's cost allowance could double count the enhancement opex if an adjustment was not applied.*

...

*The adjustment is designed to remove from the modelled allowance the impact of historical enhancement expenditure. This impact leads to firms' modelled cost allowances being greater than they would be if only base costs were used as data inputs."*

We note that the CMA said that three of the four disputing companies did not raise enhancement operating expenditure as an issue and that Bristol Water's focus seemed to be on a point of detail rather than on the point of principle. It is possible that this issue was given limited attention by the CMA during the references and treated as a low priority.

The approach applied by Ofwat and CMA at PR19 does not make sense to us and seems to involve an unreasonable deduction for enhancement operating expenditure.

This is a relevant concern in itself, but it also points to wider confusion about the concepts of base expenditure and enhancements.

As set out in section 2.2, we see value in distinguishing two types of enhancement operating expenditure:

- **Enhancement-investment operating expenditure.** This category captures the special type of operating expenditure where operating expenditure incurred in one year by a water company provides significant enhancement benefits over subsequent years. This type of operating expenditure shares some economic similarities with capital expenditure and might be seen as a form of investment.
- **Enhancement-running-cost operation operating expenditure.** This category captures all remaining operating expenditure that is incurred to provide enhancement benefits. It includes, for example, the ongoing running costs from new assets as well as the annual running costs from opex-based enhancement initiatives.

There may be grounds for excluding the first type above from the data feeding into the base-plus models. However, the case for this would depend on whether additional performance improvements over time, in aspects of performance for which this enhancement operating expenditure has contributed to past improvements, are expected from companies without any separate funding sources besides the base-plus models. Furthermore, we would expect this category to be a rarer type of operating expenditure, not the norm, which arises in some special cases.

The second category here would include the expenditure incurred in "running of new capital assets" as mentioned in RAG 4.10 above. We cannot see a logical basis for excluding this type of operating expenditure from the base-plus models.

To take a simple example, if enhancement operating expenditure incurred in 2023/24 represents the energy and labour costs incurred by companies to operate enhancement

assets commissioned in 2022/23, we cannot understand why this should be excluded from econometric models that are used for the purposes of setting allowances for the period from 2025/26 to 2029/30, when those assets will still be in place.

We illustrate this issue as part of the simulation analysis presented in appendix 1: for instance, see scenarios S1 and S2.

### **3.5: Concerns about the scale of improvements expected from base-plus allowances**

One of the issues of interest to the project was the tension between the conceptual split between base expenditure and enhancement expenditure and a regulatory approach which often assumes that certain improvements over time in industry-wide performance (e.g. relating to common performance commitments or efforts to reduce carbon usage as part of net zero strategies) are capable of being funded via base expenditure.

On further review, we think that there are different types of issues at play here.

We feel that there are conceptual and terminological issues that can cause confusion and dispute. In short, and drawing on the discussion in section 2, there is a subtle but important difference between the idea of ongoing industry-wide improvements in performance being achieved from *base expenditure* (which conceptually does not make sense) and the idea of industry-wide improvements in performance being achieved from the *allowances derived from models of reported base expenditure (or base plus expenditure)* or from what we call *base-plus allowances*. The second of these might make sense in some circumstances, as discussed in sections 2.3 and 2.4.

Aside from this point of principle, there is then a separate issue of whether there is evidence to support the specific assumptions made by Ofwat on the scale of industry-wide improvements in performance being funded by allowances from base-plus models.

Because the reported expenditure feeding into econometric models of base-plus costs is, aside from growth-related enhancements, at least meant to only cover base expenditure, one might expect some explanation as to why further improvements over time are possible, especially at the industry-level (i.e. aside from any company-specific catch-up). For instance, does Ofwat see this as part of industry-wide efficiency improvement over time, or is it based on some view about enhancement expenditure embedded in reported base expenditure? There was a lack of transparency on this issue at PR19 and Ofwat's draft methodology for PR24 does not give it enough attention.

One further source of concern is that past trends in performance improvement may have been possible only because of the contribution of enhancement expenditure that was funded by explicit enhancement allowances. What might look like performance improvement achieved from base expenditure may have been achieved via historical enhancement expenditure that is excluded from the base-plus models. In these circumstances, assumptions on future performance improvements that continue past trends could be overly demanding if no further explicit enhancement allowances are provided.

### 3.6: Potential for double funding enhancement expenditure

We have highlighted in section 2.3 that the price control framework provides three broad types of funding channels for enhancement expenditure to improve aspects of a water company's performance:

- explicit allowances for enhancement expenditure;
- allowances derived from base-plus models; and
- financial ODIs applied to performance commitments.

In this context, we see risks that there is some degree of double counting – or over-funding – from the combined contribution from multiple channels, in ways that are not readily perceptible.

For instance, there may be some degree of double counting arising if explicit allowances for enhancement expenditure are set without considering the case for deductions for implicit allowances for that expenditure as part of the allowances derived from base-plus models. This might be relevant, for example, for companies who have been performing relatively poorly compared to other companies on aspects of environmental performance and are provided with explicit enhancement allowances to catch-up to levels that other companies have been achieving for some time.

Another example is where the explanatory variables in base-plus models capture (intentionally or unintentionally) performance differences between companies such that higher or lower allowances are provided to companies according to that aspect of performance. There are risks of double counting if this is not taken into account in setting any explicit enhancement allowances or PCLs.

Another example concerns the PR19 and PR14 approach to performance commitments and financial ODIs. Where PCLs have been set using a company's historical levels of performance, and those have been worse than most of the other companies in the industry, then using ODI's to reward (or fund) improvements by that company may involve a degree of double counting if circumstances are such that the performance levels funded by base-plus allowances are well above that company's historical levels of performance.

The concern in the example directly above may be less relevant at PR24 than at previous reviews as Ofwat's PR24 draft methodology envisages a greater emphasis on common performance commitments for which PCLs are set using cross-company performance data. But Ofwat still envisages some company-specific PCLs for PR24.

The double counting risks above reflect, in part, the complexity in making assessments of the performance levels funded by base-plus allowances (see section 2.4).

### **3.7: Risks of under-funding better-performing companies**

As the flipside of the point above on double counting, there is the potential for some companies to receive too little price control funding as a result of the same features that might give other companies too much. This too reflects the complexity in making assessments of the performance levels funded by base-plus allowances.

There are risks, in particular, for companies that provide better levels of performance than others, and incur additional costs to achieve this, but are not remunerated for these costs either by the base-plus allowances, net revenues from ODI incentives or explicit enhancement allowances (in the current or previous AMPs). This might be particularly relevant for aspects of environmental performance which may differ quite significantly between companies – and may arise at very local levels – for which no common PCs or financial ODIs apply. It may also be relevant where financial ODIs apply, but the level of these is not sufficient to cover the efficient costs of maintaining aspects of performance achieved using historical enhancement allowances.

In some sense, these risks arise from a regulatory approach which:

- Only funds within-AMP enhancement expenditure via the explicit enhancement allowances.
- Sets allowances for base-plus expenditure using econometric models that do not account for differences between companies in every conceivable aspect of customer service and environmental performance.
- Does not apply financial ODIs to every conceivable aspect of customer service and environmental performance.

Some of the other concerns highlighted earlier in this section, such as that relating to capital maintenance from past enhancements, are also related to this concern, for those companies who have incurred higher levels of enhancement expenditure in the past and are held to maintain levels of performance that are higher than other companies across the industry.



## 4. Measures to help tackle the capex bias

### 4.1: Introduction

This section considers potential changes to Ofwat's approach to cost assessment to help to reduce the risks of a bias in favour of enhancement initiatives that involve a greater degree of capital expenditure relative to operating expenditure.

Our focus is on measures to tackle the specific source of risk of a capex bias which is discussed in section 3.2 of this report, and which relates to interactions between the funding available from base-plus allowances and explicit enhancement allowances. We agreed with the client companies that we would give this issue particular attention and we go into greater detail on measures to help tackle this problem than the other problems identified in section 3 (we turn to measures to help with those in section 5).

There are other aspects of Ofwat's PR19 price control framework and regulatory approach that might contribute to a bias in favour of capex-based solutions, such as:

- An approach to the remuneration of water companies' finance costs that treats these as simply proportional to the scale of the RCV (allowance for finance costs calculated as  $WACC \times RCV$ ). This is an over-simplification which may act to overcompensate the incremental finance costs of capex-based enhancement solutions and undercompensate the incremental finance costs associated with opex-based solutions, especially where Ofwat's approach is to provide explicit allowances for enhancements.
- Ofwat placing emphasis on the evidence for near-term cost efficiency when assessing enhancement proposals, which may favour familiar capex-based solutions rather than innovative opex-based approaches. A longer-term regulatory perspective might allow for some risk of higher costs in the near term in expectation of cost reductions in the future as innovative approaches are refined and rolled out more widely.
- An approach to benchmarking enhancements across companies which tended not to take account of the full range of benefits that enhancement initiatives may provide, which could work against nature-based solutions that provide a variety of environmental benefits relative to more traditional capex-based solutions.

These issues are outside the scope of this report but would be relevant to consider further in seeking to make improvements at PR24 and beyond. We briefly comment on how some account of the first issue above could be tackled as part the design of one of the key options presented in this section.

This section is structured as follows. We first explain how we have sought to place emphasis on ideas and options that provide a realistic opportunity for improvements at PR24, taking account of Ofwat's broader approach. We then present a longlist of ideas and options that we identified. The bulk of the section provides a more detailed explanation of three options that we gave greater priority to. These are:

- NPV-based funding for enhancement opex (section 4.3).
- Adaptable multi-amp enhancement funding (section 4.4).
- Targeted inclusion of enhancements in base-plus models (section 4.5).

In addition, we briefly comment in section 4.6 on a possible approach that Ofwat mentioned in its PR24 draft methodology. This would involve providing an enhancement allowance at PR24 for the operating expenditure associated with an enhancement over an initial period of ten years.

Finally, section 4.7 discusses a separate, but related, issue: how Ofwat might carry out benchmarking between opex-intensive enhancement initiatives and capex-intensive enhancement initiatives when it comes to determine explicit enhancement allowances. This issue is not directly related to the capex bias. But tacking this issue might be seen as complementary to some of the main options discussed in this section.

In this section we refer at times to capex-based or capex-intensive enhancements and opex-based or opex-intensive enhancements. This is something of a shorthand and a simplification for the purposes of the discussion. We do not intend to imply that enhancement initiatives fall into only two types: those which are predominantly capex-based and those which are predominantly opex-based. Different initiatives will have a different mix between operating expenditure and capital expenditure. The capex bias we are concerned with in this section is essentially a bias in favour of enhancement initiatives with a higher share of capital costs (e.g. in terms of the share of implied annual depreciation relative to operating expenditure) relative to those with a lower share of capital costs. Similarly, where we suggest possible approaches for opex-based enhancement initiatives, these are not intended to be applied only to initiatives that are predominantly opex-based. Instead, they might be a relevant response for any enhancement initiatives which risk being deterred in favour of feasible alternatives that involve a higher share of capital expenditure.

In section 2.2 we distinguished two broad types of enhancement operating expenditure. We make separate suggestions in section 5.4 concerning the price control treatment of enhancements that are exclusively enhancement-investment operating expenditure, which we see as something of a special case. Section 4 is primarily concerned with the price control remuneration of what we referred to as enhancement-running-cost operating expenditure. The options in this section would also be relevant where an enhancement initiative has a mix of both of the types of enhancement operating expenditure that we define, or where the duration of enhancement benefits from enhancement-investment operating expenditure is significantly shorter than the economic lives of assets that might be considered for a capex-based alternative solution.

## **4.2: Our emphasis on realistic improvements for PR24**

This project is intended to provide the basis for constructive engagement with Ofwat on potential improvements to the regulatory framework for PR24 and beyond, and to support business plan submissions at PR24.

Given this intention, we have been mindful of constraints on the opportunities for changes in Ofwat's regulatory framework that are likely to bite at PR24. For instance, we take as given that Ofwat will use econometric benchmarking of base-plus expenditure as the starting point for its cost assessment and that it will be keen to use benchmarking comparisons as far as possible for enhancements too. To develop constructive solutions for PR24, we have sought to work within, rather than overturn, what we see as fundamental aspects of Ofwat's regulatory approach.

This means that, for the purposes of this project, we have not considered options that would involve making some quite fundamental and extensive changes to Ofwat's price control approach. In particular, we have not considered:

- Any form of return to the type of approach applied to operating expenditure and capital maintenance expenditure before PR14.
- An approach that would involve allowances being set using detailed regulatory deep dive assessments across all parts of company business plans.
- Abandoning the econometric benchmarking approach for base expenditure and setting upfront allowances for these in ways that places emphasis on each company's own historical levels of expenditure combined with company-specific assessments of the case for upwards or downwards adjustments for changes over time.
- Price control remuneration approaches across all or most expenditure categories that are based largely on remuneration of expenditure incurred (e.g. 100% passthrough), subject to potential disallowances for expenditure the regulator finds to be demonstrably inefficient or wasteful (DIWE).

Similarly, we do not consider a more radical approach which could, in principle, get to the heart of some of the problems that arise at present. This would involve moving away from benchmarking and remunerating on the basis of expenditure (e.g. base expenditure or within-AMP expenditure on specific enhancement categories) and benchmarking and remunerating measures of economic or accounting costs (e.g. operating expenditure, depreciation and finance costs). This approach would represent quite a fundamental change to the price control framework for wholesale activities, which does not seem compatible with the present role of the RCV. We recognise that Ofwat is considering changes along these lines for bioresources. Outside of bioresources it does not seem realistic for PR24 and we have not considered it for this report.

In addition, we do not consider a move to a pure form of totex approach. Such an approach would remove the distinction between base expenditure and enhancement expenditure for cost assessment purposes and set allowances using econometric models of total expenditure (e.g. see the PR14 totex models). In doing so, it could help reduce the risk of a capex bias, which was a key objective of Ofwat as it developed its PR14 approach. However, the experience from PR14, including the lessons from the CMA determination for Bristol Water in 2015, suggest that a pure totex approach is not realistic, and would be a step backwards against the evolution of the price control framework from PR14 to PR19.

Ofwat reported as follows on the discussion at one of the PR24 cost assessment working groups:<sup>24</sup>

*“There was general agreement that a totex modelling approach is unlikely to be appropriate for the water sector due to the nature of the asset base and size / lumpiness of enhancement expenditure. The feedback from the CMA on the PR14 totex models was highlighted as a possible reason not to revisit totex modelling. But some companies did say that totex models could be used as a sense check”.*

On this basis, we placed emphasis on ideas and options that would fit within a framework in which a distinction between base expenditure and enhancement expenditure applies and there are separate cost assessment processes for allowances derived from base-plus models and for explicit enhancement allowances.

Finally, given the current stage in the PR24 process, we recognise that there are likely to be limits on the scale and scope of changes that Ofwat can make to its approach to cost assessment even with the constraints above. For that reason, we have given greater emphasis to consideration of options that have one or both of the following properties:

- Options that represent additional funding channels for opex-based enhancement initiatives, which could be applied alongside Ofwat’s established approach for capex-based enhancement initiatives, rather than options that would remove the established funding channels for capex-based enhancement initiatives.
- Options that could be applied on a targeted basis to some specific enhancement categories at PR24, rather than being applied across all areas of enhancement expenditure. This could allow for innovative approaches to be tested at PR24 and potentially applied more widely at PR29,

## **4.2: Longlist of ideas and options identified**

In the early stages of the project we compiled a longlist of potential ideas and options which might help address the problems identified in section 3. We refined this in discussion with the client companies and then selected a small number of prioritised ideas to work up in more detail and present as part of the project report.

In relation to measures to help tackle the risks of a capex bias for enhancements, we set out the refined longlist in Table 3. We indicate in the table which ideas we discuss in some detail in this section (first column marked in green); which ideas we discuss in section 5 of this report (first column marked pink); and which ideas we do not cover any further in this report (marked in grey). The third column of the table provides some brief comments on our rationale for the prioritisation position applied to each option.

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<sup>24</sup> Ofwat (2021) *Meeting note to cost assessment working group meeting on 15 July 2021*.

**Table 3 Potential measures to help tackle risk of capex bias in enhancements**

	Outline of idea	Prioritisation for this report
A1	<p><b>NPV-style approach to remuneration of enhancements<sup>25</sup></b></p> <ul style="list-style-type: none"> <li>• Enhancement allowances based on whole-life (NPV) cost, not within-AMP expenditure.</li> <li>• Within-AMP operating expenditure added to totex allowances with the remainder of the NPV added to the RCV.</li> <li>• Funding for ongoing costs for the solution provided via RCV-run off the RCV addition.</li> <li>• Separate reporting of outturn expenditure falling within the scope of the NPV-based funding arrangements, with these excluded from base-plus models to prevent double counting.</li> </ul>	<ul style="list-style-type: none"> <li>• Treated as high priority and covered in some detail in this section.</li> </ul>
A2	<p><b>Adaptable multi-amp enhancement funding</b></p> <ul style="list-style-type: none"> <li>• Ofwat would provide a funding stream for an opex-based enhancement initiative that spans multiple price control periods.</li> <li>• Unlike the NPV approach, these would not be firm financial commitment on funding levels (e.g. £ per year) in subsequent AMPs, but there would be a planned approach to funding over time, which provides some confidence to the company about recovery of efficient operating expenditure while offering adaptability to Ofwat to update the cost allowances in light of latest information or to terminate funding early (e.g. if enhancement benefits are no longer needed).</li> <li>• The ongoing expenditure incurred in relation to the enhancement would be subject to separate reporting, and removal from expenditure feeding into base-plus models.</li> <li>• This approach might be seen as a development and extension of the special approach taken for some catchment management expenditure at PR19.</li> </ul>	<ul style="list-style-type: none"> <li>• Treated as the highest priority and covered in greatest detail in this section.</li> </ul>
A3	<p><b>Remuneration based on measures of annualised costs and multi-amp funding</b></p> <ul style="list-style-type: none"> <li>• Rather than remunerating enhancement expenditure, Ofwat's enhancement allowances, in some areas at least, could provide companies with allowances for measures of the annualised costs of projected enhancement expenditure (operating expenditure and remuneration of finance and depreciation on capital expenditure).</li> <li>• This type of approach would be applied to both opex-intensive enhancement solutions and capex-intensive enhancement solutions, placing them on a more equal footing.</li> <li>• There would be no RCV additions in respect of these enhancements. Instead, longer-term but adaptable funding channels would be established spanning multiple price control periods as for option A2 above.</li> </ul>	<ul style="list-style-type: none"> <li>• We agreed with the client companies not to prioritise this option.</li> <li>• It would represent a more radical departure from Ofwat's current approach to the wholesale controls (it has links to Ofwat's separate bioresources proposals).</li> <li>• This option seems less realistic for PR24 than option A2 which shares some common features.</li> </ul>

<sup>25</sup> Option based on proposal from United Utilities (2020) *Evolving the Water Industry National Environment Programme to deliver greater value*, pages 12-13.

	Outline of idea	Prioritisation for this report
A4	<p><b>Targeted inclusion of enhancements in base-plus models</b></p> <ul style="list-style-type: none"> <li>Apply an adapted version of the PR19 FD growth-enhancement approach to a slightly wider set of enhancement expenditure, as a means to remove cost assessment boundaries between base expenditure and enhancements on a targeted basis.</li> <li>This type of approach involves including historical enhancement expenditure in base-plus models and then making adjustments to account for differences in the scale of enhancements needed between companies or in the next price control period relative to the historical period used for data feeding into these models.</li> <li>This approach seems more suitable where there are explanatory variables in the base-plus models to allow for differences between companies in the ongoing costs of different levels of capacity or performance relating to the enhancements included within the models.</li> </ul>	<ul style="list-style-type: none"> <li>We discuss this idea further in this section as it is potentially relevant in some specific circumstances, but we have not given it as much attention as options A1 and A2.</li> <li>This option has narrower applicability than A1 and A2, and exploring its potential role at PR24 seems to be dependent on detailed econometric model design work which is outside the scope of this project.</li> </ul>
A5	<p><b>Treat enhancement-investment operating expenditure as enhancement capex</b></p> <ul style="list-style-type: none"> <li>Some enhancement operating expenditure incurred by water companies is very similar in nature to capital expenditure, enabling a long duration of enhancement benefits from a single upfront cost, but which does not meet accounting rules for capitalisation.</li> <li>The regulatory framework could create a special category of enhancement operating expenditure that meets defined conditions.</li> <li>This expenditure would then be treated as if it were enhancement capital expenditure for the purposes of cost assessment, and excluded from models of base-plus expenditure.</li> </ul>	<ul style="list-style-type: none"> <li>We discuss this option in section 5.4, where it is relevant to the broader discussion around the treatment and reporting of enhancement operating expenditure.</li> <li>This type of approach is not applicable to all types of opex-based enhancement solutions but could bring significant incremental benefits where it does arise, for what seems limited downside.</li> </ul>
A6	<p><b>Adjustment mechanism for industry-wide expenditure</b></p> <ul style="list-style-type: none"> <li>Develop a form of uncertainty mechanisms to apply to price control allowances which adjusts for differences in industry-wide base-plus expenditure over the AMP between (a) the regulatory assumptions set at the price review (derived primarily from econometric models of historical data) and (b) outturn expenditure over the AMP.</li> <li>This mechanism would help to deal with any industry-wide forecasting uncertainty faced when setting allowances – which include issues in scope of this project (e.g. the costs of industry-wide enhancement expenditure).</li> <li>For any categories of enhancement expenditure to be covered by the adjustment mechanism, there would not be any explicit company-specific allowances for enhancement expenditure set at the price review. Moving away from these allowances provides a way to tackle the capex bias in these categories of expenditure.</li> </ul>	<ul style="list-style-type: none"> <li>We discuss this option in section 5.6, as it is relevant to tackling a range of concerns besides a capex bias.</li> <li>As a means to tackle the capex bias in enhancements, this approach would be most relevant to cases where there are common industry-wide enhancement requirements going forwards.</li> <li>It would not deal well with cases where there are substantial differences between companies in the scale of enhancement expenditure requirements (beyond differences in scale that are accounted for by explanatory variables in the base-plus models).</li> </ul>



	Outline of idea	Prioritisation for this report
A8	<p><b>Take some activities/outcomes out of base-plus models and benchmark the totex for these activities separately</b></p> <ul style="list-style-type: none"> <li>On a targeted basis, take all expenditure associated with certain activities out of the scope of expenditure feeding into the base-plus models and remunerate these separately through benchmarking exercises focused on those areas of activity/outcomes.</li> <li>Those separate benchmarking exercises would not differentiate between base expenditure and enhancements and would be intended to fund upfront and ongoing expenditure.</li> <li>By focusing on a narrower scope of costs, there may be greater potential for totex-style modelling to work well (e.g. in terms of capturing key cost drivers to explain variations in expenditure between companies and over time).</li> </ul>	<ul style="list-style-type: none"> <li>We do not discuss this option further in this section as it did not seem as promising or realistic for PR24 as some other options, especially given Ofwat's current approach.</li> <li>However, we do see a potential for option A2 to evolve over time into some version of this option, so it might be an approach that grows in relevance.</li> <li>This approach could have merit in some specific areas even though we have not prioritised it for this project.</li> </ul>
A9	<p><b>Use DPC-style approach to tackle risks of capex bias in enhancement solutions</b></p> <ul style="list-style-type: none"> <li>Use the direct procurement for customers (DPC) approach, or some variant of this, as a way to tender for long-life solutions to specific aspects of outcome delivery.</li> <li>DPC-style remuneration to be structured in a way that does not unduly favour capital expenditure delivery over operating expenditure delivery.</li> </ul>	<ul style="list-style-type: none"> <li>The DPC-style approach was treated as out of scope of the project and is not covered further in this section.</li> </ul>
A10	<p><b>Expand scope of financial ODIs and reduce role of explicit enhancement allowances</b></p> <ul style="list-style-type: none"> <li>Rather than seeking to fund enhancements via explicit allowances for enhancements (which tend to favour capex-based solutions under Ofwat's current approach), enhancements in some areas might be funded instead by expanding the scope of financial ODIs to new areas of performance/outcomes.</li> <li>Under this approach, the expenditure incurred in the relevant enhancement categories might be included within the expenditure feeding into base-plus models and an assessment of the level of performance funded by the allowances from those models used in setting the PCLs for those ODIs (though this is not necessarily straightforward).</li> </ul>	<ul style="list-style-type: none"> <li>Not covered further in this section.</li> <li>Exploring opportunities for expansion of financial ODIs is outside the scope of this project.</li> <li>The use of ODIs to fund performance improvement is an established part of Ofwat's regulatory framework, although extending it to areas currently covered by explicit enhancement allowances would be quite a significant change.</li> </ul>

### 4.3: NPV-based funding for enhancement opex

One of the options that we identified as part of the project, as a means to help tackle the financial bias in favour of capex-based enhancement solutions, is an approach which can be described as an NPV-based funding channel for enhancement operating expenditure.



Under this approach, Ofwat would make an allowance, at the price review, for the operating expenditure arising from an opex-based enhancement initiative, covering not just operating expenditure over the next AMP but also that in subsequent AMPs. That allowance would be calculated as a net present value (NPV) of forecast future operating expenditure, and it would be recovered gradually from customers via the company's RCV. This approach would involve Ofwat providing a firm long-term funding commitment for the operating expenditure arising from an enhancement which would, in turn, help reduce the financial deterrent against operating expenditure and in favour of capital expenditure.

We discuss this approach further in this section, taking the following topics in turn:

- Some background to the idea of an NPV-based allowance.
- Remuneration of longer-term operating expenditure allowance via RCV run-off.
- The rationale for an NPV calculation and the appropriate timeframe.
- Managing potential risks of double counting with base-plus allowances.
- The inclusion of operating expenditure within RCV additions.
- Potential concerns about the lack of flexibility from a long-term allowance.
- Further practicalities arising under the approach.
- Emerging view on the approach.

### Some background to the idea of an NPV-based allowance

The idea of some form of NPV-based allowances for opex-based enhancement initiatives (e.g. some nature-based solutions) was put forward, in outline terms, by United Utilities in a discussion paper in 2020. We reproduce in the box below, the outline of this approach.

#### Figure 12 Outline idea on NPV nature-based solution

Extract from the discussion paper United Utilities (2020) *Evolving the Water Industry National Environment Programme to deliver greater value*, page 13:

*“For nature based solutions, Ofwat could make allowances for totex based on the whole life (NPV) cost, not simply the in-AMP expenditure. If allowed, in-AMP opex is added to cost allowances (to form part of allowed revenues) with the remainder of the NPV added to the RCV, thereby recovering the rest of the expenditure through revenues from customers over time (this is a similar approach to how allowances for existing operating leases were made at PR19). The ongoing cost of managing the nature based solution would then be provided for by moderating RCV run-off assumptions.*

*Separate reporting of actual nature based solutions/partnerships will enable these costs to be stripped out in future AMPs to prevent companies recovering the money twice (through botex models and/or future customer sharing arrangements).*

*This would then make cost assessment of nature based solutions more directly comparable to the process for deriving allowances for end of pipe capital schemes, which would be unchanged from current benchmarking for cost allowances and recovery of revenues.*

*As benchmarking of cost for nature based solutions is likely to be more difficult, the company must therefore evidence why the preferred option delivers the best value, especially where it might be the case that the preferred option is not the lowest cost intervention.”*

Ofwat referenced this type of approach in its PR24 consultation paper from May 2021, when it acknowledged concerns about a capex bias which may be discouraging, in particular, nature-based solutions.<sup>26</sup>

In its PR24 draft methodology Ofwat said that it was “keen to support this option if possible”. But Ofwat cautioned that it saw “several challenges that would need to be overcome for it to become a workable solution.”<sup>27</sup> Ofwat said that these challenges related to: cost sharing and reconciliation; double funding risk; and the impact on financial metrics. It also expressed concern about the complexity of the approach. Ofwat identified in its draft methodology an alternative approach, which we briefly consider in section 4.6 below.

While United Utilities included the NPV-based approach in a discussion paper, it only sought to address one aspect of nature based solutions, i.e. funding over multiple AMPs, and not other aspects (such as ex-ante uncertainty in the delivery of benefits, efficiency and solution type). United Utilities told us that, following further analysis, it did not consider that an NPV-based approach would necessarily be the only viable approach for PR24, but rather that it was one option to consider.

In the following sections we first discuss in more detail how we think that the NPV-based approach might be applied, within the context of Ofwat’s broader price control framework, and then discuss some possible concerns with this approach.

### **Remuneration of longer-term operating expenditure allowance via RCV run-off**

Under the NPV-based approach, Ofwat would at PR24 set a totex allowance for the efficient operating expenditure of an opex-based enhancement initiative during AMP8 and at the same time determine an additional longer-term allowance for the operating expenditure arising from the enhancement in subsequent price control periods following AMP8.

Given the way that Ofwat sets price controls, we would not envisage that Ofwat would add that longer-term allowance directly to the company’s RCV. Under Ofwat’s broader regulatory framework, there are not typically granular decisions on whether allowances for specific

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<sup>26</sup> Ofwat (2021) *PR24 and Beyond: Creating tomorrow, together*, page 105.

<sup>27</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*, page 138.

enhancement initiatives are to be added to the RCV or recovered as a revenue allowance during the price control period. Instead RCV additions and cost recovery over time are controlled by the PAYG rate and RCV run-off rate, applied to each wholesale control.

This means that, in practice, this type of approach would be more likely to work as follows in respect of the operating expenditure beyond AMP8:

- Ofwat would determine at PR24 some form of long-term allowance for operating expenditure, which is intended to cover the efficient level of enhancement operating expenditure arising for that enhancement in one or more price control periods following AMP8. We discuss the nature of this allowance further below.
- The value of the long-term allowance for future operating expenditure determined at PR24 would be excluded from the operating expenditure that counts towards the calculation of the appropriate PAYG rate for AMP8 (so that the effect is to add it to the RCV).
- The value of that long-term allowance, and the time period that it should be recovered over, would be relevant in determining the appropriate levels of the RCV run-off rate from PR29 onwards. Decisions on RCV run-off tend to be less directly linked to specific data and calculations than for the PAYG rate, but if the long-term allowance is material within the RCV to which it is to be added, it might be taken into account as part of calculations and analysis to inform the RCV run-off.

This is not the only possible way to implement the NPV-based idea. For instance, a new dedicated RCV addition could be created. But what is set out above seems to fit better with Ofwat's totex approach and helps to keep things proportionate.

### **The rationale for an NPV calculation and the appropriate timeframe**

In the subsection above, we refer to a "long-term allowance". We now briefly explain why, under this type of approach, it would make sense for that allowance to be based on some kind of estimate of the NPV of future operating expenditure associated with an enhancement initiative.

If an allowance in respect of future price control periods is to feed into a company's RCV, as explained above, then this represents an RCV addition on which the water company would then earn a return (i.e. allowance for financing costs) over time at a rate determined by the wholesale WACC. But that financial return would be applied to forecast future costs that the company is yet to incur. This return would be excessive. The application of the WACC to the RCV is intended to remunerate the company for the costs of finance on expenditure which it has incurred which is yet to be remunerated through charges to customers.

One view is that this issue might be tackled under an approach in which the forecast stream of operating expenditure in future financial years is first discounted, using the WACC as the discount rate, before being included as part of the water companies' totex allowance. This would act to cancel out the allowed return on the forecast future operating expenditure.

However, without further allowances or changes to Ofwat's approach to the cost of capital, discounting forecast operating expenditure using the WACC, before adding to the RCV, would not make any provision for the finance costs associated with the risk borne by investors in relation to opex-based enhancements. In this context, there might be a reasonable argument for discounting by an amount representing the borrowing cost on very low risk investments rather than by WACC, which would leave in some implicit allowance for the financing costs for risk under opex-based solutions.

There is also a question of what the time period should be over which the NPV calculation is made. In the summaries of the NPV-based approach set out by United Utilities in 2020 and in Ofwat's PR24 draft methodology, it is envisaged that the NPV would be calculated over the whole life of an enhancement initiative. That is a possible approach, but we identified several issues with setting the timeframe for the NPV calculation on this basis:

- The concept of the economic life may be less relevant and meaningful in practice for opex-based enhancement solutions than for capex-based solutions which have assets for which asset life assumptions are routinely used for accounting purposes and asset management purposes.
- The need for an enhancement solution may extend well beyond any measure of the economic life of a specific solution, and in some cases that need might reasonably be considered to be indefinite.
- If the NPV for an opex-based enhancement is taken over a shorter period of time than the average asset life of capex-based enhancement solutions that might provide an alternative to the opex-based solution, then a significant bias could remain as a capex-based approach would tend to provide the company with greater funding into the future than under an opex-based approach.

Given these issues, we see merit in a variant in which the timeframe over which the NPV is calculated is set in a different way. Since the intention is to help reduce the capex bias for enhancements, it would make more sense to set the timeframe for the NPV based on the economic life of capex-based alternatives that an opex-based solution is compared against, rather than some notion of the economic life of the opex-based solution. For example, if the weighted average economic life for the assets under a capex-based response to the enhancement requirement were 25 years, then the NPV of forecast operating expenditure for the opex-based approach might be taken over 25 years, without attempting to establish an economic life for the opex-based approach directly.

### **Managing potential risks of double counting with base-plus allowances**

There is a potential concern that the NPV-based approach could lead to risks that price control funding arrangements are somewhat overly generous to opex-based enhancements and perhaps even to a bias in favour of opex-intensive enhancements.

This might arise, for example, if the NPV-based allowance fully funds operating expenditure for enhancement initiatives under the NPV-based approach for a period equivalent to the asset life of capex-based alternatives, and where some other companies choose capex-

based enhancements that involve significant ongoing operating expenditure. In that case, over time the base-plus allowances will tend to provide all companies with some implicit allowance for the operating expenditure arising from past capex-based enhancements.

There are different ways that these might be tackled. For instance:

- There could be a downward adjustment applied to the NPV-based allowances under the NPV-based approach to cancel out the estimated element of double counting. For example, suppose that the conventional enhancement allowance that would be provided to a capex-based solution would be expected to cover 85% of the NPV of the total whole-life expenditure for that solution (e.g. comprising upfront capital expenditure and operating expenditure in the first AMP but not funding operating expenditure in subsequent AMPs). In that case, a 15% deduction could be applied to the NPV of forecast future operating expenditure for enhancements funded under the NPV-based approach.
- The NPV-based funding approach for operating expenditure might be extended to cover the operating expenditure arising from capex-based enhancement initiatives. If so, all of this operating expenditure could then be excluded from the expenditure data feeding into base-plus models that are used to set allowances for the period over which the NPV is taken. This provides a different way to tackle the double counting concern.

### **The inclusion of operating expenditure within RCV additions**

We recognise that the NPV-based approach would be somewhat unconventional. But as United Utilities pointed out, there is some precedent of including an NPV of estimated future cash flows within RCV calculations from Ofwat's approach to operating leases. This was a case where accounting changes meant that costs that were previously expensed (i.e. treated as operating expenditure) were brought onto company balance sheets for statutory accounting purposes.<sup>28</sup>

We have not identified any reason to object to the broad principle of adding allowances for future operating expenditure to the RCV. This reflects what the RCV represents, and the role it plays, at the current point in time in the evolution of Ofwat's regulatory framework.

Outside of bioresources, where specific steps were taken at PR19 to try to align companies' bioresources RCV values with estimates of the economic value of bioresources assets, there is no reason to treat a company's RCV value as a meaningful measure of the value of its capital assets.<sup>29</sup> This relates, in part, to the way that RCV values were originally calculated in the early stages of the development of Ofwat's price control arrangements (e.g. giving weight to privatisation prices when setting initial RCV values for WASCs). It also reflects other factors since then such as: (a) allowances for regulatory depreciation and RCV run-off in past price control periods being influenced by financeability and bill impact

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<sup>28</sup> Ofwat (2018) *Guidance for reporting operating leases in PR19 business plans*, IN 18/09.

<sup>29</sup> Other than in the circular way that arises because the price control framework provides the company with a rate of return calculated as  $WACC \times RCV$ .

considerations rather than focused efforts to estimate what is now called the natural rate of RCV run-off; and (b) the way that various price control adjustments are implemented (e.g. totex cost-sharing).

Instead, and leaving aside the bioresources control, the RCV is better seen as a measure of the value of expenditure that Ofwat has formally “allowed” as part of its price control determinations, which have not yet been recovered from customers via the price control revenue allowances. It is a form of IOU from customers to the company.

In turn, the PAYG rate and RCV run-off are parameters that can be used to help ensure that, as far as possible, there is a fair and reasonable balance of charges over different generations of customers.

In this context, if Ofwat were to determine at PR24 fixed allowances for operating expenditure that are intended to cover price control periods that lie beyond the end of AMP8, it would be reasonable for the value of those allowances to be reflected in the RCV.

### **Potential concerns about the lack of flexibility from a long-term allowance**

If Ofwat wants to provide firm long-term commitment on allowances for enhancement operating expenditure in future price control periods, then allowing for inclusion of NPV-based allowances within the RCV, as described above, seems a reasonable thing to do.

However, the main downside that we see with the NPV-based approach is that there are questions about whether it is in customers’ interests for Ofwat to provide such firm long-term commitments relating to operating expenditure in future price control periods.

Under this type of approach, Ofwat would be committing dedicated customer funding to the company for an opex-based enhancement initiative, in respect of future price control periods (perhaps over a 20-30 year period), while facing uncertainty about factors such as the following:

- Whether there will still be a need for the enhancement initiative in those future periods.
- Whether the level of customer funding committed to the enhancement initiative will remain at a reasonable and efficient level in those future periods.

A potential response to these concerns is to say that, were the company to choose a capex-based solution, customers would be committed to an equal or even greater extent. There is some logic to this position. A regulatory framework that allows for this type of NPV-based approach seems at one level to be no worse, and potentially significantly better, than the current approach.

However, the choice at PR24 is not simply between the NPV-based approach and the current approach, so it is not sufficient to focus exclusively on a comparison between the two. In many cases, a key benefit of opex-based solutions is that they are more adaptable over time, with opportunities for innovation and learning during early years feeding through into improvements in cost efficiency in subsequent years, and an opportunity to increase or decrease the scale of activity according to changes in circumstances. Put differently, opex-

based solutions may have a benefit over capex-based solutions in terms of their option value. A regulatory approach which locks customers into long-term forecasts, at a given point in time, of the future costs and required volumes of opex-based solutions has a downside in the sense that it limits the opportunity for customers to benefit from some of the underlying advantages of opex-based solutions.

### **Further practicalities arising under the approach**

Were the NPV-approach to be implemented in practice, there would be some further implementation issues to address. For instance, these include:

- How to provide effective customer protection against risks that the envisaged benefits of opex-based enhancement initiatives are not provided or maintained in the future (e.g. how to combine the NPV-based funding with Ofwat's PR24 draft methodology proposals on price control deliverables).
- How to apply Ofwat's cost-sharing arrangements in a context where a company would be provided with an allowance at PR24 in respect of forecast operating expenditure in future periods.
- The possibility, depending on the approach to implementation, of unintended impacts on the financial metrics used by credit rating agencies and associated complications for the debt financeability analysis carried out by Ofwat at price reviews.

We did not prioritise the review of these issues for project and do not cover them in this report. We doubt that any issues arising in these areas would be insurmountable.

### **Emerging view on the approach**

We can see a good argument that allowing for an NPV-based approach for opex-based enhancements within the price control framework would be better for PR24 than retaining the PR19 approach to enhancement expenditure. By offering a similar degree of commitment to long-term funding for opex-based solutions, as for capex-based solutions, we would expect this approach to make a considerable improvement in terms of reducing the risks of an inefficient bias towards capex-based enhancements. This approach could also be implemented in a way that implicitly provides an element of financial return to compensate investors for the risks associated with enhancement solutions (whether these are opex- or capex-based).

There would be a series of implementation issues to work through, and some additional regulatory complexity, but these do not seem a disproportionate response to the residual capex bias that is currently present in Ofwat's price control framework.

However, this position does not by itself make this approach necessarily the most attractive option for PR24. As set out above, we see a potential concern that this type of approach deprives customers of some of the benefits of opex-based solutions, in terms of their adaptability over time and their option value. In the next subsection we discuss an alternative to the NPV approach – or what might be seen as a modification to – which is



intended to allow a greater degree of adaptability while still offering a framework for the longer-term remuneration of enhancement operating expenditure.

#### **4.4: Adaptable multi-amp enhancement funding**

In this section we describe an option for tackling the capex bias in relation to enhancement expenditure, which we refer to as “adaptable multi-amp enhancement funding”. This option is intended to provide a new form of regulatory funding channel for enhancement initiatives that involve substantial elements of operating expenditure. We consider that this option to be particularly promising for PR24 and we have gone into considerable detail on it within this report.

This section is organised as follows:

- Overview of the approach.
- Outline specification.
- Customer protection in event of under-delivery.
- Regulatory commitments to support confidence in the approach.
- Option to include a risk premium in the unit cost allowance.
- Managing potential risks of double counting with base-plus allowances.
- Potential development of this approach over time to tackle broader concerns.
- Emerging views on the approach.

In addition to the material presented in this section, we consider in more detail how the approach set out below might be applied in practice to some specific enhancement categories used by Ofwat: see appendix 3.

##### **Overview of the approach**

The option is targeted at helping reduce the risks of an inefficient bias in favour of enhancement solutions that involve a high proportion of water company capital expenditure. It is not necessarily a complete solution, which ensures equal incentives across opex-based and capex-based initiatives, but it offers the potential for substantial improvement on the current arrangements, with limited disturbance to the wider regulatory approach.

This option could be applied alongside Ofwat’s established approach for setting explicit enhancement allowances for predominantly capex-based enhancement initiatives. It would not require any material changes to that approach, but instead offers a new price control remuneration channel in cases where water companies propose enhancement initiatives that involve a substantial amount of operating expenditure, and which might otherwise be discouraged even if they were equally or more efficient than capex-intensive initiatives. However, if desired, this approach could be implemented as a modification to the current

enhancement funding arrangements and used to fund both opex-based and capex-based enhancements at PR24 in a technology-neutral way.

In very broad terms, if applied at PR24 this option would involve the following:

- Ofwat would determine at PR24 which enhancement initiatives or categories are to be funded through the new adaptable multi-amp enhancement funding arrangements. These arrangements would provide a water company with an explicit stream of funding for these enhancements, for a period spanning multiple price control periods. The expenditure incurred on these enhancements would be excluded from base-plus models at PR24 and for a defined period of time after that.
- Ofwat would determine at PR24 the scale of enhancement benefits that the company is to be funded for, an allowance for operating expenditure per unit of those benefits and a default time period for the funding of that enhancement, spanning multiple price control periods (e.g. from AMP8 to the end of AMP11).
- At each subsequent price review, Ofwat would have the ability to update the unit cost allowance, including in the light of the latest information on efficient costs.
- Ofwat would also have some pre-specified flexibility at subsequent price reviews to terminate or reduce the funding for the enhancement initiative before the end of the default time period in specific circumstances (e.g. if there is evidence that the original enhancement benefits are no longer needed from the water company).
- While there would be no firm long-term commitment to the amount of funding to be provided over multiple price control periods, there would be an established methodology for determining this at each review. Furthermore, a provisional allowance for the long-term funding amount (e.g. estimated over 20 years based on initial assumptions on unit costs and volumes) could be determined at PR24, with the conditions under which this would be expected to change made clear. This allowance, insofar as it relates to price control periods subsequent to AMP8, would be published and recorded but it would not be formally included in totex allowances or the RCV at PR24.

We describe the approach in more detail in subsequent subsections.

This approach is intended to provide water companies with greater confidence that the efficient costs of opex-based enhancement initiatives will be recoverable under the price control framework in price control periods beyond that in which the initiative was first introduced. This, in turn, is intended to reduce the risks of an inefficient bias towards capex-based enhancement solutions and, more generally, to help ensure that opex-based enhancement initiatives are properly funded.

This approach might be seen as a further development, extension and codification of the special approach taken for some catchment management expenditure at PR19. At PR19,

Ofwat provided some allowances for AMP7 for the running costs of continuing to operate enhancement initiatives that were introduced in AMP6.<sup>30</sup>

### Outline specification

We now provide a more detailed description of the adaptable multi-amp enhancement funding approach that we envisage. To do so, we first summarise a number of key elements of this approach and describe the role that they would play. We elaborate further on some of these in the subsections that follow.

The approach could be applied to either a single enhancement initiative or to a group of initiatives taken together (e.g. where these provide the same type of enhancement benefits). In the description below we assume a single enhancement initiative for presentational simplicity.

We outline the key elements of the approach in two separate tables below. The first table concerns the use of price control deliverables or performance commitments which are expressed in terms of “enhancement benefits”. These provide for: (a) customer protection in the event of potential under-delivery or under-performance; and (b) transparency on what is, and what is not, intended to be funded as part of the price control funding determined for the enhancement in each AMP. The second table is concerned with the funding arrangements for the enhancement initiative, and effective arrangements for price control deliverables or performance commitments associated with the enhancement are a pre-requisite for this.

In the description below, we highlight aspects that Ofwat would determine. In practice this determination could be based on Ofwat’s review of proposals made and justified by the water company; we do not intend to imply that Ofwat would need to lead the thinking on the practical implementation to a specific enhancement initiative or that companies would play a passive role in the process. We leave aside in the description below the more familiar cost assessment work that might be required by Ofwat to assess the need for a specific enhancement or whether it represents best value for money for customers.

The practicality and success of the adaptable multi-amp funding approach is likely to be dependent on the development and specification of a suitable measure or metric for the scale of enhancement benefits. This requires care and attention, and the appropriate approach may not be immediately obvious. We discuss enhancement benefits metrics further in appendix 2.

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<sup>30</sup> For example, at PR19 Ofwat, as part of its enhancement allowances for raw water determination, provided an allowance to Wessex Water for “the continuation of catchment management projects started in AMP6” (see Ofwat (2019) Raw water deterioration enhancement feeder model, [https://www.ofwat.gov.uk/wp-content/uploads/2019/12/FM\\_E\\_WW\\_raw-water-deterioration\\_FD.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2019/12/FM_E_WW_raw-water-deterioration_FD.xlsx)). This is an example of where Ofwat used its discretion in setting explicit enhancement allowances to provide funding for the ongoing operating expenditure of enhancements introduced in a previous price control period. This allowance was very much an exception to the general approach Ofwat applied at PR19.

**Table 4 PCDs or PCs expressed in terms of enhancement benefits**

Element	Brief description
Enhancement benefits metric	<p>Ofwat would determine a metric or measure of the scale of benefits that are intended to be achieved or provided as a consequence of the enhancement initiative.</p> <p>There is considerable flexibility as to how this might be defined (e.g. how outcomes-based on inputs-based the metric is) with potential benefits and drawbacks of different choices.</p> <p>Depending on what metric is chosen it might be either a PCD or a PC (common or bespoke).</p> <p>In some cases, multiple measures might be applied to a specific enhancement initiative rather than a single one. In the description below we focus on the simpler case where a single measure can be used, but further work might be carried out to specify an approach that uses multiple measures (e.g. based on multiple metrics applied in combination and an allocation of the overall funding for the initiative between these where needed for the calculations).</p>
The enhancement benefits schedule	<p>Ofwat would determine a plan – the enhancement benefits schedule – which clarifies what scale of enhancement benefits the company is intended to achieve within the forthcoming AMP and in years subsequent to that.</p> <p>The scale of these benefits would be defined in terms of improvements against the enhancement benefits metric above with a clear reference point (e.g. X units of additional benefit in each year, relative to 2024/25 levels, from 2027 onwards).</p> <p>The scheduled benefits for year t would be defined as <math>SEB_t</math>.</p> <p>In the simplest case, once the enhancement is fully operational, the schedule of benefits from that enhancement for all future years could be the same. This seems to be the implicit assumption behind most capital enhancement funding at present and the idea that Ofwat’s allowances for base costs are intended to cover the costs of companies maintaining existing levels of performance.</p> <p>But there is the possibility of Ofwat determining a different schedule where appropriate. For instance, in some cases there might be particular uncertainty about how long a particular enhancement initiative needs to be maintained for, and Ofwat could, for example, only schedule benefits for 10 years.</p> <p>If the value of <math>SEB_t</math> is not defined for a specific year, then its value would be taken as zero for that year.</p> <p>The schedule would recognise that there may be a lead time to develop and implement the enhancement initiative, before enhancement benefits are provided.</p> <p>At PR24, for financial years subsequent to AMP8, the schedule would be a plan with scope for variation, not a firm commitment.</p>

Under Ofwat’s PR24 draft methodology position on PCDs, something along the lines of what is set out in Table 4 seems likely to be needed regardless of whether new funding approaches are introduced for opex-intensive enhancements. The elements in Table 4

seem just as relevant to traditional capex-based enhancements. In the draft methodology, Ofwat said:<sup>31</sup>

*“PCDs will set out the key outcomes or outputs of enhancement expenditure, so that stakeholders and customers know what to expect from the funding provided ... We do not anticipate having PCDs on all enhancement lines, programmes of work or schemes. However, we expect companies to fully consider them in all areas where investment is material and where the benefits are not easily tracked through performance commitments. PCDs should cover each of the key outputs or benefits identified for enhancement proposals.”*

Any additional regulatory complexity relating to Table 4 above is primarily the consequence of Ofwat’s intended approach to PCDs at PR24, and its broader needs for companies to be accountable for any explicit enhancement allowances they are provided with, rather than being attributable to the multi-amp approach discussed this section or to opex-based solutions in particular.

As indicated in Table 4, the enhancement benefits schedule for new enhancements funded at PR24 would extend beyond the end of AMP8. This is relevant to opex-intensive enhancement initiatives but also for capex-intensive enhancements that are funded under the established regulatory approach. For instance, if an asset that had been funded via a conventional enhancement allowance were to break down after six years, no longer providing the enhancement benefits that were envisaged when it was funded, we would imagine that Ofwat’s expectation would be that the company should repair it (without any additional price control funding being sought) or otherwise return some money to customers. The enhancement benefits schedule is a way to provide greater transparency, and to reduce risk of ambiguity or unintended consequences within the wider context of enhancement allowances and price control deliverables.

The adaptable multi-amp funding approach would build on the foundation provided by linking enhancement allowances to PCDs or PCs via what we have called an enhancement benefits metric. Table 5 below shows the elements that are more specific to the multi-amp funding approach.

**Table 5 Core elements of the adaptable multi-amp enhancement funding arrangements**

Element	Brief description
Funding expiry year (FEY)	<p>The funding expiry year (FEY) is the financial year after which the explicit funding for the enhancement benefits would stop. This would be the earlier of:</p> <ul style="list-style-type: none"> <li>• The default funding expiry year (DFEY); or</li> <li>• The early termination date (where applicable and activated).</li> </ul>

<sup>31</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*, page 116.

	<p>When the funding expiry year is reached, this does not mean that the water company can necessarily stop delivering the enhancement benefits. The company would be expected to provide the enhancement benefits as specified in the enhancement benefits schedule above.</p> <p>As with the established approach to funding capital enhancement initiatives, the company might be expected to maintain the benefits from enhancements introduced in the past for a longer period of time than that covered by an explicit enhancement funding allowance. For instance, once the price review covering the period after the funding expiry year is reached, Ofwat might determine that the enhancement benefits are funded via the allowances from the base-plus models. Whether such a determination would be reasonable would depend on the facts of each case and in some cases further funding might be needed (e.g. via the cost adjustment process).</p>
<p>Default funding expiry year (DFEY)</p>	<p>Ofwat would set a default funding expiry year (DFEY) for the multi-amp funding arrangement for the enhancement initiative.</p> <p>The default expiry year would be set in light of estimates of the weighted-average asset life of assets for more traditional capex-based enhancement initiatives which provide the same type, or a similar type, of enhancement benefits. This would help to align the period of time over which opex-based enhancement initiatives receive explicit enhancement funding with the period of time over which capex-based enhancements are implicitly funded. Setting DFEY in this way helps to limit the extent to which the regulatory framework provides a financial bias in favour of capex-based enhancement initiatives.</p> <p>To limit complexity, and taking account of the approximate nature of any asset life estimates, DFEY would be specified as the last year of a five-year price control period. For example if an opex-based enhancement is scheduled to commence from 2026/27, and the estimated asset life for a traditional capex-based alternative is around 20 years, then DFEY might be set to 2044/45 (i.e. the end of AMP11).</p> <p>Alternatively, if the scheduled enhancement benefits are expected to fall to zero earlier than implied by the weighted average asset life of an equivalent asset, that earlier date could be used for DFEY.</p>
<p>Allowance for upfront costs (AUC<sub>t</sub>)</p>	<p>Ofwat could set a totex allowance for any significant upfront and one-off costs of the enhancement initiative that are to be incurred before it starts to provide enhancement benefits.</p> <p>These might involve operating expenditure associated with the establishment of an innovative approach. It might also involve some capital expenditure.</p> <p>Any costs funded by the allowance for upfront costs should be clearly defined in scope to avoid double counting, or funding gaps, arising when applied in conjunction with the unit cost allowance below.</p>
<p>Unit cost allowance (UCA<sub>t</sub>)</p>	<p>Ofwat would set UCA<sub>t</sub> which is an allowance per unit of enhancement benefit (where the benefit units are calculated on the basis of the enhancement benefit metric above). The allowance should represent an estimate of the efficient level of annual operating expenditure per unit of enhancement benefit (excluding any allowance for costs funded by the allowance for upfront costs above).</p> <p>At each price review, Ofwat should determine updated values for UCA<sub>t</sub> for the years within the forthcoming price control period, unless the value of SEB<sub>t</sub> is zero for all of those years. In updating UCA<sub>t</sub> Ofwat could consider evidence such as:</p> <ul style="list-style-type: none"> <li>• Fresh forward-looking estimates of the unit costs submitted as part of price control business plans for the provision of similar benefits.</li> <li>• Historical evidence on the costs incurred across multiple companies on the provision of similar benefits.</li> <li>• Previous values of UCA<sub>t</sub> and evidence on cost trends (e.g. reflecting productivity and input price inflation).</li> </ul>

	<p>If <math>UCA_t</math> is not updated or specified for a given year <math>t</math>, perhaps on materiality grounds, it would default to the value in the most recently available year (e.g. the last year of the previous price control period).</p> <p>As with other areas of cost assessment, setting reasonable allowances involves taking appropriate account of factors that might mean that future costs differ from past costs or that the efficient level of costs for one company is above or below that for another company. Furthermore, Ofwat should be aware that simply using the cost reductions achieved by company <math>X</math> in one period to set a lower allowance for company <math>X</math> in the next period could undermine incentives for efficiency improvements; hence the value of using cost benchmarking or industry-wide assumptions where possible.</p> <p>This allowance is primarily intended to cover operating expenditure. However, we recognised in the discussion further below that it might also include some capital expenditure and/or a risk premium.</p>
<p>Provision for early termination (or reduction)</p>	<p>Ofwat might specify an early termination provision as part of the application of the arrangements (either on a case-by-case basis or as part of a broader approach).</p> <p>The early termination provision would provide Ofwat with some limited rights to either: (i) cease explicit price control funding for the enhancement benefits (i.e. to bring forward the financial year FEY); or (ii) reduce the scale of benefits that is to be funded (i.e. to reduce <math>SEB_t</math> going forwards).</p> <p>These provisions would not be open-ended and would be narrow in scope. They would involve clear criteria which can be judged reasonably objectively. For example these might take one of the following forms:</p> <ul style="list-style-type: none"> <li>• A provision that Ofwat can determine the early termination of the funding arrangement if a specified external event happens.</li> <li>• A provision that Ofwat can determine the early termination of the funding arrangement if it finds clear evidence that the enhancement benefits are no longer needed or no longer provide reasonable value for money.</li> </ul> <p>If an early termination provision is included, we envisage that there would also be a reasonable notice period to avoid excessive risk exposure to the company.</p>
<p>Reporting of outturn enhancement benefits (<math>OEB_t</math>)</p>	<p>The water company would need to report on the scale of enhancement benefits that it achieves or provides in each year, for all years up to FEY.</p>
<p>Reporting of outturn operating expenditure and outturn capital expenditure (<math>OOE_t</math> and <math>OCE_t</math>)</p>	<p>The water company would need to report its outturn operating expenditure (and perhaps also capital maintenance expenditure) attributable to its provision of the enhancement benefits (<math>OEB_t</math>), for all years up to FEY.</p> <p>This expenditure would ideally be broken down between enhancement categories, as for Ofwat's current reporting arrangements for capital enhancement expenditure (e.g. to help future cost benchmarking exercises), but this breakdown is not essential.</p> <p>It would need to use appropriate cost allocation methodologies for this and take account of any specific guidance that Ofwat issues.</p> <p><math>OEB_t</math> should only cover operating expenditure that is attributable to enhancements that Ofwat has decided to fund under the adaptable multi-AMP approach.</p>
<p>Interactions with econometric benchmarking of base-plus costs</p>	<p>In respect of price reviews to set base-plus allowances for financial years up to and including FEY, all expenditure reported as attributable to the enhancement benefits (i.e. <math>OOE_t</math> and <math>OCE_t</math>) would be excluded from the expenditure data feeding into the base-plus models used to set allowances for those years.</p> <p>This exclusion of enhancement operating expenditure would be limited to operating expenditure associated with enhancements which Ofwat decides to fund under the adaptable multi-amp approach. The enhancement operating expenditure which is</p>



	<p>attributable to enhancements that are not funded by this approach would not be excluded from the data feeding into the base-plus models.</p> <p>In respect of price reviews to set base-plus allowances for financial years after FEY, all historical expenditure reported as attributable to the enhancement benefits (i.e. OOE<sub>t</sub> and OCE<sub>t</sub>) would be <i>included</i> within the historical expenditure data feeding into the base-plus models used to set allowances for those years.</p>
Provisional multi-amp enhancement allowance	<p>Ofwat would determine at PR24 a provisional long-term allowance for the enhancement, which is based on a forecast of the total allowance for the enhancement initiative up to the funding expiry date (FEY). This would be based on the schedule of enhancement benefits, the default funding expiry date and forecasts/assumptions on UCA<sub>t</sub>.</p> <p>This would not be a firm commitment but there would be clarity on the circumstances in which the actual allowance would vary from the provisional amount.</p> <p>It would not be added to the RCV but recorded for future price reviews.</p>

We illustrate aspects of the multi-amp enhancement funding approach in our simulation modelling analysis presented in appendix 1: see scenario S10.

Based on the elements defined above, we set out in Table 6 the formulae that could be used to calculate the ex ante totex allowances for the enhancement initiatives (i.e. the allowances before the application of the totex cost-sharing arrangements). As indicated in the table, these formulae depend on the values of FEY in each year. Note that, as envisaged above, the  $AUC_t$  term would be zero for all years after the initial price control period in which the enhancement is introduced.

**Table 6** Formulae to calculate ex ante allowances

Condition in year t	Formula to calculate ex ante allowance for year t (CPIH-real basis)
$t \leq FEY$	$= AUC_t + SEB_t \times UCA_t$
$t > FEY$	$= 0$

In broad terms, the ex ante totex allowance is calculated, in the period up to the funding expiry year (FEY), by multiplying the scheduled scale of benefits for that year by the unit cost allowance, and adding this to any allowance determined for upfront costs. The allowance is also zero for all years subsequent to funding expiry year.

These allowances would be subject to the cost-sharing arrangements applied to wider totex. As far as we can tell, there is no reason why cost-sharing would be problematic to apply in the context of this approach to price control remuneration of opex-based enhancement initiatives and we do not cover the calculations to apply cost-sharing here. It is more straightforward to apply cost-sharing to this approach than to the NPV-based approach discussed in section 4.3.

## Customer protection in event of under-delivery

We identified earlier in section 4.4 that the multi-amp approach is built on the foundation provided by linking enhancement allowances to PCDs or PCs via an enhancement benefits metric.

In some cases, there may be no need for specific financial arrangements to provide customer protection in the event of under-delivery or under-performance (e.g. if scheduled benefits are adequately ensured by PCs with financial ODIs or by existing obligations).

We set out below a possible approach where some form of additional customer protection is needed in respect of under-delivery scenarios, but we stress that the design would need further consideration in light of the circumstances of the relevant enhancement category or intended outcomes.

**Table 7 Possible implementation of PCD approach**

Condition in year t	Formula to calculate allowance in year t (CPIH-real basis excluding financing cost / time value of money adjustment)
$t \leq FEY \ \& \ OEB_t < SEB_t$	$= -(SEB_t - OEB_t) \times UCA_t$
$t > FEY \ \& \ OEB_t < SEB_t$	$= -(SEB_t - OEB_t) \times UCA_t$
$SEB_t = 0$	$= 0$

We highlight the following in relation to the possible financial adjustments above:

- In this example, under-delivery against price control deliverables is recognised formally as  $OEB_t < SEB_t$ .
- If  $SEB_t$  in year t is zero the company is treated as not being under an obligation or expectation to provide the enhancement benefits in that year and would not face any claw back of allowances or financial penalty if it provide no such benefits.
- There might be an argument, in some cases, for allowing under-delivery in some years to be offset by over-delivery in other years, or to assess delivery across the whole price control period rather than in each year. The formulae above could then be modified accordingly.
- The formulae above allow for a scenario where  $SEB_t$  is positive in years subsequent to the funding expiry date (FEY), meaning that the company could face a financial penalty despite no ex ante funding is provided. There is an argument that, in some circumstances at least, it would be unreasonable for Ofwat to set  $SEB_t$  above zero for years subsequent to the funding expiry year. We leave that question open.

- We have assumed above that Ofwat would not be determining a unit cost allowance value ( $UCA_t$ ) for any years subsequent to the point at which ex ante enhancement allowance is provided. This means that  $UCA_t$  would not be defined for those years after the funding expiry year ( $FEY > t$ ). For that reason, the adjustment formulae above in this scenario uses the most recent value for UCA that would be available, which is the value for the final year of funding.
- For the purposes of simplification, the formulae above do not provide for clawback of any upfront funding allowance ( $AUC_t$ ) in the event that the anticipated benefits are not provided. There might be an argument for incorporating this into the customer protection mechanism (e.g. the AUC allowance being conditional on a specified delivery milestone or minimum scale of benefit provision, or some pro rata adjustment for under-delivery). The formulae above could be extended to allow for this.
- The adjustment formulae above are not intended to account for timing differences between the revenue adjustment in respect of delivery of performance in year  $t$  and the year in which that revenue adjustment is made. In practice, a further adjustment would be needed (e.g. taking account of an appropriate discount rate and in line with Ofwat's wider approach for addressing this type of issue as part of in-period or end-of-period reconciliation calculations). This is standard practice for revenue reconciliation adjustments under Ofwat's price control framework.

### **Regulatory commitments to support confidence in the approach**

There are questions about what form, if any, the regulatory commitments surrounding the multi-amp enhancement funding approach would take.

At one level, it would be an improvement on the current arrangements if Ofwat simply applied the approach above at PR24 and did not make any statement or commitments on how it will set allowances from PR29 onwards. The approach above – especially the schedule of benefits and distinction between allowances for upfront costs and annual volume-driven costs – would provide greater clarity on what price control funding is intended to cover what costs over what timeframe and what has not yet been funded. Even in the absence of longer-term regulatory commitments from Ofwat, this would help to reduce the risk that a company is left in a situation of needing to maintain the benefits of an opex-based enhancement initiative in AMP9 and beyond without adequate remuneration of the ongoing costs of doing so. In short, the additional transparency provided by the arrangements outlined above provide valuable protection to water companies against under-funding risks.

However, given the high degree of regulatory commitment surrounding the remuneration of allowances for capital expenditure via the RCV, we would be concerned that without further steps there would be limited progress in tackling the risks of an inefficient bias towards capex-based enhancement solutions.

To tackle this concern, Ofwat could make a commitment, at PR24, that any enhancement initiatives funded at PR24 under this approach would be subject to the approach until the funding expiry date is reached. However, we recognise that Ofwat might be hesitant about making detailed commitments at PR24 on aspects of its price control methodology and

approach to cost assessment for PR29 and beyond. Furthermore, even if Ofwat does make such commitments, companies might take the view that Ofwat could still change its approach when the time comes.

Given these issues, our current view is that the following could provide an effective and practical form of additional commitment. Ofwat could determine at PR24 a *provisional multi-amp allowance* for the price control funding that will be provided in respect of the opex-based enhancement initiative in price control periods from AMP9 onwards, and specify the conditions under which it intends that allowance to be subject to adjustment. This allowance, insofar as it relates to price control periods subsequent to AMP8, would be published and recorded but it would not be included in totex allowances or the RCV at PR24.

The value of the provisional allowance would be based on a forecast of the allowance for the enhancement initiative up to the funding expiry date. For instance, in a simple case suppose that 10 units of enhancement benefits per year are scheduled to be funded for a 20-year period at an initial unit cost allowance of £25,000 per unit. At PR24 Ofwat could, in effect, determine a provisional allowance of £5m in total (subject to inflation) for the enhancement initiative over a 20-year period starting in AMP8. This would be a provisional allowance, which would be subject to revision according to the following:

- adjustments for updated assessments at each subsequent price review of the appropriate unit cost allowance; and
- adjustments arising from the potential application of the early termination provision (with the terms for early termination specified in advance).

A possible variant on the approach above is for the provisional allowance to be added to totex allowances and, in turn, the RCV (probably after first being converted to an NPV using an appropriate discount rate), in a similar way to what is envisaged as part of the NPV-based approach discussed in section 4.3. But a totex allowance or RCV addition seems much less suitable for a provisional allowance than the type of firm long-term allowance that would be committed under the approach from section 4.3.

### **Option to include a risk premium in the unit cost allowance**

We highlighted at the start of section 4 that one factor contributing to a bias in favour of capex-based enhancement initiatives stems from the way that Ofwat provides allowances for water companies' finance costs. Ofwat's established approach treats these as simply proportional to the scale of the RCV (allowance for finance costs calculated as  $WACC \times RCV$ ). This is an over-simplification which may act to overcompensate the incremental finance costs of capex-based enhancement solutions and undercompensate the incremental finance costs associated with opex-based solutions. We do not see any reason why opex-based enhancement initiatives would be inherently less risky for water companies than capex-based initiatives but this is a fundamental assumption of the PR19 framework.

A proper discussion of this issue is beyond the scope of this report. For current purposes we simply highlight that, once there is recognition of this concern, it might be tackled by adding an allowance for the incremental financing costs associated with opex-based enhancement

initiatives to the unit cost allowance  $UCA_t$  (e.g. an allowance presented as a margin on the operating expenditure allowance per unit).

We do not see any strong reason in principle against a risk premium of this nature. The difference between the allowed WACC set by Ofwat, and the estimate of the risk-free rate of return feeding into the calculation of the WACC, means that Ofwat is in effect allowing companies significant implicit risk premiums on the costs of capex-based enhancement solutions, beyond the financing costs associated with the time value of money from the gradual remuneration of capital expenditure via RCV run-off.

We recognise that this margin might be seen as a somewhat novel approach to the price control remuneration of the costs of finance for water companies' wholesale activities and that it exposes issues with how finance costs are viewed and remunerated that might have wider connotations. We do not see this margin as an integral part of the multi-amp approach. There might be other ways that Ofwat could tackle the underlying concern related to the remuneration of risk under water companies' price controls. For instance, Ofwat could adapt its approach to setting WACC-based allowances for the finance costs of water companies to recognise other drivers of financial risk beyond the size of the RCV (e.g. totex or other metrics capturing the scale of the wholesale business).

### **Managing potential risks of double counting with base-plus allowances**

As with the NPV-based approach discussed above, there are potential issues to consider in relation to the risks of double counting an element of enhancement costs across the explicit allowances for enhancements and the allowances from base-plus models.

There is a potential for some residual risk of double counting in scenarios where:

- some companies are funded under the multi-amp enhancement funding approach in a specific enhancement category and other companies carry out capex-based solutions in that category which are funded via conventional enhancement allowances; and
- those capex-based solutions involve significant elements of ongoing operating expenditure.

The risk of double counting relates to the ongoing operating expenditure from the capex-based solutions feeding through, over time, to the base-plus allowances for all companies that are derived from the base-plus benchmarking models. If the multi-amp approach fully funds the efficient costs for opex-based solutions, there may be some double counting if there is an implicit allowance for operating expenditure from the base-plus models. The existence and scale of that would depend on the scale of enhancements done by other companies across the industry, their existing levels of performance, and their mix between enhancements funded by the multi-amp approach and enhancements funded through the conventional funding route.

If this is a material concern, we see several ways in which it might be tackled. For instance:

- The multi-amp funding approach could be extended and applied to both opex-based and capex-based enhancements (for either some or all enhancement categories). Funding capital enhancement expenditure under the multi-amp approach is something that can be accommodated in a straightforward way using the  $AUC_t$  term (allowance for upfront costs) introduced above, and using this approach would cover the ongoing operating expenditure from capex-based approaches. As set out above, for the duration of funding allowed for under the multi-amp approach, the operating expenditure from capex-based enhancements would be excluded from the expenditure feeding into base-plus models, which would tackle the double counting concern.
- A deduction could be made against the annual unit cost allowance provided for each AMP based on an estimate of the element of double counting (i.e. an adjustment for the implicit allowance). This might be calculated at each price review based on estimates of the scale of operating expenditure from relevant capex-based enhancements feeding into the expenditure used as input data for the base-plus allowances (e.g. as a proportion of that expenditure or normalised in a reasonable way across companies). This deduction would not be applied to companies who carried out capex-based enhancements outside the scope of the multi-amp approach.

In general, if the aim is to remove biases in favour of one type of expenditure over another, it is helpful to limit as far as possible differences in the price control remuneration approach applied to different types of expenditure. This would point towards the first of these options. However, given the time lag before expenditure data enters the base-plus models and affects base-plus allowances, the risks of double counting arising from the multi-amp approach seem more relevant to price reviews subsequent to PR24. One possible approach might be to make no adjustments at PR24, with a view to moving all enhancements to the multi-amp funding approach at PR29 or, if that is not practical across the board, to make targeted adjustments for implicit allowances at PR29 where this is considered to be proportionate.

Beyond this specific issue of double counting operating expenditure from capex-based enhancements that are funded outside the multi-amp approach, there might be further instances of double counting risks that emerge over time (e.g. if there are changes in the specification of base-plus models to include explanatory variables which capture differences between companies in levels of performance that have previously been funded by enhancement allowances). Our view is that in general it would be better and more logical for such double counting concerns to be addressed by a separate adjustment which is technology-neutral. In particular, if there is a case for adjustments to tackle double counting concerns, these could be applied to the allowances derived from base-plus models, rather than as part of the allowances for opex-based enhancements only. Such adjustments could form part of an enhanced cost adjustment process (see section 5.7).

### **Potential development of this approach over time to tackle broader concerns**

The adaptable multi-amp enhancement funding approach set out above is intended to help reduce the risks of an inefficient bias towards capex-based enhancements, and its design is focused on that objective. Nonetheless, we can envisage ways in which the approach might

be used or extended over time to help tackle some of the other concerns identified in this report concerning the interactions between enhancement allowances and base-plus allowances.

In particular, modifications could be made to the approach to help to tackle concerns that the after a given point in time the ongoing costs of past enhancement initiatives are not funded by either explicit enhancement allowances, allowances from base-plus models or by financial ODIs. These concerns may apply to capital maintenance in the case of capital enhancement expenditure; they may also apply to operating expenditure in years subsequent to the funding expiry date under the approach set out above for opex-based enhancements. These concerns might be tackled through a combination of the following modifications:

- We have suggested a default funding expiry year based on the weighted average asset life for competing capex-based enhancement solutions. But it would also be possible to extend the funding under the scheme past the original default funding expiry year.
- The arrangements set out above are primarily intended to cover operating expenditure associated with enhancements over multiple price control periods. However, it would be possible in principle for it to cover capital expenditure too (i.e. capital enhancement and capital maintenance expenditure). For instance, upfront capital enhancement expenditure might be funded via the  $AUC_t$  term and capital maintenance expenditure funded via the  $UCA_t$  term (perhaps on a smoothed or depreciated basis). If so, both the capital enhancement and capital maintenance expenditure associated with the enhancement would need to be reported separately and excluded from the expenditure data feeding into base-plus models.

Whether it would be appropriate to apply this type of approach would depend on the circumstances and, in particular, whether there is a good reason to think that the ongoing costs of past enhancements are not funded by base-plus models, past enhancement allowances or financial ODIs.

Alternatively, the calculations of costs per unit of enhancement benefits used under the adaptable multi-amp enhancement funding approach could provide evidence for cost adjustment claims in respect of allowances from the base-plus models, including both upward adjustments for better-performing companies and downward adjustments for better-performing companies. This might be particularly relevant where the enhancement benefits metric is something that can be used to gauge company-level performance differences between companies. This would be relevant to the idea of an enhanced cost adjustment process (see section 5.7).

### **Emerging views on the approach**

We consider that the adaptable multi-amp enhancement funding approach set out in this section is a highly promising idea for PR24. It seems to provide a reasonable balance between water companies' desire for longer-term funding for opex-based enhancement initiatives (and the influence this has on decisions between opex-based and capex-based solutions) and the likely regulatory desire for a degree of flexibility and adaptability over time



in the interests of customers. In that respect, it seems a more credible option than the NPV-based approach discussed in section 4.3.

We have no expectation that this approach would ensure that incentives across opex-based and capex-based enhancements are fully equalised at PR24. This is partly because of features of the approach that might lead to some residual advantage for capex-based solutions (e.g. the flexibility for Ofwat to reduce unit cost allowances in the future, which presents risks to the company which might be avoided under a capex-based approach). But also because of some wider aspects of the price control framework, and cost assessment process, which might advantage capex-based enhancements, which would require complementary action even if this approach were to be implemented.

We recognise that there would be some additional regulatory burden and complexity from this approach, but this should not be a barrier to its application. This is especially so given the emphasis that Ofwat has placed in the past on tackling risks of a capex bias affecting the efficiency of water companies' expenditure.

Besides the NPV-based approach, we are not aware of other options that could play the same role as the multi-amp enhancement funding approach. In section 4.5 (targeted inclusion of enhancements in base-plus models) and section 5.6 (adjustment mechanism for industry-wide expenditure) we discuss further options that could help tackle the risks of a capex bias in enhancements, but these options only seem suitable in much narrower circumstances.

Finally, we draw attention to links between the approach set out above and outcomes-based regulation. In seeking to reduce the bias towards capex-based enhancements, this approach involves linking enhancement funding to measures of enhancement benefits rather than to the delivery of specific capital assets. In doing so it can, over time, help move the focus for understanding delivery and performance further away from assets and agreed capital programmes, and further towards outcomes. The development of appropriate enhancement benefit metrics, as we have called them, might involve significant effort from companies and Ofwat, but could help with broader ambitions to make the regulatory framework more outcomes-oriented, where possible without losing effective accountability.

## **4.5: Targeted inclusion of enhancements in base-plus models**

In this section we discuss a potential option that is worth considering in the special case – certainly not the norm across the enhancement categories used by Ofwat – where:

- a particular category (or group of categories) of enhancement expenditure provides enhancement benefits in relation to one or more aspects of performance; and
- the econometric models of base-plus expenditure include one or more explanatory variables to capture differences between companies in that/those aspects of performance.

In these circumstances, the base-plus models have some capability to fund companies for ongoing operating expenditure associated with improved levels of performance (i.e. enhancement operating expenditure) and there is an opportunity to incorporate capital enhancement expenditure in these models on a targeted basis. This would mean that allowances for both opex-based and capex-based enhancement initiatives would be funded in the same way through the price control framework, rather than via separate and explicit enhancement allowances for projected cash expenditure on enhancements over the next AMP. This would, in turn, help to reduce concerns above a capex bias in enhancement expenditure.

To make this approach viable, there needs to be some way, either within the base plus model specifications or via systematic off-model adjustments, to take account of differences, over time and across companies, in the scale of enhancement benefits expected over the forthcoming price control period compared to the scale of enhancement benefits provided over the historical period used for the expenditure data feeding into the base-plus econometric models.

We elaborate on this option below. We do not provide as much detail and discussion as for the multi-amp funding approach above. There is likely to be less opportunity to apply this option, given the difficulty of capturing, within the base-plus econometric models, the impacts on expenditure arising from differences in water companies' customer service or environmental performance. To better understand the potential opportunity to apply this approach would require a detailed econometric model development exercise, which is beyond the scope of this project. Nonetheless, we consider it relevant to present this option at least in an outline form.

### **Links with approaches used by Ofwat at PR14 and PR19**

This option shares some similarities with Ofwat's original ambitions at PR14 for setting price controls using econometric models of totex – rather than the econometric models of base expenditure or base-plus expenditure combined with separate allowances for enhancement expenditure. While that approach would probably have made more progress in addressing the capex bias that Ofwat was concerned with at PR14, compared to the approach Ofwat ended up with, it was not realistic or practical to apply to enhancement categories across the board.

The option here scales back that ambition substantially and would target it at those areas, if any, where it has a reasonably opportunity to work well.

There are also some links with the approach used for some growth-related enhancement expenditure at PR19, which Ofwat used in its final determination and which the CMA used, with some modifications, in its determinations for the PR19 appeals. It is not the aim of this section to consider the benefits and drawbacks of Ofwat's PR19 approach to growth-related enhancement expenditure, but we highlight three broader features of particular relevance to this project:

- Historical enhancement expenditure for certain growth-related enhancement expenditure was included in the expenditure feeding into base-plus models.

- The suite of base-plus models included some explanatory variables (e.g. number of connected properties or length of water mains) which capture differences between companies and over time in the number of customers served by each water company.
- Ofwat made adjustments for all companies, outside of the base-plus econometric models, to try to take account of differences between companies and over time in the expected pace of customer growth in AMP8 compared to the average across the historical period used for these models.

### Outline specification

As indicated at the start of this section, we consider that this approach might be applicable where both of the following conditions apply:

- A particular category (or group of categories) of enhancement expenditure provides enhancement benefits in relation to one or more aspects of performance (where performance is to be interpreted broadly: see section 2.2).
- The econometric models of base-plus expenditure include one or more explanatory variables to capture differences between companies in that/those aspects of performance. The explanatory variables to capture performance might be a direct measure of performance or some further factor which is understood to drive or enable performance improvements (e.g. some measure of company capabilities).

In these circumstances, and taking the simpler case where there is only a single aspect of performance and a single enhancement category to be captured, this option would work broadly as follows:

- There would be no explicit enhancement allowances for that category of enhancement expenditure, either for enhancement operating expenditure or capital enhancement expenditure. All allowances for enhancement expenditure would be provided via allowances derived from the base-plus models – combined with off-model adjustments.
- All historical enhancement expenditure (capital and enhancement expenditure) in the corresponding enhancement category would be included in the input data feeding into the base-plus models.
- This means that those models would provide some implicit allowance for that enhancement expenditure. Provided that some of the historical enhancement expenditure was capital expenditure (or what we have called in section 2.2 enhancement-investment enhancement operating expenditure), the allowances derived from the base-plus models would allow for further improvements in performance over time, beyond levels of performance achieved over the historical data period.
- Off-model adjustments would be used to make adjustments for these changes over time. These off-model adjustments would be used to account for differences in the scale of enhancement benefits or performance improvements expected from companies over the next price control period, recognising (a) differences between companies and (b)

differences between the forthcoming AMP compared to the historical data period used for the expenditure data feeding into the econometric models.

- The logic for such adjustments off-model is similar to the principle behind the off-model adjustments applied by Ofwat at PR19 for some growth-related enhancement expenditure. And as at PR19 for growth-related expenditure, a comparison of the predicted costs between model versions that include and exclude the relevant category of historical enhancement expenditure can be used to identify the implicit allowance for such expenditure within the base-plus cost benchmark estimated for each company. This can provide a starting point for the calculation of off-model adjustments. But there are potentially more sophisticated approaches available for making these adjustments than used at PR19, including recognition of multiple possible drivers for enhancement cost differences between companies and over time rather than assuming a single driver.

We also considered a variant on this approach in which, instead of making off-model adjustments, an additional explanatory variable(s) would be included in the base-plus model specifications to try to capture changes over time in each company's level of performance or the scale of enhancement benefits provided. In a simple hypothetical case, the estimated coefficient on that variable might be used to pick up the costs of performance improvements driven by capital enhancement expenditure, and such a model might provide a way to tailor allowances to forward-looking enhancement requirements or bespoke PCLs. However, on further consideration, and drawing on some initial exploration using simulation analysis, we feel that it could be quite challenging to apply this variant in practice. It would be asking a lot of the base-plus econometric models for them to approximate the relationship between capital enhancement expenditure and improvements in a specific dimension of performance, especially where: (a) the capital expenditure from an enhancement initiative may be spread over several years and (b) the performance benefits from that expenditure may materialise gradually over time. We do not rule out this approach, but at this stage it seems a distraction relative to that involving an off-model adjustment as set out above.

### Emerging views on this approach

The practical relevance of the approach outlined above hinges on the ability to do both of the following:

- Capture reasonably well, through explanatory variables included in the suite of econometric models of base-plus costs, the impacts on ongoing expenditure of differences between companies and over time in an aspect of performance for which explicit enhancement allowances might otherwise be provided.
- Make reasonable off-model adjustments for differences in efficient enhancement expenditure requirements (a) across companies and (b) in AMP8 relative to the historical data period used for the base-plus models.

Some of Ofwat's base-plus models at PR19 did capture aspects of performance, interpreted broadly: the water models had variables relating to water treatment complexity and the wastewater models had a variable relating to load with ammonia consent below 3mg/l. But

this was quite limited. For most enhancement categories there is no corresponding explanatory variable in the base-plus models.

It is beyond the scope of this project to explore econometric model development for base-plus costs, and in agreement with the client companies we agreed that the option considered in this section was not of highest priority for the project.

Our view is that it is useful to be aware of this approach as a potential option for funding enhancement expenditure, but its practical relevance for PR24 is something that we leave open to question at this stage.

This option would also benefit from further investigation to understand what conditions or measures might be needed to help ensure the expenditure allowances derived from it are consistent over successive price control periods, in a context where companies' mix of enhancements (e.g. opex-based or capex-based) changes over time and where the time series of historical data used by Ofwat, and its model specifications, changes from one price review to the next.

Were it to be possible to apply this option for some areas of enhancements that are currently funded by explicit enhancement allowances, it could make a substantial contribution to reducing the risks of a capex bias for enhancements, moving Ofwat's approach some way towards its original aspirations for a totex approach in the run-up to PR14. It would represent quite a significant change in the funding for enhancement expenditure, and companies might be concerned about a less certain funding channel for capex-based enhancements.

## **4.6: Enhancement allowance covering ten years of opex**

In this section we briefly discuss a possible approach that Ofwat mentioned in its PR24 draft methodology as an alternative to an NPV-based approach to remuneration of nature-based and opex-intensive enhancement initiatives.

Ofwat identified some practical challenges that it saw as arising in relation to the NPV-based funding approach that we discussed in section 4.3 above. Ofwat then put forward an alternative as follows:<sup>32</sup>

*“An alternative proposal is that we set a ten-year allowance (to be recovered over two price control periods) for the efficient opex related to nature-based solutions which are wholly or primarily opex based. The cost allowance for 2030-35 could be added to the RCV at the PR29 determination. This will bridge the period before the costs are recognised in the base models, after which the costs would be allowed for in our modelled base allowance. If expenditure is not as forecast, customers would be protected from funding more over a longer period*

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<sup>32</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*, page 139.

*of time as actual costs would be reconciled at the end of each period. We propose to retain flexibility to review allowances at PR29 if costs are materially different to those forecast at PR24. However, companies will have to provide compelling evidence to support any reassessment of costs.*

*Companies will still be able to submit cost adjustment claims once the ongoing costs of the solution are picked up by the base models. This is, after ten years, if the company considers that the modelled base allowance does not adequately reflect its circumstances (for example, if it has implemented more opex based enhancement solutions than the industry average), it can submit a cost adjustment claim.*

*We are also open to companies recovering the proposed ten-year allowance partly through the RCV by not adjusting PAYG rates because of the increase in their opex to capex ratio.”*

We consider that this option has little merit and is not a viable approach for tackling the capex bias for enhancements at PR24 or for funding nature-based or opex-based enhancement initiatives.

First and foremost, there are no reasonable grounds to consider that, after 10 years, the efficient opex associated with past enhancements will be properly funded via the allowances derived from base-plus benchmarking models. Ofwat claimed that the 10-year allowance would “*bridge the period before the costs are recognised in the base models, after which the costs would be allowed for in our modelled base allowance*”. This suggests insufficient understanding of what can realistically be expected from the allowances derived from the base expenditure modes. In its PR24 draft methodology, Ofwat seems to have underestimated the duration of the funding shortfall that opex-based enhancement solutions are likely to face under the PR19 approach.

In appendix 1, we present some simulation analysis which shows how, under some extreme and highly unlikely assumptions, a 10-year allowance would provide sufficient funding for opex-based enhancement solutions. In our simulation analysis, these are that:

- There are no differences between companies in the levels of performance that have been achieved in the dimension(s) of performance to which the enhancement expenditure relates.
- All companies have carried out 100% opex-based enhancement solutions over the historical data period used for the simulation analysis.
- The econometric benchmarking used by Ofwat to set allowances from PR34 onwards (i.e. for the period from AMP10 onwards, once the 10-years from PR24 has expired) uses only five years of historical data.

These assumptions do not seem realistic or relevant for PR24. There are probably some other sets of hypothetical assumptions under which 10 years of funding is sufficient, but we would expect these to be special cases, not something that can reasonably be relied on. In the more plausible and probable cases, 10 years of funding will be insufficient.

For example, our simulation analysis indicates that the 10-year approach will not properly fund opex-based enhancements in a scenario where, in the relevant enhancement category, some companies do opex-based enhancements, and some do capex based enhancements. See scenario S9 from appendix 1.

Ofwat shows some awareness of the limitations of the 10-year funding approach in this type of scenario. In the extract above, it says that a company could submit cost adjustment claims if it has implemented more opex-based enhancement solutions than the industry-average.

However, we cannot see how the cost adjustment process at PR24 can be used to tackle the incentive distortion in favour of capex-based enhancement solutions. This does not seem a credible solution.

Elsewhere in its draft methodology, Ofwat envisages materiality thresholds for cost adjustment claims that would seem to preclude this. Even if these thresholds were reduced, the cost adjustment process is not a credible funding channel given how few successful claims there have been in the past for adjustments from the allowances derived from base-plus models.

A company adopting an opex-based solution would face substantial uncertainty about remuneration of its efficient costs beyond 10 years. In contrast, a capex-based solution would qualify for committed funding for efficient costs covering a much longer period of time (e.g. the period covered by assets lives for the solution which could be 20 years for example).

Overall, we consider it useful to think through the 10-year funding proposal mentioned in the draft methodology, as it helps bring additional clarity to some of the underlying issues, but it does not seem to be a viable option.

## **4.7: Benchmarking opex- and capex-based enhancements**

We have discussed in this section a number of ways that the price control remuneration arrangements for enhancement expenditure might be adapted to reduce the risks of a bias towards capex-intensive enhancements.

A separate, but related, issue is how Ofwat might carry out benchmarking between opex-intensive enhancement initiatives and capex-intensive enhancement initiatives when it comes to determine explicit enhancement allowances. This issue is not directly related to the capex bias. But tacking this issue might be seen as complementary to the options discussed above concerning NPV-based allowances for enhancement operating expenditure and the adaptable multi-AMP enhancement funding approach.



This topic was not a high priority for this project, but we provide some comments below. Some further discussion of this aspect of Ofwat's PR19 was provided in a previous review by Reckon.<sup>33</sup>

### The PR19 approach

At PR19 Ofwat did not have a reasonable approach to benchmarking between opex-intensive and capex-intensive enhancement initiatives. To the extent that opex-intensive and capex-intensive enhancements were covered in the same benchmarking analysis at PR19, this was done in a way that seems to be unreasonable. This involved comparing cash expenditure in a given AMP (e.g. AMP7) across enhancement solutions, without taking any account of the types of expenditure (e.g. operating expenditure versus capital expenditure) or the duration of enhancement benefits provided by different types of enhancement expenditure. Ofwat's approach did not differentiate between spending £1m to achieve performance benefits for a single year and spending £1m to achieve the same level of performance benefits for 20 years.

The approach used at PR19 would lead to a misleading picture of the relative efficiency of alternative enhancements options and does not provide a sound basis on which to set explicit allowances for the efficient costs of enhancement solutions.

As far as we can tell, this issue was overlooked in Ofwat's PR24 draft methodology.

### Benchmarking based on annualised cost measures

The main alternative that we see to that used at PR19 is to benchmark a measure of estimated annualised costs (or annualised costs per unit of enhancement benefit) where the measure of annualised costs would cover operating expenditure, an annualised measure of capital cost,<sup>34</sup> and any further costs of finance.

The costs of finance should be considered even for enhancement solutions that are entirely opex-based, as these may involve an element of risk that carries finance costs.

This type of benchmarking would require assumptions on the economic life of assets arising from the proposed enhancement expenditure and, where relevant, assumptions on the duration of enhancement benefits from what we refer to as enhancement-investment operating expenditure. This, in turn, would increase the complexity of enhancement benchmarking analysis and the data requirements from companies, compared to the PR19 approach.

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<sup>33</sup> Reckon (2019) *Note on totex benchmarking of enhancements in Ofwat's PR19 IAP*.

<sup>34</sup> For instance, using a calculation based on the annual payment that would arise for a repayment mortgage on the amount of upfront capital investment. For example, if the cost of capital is 5%, an asset that costs £10m upfront and lasts 20 years might be calculated to have an annualised cost of around £800k per year using the PMT calculation in Excel or Google Sheets. This calculation would already include costs of finance so it may not be appropriate to include any further finance costs as part of the annualised cost measure.

There might also be arguments for recognising the greater option value that might arise from some opex-based solutions, to avoid these being compared to capex-based solutions in a way that disregards a potentially significant efficiency benefit of opex-based solutions.

Past experience, and the PR24 draft methodology, suggest that Ofwat might be resistant to any increased complexity in its enhancement benchmarking. But it is hard to see how either Ofwat or water companies can have any reliable idea whether an opex-intensive or capex-intensive enhancement solution is a better option for customers without a proper consideration of asset lives, the duration of enhancement benefits and option value.

### **Use of results from benchmarking based on annualised cost measures**

If enhancement benchmarking at PR24 was to be based on annualised cost measures, rather than on estimated enhancement totex for AMP8, then the cost benchmarks emerging from the analysis would be in the form of annualised costs. These figures could not be used directly to set enhancement allowances.

Instead, the benchmarking results could be used to calculate a benchmarking adjustment factor which is defined for company X as: annualised costs for company X estimated from benchmarking models divided by annualised costs under company X's own expenditure forecasts.<sup>35</sup>

This factor could then be applied in different ways, depending on the funding channels used for a company's enhancement expenditure in a particular area:

- For enhancements funded under the conventional approach to enhancement allowances, the efficiency adjustment could be applied to AMP8 totex (e.g. taking the companies' forecast totex and multiplying by the benchmarking adjustment factor).
- For enhancements funded under the NPV-based approach (section 4.3), the benchmarking adjustment factor could be applied to the totality of long-term expenditure which is to be taken as an input to the NPV calculation used to determine a long-term allowance.
- For enhancements funded under the NPV-based approach (section 4.4), the benchmarking adjustment factor could be applied to the allowance for AMP8 totex which would be funded at PR24. In addition, it could be applied to the calculation of the provisional long-term allowance to be published at PR24.

This is one possible approach and there may be alternatives which are better in some ways.

It was not the purpose of this project to explore these issues in detail and they would benefit from further development and attention.

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<sup>35</sup> This adjustment factor might sometimes be described as an efficiency challenge, but that terminology can be confusing in a context where the effect of the adjustment in some cases might be to set the allowance for company X at a level which is above the costs that company X forecast itself.

## 5. Measures to tackle broader concerns

### 5.1: Introduction

Section 4 considered potential changes to Ofwat's approach to cost assessment to help to reduce the potential bias in favour of capex-based enhancement initiatives. This section considers potential changes to help mitigate, to some degree at least, some of the other concerns with the current approach that were identified in section 3. To recap, these other concerns are:

- Industry-wide risks of under-funding capital maintenance from past enhancements.
- Unreasonable exclusion of enhancement opex from base-plus modelling.
- Concerns about the scale of improvements expected from base-plus allowances.
- Potential for double funding enhancement expenditure.
- Risks of under-funding better-performing companies.

These concerns are interrelated and the various measures discussed in this section are generally complements that could be applied together, rather than alternative options.

This section starts with an overview of the measures we identified and then discusses a series of prioritised measures in more detailed in the subsections that follow.

### 5.2: Overview of measures covered in this section

We present in Table 1Table 8 an overview of the various measures discussed in this section, and relate these the set of concerns with the PR19 approach identified in section 3 of this report. A tick against a green background indicates that the specific measure in the relevant row of the table could make a significant contribution to improvements in respect of the problem listed in the relevant column of the table. A tick is not intended to imply that a measure would fully or mostly address any specific problem. Where the same problem has ticks across multiple rows, this means that we see a role for a package of measures to help tackle that problem. The measures presented across different rows are not alternative options and they would generally play a complementary role.

We include in Table 8 the problem relating to risks of a capex bias in enhancements; while this was the focus of section 4, it is relevant to some of the measures covered in this section too.

As with the measures discussed in section 4, the measures we present in this section emerged following a process to develop a longlist and then the application of a prioritisation exercise. We summarise in Table 9 some further ideas or options that we identified in the earlier stages of the project but which we do not cover in any detail in this section, on prioritisation grounds. We indicate in the description of the idea/option which problems it would be directed at tackling.

**Table 8 Mapping between potential measures discussed in this section and the concerns with the PR19 approach identified in section 3**

Potential measures	Risks of an inefficient capex bias for enhancements	Industry-wide risks of under-funding capital maintenance from past enhancements	Unreasonable exclusion of enhancement opex from base-plus modelling	Concerns about the scale of improvements expected from base-plus allowances	Potential for double funding enhancement expenditure	Risks of under-funding better-performing companies
B1	Exposing and refining the conceptual framework	✓	✓	✓	✓	✓
B2	Treating certain enhancement opex similarly to enhancement capex	✓		✓		
B3	Inclusion of enhancement opex for ongoing costs in base-plus models	✓		✓	✓	
B4	Mapping of enhancement-performance interactions	✓	✓		✓	✓
B5	Adjustment mechanism for industry-wide expenditure	✓	✓		✓	
B6	An enhanced cost adjustment claim process		✓		✓	✓
B7	Technology-neutral deductions for implicit allowances				✓	
B8	Refinements to regulatory reporting arrangements	✓	✓	✓	✓	✓

We stress that where we have not prioritised potential measures for this project this does not imply that there is no merit in considering these options further or that we have enough information to form a definitive position on the relative value of these options.

**Table 9 Ideas and options from our longlist that were not prioritised**

	Outline of idea or option	Summary of reasons not prioritised
B9	<p><b>Forward-looking industry-wide uplift to benchmarks derived from base-plus models</b></p> <ul style="list-style-type: none"> <li>• Allowances for base expenditure at PR24 set by applying an industry-wide uplift to figures derived from historical benchmarks, intended to bring a more forward-looking perspective.</li> <li>• Uplift intended to help tackle concerns relating to (a) capital maintenance and operating expenditure from historical enhancements and/or (b) industry-wide improvements during AMP8 (e.g. for net zero) that are not funded through other means (e.g. explicit enhancement allowances).</li> <li>• Assessment of scale or materiality of uplift to take account of potential offsetting factors.</li> </ul>	<ul style="list-style-type: none"> <li>• It is open to companies to make a case for such an uplift (e.g. via cost adjustment process) if there is evidence to support it, analysis of which is outside the scope of this project.</li> <li>• We imagine that Ofwat might apply a very high threshold in assessing such evidence.</li> <li>• We consider measure B5 provides a more credible way to tackle concerns about changes over time in industry-wide expenditure requirements.</li> </ul>
B10	<p><b>Use forecast expenditure data as an input to base-plus models or in setting efficiency challenge</b></p> <ul style="list-style-type: none"> <li>• Use business plan forecasts of base-plus expenditure, rather than (or as well as) companies' historical levels of base-plus expenditure as input data to the econometric benchmarking models, or in setting the scale of the efficiency challenge relative to the levels of historical expenditure.</li> <li>• This might be seen to help tackle concerns that base-plus allowances reflect historical expenditure only and do not adequately allow for changes over time, such as the capital maintenance implications of past capital enhancement expenditure and or the costs of performance improvements that are not funded by ODIs or explicit enhancement allowances.</li> </ul>	<ul style="list-style-type: none"> <li>• We did not think that this was an area where the project could add value, relative to other areas.</li> <li>• The use of forecast expenditure data within base-plus benchmarking models is something that has been suggested in the past including by Ofwat but we consider that it suffers from significant problems for benchmarking purposes, in terms of data quality/reliability, especially given wider incentives that companies face as part of Ofwat's business plan assessment process.</li> </ul>
B11	<p><b>NPV-based adjustment for time lag in remuneration of growth in capital maintenance</b></p> <ul style="list-style-type: none"> <li>• As part of the allowances set for enhancement expenditure, add an NPV-based adjustment that is intended to account for the anticipated delay in remuneration of increased capital expenditure – which arises from time between increases in base expenditure feeding through econometric model into allowances.</li> <li>• In setting the adjustment consider any potentially offsetting benefits (e.g. if the upfront capital enhancement expenditure involves replacing assets that would otherwise need to be renewed in due course and thereby brings a capital maintenance saving).</li> </ul>	<ul style="list-style-type: none"> <li>• We consider that other measures (B5 and B6) offer a more credible way to tackle the concerns that this idea is aimed at.</li> <li>• This approach would be dependent on assumptions, at the time at which an enhancement allowance is made, about the data period and model specifications (e.g. use of time dummies) used for setting base-plus allowances at future price reviews, which does not seem realistic given the evolving nature of Ofwat's base cost modelling over time.</li> </ul>

B12	<p><b>Off-model adjustments for estimates cost-performance relationship not captured by explanatory variables</b></p> <ul style="list-style-type: none"> <li>• Develop estimates of the relationships between aspects of water company performance and base-plus expenditure, for those aspects that are understood to have a particularly large influence on differences in base-plus expenditure between companies or over time.</li> <li>• Use these estimate relationships to (a) make pre-modelling adjustments to data feeding into the econometric models, to enable more like-for-like benchmarking; and then (b) to tailor allowances derived from base-plus models to the performance levels expected from each company over the forthcoming price control period (but taking care of interactions with ODIs and explicit enhancement allowances to avoid double counting).</li> <li>• Alternatively, as a more approximate approach, leave aside step (a) and follow step (b) as part of the cost adjustment process.</li> <li>• Where practical, this approach might help in particular with concerns about better-performing companies being under-funded, with concerns about funding capital maintenance from past enhancements and concerns about potential double funding of some companies.</li> </ul>	<ul style="list-style-type: none"> <li>• In line with the approach to the project that we agreed with the client companies, we have not prioritised this option.</li> <li>• We understand that water companies are engaged in a separate study which is considering this.</li> <li>• This approach is relatively demanding in terms of the evidence on cost-performance relationships and the data needed on relative performance across companies.</li> <li>• This approach could be relevant as part of an enhanced cost adjustment process which we comment on briefly in this section.</li> </ul>
B13	<p><b>Expand scope of financial ODIs and reduce role of explicit enhancement allowances</b></p> <ul style="list-style-type: none"> <li>• See option A10 from section 4.</li> <li>• Where practical, this could help tackle concerns about better-performing companies being under-funded, funding capital maintenance from past enhancements and potential double funding of some companies, as well as a capex bias.</li> </ul>	<ul style="list-style-type: none"> <li>• Expansion of financial ODIs outside the scope of this project.</li> <li>• The use of ODIs to fund performance improvement is an established part of Ofwat's regulatory framework, although extending it to areas currently covered by explicit enhancement allowances would be quite a significant change.</li> </ul>
B14	<p><b>Development of econometric models of base-plus costs to better capture performance differences</b></p> <ul style="list-style-type: none"> <li>• Develop richer econometric model specifications for base-plus expenditure that include explanatory variables to capture aspects of customer service and environmental performance that differ between companies and over time.</li> <li>• Use these tailor allowances derived from base-plus models to the circumstances of each company (but taking care of interactions with ODIs and explicit enhancement allowances to avoid double counting).</li> <li>• Perhaps also consider whether models might take account of differences between companies and over time in scale of benefits from historical enhancement expenditure.</li> </ul>	<ul style="list-style-type: none"> <li>• Detailed econometric model development outside the main focus of this project.</li> <li>• Improvements over time in the econometric model specification is a normal part of the price review process, and we see no reason to object in principle to including explanatory variables for performance in the models (but this can be hard to achieve successfully in practice).</li> </ul>

The remainder of this section discusses the measures from Table 8 in more detail. It takes measures B1 to B8 in turn, grouping some of these together where they are closely related.

### **5.3: Exposing and refining the conceptual framework**

Our view is that the type of conceptual and theoretical material provided in section 2 of this report can itself help to alleviate some of the concerns with Ofwat's current approach.

It can help provide the basis for a more logical and coherent approach across different boundaries relating to base expenditure and enhancement expenditure. In doing so, it may provide the basis for more constructive engagement between water companies and Ofwat, both on options for further developing and improving the regulatory framework and on the evidence and analysis that is informative for specific aspects of the cost assessment process.

The material presented in this report is a first step towards a conceptual framework relating to the interactions between base expenditure, enhancement expenditure and financial ODIs. It may not work perfectly and aspects of it may not be as clear as they could be. There may be value in a further stage of work to share the material developed in the course of this project with Ofwat, a wider set of water companies and other informed stakeholders and then refining it further in light of feedback from these parties. It would be particularly useful to get buy-in from Ofwat, so it would be valuable to spend time with Ofwat to understand and resolve any areas of potential disagreement or uncertainty.

The framework set out in section 2 is partly descriptive, but it also proposes a set of modified and extended concepts and definitions. Subject to a process of review and refinement with companies and Ofwat, we propose that Ofwat adopts these concepts and definitions.

As part of the exposure of the conceptual framework, we see value in the type of simulation analysis that we have presented in this report. While this is inevitably assumption-driven and highly simplified, we see this as a powerful tool to help to better understand some of the complexities, especially around:

- the performance levels that might be seen as implicitly funded by allowances from base-plus models; and, related to this
- how the allowances from different funding channels (e.g. explicit allowances for enhancements combined with allowances from base-plus models) might be expected to combine over time, depending on the details of the regulatory approach taken, in ways that could provide too much or too little funding over the long term.

### **5.4: Improved treatment of enhancement opex**

In light of both the conceptual framework set out in section 2 of this report, and the discussion of concerns with the PR19 approach provided in section 3, our view is that there is a strong case for Ofwat to modify the way that enhancement operating expenditure is defined and reported, so as to distinguish between two quite different types enhancement operating expenditure, and then to treat these two types in different ways for the purposes of cost assessment.



This section starts with a recap of the distinction we propose is drawn between two types of enhancement operating expenditure. It then sets out the two specific measures we have for improvements, which are based on that distinction. These are to:

- Treat enhancement-investment opex similarly to enhancement capex.
- Include enhancement-running-cost operating expenditure within base-plus models.

### **Distinguish between two types of enhancement operating expenditure**

As set out in section 2.2, we consider that it would be very helpful to draw a conceptual distinction between two types of operating expenditure that might fall under the broader category of enhancement expenditure. We propose the following working definitions:

- **Enhancement-investment operating expenditure.** This category captures the special type of operating expenditure where operating expenditure incurred in one year by a water company provides significant enhancement benefits over subsequent years. This type of operating expenditure shares some economic similarities with capital expenditure and might be seen as a form of investment.
- **Enhancement-running-cost operating expenditure.** This category captures all remaining operating expenditure that is incurred to provide enhancement benefits, which might be thought of as the ongoing operating expenditure to run and/or operate arrangements that provide enhancement benefits.

We imagine that further work to tighten the terminology and definitions above might be helpful.

In practice, we would expect the second of the two types above to be more common than the first. The second relates more closely to what is normally understood as operating expenditure whereas the first seems something of a special case or an exception.

Even where payments are made by water companies in one year that provide benefits across a number of future years, there are ways in which these costs might be smoothed over time in companies' accounts (and in turn regulatory reporting) even if they do not represent capital expenditure or create fixed assets on the balance sheet. For example, where a single upfront payment is made to a third party in one year to cover services or benefits to be received across five future years, this might be treated as a pre-payment for accounting purposes, with the operating expense recognised in each year corresponding to a fifth of the upfront amount. In that case, even though a single upfront payment is made, the reported operating expenditure would fall under the category above for enhancement-running-cost operating expenditure.

Nonetheless, there may be reasons why accounting provisions for pre-payments are not applicable or made in all cases, and so we consider that the regulatory framework should allow for the possibility of the expenditure companies report as enhancement operating expenditure including some element of what we define above as enhancement-investment operating expenditure. For example, where upfront expenditure leads to behavioural change (e.g. crop management practices amongst farmers) which brings benefits to the

water company but does not give rise to a multi-year agreement with the water company, then it seems less likely to be treated as a pre-payment than a multi-year agreement for services.

### **Treat enhancement-investment opex similarly to enhancement capex**

Once a separate category of enhancement-investment operating expenditure is recognised as part of the regulatory framework, we see a strong case that this category could be treated as though it was capital enhancement expenditure for Ofwat's cost assessment purposes.

This could type of enhancement expenditure could include, for example:

- A water company's share of the upfront costs of partnership projects (e.g. with local authorities) in which an asset is created which provided long-term benefits to the water company's customers, but where that asset is not owned by the water company.
- Investment in assets that will be owned by customers (e.g. customer-side lead pipe replacement).

For this special type of enhancement expenditure, in which the enhancement expenditure profile is largely one of upfront costs with similar economic properties to capital expenditure, the concerns that we have considered in section 4 of this report, about a bias towards capex-based enhancement initiatives, do not arise to the same degree and in some cases at least there may be no need for the new types of approach presented in section 4. (There might be a role for the options from section 4 in cases where enhancement-investment operating expenditure brings enhancement benefits of a much shorter duration than the asset lives for capex-based alternatives.)

The following simpler approach could be applied for at least some enhancement-investment operating expenditure, especially where the duration of benefits is similar to those for capex-based alternatives:

- This category of enhancement expenditure would qualify for explicit enhancement totex allowances of the same type that are to be used for capital enhancement expenditure.
- The value of allowances for this type of enhancement expenditure would be excluded from the measure of operating expenditure feeding into calculations for the PAYG rate, subject to any financeability constraints that may arise (which do not seem likely given the relatively small scale of this type of expenditure). This would enable RCV-based recovery of expenditure allowances. This is appropriate to help ensure a fair balance of charges between current and future customers, given the long-term benefits from the expenditure incurred in a given year.
- The level of enhancement-investment operating expenditure incurred would be reported by water companies separately for each applicable enhancement category and excluded from the expenditure feeding into the base-plus models.

In addition, given that a water company would not necessarily own the asset funded by this type of enhancement expenditure, there may be a role of additional safeguards for customer

protection purposes to ensure that the benefits expected from the asset are maintained over time. This might be achieved, for example, through a PCD that is designed to ensure the availability and proper functioning of the asset over time. This type of customer protection arrangement is unlikely to be needed or proportionate in all cases, but it is an option to consider in recognition that there are some differences between capital enhancement expenditure and enhancement-investment operating expenditure.

In contrast to the approach outlined above, if there are no explicit enhancement allowances for enhancement-investment operating expenditure, or adequate funding from financial ODIs, but companies are expected to make continued improvements over time in the aspects of performance funded by such expenditure, it may be appropriate to include enhancement-investment operating expenditure within the scope of expenditure feeding into base-plus models.

### **Include enhancement-running-cost opex within base-plus models**

Ofwat took steps at PR19 to deduct historical enhancement operating expenditure from the expenditure data feeding into its base-plus models and has indicated that it intends to make a similar deduction for PR24. As discussed in section 3, we consider that this approach is mistaken and lacks a logical foundation.

Once the distinction above is drawn between the two types of enhancement operating expenditure, we think it becomes much clearer that it is inappropriate to deduct all enhancement operating expenditure from the expenditure feeding into base-plus models. To do so creates a situation where companies will, on average, tend to be under-funded for some of the expenditure needed to maintain historical levels of service and performance.

In appendix 1 we have used our simulation analysis to illustrate how an approach of excluding enhancement-running-cost operating expenditure will systematically under-fund companies for the costs to maintain existing levels of performance.

However, there may be exceptions where enhancement-running-cost operating expenditure should not feed into base-plus models, at least for a defined period of time. In particular, this is the case for operating expenditure funded via the NPV-based approach and the adaptable multi-amp enhancement funding approach described in sections 4.3 and 4.4.

We recognise that the historical data available for base-plus benchmarking at PR24 will reflect Ofwat's regulatory reporting arrangements over that historical period, and will not involve the separation between the two types of enhancement operating expenditure that we propose above. We do not consider this to be a reason not to take action to make improvements at PR24. For instance, some practical responses to the current data availability are as follows:

- Ofwat could ask companies to provide a retrospective allocation of their total reported enhancement operating expenditure between these two types of enhancement operating expenditure, over the historical period used for the econometric models. This might be supported by requirements for companies to provide a transparent methodology for the allocation and/or third party assurance.

- If that is not considered to be proportionate, Ofwat could start to collect data from companies that is separated between the two types of enhancement operating expenditure for 2022/2023 onwards, and then use the proportions of expenditure reported for each type to make estimates for each type for the years falling within the historical period used for the econometric models.

While these are approximations, they offer a way for Ofwat to avoid the error made at PR19.

Furthermore, since Ofwat's approach at PR19 itself relied on approximate estimates of enhancement operating expenditure, rather than data reported directly in the APR, we cannot see a reasonable objection to using approximations for PR24 to tackle gaps in data availability.

## **5.5: Mapping of enhancement-performance interactions**

During the course of this project, we became increasingly aware that some of the problems arising under the current approach are influenced by the complexity, and a lack of clarity, over the relationships and interactions between the following:

- the various individual enhancement expenditure categories used by Ofwat for cost assessment reporting purposes;
- the various aspects of water company performance (interpreted broadly) and outcomes that matter to customers and the environment (including both those which are subject to common performance commitments and consistent regulatory reporting across companies and those which are not); and
- the three sources of enhancement funding we identified in section 2.3 (i.e. explicit enhancement allowances, allowances derived from base-plus models, and financial ODIs).

While the conceptual framework we present in section 2 of this report is intended to help understand these relationships better in a general sense, it does not get into the details of how specific enhancement categories relate to specific aspects of performance and specific funding channels. We have not come across anything else that provides this.

In this context, we see substantial value in Ofwat and/or water companies carrying out a mapping exercise that exposes more clearly the relationships highlighted above.

This mapping would be intended to show for example:

- Those enhancement expenditure categories used by Ofwat for which expenditure is understood to lead to improvements against a single aspect of company performance, and whether or not there are financial ODIs on that metric.
- Those enhancement categories for which expenditure is understood to influence performance against multiple aspects of company performance.

- Any aspects of company performance that are potentially funded by multiple funding channels (e.g. via financial ODIs and by explicit allowances for enhancement expenditure).
- Areas of conceptual enhancement expenditure that support improvements in dimensions of company performance which are not funded by explicit enhancement allowances or financial ODIs.
- Areas of conceptual enhancement expenditure that support improvements in dimensions of company performance which are not reported or recognised as part of enhancement expenditure in the enhancement expenditure categories used for regulatory reporting (and which may be captured, perhaps inadvertently, under reported base expenditure).

This mapping would be conceptual – there would be no attempt to quantify the relationships between enhancement expenditure and performance. We envisage, for example, a matrix in a spreadsheet with enhancement categories as columns and aspects of performance as cells. A colour coding system could potentially show interactions such as where an enhancement category is understood to have a high, intermediate/variable or insignificant impact on an aspect of performance. There would of course be uncertainty in the perceived relationships, but this could be captured in a colour-coding system. Even if the gradation implied by colour-coding was not possible, the mapping would be useful. The mapping would be a somewhat subjective exercise and need not be perfect to have value.

This mapping could bring a number of specific benefits, such as:

- It would show where improvements over time in aspects of performance across the industry are likely to have been driven at least in part by past enhancement expenditure that is omitted from the scope of base-plus models. This is relevant to assessment of the degree of improvement that can reasonably be expected in the future.
- It would help show where levels of performance observed across companies are likely to have been heavily influenced by historical enhancement expenditure (and enhancement allowances), which may have differed between companies. This would be relevant to inform whether it is reasonable for PCLs on those aspects of performance to be set using industry-wide averages of observed performance in recent years.
- It would help to reduce the risk of double counting, going forward, in cases where explicit enhancement allowances are to be provided in relation to aspects of performance that are also subject to financial ODIs (this risk will depend not only on the use of ODIs but also on the PCLs that are set at).
- It would help to show where enhancement expenditure may be embedded within the expenditure reported as base expenditure and, in turn, indicate those areas of performance where it may be reasonable for Ofwat to expect performance improvements over time to be funded from allowances derived from econometric models of base expenditure – and those areas where it would not be reasonable to do.
- It would help to show where bespoke customer protection measures (e.g. bespoke performance commitments or PCDs) may be particularly important to ensure that

companies have adequate accountability for the expected benefits arising from enhancement funding provided through the price control.

This mapping could be developed in phases, with an initial version developed and shared amongst Ofwat and water companies, allowing for further feedback and further refinement. It could be updated over time as more is understood about the enhancement expenditure categories and ODIs/performance commitments that would be used for PR24.

The fulfilment of this mapping exercise was not within the scope of this project. It would require a multi-disciplinary expertise involving knowledge of the regulatory framework as well as technical engineering and operational expertise. Nonetheless, we provide in Figure 13 a simplified mock-up of how the mapping might be presented.

This mock-up abstracts from the actual enhancement categories used in practice, and the specific aspects of company performance or outcomes that matter to customers. Instead, it sets out a number of hypothetical enhancement expenditure categories (EC1 to EC10) and relates these to a number of hypothetical outcomes (O1 to O7). In practice there are considerably more enhancement categories and relevant outcomes. In Figure 13, a darker shade of green indicates where a particular enhancement expenditure category has a relatively high influence on a particular outcome.

Note that, in the mock-up and more generally for this exercise, we are more interested in ODIs that provide a potential funding channel for enhancement expenditure (e.g. those for common performance commitments), than ODIs that are inherently linked to explicit enhancement allowances and used for customer protection purposes in the event that enhancements are not delivered or under-delivered (e.g. what might have been called a bespoke ODI at PR19 but would be a PCD at PR24 under Ofwat's refined terminology).

In the mock-up illustration provided here, a number of features of potential interest are indicated, such as:

- Enhancement expenditure category EC1 is a simple case where that expenditure influences a single outcome (O1) which is not affected by enhancement expenditure in other categories.
- Outcome O2 is influenced by enhancement expenditure that falls across three separate categories EC2, EC3 and EC4. In this example, category EC3 is assumed to have a greater impact on outcome O2 than EC2 and EC4. The influence of each of these three categories on outcome O2 is assumed to be less than the influence of category EC1 on outcome O1, and so these three categories are shown in a lighter shade of green than for the EC1-O1 mapping.
- Outcome O6 has a financial ODI attached to it and is influenced by enhancement expenditure category EC7. Expenditure in category EC7 is included in base-plus models and there are no explicit enhancement allowances for expenditure in that category.
- Outcome O5 is has a financial ODI attached to it and is influenced by two expenditure categories: EC6 for which explicit enhancement allowances are provided and EC8 for

which there are no explicit enhancement allowances and expenditure is included in the base-plus models.

- Expenditure categories EC9 and EC10 represent expenditure that is conceptually enhancement expenditure, but which is not recognised as enhancements for regulatory reporting purposes and which feeds implicitly into the base-plus models. Category EC9 influences an outcome for which there is a financial ODI (O7) and category EC10 influences an outcome which has no financial ODI and which is not reported consistently across companies (O3).

We recognise that the mock-up is quite abstract. As a practical example of the types of issues that the mapping might pick up, enhancement expenditure categories for flow to full treatment (FFT), storm tanks and spill monitors might all contribute to outcomes relating to pollution from wastewater systems, and would be relevant to performance commitments and financial ODIs on pollution events.

The mock-up that we envisage is an industry-wide one. We recognise that there may be some variations across companies in what outcomes, or aspects of performance, are applicable, and in the types of enhancement solutions (and in turn enhancement expenditure categories) that are used. But we do not think that this should undermine attempts at industry-wide mapping. The mapping would be separate for water and wastewater.

It is likely that the presentation, scope and functionality of the mapping output could be refined and developed further as the mapping exercise is carried out in practice. The mock-up that we provide in this section should be seen as a guide and a starting point; it should not be taken as a constraint on the outputs from such an exercise.



**Figure 13 Illustrative mock-up of mapping of relationships between hypothetical enhancement categories and hypothetical outcomes**



## 5.6: Adjustment mechanism for industry-wide expenditure

In this section we discuss an approach that we describe as an adjustment mechanism for industry-wide (base-plus) expenditure. This section is structured as follows:

- Overview of the approach.
- Outline specification.
- Suitability of the mechanism as a funding channel for enhancements.
- Transitional issues and interactions with past performance.
- Emerging views on the approach.

### Overview of the approach

The core idea presented in this section is a form of uncertainty mechanism to apply to price control allowances which adjusts for differences in industry-wide base-plus expenditure over the AMP between (a) the regulatory assumptions set at the price review (derived primarily from econometric models of historical data) and (b) outturn expenditure over the AMP.

While this type of uncertainty mechanism would be novel for the water industry, it is quite closely related to the idea that Ofwat's process for setting allowances for base expenditure, which is primarily based on econometric models of historical expenditure, would benefit from a more forward-looking assessment. Ofwat said the following in its PR24 draft methodology:

*"For PR24 we are proposing to include more of a forward look in our base expenditure modelling."*<sup>36</sup>

*"We [...] intend to cautiously consider using business plan forecast data in our base cost models providing business plan forecasts are sensible and not significantly impacted by different risk appetites between companies."*<sup>37</sup>

One of the concerns with using forecast expenditure data for the base-expenditure models is that it is not sufficiently accurate, reliable or sensible. Any business plan forecast of efficient base expenditure requirements over the 2025-30 period will be subject to considerable uncertainty. The uncertainty mechanism approach represents a response to that uncertainty: forecast expenditure data for 2025-30 would not be needed for the econometric benchmarking at PR24, and instead there would be mechanistic adjustments (implemented at PR29 as part of the PR24 reconciliation) for differences between outturn expenditure during 2025-30 and the expenditure allowances set at PR24 on the basis of historical data for the years up to 2023/24. This seems to offer the benefits sought from what Ofwat calls a "forward look" without the downside of using expenditure forecasts in the base-plus models.

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<sup>36</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24*, page 72.

<sup>37</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*, page 19.

There are various ways that the adjustment mechanism could be specified and implemented but a key feature is that the adjustment for each company would be calculated by comparing price control allowances without a measure of industry-level expenditure rather than company-level expenditure. This is important in order to preserve efficiency incentives for companies in respect of expenditure covered by the mechanism.

This mechanism would essentially be intended to deal with any industry-wide forecasting uncertainty faced when setting allowances. This uncertainty includes issues that are closely related to some of the problems identified in section 3 of this report:

- The mechanism could help tackle concerns that the required scale of performance improvements over the forthcoming price control period which Ofwat treats as being funded by allowances from base-plus models might be unrealistic (whether too high or too low) or not supported by good evidence. It would enable adjustments, for example, if certain enhancement expenditure over the price control period exceeds that which was implicitly allowed for via allowances derived from base-plus models estimated using historical expenditure data (or via any adjustments that Ofwat applies base-plus allowances to take account of future developments).
- Related to the point above, the mechanism could help where it is recognised that there will be some future expenditure impacts arising across the industry from performance improvements required from all companies, but Ofwat faces uncertainty in gauging the scale of expenditure that is needed during the forthcoming AMP. This might be relevant, for example, in areas such as carbon reduction.
- The mechanism could also help tackle concerns about industry-wide under-funding capital maintenance from past enhancements, as the adjustment for actual spend would act to compensate in cases where historical levels of capital maintenance are too low given the impacts of cumulative enhancements over time.

Furthermore, because this mechanism could in some cases be used to remunerate companies for enhancement expenditure, it could replace the role of explicit enhancement expenditure allowances in some areas of enhancement expenditure which would, in turn, help to reduce the risks of capex bias for enhancements in those areas.

This type of uncertainty mechanism would also help to deal with some uncertainties that are outside project scope. For instance, it would also help to cover uncertainty about how broader capital maintenance requirements in the industry will evolve over time, uncertainty in industry-level productivity improvements over the forthcoming price control period and uncertainty on real price effects (RPEs) over that period (where it could replace the narrow labour RPE uncertainty mechanism Ofwat included at PR19).

### **Outline specification**

We set out below an outline specification of how the industry-wide adjustment mechanism might work, but we recognise that there may be different ways in which the core idea could be applied.

Ofwat would first determine what scope of outturn expenditure should fall within the scope of the mechanism. Our starting point is that this would be all of base expenditure plus enhancement expenditure in those categories which are included in the data feeding into the base-plus models. We refer to this as “in-scope expenditure”.

Ofwat would then determine calculations that specify exactly how companies’ allowances would be adjusted in light of outturn expenditure data for in-scope expenditure.

One way to do this is through an adjustment factor approach as follows (subject to an important caveat about financial ODIs discussed further below):

- An adjustment factor would be calculated by: (a) taking each company in turn, and dividing the in-scope expenditure that it actually incurs by the final ex ante allowance set by Ofwat for its in-scope expenditure (after adjustments for efficiency assumptions, RPEs, etc); and then (b) taking an average of this value across all companies.
- This factor would be above 1 if, on average across companies, companies spent more than the relevant allowances and below 1 if they spent less.
- A totex adjustment would then be applied for each company by taking its ex ante allowance set by Ofwat for its in-scope expenditure and multiplying by: the adjustment factor minus 1. For instance, if a company’s ex ante allowance was 100 million and the adjustment factor was 1.03 then the adjustment would be £3 million.
- This value would then be subject to an adjustment for financing costs for the delay between expenditure impacts and revenue adjustments (as for the revenue reconciliation for other uncertainty mechanisms and true-up arrangements).

There might also be a possibility of an approach in which the econometric models of base-plus expenditure are re-estimated or re-applied in some way. For instance, if the focus is on industry-level changes over time, coefficients on explanatory variables for cost drivers could be held constant (to limit deviations from the final determination models) and coefficients on the constant term or time dummy variables updated and re-estimated using outturn data from the price control period in question. Our initial view is that the adjustment factor approach would be simpler and probably sufficient, but we do not take a definitive position on this at this stage.

The role of the adjustment would be so that, at an industry-average level, there would be no net over-spend or under-spend, but there would still be expectations of under-spend and over-spend for individual companies.

The adjustment described above simplifies in one important respect. There is a question of how interactions with financial ODIs would be taken into account. As explained in section 2.3, financial ODIs are one type of funding channel for enhancement expenditure and it does not seem appropriate to adjust for outturn industry-wide expenditure exceeding totex allowances if the difference has been funded by financial ODIs. Our current view is that the net revenue (i.e. total financial rewards less penalties) from those financial ODIs that relate

to in-scope expenditure should be deducted from the value of in-scope expenditure before calculating the adjustment factor outlined above.

The adjustments might be implemented through reconciliation adjustments at the next price control review or on a rolling basis during the price control period, as expenditure data becomes available. Reconciliation at the next review might make more sense given Ofwat's broader approach to reconciliation (e.g. for totex cost-sharing) and the potential for variations in industry-wide expenditure, versus allowances, to even out across the five-year price control period.

As with other uncertainty mechanisms, there are a range of detailed design options that might be considered. For instance, there are questions about whether total upward or downside adjustments would be capped and whether there would be a materiality threshold or deadbands within which outturn industry-wide expenditure is seen as sufficiently close to ex ante allowances that no adjustments are made. We leave these points aside at this stage.

### **Suitability of the mechanism as a funding channel for enhancements**

The mechanism outlined above involves adjustments for industry-wide expenditure being different to industry-wide allowances. This mechanism offers a potential additional funding channel for enhancement expenditure, beyond those available at present: explicit enhancement allowances determined on a company-specific basis, implicit allowances for enhancements derived from base-plus models estimated using historical expenditure; and financial ODIs.

As a channel to fund enhancements, this mechanism would be most relevant to cases where either:

- there are common industry-wide enhancement requirements going forwards and companies start from reasonably similar positions in terms of the historical levels of enhancement funding provided for the relevant dimension of performance; or
- where companies start from reasonably similar positions and any differences in required performance levels across companies in the future can be managed through ODIs around common PCLs (or perhaps via the cost adjustment process).

We wondered whether aspects of enhancement expenditure and performance improvements relating to carbon reduction might be a potential area where the mechanism could play a role, but this is not something that we have given proper consideration for this project.

By its nature, the mechanism would not deal well with cases where there are large differences between companies in the scale of the efficient enhancement expenditure requirements that need to be funded via price control allowances at PR24 (other than differences captured by explanatory variables in the base-plus models). However it might be possible to apply the mechanism if its introduction was complemented by adjustments (e.g.

via cost adjustment process) to place companies on a more equal footing before the mechanism it is applied.

Where the mechanism could be applied, we would expect it to make a substantial contribution to reducing the risks of a bias in favour of capex-based enhancement initiatives. This is because it would avoid the need for explicit totex enhancement allowances for those areas where it is applied which would, in turn, help to tackle the risks of capex bias for those enhancements. However, the mechanism would not itself tackle all factors contributing to a capex bias (e.g. potential under-remuneration of finance costs associated with opex-based enhancements).

### Transitional issues and interactions with past performance

Ofwat has, on occasion in the past, taken the view that expenditure allowances derived from base-plus models are intended to be longer-term averages are not necessarily reflective of efficient spend in any specific five-year price control period. It also takes somewhat contradictory positions to this (e.g. that view seems to be at odds with Ofwat's approach of applying asymmetric cost-sharing incentive rates across over-spend and under-spend).

During the CMA references at PR19, in the context of the potential for peaks and troughs arising from the potential for lumpy capital maintenance expenditure, the CMA reported on some relevant comments from Ofwat and expressed a view of its own as follows:<sup>38</sup>

*“Ofwat said that the data used in the econometric model included ‘lumpy’ investment as well as peaks and troughs in capital investment costs. Specifically, it found evidence of peaks and troughs for companies at different percentile levels (for example, upper or lower quartile). However, the econometric model covered eight years which, in Ofwat’s view, ensured that the cost allowance was set in the long-run and thus addressed issues relating to peaks and troughs and ‘lumpy’ investments. Ofwat said that none of the companies that defined the efficiency benchmark were in a trough of capital maintenance..*

*[...]*

*“We recognise that the base cost models may not cover all capital maintenance costs. For example, capital maintenance costs can be ‘lumpy’, and companies could face peaks and troughs, which may not be reflected in the correlation with the cost drivers. However, while some companies may be in peaks and troughs in individual AMPs, there should be no systematic underfunding in the long run.”*

Against this background, the type of adjustment mechanism approach might be seen to mark a change of approach from one where allowances are intended to cover some concept

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<sup>38</sup> CMA(2021) *Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations: final report*, paragraphs 4.261 and 4.282.

of long run costs to one where allowances are intended to match expenditure over a single AMP.

While this might be seen as a significant change of approach, it might instead be treated as an appropriate correction, in light of both a conceptual understanding of what base expenditure represents (see section 2.2) and the types of issues we have discussed in section 3.

The position attributed to Ofwat in the extract above, that allowances set from econometric models of historical expenditure can represent some “long run” level of base expenditure for water companies,<sup>39</sup> seems over-simplified. It might be okay in a hypothetical world where companies are in some steady state with no changes over time in the number of customers, scale of service provision/demand, customer service quality or environmental performance (beyond changes captured in the base-plus models). But it does not seem a reasonable position in practice, even for base expenditure. It overlooks the impacts on base expenditure from the ongoing operating expenditure and capital maintenance associated with historical enhancements and performance improvements. Given the scale of water company enhancements and improvements over time, these are not likely to be small issues.

We do not think that it makes sense, in a context where companies make significant enhancements over time, to think that the allowances set for base expenditure, or the allowance from the base-plus model, can represent a long-term average level of expenditure.

While that is too simplified a view, we recognise that there are specific factors which might lead to under-spends (or out-performance) in one period being offset by over-spends in subsequent periods (and vice versa). If there is a move to the type of approach implied by the adjustment mechanism above, there may be concerns that:

- If, on average across the industry, companies have under-spent allowances in the past (e.g. due to the timing of peaks and troughs in capital maintenance profiles) it might not be fair to customers to introduce an adjustment mechanism that makes customers pay extra for future expenditure increases linked to past under-spends.
- If, on average across the industry, companies have over-spent allowances in the past (e.g. investment in anticipation of future ODI rewards) it might not be fair to companies to introduce an adjustment mechanism that denies companies future out-performance that arises from past over-spend.

If concerns about past under-spend or over-spend were significant there would be ways to tackle them, in what might be seen as transitional measure recognising differences from arrangements that applied historically, especially since PR14. For instance, it might make sense to introduce a mechanism at PR24 in a way that would not make any adjustments in

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<sup>39</sup> Or perhaps a level of expenditure that is stable apart from trends from CPIH inflation, RPEs and industry-wide productivity.



respect of the AMP8 period if the effect of variations between outturn expenditure (adjusted for ODIs) and allowances during AMP8 is to reduce the cumulative scale of such variation since PR14.

The scale of these transition issues is an empirical matter and not something that we have explored in this project. It might be instructive to look more closely at industry-wide expenditure since the start of PR14 and compare allowances against expenditure (adjusted for net performance in relevant ODIs) at the industry-level. Ofwat did some analysis related to this as part of its ex post review of PR14 – albeit looking across a potentially broader scope of expenditure – and found as follows:<sup>40</sup>

*“Our allowances were broadly appropriate and in line with aggregated company business plans. While the sector overspent its wholesale allowances by 1.5%, this was at least partly because of expenditure brought forward in the latter part of the period in preparation for PR19, and will also have been driven in part by companies' investing to earn ODI outperformance payments.*

This type of analysis seems useful in considering how the mechanism should be applied and does not, in our view, weaken the case for the mechanism. A lack of substantial variation between expenditure and allowances over the 2015-2020 period does not mean that there will be no such variation for the 2025-30 period or beyond.

### Emerging views on the approach

This type of industry-wide adjustment mechanism is something that we see considerable value in, given the range of issues faced at PR24.

The design and implementation of the adjustment mechanism would certainly involve a material amount of work, at least if it is to be done well. At the same time, it is far from obvious that this mechanism would increase the overall regulatory burden and complexity. A potentially useful side-effect of the mechanism is that it would take some of the heat out of debates about the appropriate regulatory assumptions on a range of factors relating to the relationship between industry-wide expenditure requirements over the price control period and cost benchmarks derived from econometric models estimated using historical expenditure data. This includes assumptions on real price effects (RPEs), industry-wide productivity growth, setting PCLs; and the overall degree of stretch in regulatory assumptions. These things would still matter to some degree, but they would matter much less as the net effect of all assumptions on industry-wide base costs would be subsequently cancelled out via the uncertainty mechanism. This, in turn, might allow the resources of Ofwat and water companies, to be better prioritised elsewhere.

We recognise that this type of mechanism would reduce the predictability of price control allowances in respect of a given five-year period (though revenue allowances would be just as predictable if reconciliation is done as part of setting the subsequent price control rather than annually). This is something which might be a concern, to some degree, for

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<sup>40</sup> Ofwat (2022) *PR14 Review*, page 49.

companies, including their ability to understand final determination allowances when considering whether to appeal to the CMA. But any drawbacks such as this should be weighed against the benefits it could bring.

In Table 10 we provide a high-level comparison of the industry-wide expenditure adjustment mechanism against some other options that might be used to help tackle concerns about industry-wide funding for the capital maintenance impacts of historical enhancement projects and future performance improvements over time. This comparison is intended to convey some of the key differences between these options and is not a comprehensive assessment. The colours indicate benefits and drawbacks in relative terms across these options only, not in any absolute sense.

It is not the aim of this report to take a definitive position on the case for or against this mechanism, but our view is that it looks highly promising as a potential option that could help substantially addressing several of the problems identified in section 3 of this report.

**Table 10 High-level comparisons of adjustment mechanism and other related options**

	Robustness to uncertainty and complexity in setting totex/PCLs	Reliability of data used to set allowances	Predictability of allowances after final determinations	Implementation effort required
PR19 approach without any further adjustments	Red	Light Green	Light Green	Light Green
Uplift to base-plus allowances for forward-looking costs	Yellow	Yellow	Light Green	Light Green
Use forecast expenditure as input to base-plus models	Yellow	Red	Light Green	Light Green
Adjustment mechanism for industry-wide expenditure	Light Green	Light Green	Yellow	Yellow

## 5.7: Enhancements to the cost adjustment process

We agreed with the client companies that we would not go into much detail on the opportunities to use the cost adjustment process – or the particular types of analysis that might be useful to support claims – within this project. But in this section we make some brief comments on the role that the cost adjustment process could play in helping to tackle some of the concerns identified in section 3 of the report, including on the potential role of targeted deductions from companies’ cost allowances for potential double funding.

## An enhanced cost adjustment claim process

Ofwat's current approach to cost assessment has an established process for companies to make evidence-backed submissions in areas where they feel that allowances derived from base-plus models, or enhancement benchmarking exercises, are not sufficient. This is the process for cost adjustment claims, or the cost adjustment process.

In principle, that process could help with a number of the problems identified in section 3.

It seems particularly relevant for issues where one company considers there to be evidence that features of Ofwat's assessment mean that its allowances are too low while other companies' allowances are too high. These might relate, for instance, to performance differences between companies, for which there are associated cost differences that are not in the allowances for base-plus expenditure or the explicit enhancement allowances. This can give rise to risks of under-funding better-performing companies and of potential for double funding enhancement expenditure, for example for worse-performing companies.

The cost adjustment process could also be relevant to risks of under-funding capital maintenance from past enhancements and concerns about the scale of improvements expected from base-plus allowances. However, to the extent that those issues are industry-wide, rather than a matter of some companies getting too low an expenditure allowance and some companies too much, the option of an adjustment mechanism for industry-wide expenditure could help to avoid the need for these issues to be tackled through the cost adjustment process.

At PR19, Ofwat seemed to apply a high threshold for making adjustments to allowances derived from its benchmarking. It also seemed, in places, to require that companies show their situation to be unique, which does not seem a logical basis on which to judge the case for an adjustment.

We see value in an enhanced cost adjustment process for PR24, which would have the following core features:

- The overall process would be more open to adjustments being made, recognising that there is a solid conceptual case for making adjustments where supported by evidence, and that an approximate adjustment may be better than nothing.
- In addition to reviewing adjustments proposed by companies, Ofwat could be more proactive in considering the case for off-model adjustments itself, on a targeted basis.
- We agree with Ofwat's position on the need for symmetric adjustments as far as possible (unless adjustments are intended to correct for industry-wide issues). There are some practical issues to consider in making symmetric adjustments, not least the need for companies who may face negative adjustments to have reasonable opportunities to respond before these are finalised, but it seems difficult to justify a process that makes significant adjustments to increase allowances and none to reduce them.

On the broader issue of symmetry, we would expect Ofwat to be more open to allowing additional expenditure to some companies via the cost adjustment process if this was

combined with steps to remove revenue from other companies. On this point, the potential for making deductions from enhancement allowances, for companies that may be catching up to levels of performance achieved by other companies for some time, may be relevant. We discuss this in more detail in the next subsection.

### **Technology-neutral deductions for implicit allowances**

As identified in section 3, we see risks that there could be double counting across explicit allowances for enhancements and the allowances from base-plus models.

These risks of particular practical relevance where:

- There is data that allows reasonable comparisons of performance across companies.
- There are substantial differences in performance across companies and these reflect differences in expenditure between companies, rather than simply variations in management quality or good and bad luck.
- Explicit enhancement allowances are to be given, or have been given in the past, to companies whose performance lags other companies and for which the enhancement allowance would allow the company to catch up to levels of performance achieved by other companies.
- The performance achieved historically by better-performing companies either involve a substantial share of operating expenditure or expenditure on assets with relatively short lives, which acts to increase the scale of expenditure associated with that aspect of performance that feeds into the allowances from base-plus models.

Subject to proportionality, we can see a case for Ofwat to consider making targeted deductions to the price control allowances for some companies in these types of circumstances to tackle concerns that the base-plus allowances already fund some degree of performance improvement and that the overall allowance may be excessive when combined with a full allowance for enhancement costs. This would build on aspects of approaches used by Ofwat at PR19 (e.g. adjustments for implicit allowances as part of the cost adjustment claim deep dives).

We have labelled these deductions as “technology-neutral deductions for implicit allowances”. This is intended to convey the idea that deductions should not be determined according to whether a company has chosen an opex-based or capex-based approach for the achievement of enhancement benefits. We do not consider it appropriate for the regulatory framework to apply greater immunity against deductions for double counting or implicit allowances in cases where a company was granted an allowance for capital expenditure in the past (which is then reflected in its RCV) compared to the case where it is being funded for operating expenditure on an ongoing basis.

It may make sense for deductions to be applied against the base-cost allowances, rather than against explicit allowances for enhancement expenditure. This is partly to help with the objective that deductions are technology-neutral and partly because double counting issues may emerge some time after allowances for past (capital) enhancements were set,

depending on how the levels of performance of all companies evolves over time and how models used to produce base-plus allowances are specified, by which point it may be too late to apply deductions against explicit enhancement allowances.

This is not an area that we prioritised for this report and we have not sought to consider in any detail how deductions for implicit allowances might be calculated. The discussion in section 2.4 of this report, relating to what performance levels are funded by base-plus allowances, could be useful as part of such work.

## **5.8: Refinements to regulatory reporting arrangements**

The regulatory reporting arrangements relating to base expenditure and enhancement expenditure, are important to the cost assessment process. These determine, for example, exactly what scope of expenditure is fed into the base-plus models which are a core part of the allowances set by Ofwat.

We agreed with the client companies that we would not venture far into regulatory accounting matters for this project (e.g. detailed definitions and issues around the accuracy and consistency of reporting across companies). Nonetheless, we agreed to make some comments on key issues arising from the project.

We made some specific proposals on regulatory reporting for enhancement operating expenditure in section 5.4 above. In addition to these, we briefly highlight some suggestions below in relation to regulatory reporting which arise primarily from the discussion in section 2.2 of this report and consideration of the problems set out in section 3.

RAG 4.10 does provide definitions of base expenditure and enhancement expenditure, but these definitions are buried away on page 163,<sup>41</sup> and are somewhat loose. It is not clear what bearing these definitions have on the figures that companies report on base expenditure and enhancement expenditure. The main reporting of enhancement expenditure is governed by a series of individual categories of enhancement expenditure which have specific reporting definitions (which are not directly linked to the definition of enhancement expenditure on page 163) with companies also given the opportunity to report expenditure in some freeform additional lines which count towards total enhancement expenditure. There is no direct link between total enhancement expenditure and the definition of enhancement expenditure on page 163.

Given the current reporting arrangements, we see significant risks that some expenditure that is incurred which is conceptually enhancement expenditure is reported as base expenditure (see section 2.2). There may also be risks that some base expenditure is reported as enhancements given the way that individual enhancement categories are defined.

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<sup>41</sup> Ofwat (2022) RAG 4.10 – *Guideline for the table definitions in the annual performance report*, March.

In its PR24 draft methodology, Ofwat said that historical base expenditure also includes “one-off investments to improve service”.<sup>42</sup> This statement seems an admission that the regulatory reporting between base expenditure and enhancements is not working properly. Using Ofwat’s own definitions of enhancement expenditure from RAG 4.10, one-off investments to improve service would naturally be treated as enhancement expenditure, but Ofwat thinks that at least some of this expenditure is instead reported as base expenditure.

It would be considerably better if RAG 4 gave greater prominence to improved definitions of base expenditure and enhancement expenditure towards the start of the document, and these definitions governed expenditure reporting between base and enhancements. The total enhancement expenditure reported by companies would then be explicitly required to align with the conceptual definition of enhancement expenditure provided, and companies would be required to use the freeform enhancement expenditure additional lines to cover any areas of enhancement expenditure incurred that do not fit with any of the specific enhancement categories provided in the data tables. This would help reduce the risk of enhancement expenditure being inadvertently reported as base expenditure and it would shine a light on specific areas of enhancement expenditure that have been feeding into the base-plus models (which is relevant, for example, to issues around what levels of performance are funded by allowances from base-plus models).

Under this approach, some refinement and elaboration of the definitions of enhancement expenditure and base expenditure from page 163 would also be helpful, as these are somewhat brief and loose.<sup>43</sup> The material we provide in section 2.2 of this report could help here, though we have not sought to draft definitions directly suitable for the RAG.

Related to this, RAG 4.10 defines developer services expenditure as separate from enhancement expenditure, rather than part of it (page 163 distinguishes between base expenditure, developer services expenditure and enhancement expenditure). This seems unhelpful. It muddies the conceptual distinction between base expenditure and enhancement expenditure. We suggest that it would be more logical for a high-level distinction to be made between base and enhancements, with developer services expenditure treated as a sub-category within enhancement expenditure.

In addition to these specific issues with the definitions in RAG 4.10, the client companies told us that, in cases where a company has not been given enhancement allowances at the last price review for expenditure within specific enhancement categories, there may be instances where the regulatory reporting arrangements require or permit them not report any enhancement expenditure in that category, with the potential for this to be reported instead as base expenditure. We did not identify direct coverage of this issue in RAG 4.10, but page 163 includes the requirement that “Companies should report expenditure in the year consistently with the final determinations”. This is somewhat cryptic but, given its role within a short section that seeks to distinguish base and enhancement expenditure, it might be

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<sup>42</sup> Ofwat (2022) *Creating tomorrow, together: consulting on our methodology for PR24 Appendix 9: Setting expenditure allowances*, page 77.

<sup>43</sup> Ofwat (2022) *RAG 4.10 – Guideline for the table definitions in the annual performance report*, March.

taken to imply that reporting of enhancement expenditure should be influenced by what allowances Ofwat provided at the price review.

We see no reason why decisions on what expenditure is reported as part of enhancement expenditure should be determined by whether or not allowances were provided for that expenditure. We see value in Ofwat taking steps to consider this issue further and clarify.

Beyond the specific changes above, there may be merit in work to review the individual enhancement expenditure categories (categories “by purpose”) in RAG 4.10 and consider whether their definitions remain fit for purpose (especially in scenarios where companies may move increasingly towards opex-based enhancement initiatives), and whether some further categories could be helpful going forwards.



## 6. Key points for the PR24 review

### Introduction

In this final section we draw together some key points from the project for the PR24 review. It is structured as follows:

- Recap on the concerns at the heart of the project.
- Laying the foundations for a more coherent approach.
- Improved price control arrangements for opex-based enhancement initiatives.
- The potential for an adjustment mechanism for industry-wide expenditure.

The bulk of the work on this project was done before Ofwat published its draft methodology consultation for PR24 and it is not intended to provide any form of review of that methodology or a consultation response. However, we did have opportunity to digest the PR24 draft methodology consultation before finalising the report and were able to refine aspects of it in light of some of the most relevant aspects of the draft methodology.

### Recap on the concerns at the heart of the project

The approach to wholesale cost assessment has evolved in a way that has led to a lack of coherence between aspects of the assessment of base expenditure, the assessment of enhancement expenditure and the approach to performance commitments and outcome delivery incentives. In particular, tensions have arisen as the regulatory framework has gradually come to place greater emphasis on cross-company benchmarking (for expenditure and aspects of performance), while retaining legacy elements of company-specific assessments that developed in a different context.

We identified a series of concerns with the PR19 regulatory approach, which are related to these tensions. We developed and refined our understanding of these concerns in light of the conceptual framework set out in section 2 of this report, discussions with the client companies, a targeted review of relevant regulatory literature, and the simulation modelling analysis described in appendix 1.

We summarise these concerns as follows:

- Risks of an inefficient capex bias for enhancements, arising from less advantageous and more uncertain price control funding arrangements for the remuneration of the ongoing operating expenditure from enhancement initiatives than for upfront capital enhancement expenditure.
- Concerns that, across the industry, the capital maintenance expenditure requirements from past capital enhancements may not be fully remunerated, due to the way that Ofwat's cost assessment process combines allowances for the initial upfront costs of capital enhancements with allowances for the subsequent operating and maintenance costs of these enhancements that are derived from econometric models estimated using historical data.

- What seems to be an unreasonable exclusion of enhancement operating expenditure from the expenditure data feeding into base-plus models, which will tend to under-fund companies for the costs of maintaining existing levels of performance.
- Concerns about the scale of improvements that Ofwat requires companies to achieve via funding from base-plus allowances, which relate in part to the complexities surrounding the question of what levels of performance (or improvements over time) is implicitly funded by allowances derived from base-plus models.
- The potential for double funding enhancement expenditure, to the detriment of customers, across the three main funding channels we identify for enhancement costs: explicit enhancement expenditure allowances; allowances derived from base-plus models; and funding from financial ODIs.
- Risks of under-funding better-performing companies, for instance in cases where such companies are required to maintain (or improve upon) relatively high levels of performance that are not adequately funded by explicit enhancement expenditure allowances, allowances derived from base-plus models or financial ODIs.

These concerns are somewhat interrelated and there may be other ways to organise and present them. In looking for steps to tackle them, we have taken care not to treat each of them in isolation.

In relation to the concerns about under-funding and potential double counting, we recognise that what matters most is whether overall allowances are appropriate, and issues in one area may be offset by issues elsewhere. But we see little reason to be confident that various issues will cancel out going forwards, even if they have done to some degree in the past.

The regulatory framework for water companies cannot be expected to work perfectly. Problems will emerge – or come into sharper focus – as the framework evolves over time. What matters is not so much whether concerns or problems are identified, but whether the opportunities available to understand and tackle them are taken.

It does not seem possible to create a fully coherent regulatory approach across base expenditure allowances and enhancement allowances in the near term. But we see opportunity for substantial improvement at PR24 – and little reason for Ofwat to stick close to the status quo.

### Laying the foundations for a more coherent approach

A number of the measures that we present in section 5 can be understood as groundwork that lays the foundations for a more coherent and better-functioning regulatory approach. We consider that a package of the following seems desirable for PR24:

- **Conceptual framework.** We suggest the exposition and refinement of the conceptual framework relating to base expenditure and enhancement expenditure which we set out in section 2 of this report. This framework has some implications for regulatory reporting and the terminology used for regulatory purposes but does not itself involve any direct changes in the tools and remuneration arrangements used for cost assessment. An

important, but challenging, part of the conceptual framework is the concept of the performance levels funded by base-plus allowances, which sits alongside other elements to contribute to the overall performance funded by a price control determination.

- **Mapping between enhancements and performance/outcomes.** We recommend the mapping exercise described in section 5.5 to map the relationships between (a) various individual enhancement expenditure categories used by Ofwat for cost assessment reporting purposes; (b) the various aspects of water company performance (interpreted broadly) and outcomes that matter to customers and the environment (including both those which are subject to ODIs and consistent regulatory reporting across companies and those which are not); and (c) the three potential sources of enhancement funding (i.e. explicit enhancement allowances, allowances derived from base-plus models, and financial ODIs). Given the degree of complexity surrounding these relationships, and the number of enhancement categories and relevant outcomes or aspects of performance that are relevant to water company activities, it seems almost reckless to carry out price control cost assessment without properly understanding these relationships. Such an understanding and mapping, perhaps in an approximate form, might be implicit in the minds of relevant staff from Ofwat and water companies, but that strikes us as a poor substitute for a properly developed and transparent mapping exercise.
- **Recognising two types of enhancement operation expenditure.** As discussed more fully in section 5.4, and building on the conceptual foundation above, we propose the introduction of a regulatory reporting distinction between two different types of enhancement operating expenditure, with implications for the way that each type is treated as part of the cost assessment process. This involves correcting what seem to be a technical/conceptual error in the deduction of all reported enhancement operating expenditure from expenditure feeding into base cost models – it does not seem right to make deductions for operating expenditure that is essentially the ongoing running costs of historical enhancements. It also involves recognising that some enhancement operating expenditure has features which are very similar to capital enhancement expenditure and can be treated accordingly.
- **Regulatory reporting improvements.** We suggest the changes to regulatory reporting arrangements outlined in section 5.7, which would help to improve the reporting boundaries between base and enhancement expenditure and provide richer information on historical enhancement expenditure to inform future price reviews.

These measures would involve some regulatory resource and time requirement but seem to carry limited downside risk. In the context of the overall scale of effort and resource directed at the price review process, and building on the progress made as part of this project, these might be seen as relatively low-hanging fruit that are available at PR24.

Of these steps, the third and fourth of them, which relate to regulatory reporting and the detailed application of Ofwat's cost assessment techniques, require changes to be led by Ofwat. The conceptual and mapping work under the first and second steps above could be led by water companies, ideally in a way that involves engagement with, and feedback from, Ofwat and water companies with a range of perspectives.

We also identified in section 5 that an enhanced process for cost adjustment claims could make a positive contribution, and we see a case for Ofwat being more open to making adjustment proposed by companies as well as proactively making some adjustments itself. This is an area that we agreed with the client companies to give less attention to during this project, but that does not imply that it is unimportant for PR24.

### **Improved price control arrangements for opex-based enhancement initiatives**

We have given particular attention in this project to the risks of an inefficient bias towards capital expenditure in companies' planning, and subsequent delivery, of enhancement solutions, and to how these risks might be tackled. This concern has been widely recognised by Ofwat and water companies, but it is not straightforward to address.

It is worth recalling that in the run up to the PR14 review, Ofwat placed substantial emphasis on the need to tackle a bias towards capital expenditure, which was acting to the detriment of customers. Ofwat made extensive reforms to its price control framework, with the use of totex concepts and a greater emphasis on outcomes. Taken across PR14 and PR19, these reforms have been more effective in respect of companies' base expenditure than in relation to enhancement expenditure. The approach at PR19 framework has made limited progress in tackling that bias in respect of those categories of enhancement expenditure for which Ofwat's cost assessment process provides explicit enhancement allowances. While these explicit enhancement allowances are presented as totex allowances, they provide greater remuneration for enhancement initiatives that involve a high degree of upfront expenditure relative to ongoing operating expenditure.

This incentive problem acts to reduce the efficiency of enhancement solutions, which may expose customers to unnecessary costs or, given affordability considerations, hold back the pace of improvements to customer service and environmental performance. But it is more than just an incentive problem. Drawing on the perspective that the CMA has applied in past appeals in the energy sector,<sup>44</sup> Ofwat's current approach renders opex-based enhancement initiatives in those categories unfinanceable because there is no established funding channel for the long-term efficient costs of these enhancements.

Our view is that this is a pressing matter for PR24.

As explained at the start of section 4, the risks of an inefficient bias towards capital expenditure in companies' enhancement expenditure arises from a number of different factors, some of which are outside the scope of this project. Nonetheless, we consider that this project can make a valuable contribution to efforts to tackle these risks. Section 4 describes and reviews a range of options to help tackle the capex bias for enhancements.

We consider that the adaptable multi-amp enhancement funding approach described in section 4.4 is a highly promising idea. It seems to provide a reasonable balance between water companies' desire for longer-term funding for opex-based enhancement initiatives

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<sup>44</sup> See for example CMA (2017) *SONI Limited v Northern Ireland Authority for Utility Regulation: Final determination*.

(and the influence this has on decisions between opex-based and capex-based solutions) and the likely regulatory desire to retain a degree of flexibility and adaptability over time in the interests of customers. In that respect, it seems to be a more credible option than the NPV-based approach discussed in section 4.3.

We have set out in some detail how the multi-amp enhancement funding approach might be applied in practice. It might benefit from further refinement in light of feedback from Ofwat and other stakeholders.

We recognise that the multi-amp enhancement funding approach is novel. However, we do not consider that this provides a good reason not to progress with this approach at PR24. We see an important role for Ofwat in experimenting with, and learning from, new regulatory approaches over time. If there are concerns from Ofwat that a full-scale adoption of the multi-amp enhancement funding approach would be impractical, or judged too risky, to apply across the board then a targeted application could make sense for PR24 (e.g. for a subset of enhancement categories). This could pave the way for a fuller adoption at PR29, with the arrangements improved in the light of practical experience.

If so, it would make sense to target the approach to those areas where opex-based solutions offer the most potential but risk being held back by the current regulatory arrangements. These may include areas involving nature-based solutions, but we would expect its relevance and applicability to be wider in scope than this. When Ofwat gave emphasis to the benefits of addressing the capex bias as part of its work for PR14, it was not focusing simply on nature-based solutions.

Looking over a longer timeframe, we see the introduction of the multi-amp funding approach at PR24 as something that could help pave the way for broader regulatory improvements at PR29 and beyond. As evidence on unit costs and company performance levels is built up over time, this may help with effort to tackle some of the concerns about inter-company funding problems discussed in this project (e.g. double counting of allowances for some worse-performing companies or under-remuneration of some better-performing companies). And the application of this approach could support steps towards a more outcomes-focused approach to customer protection and accountability in respect of enhancements at future reviews.

The multi-amp enhancement funding approach is not the only potentially viable approach to help tackle the concerns about capex bias, and it might be applied alongside other tools. The industry-wide adjustment mechanism, discussed further below, could be helpful in some specific circumstances.

In section 4 we also discussed the option of targeted inclusion of enhancements in base-plus models. This shares some similarities to Ofwat's original plans for a totex approach at PR14, but applied on a less ambitious scale. It also has similarities with the approach used for growth at PR19 – and indeed some of our discussion of this option might be relevant to how growth is treated at PR19 although we stress that we have not sought to consider growth-related enhancement expenditure in any detail for this project. Growth aside, our current position is that it is valuable to be aware of this option as a potential way to fund

enhancement expenditure that would be less prone to a capex bias. But its practical relevance for PR24 is something that we leave open at this stage given the somewhat demanding conditions it places on econometric modelling and off-model adjustments for it to work well.

### **The potential for an adjustment mechanism for industry-wide expenditure**

Further to the groundwork above, and the specific measures targeted at the capex bias, the other key policy option discussed in this report is idea of an adjustment mechanism for industry-wide expenditure (section 5.6).

Overall, the adjustment mechanism seems capable of both improving the accuracy of cost assessment and regulatory remuneration, as well as improving incentives in any specific enhancement areas where it can be applied. For instance:

- It could provide a relatively simple funding channel for enhancement requirements that are broadly similar across the industry and not accounted for in the historical expenditure data feeding into base-plus models (or where differences between companies can be managed by financial ODIs on common PCs).
- It could help tackle concerns about the scale of required performance improvements over the forthcoming price control period which Ofwat treats as being funded by base expenditure allowances, for which there is considerable uncertainty and complexity.
- The mechanism could also tackle concerns about industry-wide under-funding of capital maintenance from past enhancements.

The emphasis on adjustments for industry-wide variations in expenditure means that the mechanism is not capable of dealing with inter-company funding problems (e.g. double counting of allowances for worse-performing companies or under-remuneration of some better-performing companies). But this limitation in scope is central to ensuring that the adjustments are made in a way that does not undermine companies' incentives for efficiency over time.

The design and implementation of the adjustment mechanism would certainly involve a material amount of work and complexity. At the same time, it is far from obvious that the introduction of this mechanism would actually increase the overall regulatory burden and overall complexity. There may be significant offsetting benefits as previously contentious areas of the price review determinations (e.g. RPEs, industry-wide productivity or the overall degree of stretch) become less important.

We do not take a definitive position on the case for or against this mechanism, but our view is that this too could be a promising response to several of the problems covered in this report, as well as to other issues which are outside the scope of this report (e.g. relating to capital maintenance more broadly or RPEs and industry-wide productivity).

# Appendix 1: Simulation modelling analysis

## A1.1: Introduction

We have carried out simulation modelling analysis with two main aims in mind. First, by uncovering aspects and crystallizing issues that our qualitative assessment might otherwise miss, it can support the quality of: (a) the conceptual foundation of the report (section 2); (b) our assessment of the problems with the current arrangements (section 3); and (c) the ways in which these might be mitigated (sections 4 and 5). Second, the simulation analysis provides a helpful additional way to communicate ideas, with charts or diagrams derived from the simulation analysis helping to draw out and illustrate key points.

We have structured this appendix as follows:

- Overview of our simulation modelling approach.
- Outputs from the simulation modelling analysis.

The simulation modelling analysis is quite novel, highly simplified, and subject to a range of assumptions. It is not intended to provide self-standing results that can be taken in isolation from the type of qualitative analysis and understanding presented in the main body of the report.

## A1.2: Overview of our simulation modelling approach

For the purpose of our simulation analysis we constructed a hypothetical model of water companies' expenditure over time and of how price control allowances are set by Ofwat. We sought to capture in the model those features that we considered to be particularly important to allow us to explore some of the issues we address in the report, while limiting the degree of complexity so as to keep the analysis manageable and not cloud the results.

The simulation model we use includes three main components:

- The first creates a set of hypothetical companies and determines how their expenditure and performance level evolve over successive price control periods. We use input data relating to enhancement scenarios in each AMP to vary the assumptions on the evolution over time of each company's expenditure and performance.
- The second component of the simulation model determines how price control totex allowances are set. These allowances are the sum of allowances derived from base-plus models applied to historical data observed across companies, and explicit enhancement allowances for anticipated enhancement expenditure over the next price control period.
- The third component calculates the level of performance funded by those allowances, identifying separately the performance funded by base-plus allowances and the



incremental performance funded by enhancement allowances. We leave aside the impacts of financial ODIs from our simulation modelling.

The set-up of the component which specifies companies' expenditure and performance levels is as follows:

- There are 17 companies, who differ in respect of customer numbers, an exogenous environmental factor (or cost driver) and in respect of management quality.
- The simulation traces companies' expenditure, allowances and performance levels over a succession of AMPs.
- The level of performance provided by a company at a given point in time is a function of the stock of "Capability Points" held by the company at that time. Companies add to their stock of Capability Points, and so raise the level of service performance provided, by carrying out enhancements. The number of additional Capability Points that a company must acquire to provide a given incremental level of performance is a function of: (i) that company's number of customers; (ii) a factor related to environment which affects costs and performance, and which varies across companies; and (iii) its management quality. For example, to deliver a given improvement in performance, a company serving a greater number of customers will need to acquire more Capability Points than a smaller company.
- Companies are mapped to an "Enhancement Schedule". The schedule defines, for each company: (i) the increase in performance level that a company aims to deliver in each AMP; and (ii) what is the mix of enhancement initiatives it will adopt to deliver that increased performance. This schedule is an input data item. By varying this in different runs of the simulation, we are able to explore different scenarios (e.g. we can consider a setting where no company aims to improve performance, or we can consider a setting where one or all companies aim to improve performance by a certain level in a given AMP by investing in a capex-based enhancement).
- In our analysis, we have allowed for two main types of enhancement initiative. In broad terms, they differ with respect to whether they are capex-based or opex-based. Each of the enhancement-types is associated with a given schedule of expenditure. The schedule defines the annual cash expenditure over a long-term horizon (we have used 100 years) required to provide one Capability Point, broken down by capital expenditure, operating expenditure and capital maintenance. So that there is no advantage of one enhancement option over the other, we have constructed those schedules such that the annualised cost of each option is the same.
- As starting conditions, we assume that each company is endowed with a stock of Capability Points such that all provide the same level of expected performance in the first AMP. We also assume that companies' expenditure in providing that initial level of service is a function of the number of customers, an environmental factor and management quality.

- For a given set of Enhancement Schedules the above elements will produce, for each company, a dataset reporting (i) annual cash expenditure, over time and broken down by type of expenditure, (ii) the level of performance delivered, and (iii) number of customers and metric on the environmental factor.

With regards to the component that determines price control expenditure (or totex) allowances for each company, the model assumes the following:

- For enhancements, we assume, as a base case, that companies are provided with an allowance in respect of the sum of capital expenditure and operating expenditure incurred during the AMP in which the enhancement is carried out. As a variant, we also explore a setting where enhancement allowances are set so that they cover the capital and operating expenditure incurred over a number of subsequent AMPs; this is intended to reflect the multi-AMP enhancement funding approach outlined in the main body of the report.
- With regards to base-plus service, we assume that companies are set an allowance equal to modelled base-plus costs. In turn, modelled base-plus costs are derived from the values predicted by an econometric model that regresses botex against the number of customers and the environmental metric. As a default, the econometric model draws on the data from the five years in the previous AMP to set allowances for the subsequent AMP. As variants to this, we also explore a setting where the data on base-plus costs used in the modelling cover 10 or 15 years, drawn over the previous two or three AMPs respectively.
- In line with our understanding of Ofwat's intended approach at PR19, all operating expenditure incurred in the previous AMP that is attributable to enhancements made in that period (i.e. reported enhancement operating expenditure in that AMP) is excluded from the expenditure feeding into the base-plus models.

The set-up outlined above allows us to trace over time companies' expenditure (broken down by type), their level of performance, their allowances (identifying separately those related to base-plus allowances and those related to enhancements) and the level of performance that we calculate to be funded by base-plus allowances and by enhancement allowances.

Our explanation of the concept of performance levels funded by base-plus allowances is set out in section 2.4 of this report. We have sought to align our simulation modelling with this concept (indeed, the simulation modelling helped guide the material in section 2.4).

### **A1.3 Outputs from simulation modelling analysis**

The simulation model we constructed is a fertile ground on which to develop analysis to explore a set of themes considered in this report. We constructed that analysis by considering a set of different scenarios and then analysing the outputs produced by the simulation model for each scenario.

## Overview of scenarios for simulation modelling

Each different scenario is defined by reference to the set of assumptions made with regard to, for example, the profile of enhancements carried out or the approach to setting enhancement or base-plus allowances. We have sought to define a set of different scenarios with a view to exploring different aspects of interest. Table 11 outlines the scenarios considered and which we subsequently discuss in this section.

**Table 11** Outline of scenarios presented in appendix 1

Scenario	Brief description
S1	<ul style="list-style-type: none"> <li>In AMP7 all companies do a one-off capex-based enhancement.</li> </ul>
S2	<ul style="list-style-type: none"> <li>In AMP7 all companies do a one-off opex-based enhancement.</li> </ul>
S3	<ul style="list-style-type: none"> <li>In AMP7 all companies do a one-off enhancement with different companies choosing different approaches to doing so.</li> <li>Five of the companies do an opex-based enhancement and the remaining 12 do a capex-based enhancement.</li> </ul>
S4	<ul style="list-style-type: none"> <li>At each AMP from AMP4 onwards, all companies carry out capex-based enhancements.</li> <li>The level of enhancement carried out by a given company in each AMP is targeted at raising its level of service performance by the same percentage compared to the level provided in the previous AMP.</li> </ul>
S5	<ul style="list-style-type: none"> <li>At each AMP from AMP7 onwards, all companies carry out enhancements to improve their level of service performance.</li> <li>Five of the companies carry out their enhancements through an opex-based solution, and the remaining carry out capex-based enhancements.</li> </ul>
S6	<ul style="list-style-type: none"> <li>In AMP7, a subset of the companies carries out a one-off capex-based enhancement. The improvement in service performance targeted by the enhancement is assumed to vary across those companies.</li> <li>The remaining companies do not carry out any enhancement.</li> </ul>
S7	<ul style="list-style-type: none"> <li>At each AMP from AMP4 onwards, all companies carry out capex-based enhancements.</li> <li>The enhancement expenditure is defined to fall within the scope of base-plus expenditure that is taken as input data for the econometric model used to derive base-plus allowances.</li> <li>The level of enhancements in each AMP is targeted at raising the level of service performance by the same amount in absolute terms.</li> </ul>
S8	<ul style="list-style-type: none"> <li>We explore variants with regard to the time window from which data are drawn to estimate the econometric model that sets base-plus allowances. Specifically, we consider using 5-, 10- and 15-year long windows.</li> <li>We consider this in a setting where in AMP7 all companies do a one-off capex-based enhancement.</li> </ul>
S9a and S9b	<ul style="list-style-type: none"> <li>This scenario explores the approach outlined by Ofwat in its PR24 draft methodology consultation with regard to setting allowances for nature-based solutions. The scenario adopts that approach to setting such allowances.</li> <li>We consider two variants. For scenario S9a, we assume that in AMP7 most companies carry out a capex-based enhancement and the remaining carry out an opex-based enhancement. For scenario S9b, we assume that in AMP7 all companies carry out an opex-based enhancement.</li> </ul>

Scenario	Brief description
S10	<ul style="list-style-type: none"> <li>We explore the application of the multi-AMP enhancement funding approach we discuss in section 4.4.</li> <li>In AMP7, a subset of companies carry out an opex-based enhancement and the remaining companies do not carry out any enhancement.</li> </ul>

In interpreting the simulation outputs presented in this appendix, we draw attention to the following points which, unless stated otherwise, are common across scenarios:

- Other than as stated in the text, our scenarios relate to enhancement expenditure that improves an aspect of performance that is not captured through explanatory variables in the econometric models of base-plus expenditure. This is a highly relevant scenario for most aspects of companies' enhancements to improve customer service quality and environmental performance, but does not cover all enhancements (e.g. those relating directly to customer growth).
- The capex-based enhancement solution involves a large capital expenditure in the AMP when the enhancement is made and, after that, a stream of operating expenditure to run the capital asset. The capital asset is assumed to have a 20-year life and capital maintenance (equal to the value of the upfront capital expenditure) is incurred at the end of asset life. Other than as stated in the text, the capex-based enhancement solution is assumed to involve ongoing running costs (operating expenditure) in each year, alongside the initial capital enhancement expenditure and subsequent capital maintenance expenditure.
- The opex-based enhancement solution involves a stream of opex expenditure alone over time, and no capital expenditure. We assume that it is the ongoing running costs of particular capabilities or benefits (what we would define as enhancement-running-cost operating expenditure under the definitions from section 2.2).

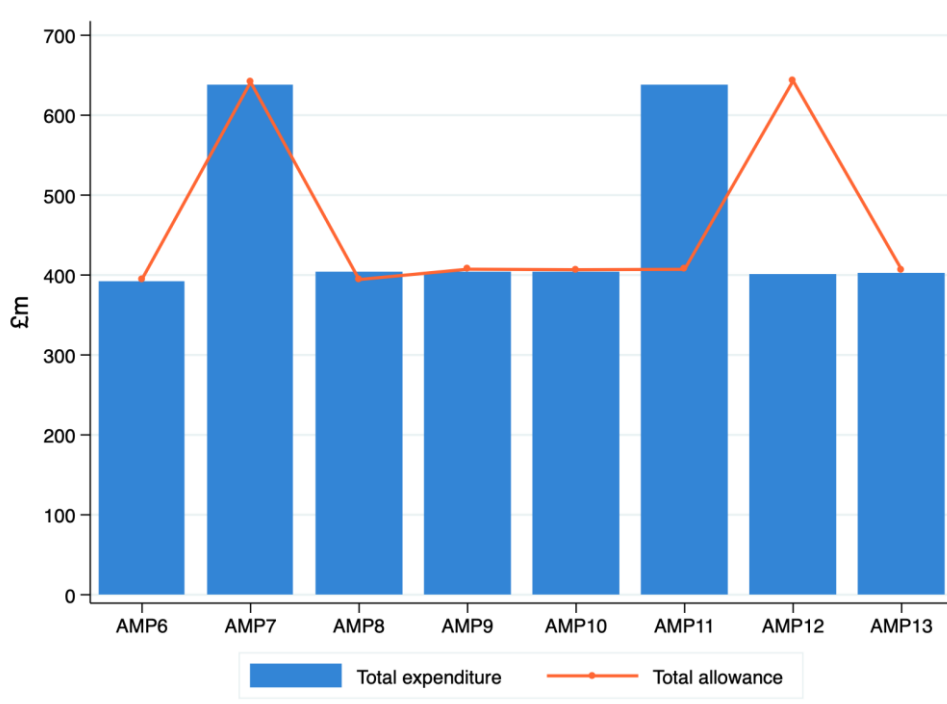
Below, we discuss the outputs from the simulation modelling for each scenario from Table 11.

### Scenario S1: One-off capex-based enhancement in AMP7

Scenario S1 relates to a setting where all companies carry out a capex-based enhancement in AMP7 and no further enhancements after that. Drawing on the output of the simulation for that scenario, we have constructed a time series of companies' total cash expenditure and of their total price control expenditure allowances. That is to say, a time series of their aggregate capital and operating expenditure and of their aggregated base-plus allowance and enhancement allowance.

Figure 14 contrasts the series for a given company. Whilst the levels, in £ terms, are different across companies the profile over time – which is what most interests us here – is representative of that for other companies.

Figure 14 Scenario S1: Total expenditure and allowances



We set out a brief AMP-by-AMP comment on the figure to highlight some of its features:

- Up to and including AMP6, no enhancements have been carried out. Given the assumed little variation between companies in terms of their management quality, and given little noise assumed elsewhere, we find, as shown, in the figure, that the allowance for AMP6, which relates entirely to base-plus allowances given there are no enhancements in the AMP, matches expenditure.
- For AMP7, when, like the rest of the industry, the company is assumed to have carried out enhancements to improve performance, allowances also match expenditure. The allowance relating to base-plus service – which was derived from models based on base-plus expenditure in the preceding AMP – matches base-plus expenditure. And, by assumption, the allowance for the enhancement made in AMP7 matches the expenditure relating to that enhancement and which is incurred in that AMP, i.e. it matches the sum of the capital expenditure and the operating expenditure related to that enhancement and which are incurred within AMP7.
- In AMP8, allowances fall below total expenditure. This reflects the fact that whilst the expenditure in that AMP includes operating expenditure associated with running the enhancement made in AMP7, the allowances for the period were set by an econometric model that drew on data for base-plus expenditure from AMP6, which do not include the operating expenditure of the enhancement. In AMP8, therefore, companies' allowances fall short of their expenditure. This is an illustration of the concern about the unreasonable deduction of enhancement operating expenditure from base-plus modelling, as discussed in section 3.4 of the report.

- In AMP9 and AMP10, the previous wedge between allowances and expenditure does not arise. In those two AMPs, the base-plus allowances are set drawing on the modelling carried out on expenditure data from the preceding two AMPs (AMP8 and AMP9 respectively), which include the operating expenditure on the enhancement done earlier in AMP7 within the measure of base-plus expenditure. The running costs of the AMP7 enhancements is no longer reported as enhancement operating expenditure in AMP8 and AMP9 and so is included within the reported base-plus operating expenditure.
- In AMP11, companies incur capital maintenance expenditure, associated with replacing capital asset purchased in AMP7 at the end of its assumed 20-year asset life. The allowances for that AMP, calculated on the basis of expenditure data from AMP10, do not reflect this additional capital maintenance expenditure.
- The situation is reversed in AMP12. In that AMP, companies' allowances are set by reference to base-plus expenditure data that capture the capital maintenance expenditure of AMP11 whilst their expenditure in the AMP does not encompass any such capital maintenance expenditure.

Further to using the simulation to derive a time series of companies' allowances and expenditure, we have sought to derive time series of companies' performance for some of the scenarios that we explored. Figure 15 presents a chart of that evolution of companies' performance in the context of scenario S1.<sup>45</sup> Specifically, that figure shows the evolution over time of:

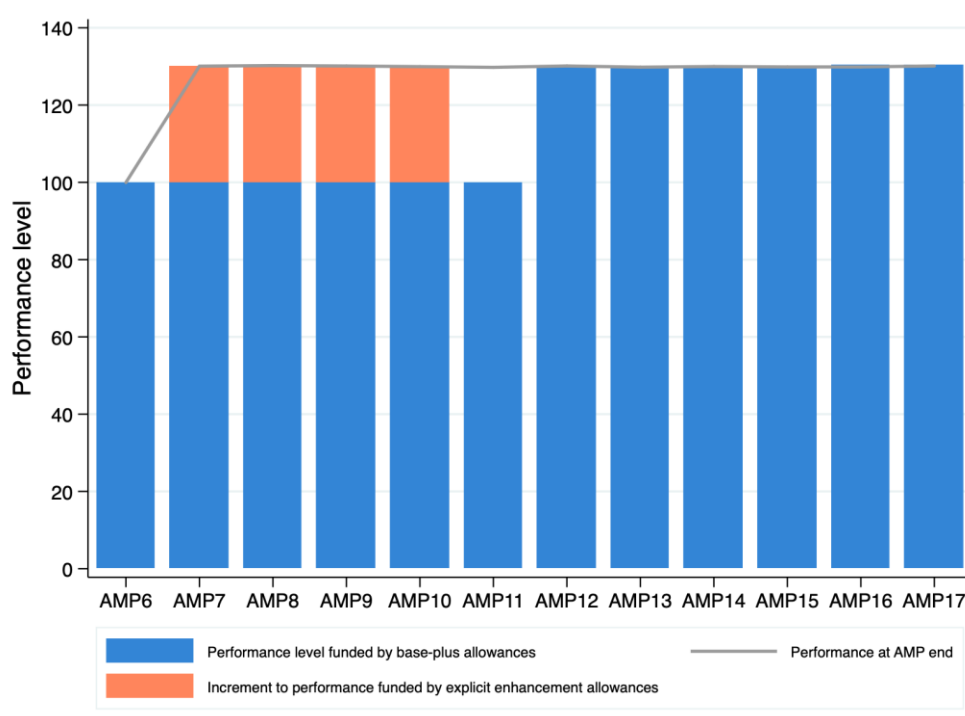
- companies' actual level of performance, as shown by the grey line;
- the performance level that we estimate to be funded by the base-plus allowances, as shown by the blue bar; and
- the incremental performance level funded by the enhancement allowance made for AMP7, shown by the orange bar.

In drawing the chart in Figure 15, we have averaged the relevant performance levels across companies – given in this setting we assume they all target the same level of improvement in performance in AMP7 and all do so by carrying out the same capex-based investment – and across the simulation runs.

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<sup>45</sup> For purpose of producing figure A1.2 we made the simplifying assumption that there is no ongoing operating expenditure associated with the capex-based enhancement carried out in AMP7.

**Figure 15 Scenario S1: Performance funded by allowances**



The figure shows some points of interest:

- The companies are fully funded for performance in AMP7 to AMP10, via a combination of the performance funded by base-plus allowances and the increment to performance from enhancement allowances (specifically the enhancement allowance in AMP7 which provides performance benefits for a period running to the end of AMP10).
- To trace the levels of performance funded by allowances, we made the simplifying assumption that there is no running operating expenditure associated with the capex-based enhancement carried out in AMP7. This was for computational ease and does not affect the general picture set out in Figure 15. But a consequence of that simplifying assumption is that base-plus allowances remain at the same initial level up to AMP12. That, in turn, translates to the performance level funded by base-plus allowances to also remain unchanged up to AMP12, as shown in the figure.
- In AMP11, however, companies will incur capital maintenance expenditure associated with the need to replace the (assumed) 20-year assets that had been invested in AMP7. That gives rise to increased base-plus allowances for AMP12 which, in turn, raises the level of performance funded by base-plus allowances over subsequent AMPs.
- The figure shows that in AMP11 there is a funding gap: the level of performance provided by the companies is above the level that is funded from base-plus allowances. The gap arises from the assumed one-AMP lag between the time when capital maintenance expenditure is incurred and the time in that expenditure feeds through to base-plus allowances.

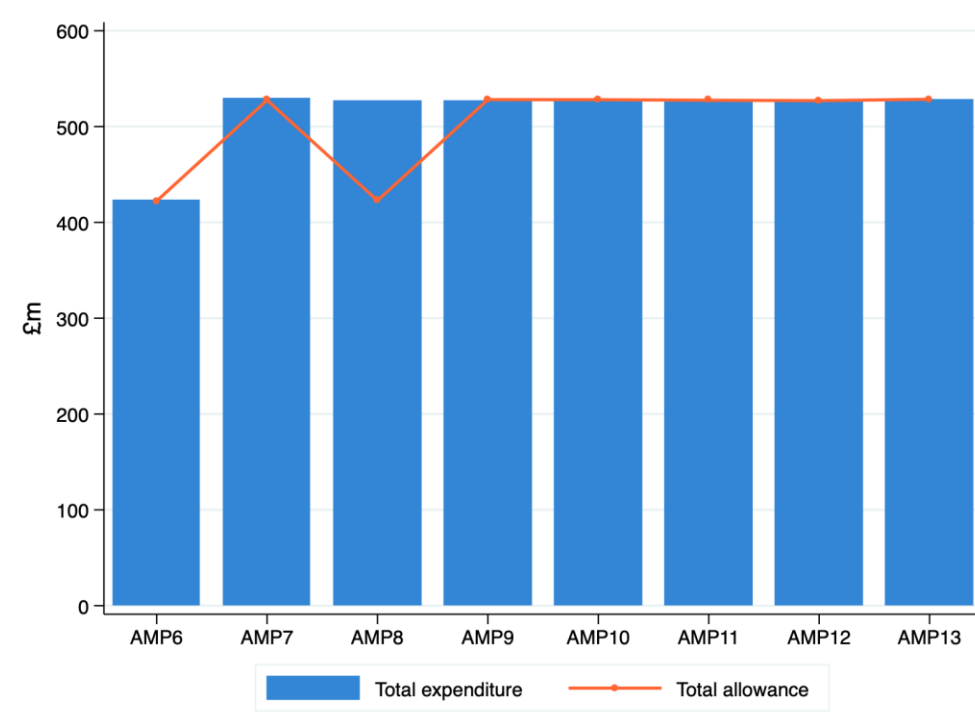


## Scenario S2: One-off opex-based enhancement in AMP7

In scenario S2 we consider the case where all companies carry out an opex-based enhancement in AMP7. This involves incurring additional operating expenditure in AMP7, and to sustain the incremental level of performance, in each subsequent AMP.

Figure 16 shows the profile of a company's allowances and expenditure over time under that scenario.

**Figure 16 Scenario S2: Total expenditure and allowances**



The profile of allowances relative to that of expenditure shown is summarised as follows:

- In AMP7, the AMP in which the opex-based enhancement is carried out, a company's total allowance – which reflects the sum of the base-plus allowance and the enhancement allowance for the AMP – matches the company's actual expenditure.
- In the subsequent AMP, AMP8, allowances fall below expenditure. This reflects the fact the econometric model setting the base-plus allowances for AMP8 draws on base-plus cost data from AMP7 and that data excludes the operating expenditure associated with the enhancement carried out in AMP7 (as for Ofwat's approach at PR19 and its proposed approach for PR24).
- From AMP8 onwards, however, the operating expenditure associated with the enhancement initiated in AMP7 is included within the scope of the econometric model used to base-plus allowances for the relevant subsequent AMP. As such, from AMP9 onwards, base-plus allowances will match the company's expected expenditure.

As for scenario S1, this scenario assumes that all companies have the same scale of enhancement expenditure (in relative terms) and target the same levels of performance.

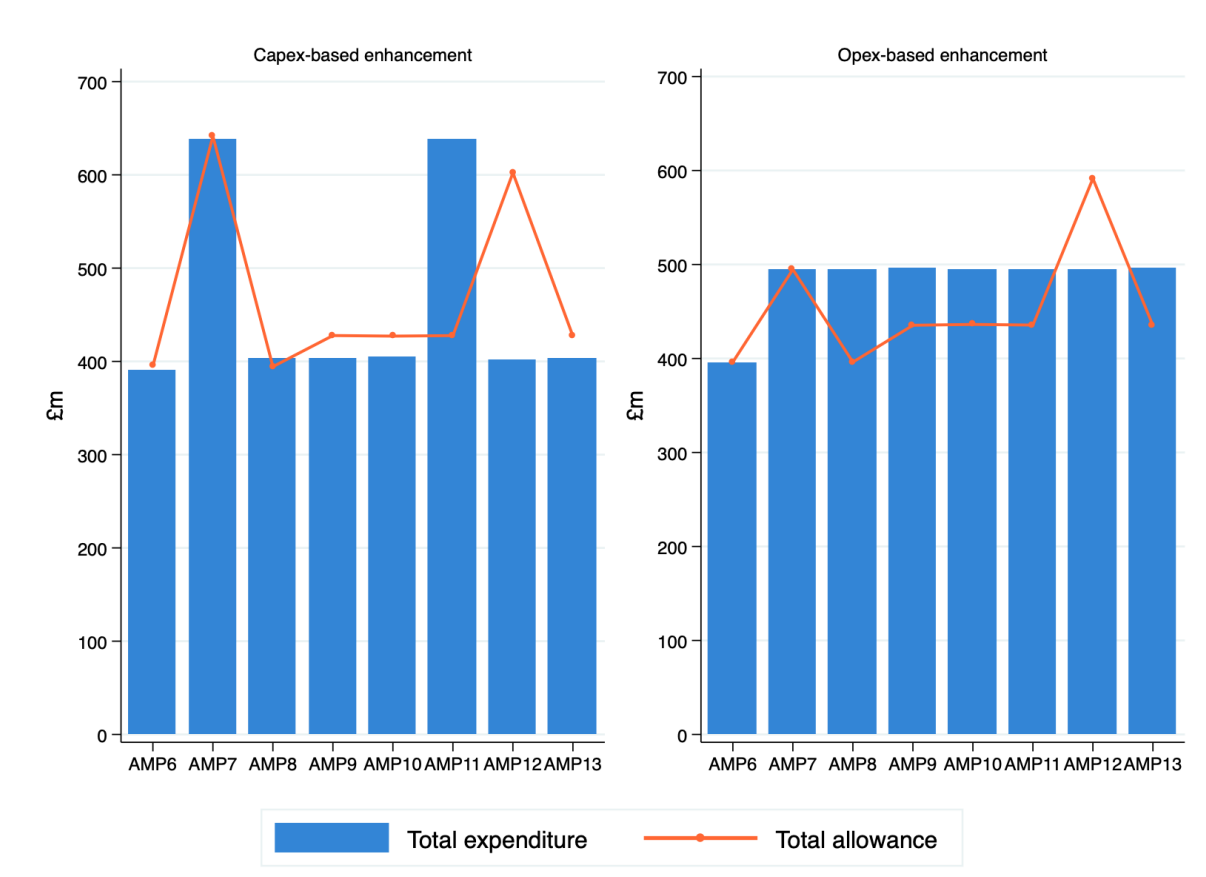
The alignment between allowances and expenditure in the chart above reflects this lack of differences between companies.

### Scenario S3: One-off enhancements in AMP7 with mix of approaches

Scenario S3 is a variant of the scenarios discussed above. Specifically, whereas in scenario S1 we assumed all companies carried out their enhancement in AMP7 through a capex-based solution and in scenario S2 we assumed all carried out an opex-based enhancement in that AMP, here we assume there is a mix of approaches taken across the industry. Specifically, we assume that five of the companies adopt an opex-based approach to the enhancement carried out in AMP7 and the remaining adopt a capex-based solution.

The charts in below reproduce, for this setting and for each of the types of companies, a figure of the change over time in expenditure and total allowances.

Figure 17 Scenario S3: Total expenditure and allowances



In relation to this pair of figures we highlight the following:

- In relation to those companies that delivered their enhancement in AMP7 through a capex-based solution, the profile of expenditure over time, as shown in the chart on the left-hand-side of Figure 17, is the same as that which was shown earlier in relation to scenario S1; this is as expected given in both scenarios those companies are delivering the enhancement through the same capex-based solution.

- With regards to the allowances for those capex-based companies, the profile is also similar to that in the previous scenario, though there are interesting differences in relation to the level of those allowances relative to expenditure compared to those in scenario S1. In particular, their allowances in AMP9 and AMP10 (and later on in AMP13 too) are greater than their expenditure. This comes about because the allowances for those capex-based companies in those two AMPs are based on modelling outputs that draw on industry-wide data on base-plus expenditure in the preceding AMP, AMP7 and AMP8 respectively. In those expenditure datasets, the data for those companies that had opted for the opex-based enhancement will reflect the higher running operating expenditure associated with the enhancement. This pushes up the level of modelled base-plus expenditure for all companies, including for those companies that had opted for a capex-based approach for enhancement and so do not incur as high operating expenditure as others. In those AMPs those companies that took a capex-based approach to their enhancement are set allowances above their expenditure levels.
- The profile of allowances relative to expenditure for those companies that took an opex-based approach to their enhancement in AMP7 is markedly different, as shown in the chart on the right-hand-side of Figure 17. The allowance for AMP7, when the enhancement is carried out, matches the companies' expenditure in the AMP, reflecting our assumption that enhancement allowances are set as the sum of capital expenditure and operating expenditure associated with the enhancement which is incurred within the AMP itself. In AMP8, allowances fall. This is driven by fact that in AMP8 the company is receiving an allowance only in respect of base-plus service and that allowance is set on basis of modelled base-plus expenditure that is calculated from the econometric model drawing on base-plus expenditure in AMP7, which, by definition, does not encompass the operating expenditure associated with the enhancement.
- From AMP8 to AMP9, the allowance for the opex-based companies increases. This reflects the fact that the base-plus expenditure data in AMP8, used to set base-plus allowances for AMP9, do incorporate the operating expenditure related to running the opex-based enhancement, which was not the case in the previous AMP.
- A final point to make regarding the opex-based companies is to note that their allowances raise in AMP12 and then fall back down again. This reflects the fact that the base-plus allowances in that AMP are set with reference to the modelling of the expenditure data in AMP11 and, in this AMP, the base-plus expenditure will reflect the capital maintenance expenditure carried out by those companies that had taken a capex-based approach to their enhancement.

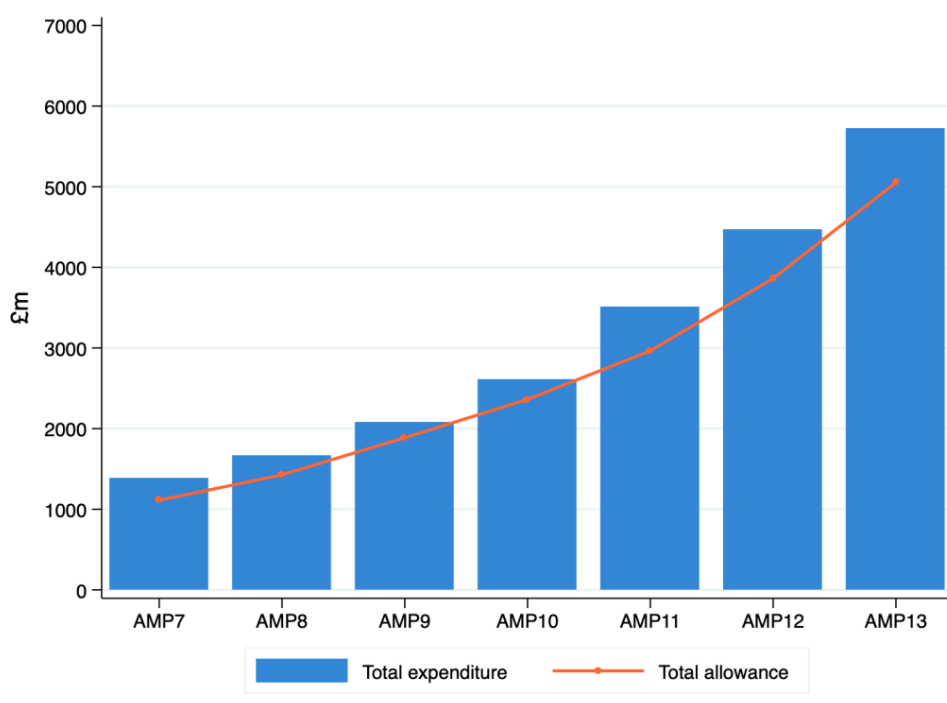
The comparisons of the profiles for the companies with capex-based enhancements against those with opex-based enhancements helps to illustrate the rationale for identifying risks of a capex bias for enhancements funded through explicit enhancement allowances (see section 3.2).

#### **Scenario S4: Continuous capex-based enhancements from AMP4**

In scenario S4 we explore a setting where companies carry out successive enhancements from AMP4 onwards and adopt a capex-based solution for doing so. We have assumed

that, at each AMP, the level of enhancement is such as to increase the level of performance by the same proportion each time. Figure 18 traces the profile of expenditure and allowances for a company in such a setting.

**Figure 18 Scenario S4: Total expenditure and allowances**



We set out below some comments on the chart above.

- Throughout the period shown in the figure, the level of allowances fall behind expenditure and the wedge grows over that period. There are a couple of factors driving this.
- First, as set out in our discussion of scenario S1, the base-plus allowances for a given AMP are set by reference to modelled expenditure that draw on expenditure data that do not include the operating expenditure of enhancements of the previous AMP. Across the AMPs, that wedge grows as, in this scenario, we have assumed that over AMP4 to AMP13, companies at each AMP increase their performance by the same proportion which means that, in absolute terms, the volume of the enhancement required grows over those successive AMPs.
- Second, there is an effect that is channelled through the capital maintenance, the allowances for which are always lagging behind expenditure. For example, in AMP11 the companies will incur capital maintenance expenditure to replace the 20-year asset that had been purchased as part of the enhancement carried out in AMP7. That capital maintenance expenditure will contribute to the expenditure data used to set allowances for AMP12. However, in AMP12, the company will face the capital maintenance expenditure required to replace the assets that it purchased in AMP8. In turn, and because we have assumed continuous improvement in performance in relative terms,

that capital maintenance expenditure in AMP12 is greater than the contribution to allowances from the capital maintenance expenditure incurred in AMP11.

- In this scenario, there will remain therefore a degree of underfunding associated with allowance not funding capital maintenance expenditure, which grows over time due to the assumption for this scenario that, companies carry out enhancements to attain the same growth rate in performance levels at each AMP.

This analysis helps to illustrate the concerns about under-funding capital maintenance requirements that arise from past enhancements (see section 3.3).

### **Scenario S5: Continuous enhancements from AMP7 with mix of approaches**

In scenario S5 we consider a setting where companies carry out continuous enhancements from AMP7 onwards. Here, we consider that different companies adopt different approaches to enhancement, namely that most companies do so by following capex-based enhancements and a smaller number do so through opex-based enhancements.

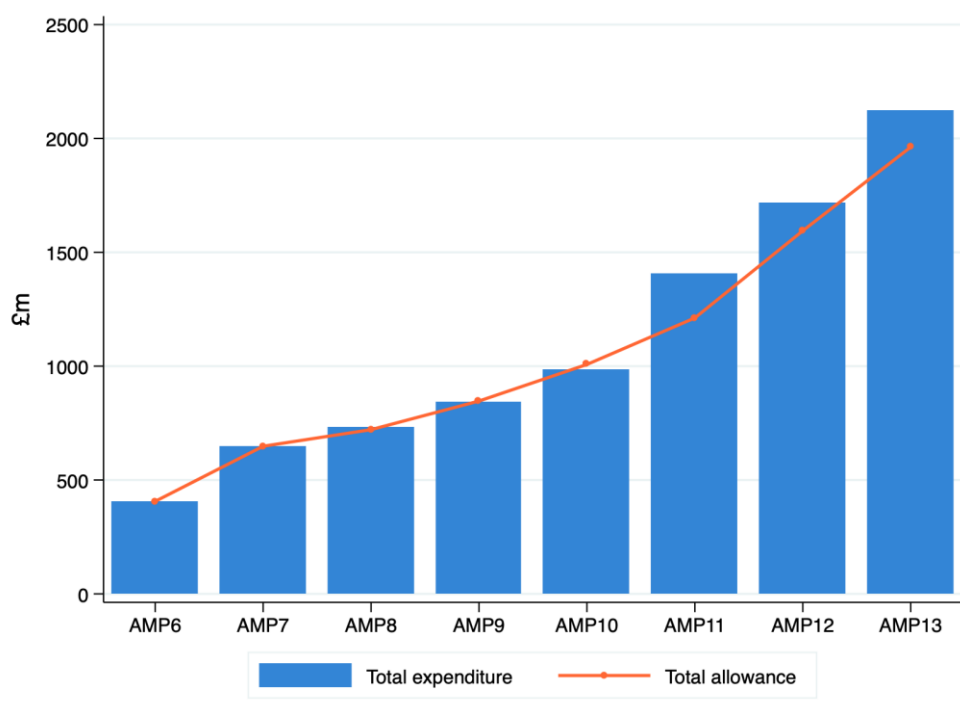
Figure 19 and Figure 20 illustrate the time-series of allowances and expenditure for each of these types of companies in this scenario.

For each of the two types of companies, the two figures reflect the net effect of features which highlighted in the discussion of earlier scenarios.

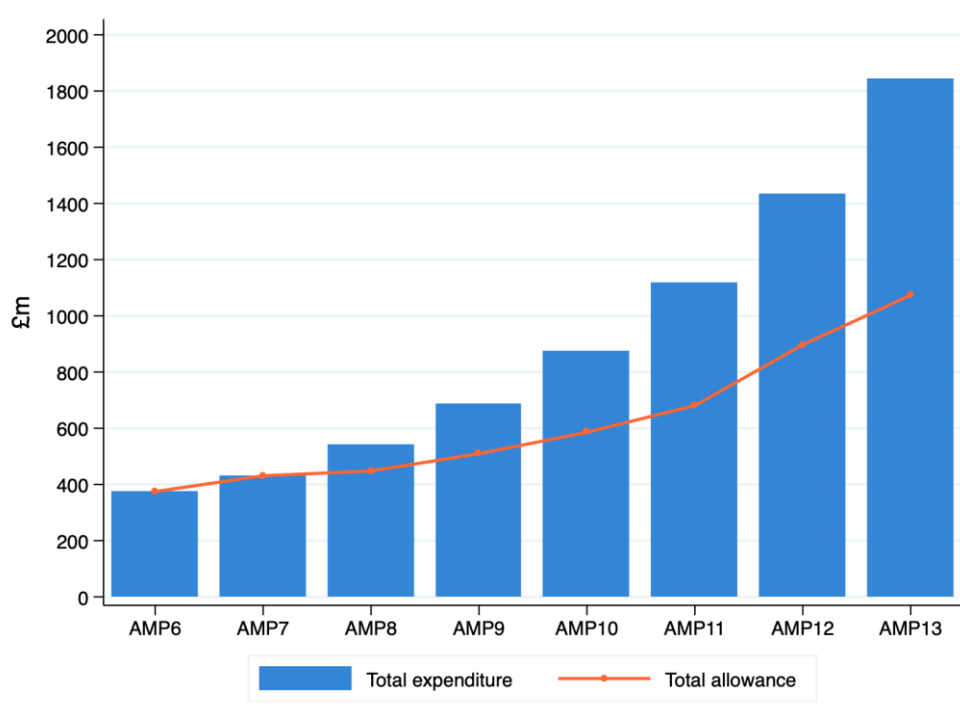
- In relation to those companies that carry out capex-based enhancements, Figure 19 shows that up to AMP10 allowances slightly exceed expenditure. In each of those AMPs, those companies' enhancement allowances match its enhancement expenditure. In addition, those companies' base-plus allowances are pushed up by the higher operating expenditure of those other companies that adopted an opex-based approach to enhancements. In AMP11, this surplus of allowances over expenditure is reversed, due to the impact of the capital maintenance expenditure incurred in that period, as discussed above for previous scenarios.
- In relation to those companies that carry out opex-based enhancements, illustrated in Figure 20, we find that from AMP8 to AMP11 their level of expenditure outstrips allowances as their base-costs are consistently greater than those of companies that adopted capex-based enhancements. As shown in that figure, there is a kink at AMP11 in the profile of the allowances made, reflecting the contribution of the capital maintenance expenditure incurred at AMP11 by those companies that adopted capex-based enhancements.

This example is a further illustration of the concerns around a capex bias, given the far greater funding shortfall, over time, for an opex-based enhancement strategy compared to a capex-based strategy.

**Figure 19 Scenario S5: Total expenditure and allowances for capex-based enhancement**



**Figure 20 Scenario S5: Total expenditure and allowances for opex-based enhancement**



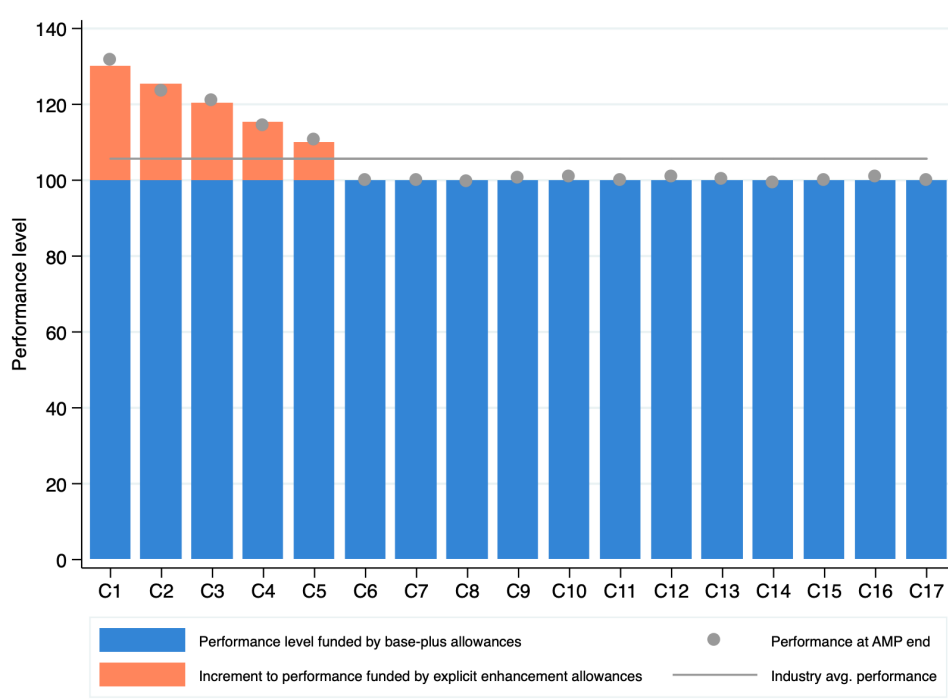
**Scenario S6: In AMP7 a subset of companies carry out capex-based enhancements**

We considered a setting where a subset of the companies carry out capex-based enhancements in AMP7 and where the extent of the performance improvement by those companies varies. Specifically, in this setting we assumed that five of the 17 companies

carried out an enhancement in AMP7 with a view to improving their performance, and that the extent to which these sought to improve performance varied.

We have drawn on this scenario to examine the influence of historical enhancements on companies' performance and on the performance funded by base-plus allowances. In this light, we set out in Figure 21 a chart showing for each of the 17 companies in our simulation model, the level of actual performance, the level of performance funded by base-plus allowance, the incremental performance funded by enhancement allowances and the average level of performance across companies. The chart is a snapshot taken at AMP8, the AMP following that in which the capex-based enhancement was carried out by a subset of the companies. As is reflected in the chart, it is the companies labelled C1 through to C5 which carried out enhancements in AMP7 – to different degrees, as mentioned above – whilst companies C6 through to C17 are assumed to not have done any such enhancement.

**Figure 21 Scenario S6: Performance funded by allowances at AMP8**



As shown in the figure, the level of performance funded by base-plus allowances is the same across companies in this scenario. That level is below the average performance level observed across the industry as the latter reflects the incremental performance associated with the enhancements carried out in AMP7 by a subset of the companies. The chart also shows that, in AMP8, those companies who had carried out enhancement in AMP7, companies C1 through to C5, are fully funded for performance, via a combination of base-plus allowances and the explicit enhancement allowances.

### Scenario S7: Continuous improvement in performance and inclusion of enhancements in base-plus models

Scenario S7 considers a setting where the enhancement expenditure incurred by companies in a given AMP falls within the scope of expenditure feeding into the econometric model

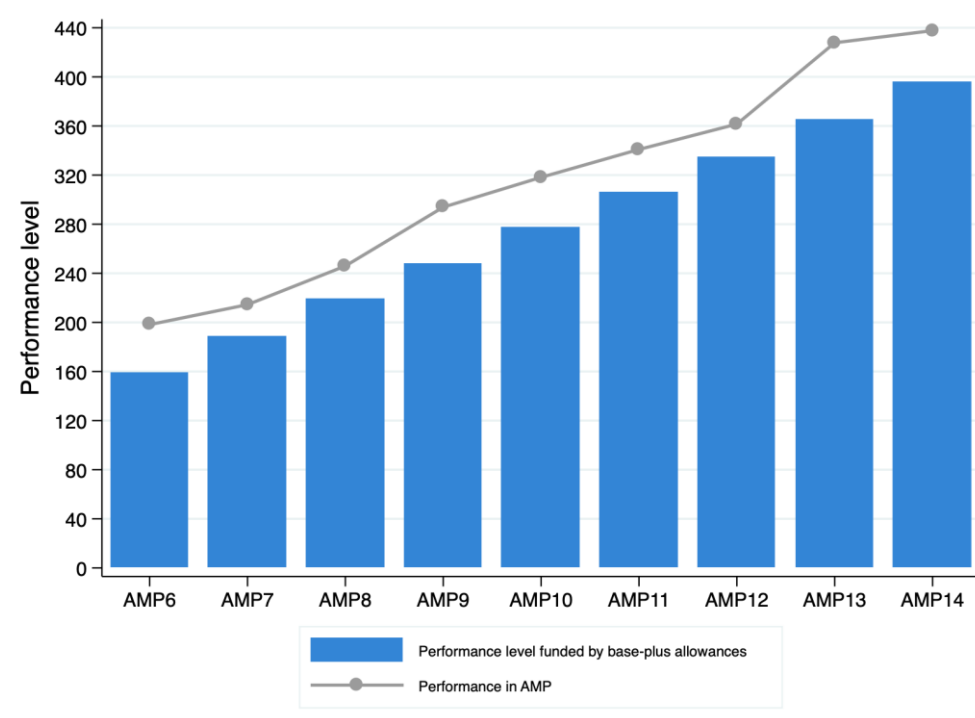


used to set base-plus allowances for the subsequent AMP. This is scenario is an exception to the general case under Ofwat’s cost assessment approach, which typically involves the exclusion of enhancement expenditure from the costs feeding into the base-plus models.

We have explored this in a setting where companies carry out successive enhancements in each AMP, starting from AMP4 and do so through capex-based enhancements, so that performance is on a continuing upward trajectory.

We think it is particularly interesting to examine in this setting the profile of companies’ actual performance compared to that of performance funded by the base-plus allowance. Figure 22 charts this for a given company in our simulation (the profile reflects an element of noise, but all companies show an upward trend in performance and performance funded by base-plus allowances).

**Figure 22 Scenario S7: Performance funded by allowances**

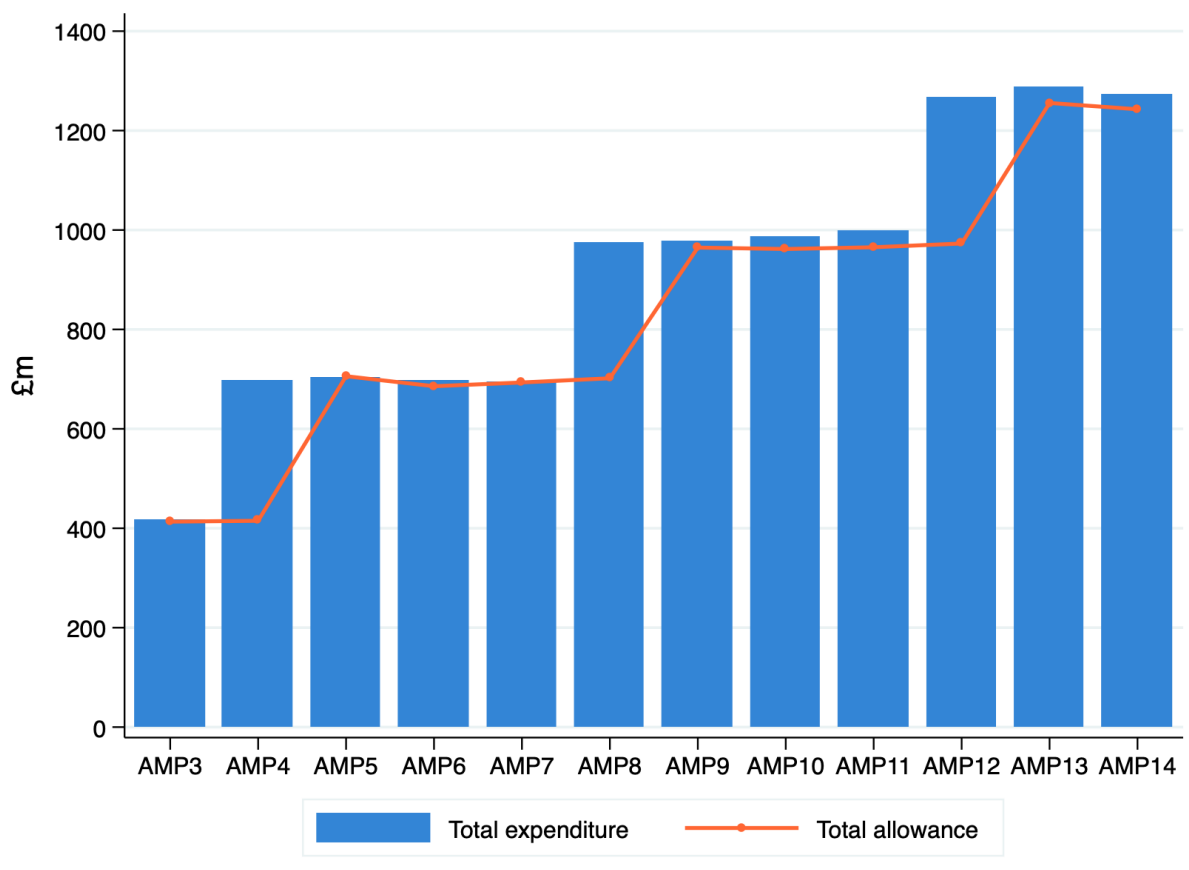


The figure shows the growing level of the company’s actual performance over time, reflecting the successive enhancements carried out at each AMP. The level of performance funded by the base-plus allowance also grows over time, mirroring the trend in observed performance across companies.

However, the level of performance funded by base-plus allowances is consistently below that of the actual performance observed and does not track it perfectly. This is because of the effects of some periods in which allowances from the base-plus models are significantly below companies’ actual expenditure levels (e.g. when the companies first start doing enhancement expenditure or when they incur capital maintenance expenditure to replace assets from past enhancements). This, in turn, reflects the time lag between an increase in expenditure being incurred and it feeding through to allowances via the econometric models

of base-plus expenditure. This is illustrated for a specific company from this scenario: see AMPs 4, 8 and 12 (there is some noise in the data for each company which explains why allowances and expenditure do not fully match in periods such as AMP9 to AMP11).

**Figure 23 Scenario S7: expenditure allowances versus actual expenditure for a single company**

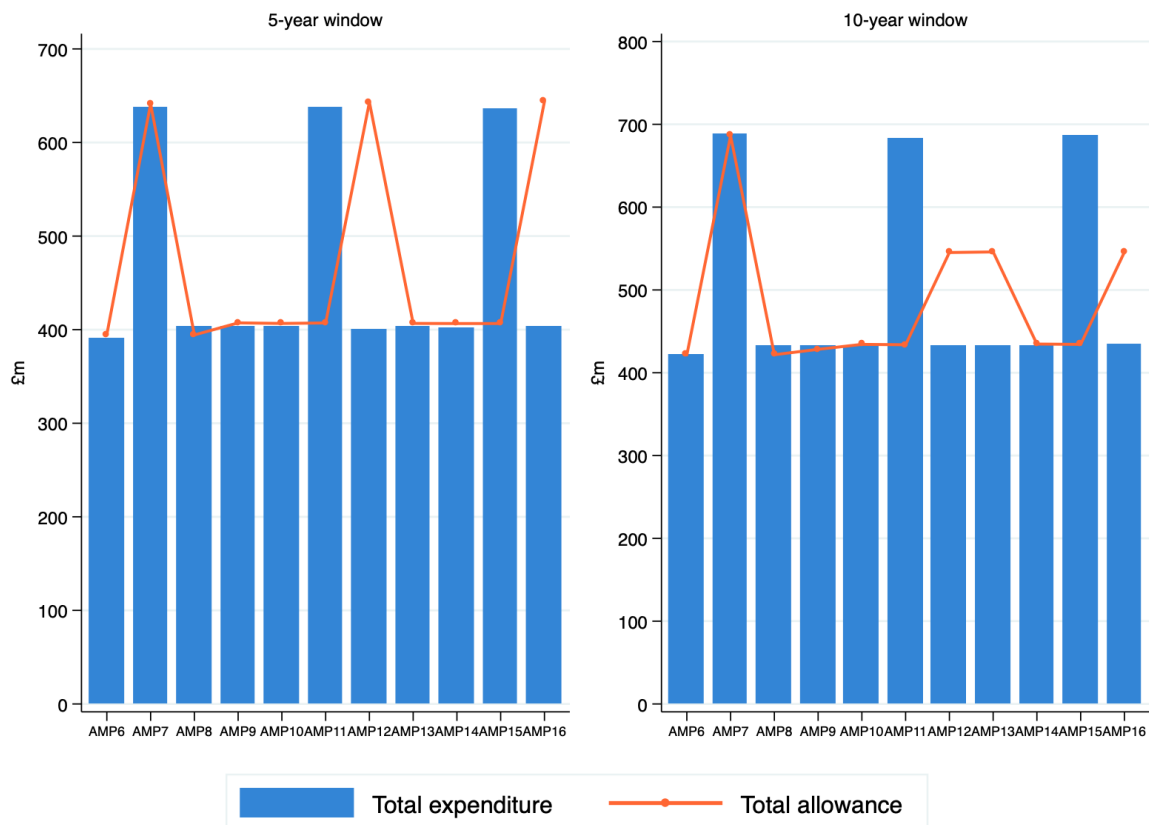


**Scenario S8: Varying window over which data are used to set base-plus allowances**

We explored the effect of varying the time window over which historical data are used for the purpose of estimating the econometric models used to set base-plus allowances.

Figure 24 illustrates an output from that analysis. The figure relates to a setting where all companies are assumed to carry out a one-off capex-based enhancement in AMP7. The figure on the left-hand side shows the expenditure and allowance set for the average company in a scenario where the base-plus allowances for a given AMP are set by reference to an econometric model that draws on data from the previous five years. The figure on the right-hand side shows the same set of measures in a scenario where the models setting base-plus allowances draw on data from the previous 10 years.

**Figure 24 Scenario S8: Allowances and expenditure**



The two charts shown in the figure were produced from different sets of runs of the simulation, which is why the absolute level of the allowances and of expenditure is different between the two. That is independent of the choice of whether the setting depicted is one where five or ten-years of past data are used to estimate the econometric model.

The choice of five or 10 years does have an impact on the relative profile of the allowances compared to the level of expenditure. As shown in the figure, moving from a 5 to a 10-year window elongates the peaky profile of allowances in the period following AMP11 and AMP15, the two AMPs in which the companies are incurring capital maintenance expenditure associated with the capex-based enhancement initially carried out in AMP7 (as elsewhere, we have assumed a 20-year asset life). This effect follows from the fact that where a 10-year rather than a 5-year data window is used: (i) the capital maintenance expenditure incurred in, say, AMP11 contributes to the modelling that sets allowances for two AMPs, namely AMP12 and AMP13, and (ii) the relative impact of that capital maintenance expenditure is diluted by other years falling within the data window during which no capital maintenance is incurred. A chart of a further scenario where the econometric data window was extended to 15 years of past data would show a further dilution and elongation of the profile of allowances.

## Scenario S9: Ofwat’s proposed 10-year approach to funding nature-based enhancements

In its consultation on the draft methodology for PR24, Ofwat put forward an option for funding nature-based enhancements that are wholly or primarily opex-based whereby an allowance was set for the efficient operating expenditure expected to be incurred over the successive two AMPs.<sup>46</sup> This option is discussed in section 4.6 of this report.

We have examined within our simulation analysis how Ofwat’s proposals might play out, contrasting companies’ expenditure and allowances. We present below two charts relating to this, each depicting a different simplified scenario:

- Scenario S9a: A scenario where all companies carry out a one-off enhancement in AMP7 and there is a mix across companies in the approach taken to carry that out. Specifically, 75% of companies are assumed to use a capex-based solution and 25% an opex-focused solution which is nature-based and qualifies for the 10-year funding approach being considered by Ofwat in its consultation.
- Scenario S9b: a scenario where all companies carry out a one-off enhancement in AMP7 and all companies do so using an opex-focused solution, which is nature based and qualifies for the 10-year funding approach being considered by Ofwat in its consultation.

The charts in Figure 25 trace the allowances and expenditure of a company that carries out opex-focused solutions in AMP7 in each of the above settings.

As shown in the figure, from AMP8 onwards, once the opex-based enhancement beds in and attracts five-years’ worth of operating expenditure within each AMP, the company’s total expenditure remains at a constant level. That is the pattern across either scenario. With regard to the level of allowances set, however, there are interesting differences between the two scenarios shown:

- In the figure on the left-hand-side, corresponding to a scenario where there is a mix in the approach taken to carry out the enhancement, the level of allowances set for the company that opted for the nature based solution to the enhancement is generally below the company’s expenditure. In particular, after AMP7, when the initial 10-year’s worth of allowance is made – and so exceeds the level of expenditure incurred in that AMP – the company’s allowance falls below actual expenditure. This reflects the fact that over those AMPs, those companies that had adopted a capex-based approach to their enhancement – which we assume in the scenario to be the majority in the industry – do not contribute much to the expenditure data on which the econometric model determining the base-plus allowances is estimated. An exception is in AMP12, reflecting the impact of the capital maintenance expenditure incurred in AMP11 by those companies that had adopted capex-based solutions and which feeds through to the allowances determined for AMP12.

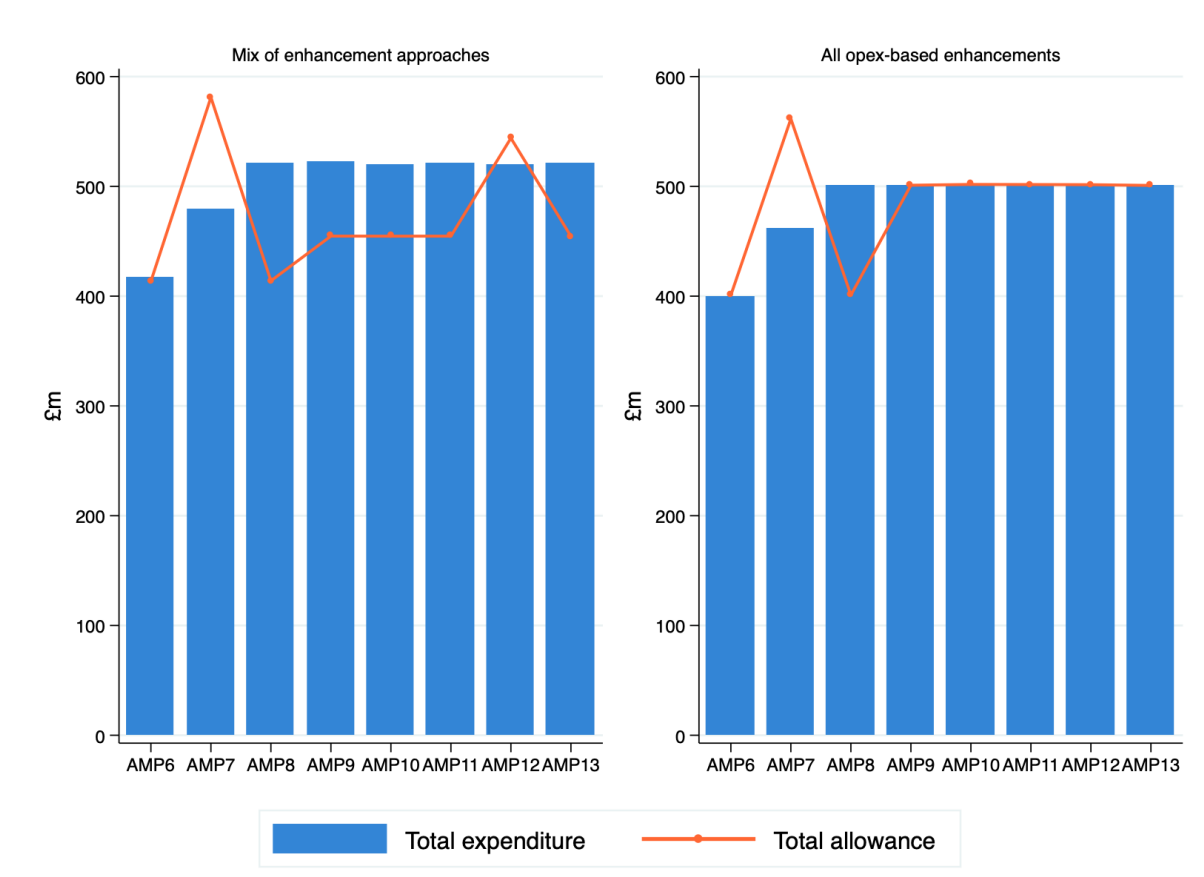
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<sup>46</sup> Ofwat (2022) “Creating tomorrow together: consulting on our methodology for PR24 – Appendix 9: Setting expenditure allowances”, page 139.

- In the scenario depicted on the right-hand-side where all companies carry out nature-based solutions to deliver the improved service, and looking beyond the timing issues arising in AMP7 and AMP8, the AMPs in respect of which the enhancement allowance is made, the allowances determined through Ofwat’s proposed approach do trace companies’ expenditure.

The second of these scenarios – one where it is assumed all companies do opex-based solutions and operate at exactly the same levels of performance – is an extreme case and, arguably, unlikely to be a realistic description of what might be observed at PR24. We would expect to observe a mix of approaches to enhancements across companies. In that light, the situation shown in the figure on the left is a more likely and relevant representation of how Ofwat’s proposed approach to funding nature-based allowances might play out and that, as outlined above, leaves unaddressed concerns about the sustained funding of nature-based enhancements.

**Figure 25 Scenario S9a and S9b: Allowances and expenditure under Ofwat’s proposed approach to nature-base solutions**



**Scenario S10: Multi-AMP approach to funding nature-based enhancements**

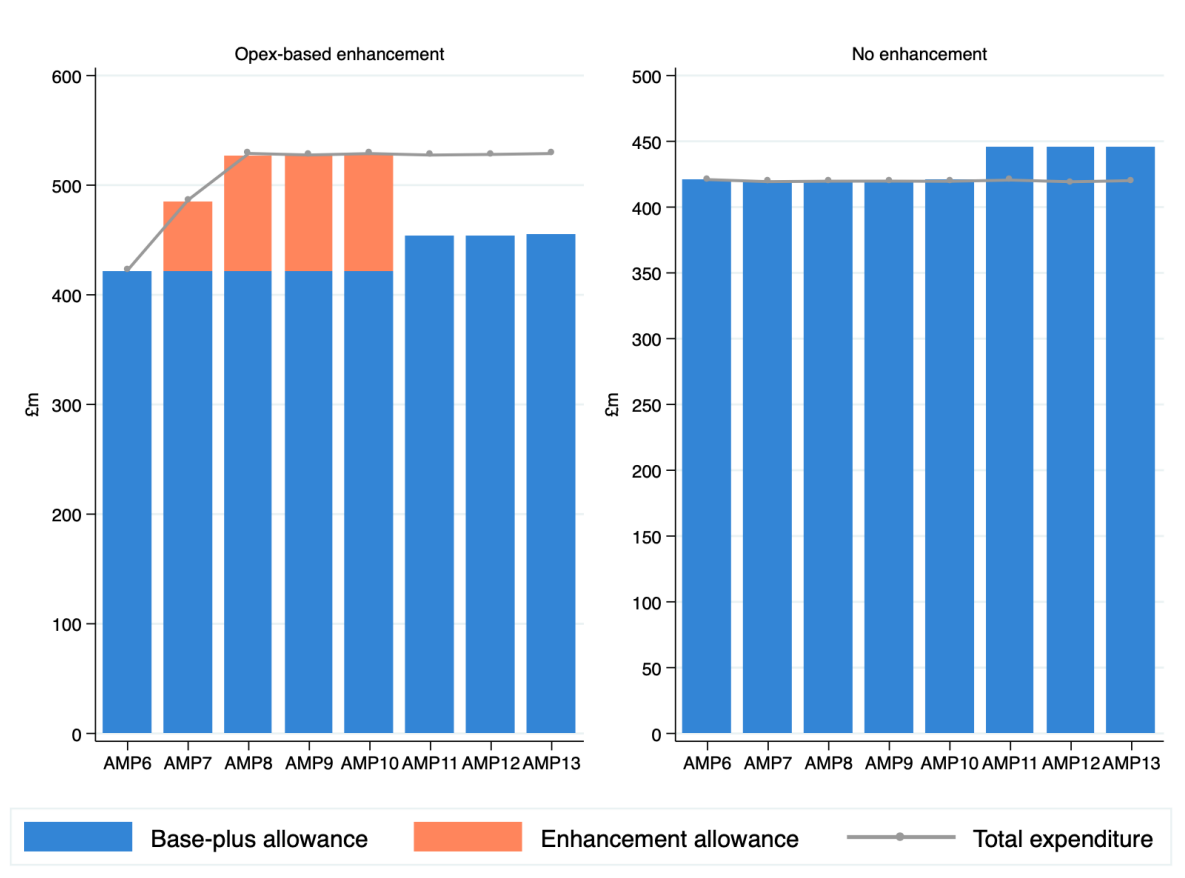
We explored within our simulation analysis the application of the multi-amp enhancement funding approach outlined in Section 4.4.

For the purpose of our modelling, we assumed that, under the multi-AMP enhancement funding approach, the enhancement allowances would be set to provide funding for the

proposed enhancement over a four-AMP period, which reflects our assumption on the length of the asset life associated with the capex-based enhancement solution we have defined in our modelling.

Figure 26 shows the allowances and expenditure under such a multi-AMP approach for a setting where a subset of the companies adopt an opex-based enhancement in AMP7 but the majority of companies do not carry out such an enhancement then (or at a later stage). The chart on the left-hand-side of the figure relates to one of the companies that did carry out such enhancement in AMP7 and that on the right-hand-side relates to a company that did not.

**Figure 26 Scenario S10: Allowances and expenditure under the multi-AMP approach**



The differences in the range of values on the vertical axis between the charts reflect differences in the assumed size (and other cost drivers) of the two companies to which the charts relate. They do not affect the comments on the comparison of allowances relative to expenditure. We highlight the following:

- As shown in the figure on the left, relating to a company that did carry out an opex-based enhancement in AMP7, the allowances set in respect of the four AMPs from AMP7 through to AMP10 (inclusive) are such as to fully fund the company's expenditure. The company's aggregate allowance in AMP7 to AMP10 comprises the sum of a base-plus allowance and a dedicated allowance in respect of the ongoing operating expenditure arising from the enhancement introduced in AMP7.

- Beyond AMP10 i.e. beyond the four-AMP period we have assumed for the multi-AMP allowance in this setting, the company's base-plus allowance is not sufficient to fund the ongoing operating expenditure associated with the opex-based enhancement begun in AMP7. This reflects the fact that, by assumption in the setting we are considering, only a subset of the companies carry out that enhancement in AMP7 and so only a subset of them is incurring the incremental operating expenditure that feeds into the econometric model used to set base-plus allowances from AMP11 onwards.
- For those companies that did not carry out an enhancement in AMP7, the allowances mirror their expenditure up to AMP10, as shown in the chart on the right. Beyond that, their allowances exceed their expenditure; a reflection of the fact that those companies' base-plus allowances from that AMP onwards reflect the effect of the incremental operating expenditure of those companies that did carry out an enhancement.

A contrast of the charts above with those set out earlier in Figure 20, shows the scope of the multi-AMP approach to provide a better alignment of allowances and expenditure in settings where companies put forward opex-based solutions to enhancements. This contributes to reducing the capex-bias discussed in the report. However, there can be differences between expenditure and expenditure allowances after the end of the initial 20-year period. The multi-amp approach is focused on tacking the capex bias and not addressing wider under-funding issues that apply to both capex-based and opex-based enhancements for companies that provide better performance levels than the rest of the industry. However, it could be extended to handle those issues as an optional development.



## Appendix 2: Enhancement benefits metrics

### Introduction

This appendix is provided in support of the explanation of the multi-amp enhancement funding approach provided in section 4.4 of the main report. It elaborates on what we mean by enhancement benefits metrics in that section.

We see enhancement benefits metrics as closely related to Ofwat's PR24 draft methodology proposals for enhancement allowances to be linked to PCDs or PCs. The issues covered in this appendix are not unique to the multi-amp funding approach; they are likely to need consideration under Ofwat's broader approach to enhancement allowances at PR24, especially if a more outcomes-based regulatory approach is to be taken.

### Examples of enhancement benefits metrics

We provide in the table below some simplified illustrations of enhancement benefit metrics. There is some further discussion of enhancement benefit metrics in the case studies in appendix 3.

**Table 12 Illustrative examples of enhancement benefits metrics (simplified)**

Type of metric	Examples
Metric closely linked to outcomes	<ul style="list-style-type: none"> <li>Measures of concentration of pollutants in a specified stretch of river</li> <li>Measure of biological oxygen demand in a specified stretch of river.</li> <li>Measure of number/severity of sewer flooding or pollution incidents.</li> <li>Measures of wildlife/biodiversity in an area post-greening.</li> <li>Metric based on quantity of water abstracted/reduction in river abstraction requirements.</li> </ul>
Scale of improvement in environmental conditions understood to substantially influence outcomes	<ul style="list-style-type: none"> <li>Estimated volume of phosphates or nitrates running off farmland to a specified part of a river catchment.</li> <li>Estimated volume of phosphates or nitrates removed from a specific part of a river catchment (e.g. via a wetlands scheme)</li> <li>Estimated quantity of phosphates or nitrates present in soil &amp; below root-level, based on sampling.</li> <li>Measure of travel time for water flows in a specified location (which affect flooding risk in periods of rapid rainfall).</li> </ul>
Scale of improvement measured by reference to established capital enhancement solutions that might be used in the absence of opex-based initiatives	<ul style="list-style-type: none"> <li>Measure of the equivalent rain water storage capacity that is provided by blue-green drainage infrastructure</li> </ul>

Measure of risk of adverse outcomes	<ul style="list-style-type: none"> <li>• Metric of valued-weighted risk of adverse events (e.g. CSO usage) defined according to a pre-specified methodology and holding external input data (e.g. assumed weather patterns) constant.</li> <li>• Metric of risk of sewer flooding in storm conditions (e.g. node based approach where a node is taken as a manhole).</li> </ul>
Activity-based metrics	<ul style="list-style-type: none"> <li>• Area of farmland for which agreements have been reached to use low-pesticide farming practices.</li> <li>• Area of land converted to rain gardens (could also be measured as output (quantity of water held) or risk (risk of flooding)).</li> </ul>

### Further considerations

There is much that could be said about the design of the metric – which has much broader relevance to Ofwat’s proposals for PCDs at PR24.

We highlight the following points, but this is not intended as a comprehensive treatment of the important issues to consider:

- The metric needs to be relevant and verifiable for the purposes of ensuring the water company is accountable for the intended benefits of the enhancement.
- There are likely to be benefits in enhancement benefits metrics which can be used across multiple companies, and which are likely to be relevant into the future, to support Ofwat’s general approach of taking opportunities to use benchmarking comparisons as part of its cost assessment work. But this might not always be possible.
- Ideally, the metric should be as outcome-focused as practical, taking account of the recognised benefits of regulatory arrangements targeting outcomes (e.g. in encouraging innovation, efficiency and flexibility in achieving what matters to customers and the environment) and other considerations. Doing so would, for example, provide some flexibility for a water company to make use of capex-based enhancements to achieve the intended benefits if the envisaged opex-based initiative does not work as well as intended.
- The metric used could be quite novel in some cases, rather than being a well-established metric for which reporting arrangements already exist. If so, it would be important to clarify upfront the methodology to be used to calculate the metric, and then apply this methodology consistently when comparing outturn delivery with scheduled benefits. There might be value in allowing for revisions to this for any clear errors or to address unintended consequences. The methodology for benefits calculation might also be developed and improved over time, from one price control period to the next, perhaps subject to safeguards that the schedule of benefits is to be updated if the methodology change may have material effects on the scale of benefits that will be reported.
- In some cases, tying price control funding to a specific metric might not be sufficient to ensure good outcomes, especially where the metric itself is not directly capturing the

impacts on outcomes. In these cases, there might be value from an approach in which a metric is combined with qualitative commitments, obligations or constraints on the water company which help to align its behaviour better with desired outcomes.

- In some cases a single metric may be insufficient to capture the key enhancements of an opex-based solution. A means of implementing multiple metrics simultaneously, or the creation of a metric that encompasses multiple types of enhancement from a single solution might be developed, or the expenditure allowance for a scheme could be allocated between multiple metrics applied in combination.
- In some cases, holding a company accountable to delivery against a relatively outcomes-focused metric might expose the water company to too much financial risk (e.g. due to the potential influence of third parties or external factors on the outcome observed in practice or due to uncertainty about the relationship between innovative company enhancement initiatives and outcomes). If so, one response might be to use a less outcome-focused metric. Another possible response would be to refine the methodology for the metric in a way that seeks to limit the influence of other parties or factors (e.g. allowing an adjustment for the impacts that are reasonably attributable to the third parties or allowing adjustments for weather patterns).
- In some cases, an enhancement initiative might be seen as something that is needed to solve a specific problem, rather than something that provides an amount of benefit on a measurable scale. In that context, the enhancement benefit metric could be defined in a binary way: 0 if the problem is unresolved and 1 if it is solved, combined with a qualitative description of the problem, and the schedule of enhancement benefits specified accordingly. However, we suspect that this approach to the specification of enhancement benefits might be problematic over time. Even if the company takes the action envisaged to solve the problem initially, the same problem might arise again in the future due to external changes (e.g. the actions of other parties in a catchment or changes in weather conditions), leading to a situation where the company is held responsible for addressing the problem again without additional funding. In general, we would expect it to be better to define the enhancement benefit metric by reference to some measure of the improvements or benefits to be achieved by the company, relative to a past position, rather than by reference to the resolution of a problem that might reoccur in the future.
- It would be good to specify the enhancement benefit metric in a way that avoids the risk that a company could successfully achieve the intended benefits on that metric in a scenario where it improves its performance as captured by the metric but at the same time allows for an unplanned degradation in performance in related areas not captured by the metric.
- There may be value in setting out assurance requirements for the metric.

We provide further discussion of how enhancement benefits metrics might be defined in relation to two specific case studies in appendix 3.

## **Appendix 3: Case studies for specific enhancement categories**

### **A3.1 Introduction**

This appendix discusses two areas of water company enhancement expenditure: catchment management, with a particular focus on enhancements to address raw water deterioration, and enhancements to the capacity of the wastewater network and at sewerage treatment works. We drew on these case studies as a means to help ensure that our understanding of key issues discussed in the project, and our development of potential responses to them, was not overly theoretical or abstract.

For each case study we summarise relevant aspects of the cost assessment approach at PR19 and then discuss concerns about risks of a capex bias hindering innovative solutions that involve a greater proportion of ongoing operating expenditure than conventional solutions. We also discuss aspects of the potential application of the multi-amp enhancement funding approach presented in section 4.4 of the main body of the report.

This appendix has been produced in support of specific issues covered in the main body of the report and is not intended to provide a comprehensive review of regulatory issues that arise in relation to the enhancement categories that we cover.

In parts of this section we discuss how specific types of costs might be treated for accounting purposes (e.g. operating expenditure versus capital expenditure). This is for illustrative purposes to help show different scenarios that might arise and to discuss some of their consequences for the price control framework. Nothing in this appendix is intended to provide any guidance or advice to water companies or other parties on accounting matters.

### **A3.2 Catchment management**

In this section we consider how some of the issues and ideas covered in the main body of this report relate to catchment management activities that water companies might engage in. This section is structured as follows:

- Introduction.
- Relevant aspects of the PR19 approach to cost assessment.
- Concerns about capex bias hindering the scope of catchment management solutions.
- The impact of the treatment complexity variable on concerns with the PR19 approach.
- Risks of a capex bias affecting base expenditure.
- The special treatment for some ongoing catchment management costs.
- Potential application of the multi-amp enhancement funding approach.

## Introduction

Catchment management might be relevant across a number of water and wastewater enhancement areas:

- Catchment management activities might help a water company address problems arising from deterioration in the quality of raw water in a river source that a water company abstracts from, while maintaining the quality of water provided to customers.
- Catchment management activities might help improve outcomes in rivers that a water company discharges effluent into. In some cases, and especially if a catchment-wide perspective is adopted, it may be more efficient and effective to improve water quality in the river through actions carried out by farmers or industry than through action by a water company to enhance its wastewater treatment works to improve the quality of water that it discharges into the river.

We provide below some examples of catchment management initiatives<sup>47</sup>, including information on the types of cost structures that these impose on water companies and farmers. A key point from the table is that across different initiatives, whether operating expenditure from the enhancement is enhancement-investment operating expenditure or enhancement-investment operating expenditure depends on factors such as the length of agreement with the farmer, whether the farmer is paid upfront or annually and how any upfront payments for multi-year agreements are accounted for. Furthermore, initiatives that give rise to capital expenditure from the perspective of the farmer may translate into operating expenditure for the water company.

**Table 13 Examples of catchment management initiatives and their cost structures**

Example initiative	Comments on cost structures	
	Cost structure to water company	Cost structure to farmer
<p><b>Cover crops</b></p> <p>Funds a farmer to plant and maintain cover crops.</p> <p>In some cases, cover crops are grown during the winter off-season. In others, cover crops are grown and maintained for an uninterrupted period of 12 months.</p>	<p>Would tend to be water company operating expenditure, not capital expenditure.</p> <p>Where a farmer has a 12-month agreement (or shorter) with the water company for this activity, payment seems likely to be enhancement running-cost operating expenditure.</p> <p>Possibility of some enhancement-investment operating expenditure if water company pays upfront for multi-year agreement but does not recognise this as a prepayment for accounting purposes.</p>	<p>Most costs seem to be annual ongoing operating costs, such as purchase of seed mixes; planting of cover crops; maintenance of cover crops over time; weed maintenance; and pest control.</p>
<p><b>Buffer strip creation/maintenance</b></p>	<p>Would tend to be water company operating expenditure not capital expenditure.</p>	<p>Some potentially significant upfront costs, such as</p>

<sup>47</sup> We drew in part on catchment management measures described in Thames Water (2022) *Thames Water Catchment Fund Handbook*.

Comments on cost structures		
Example initiative	Cost structure to water company	Cost structure to farmer
Funds farmers to create a new buffer strip surrounding farmland, or to maintain an existing buffer strip.	Costs could be enhancement-investment operating expenditure if water company pays upfront for multi-year agreement but does not recognise this as a prepayment for accounting purposes.  if company pays farmer annually or recognises an upfront payment for multi-year agreement as a pre-payment then likely to be enhancement-running-cost operating expenditure.	initial land preparation for the buffer strip.  Further ongoing operating costs for maintenance of the buffer strip, such as edge mowing; pest control and clearing of debris.
<b>Equipment to disrupt tramlines in arable areas</b>  Farmers are provided funding to purchase specialised machinery to disrupt soil that has been compressed by tractor tyres (tramlines).  Machinery is designed to minimise water pooling and run-off of pesticides from farmland treatment	As above	Machinery purchased by farmer would tend to be capital expenditure by the farmer  Some ongoing operating costs for the machinery
<b>Creation of hedgerows</b>  The water company provides funding upfront for the creation of hedgerows to minimise pesticide runoff from farmland. The farmer is obligated to continue to maintain the hedgerow for a period of time (e.g. 5 years) following the initial erection of the hedges.  In some cases the payment is one-off upfront and implicitly includes funding for ongoing maintenance, in other cases farmers receive payment	As above	Upfront costs: purchase and planting of shrubbery  Some ongoing costs of maintaining hedgerows
<b>Farmer Education and training</b>  Company funds a member of farm staff to receive training relevant to efficient farm operations in the form of a single payment with no ongoing obligations	Would tend to be water company operating expenditure not capital expenditure.  Assuming benefits of training last more than a single year, would seem to fall under enhancement-investment operating expenditure.	One-off cost of training.  May be some ongoing cost implications from changes in behaviour following training.

We focus for the most part in this appendix on catchment management to address raw water deterioration, but we also make some comments in places in relation to the potential application to catchment management in respect of wastewater activities.

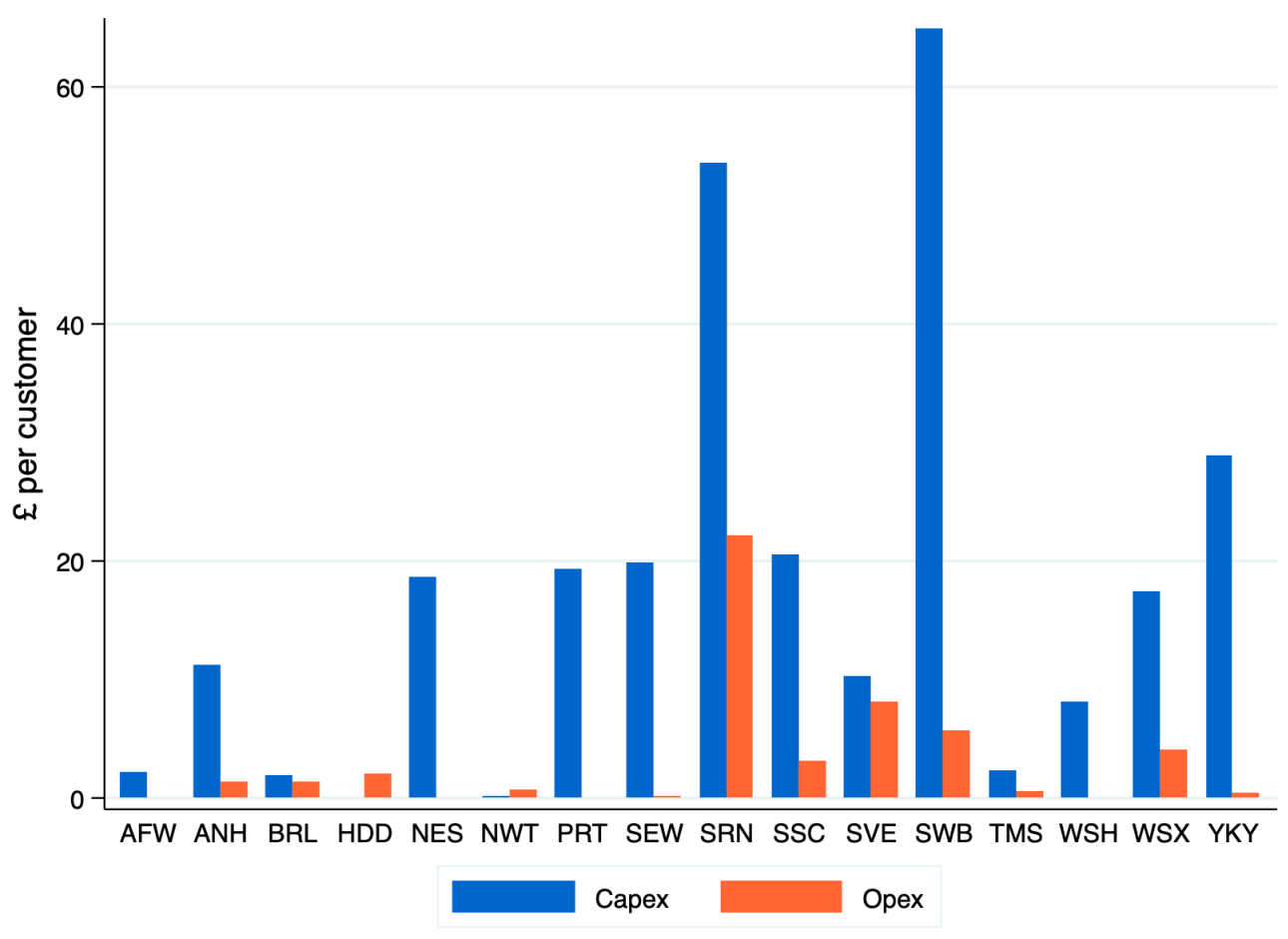
### Relevant aspects of the PR19 approach to cost assessment

The enhancement category for raw water deterioration is particularly relevant to catchment management activities. At PR19, Ofwat provided explicit enhancement allowances for

expenditure to address raw water deterioration. Ofwat’s assessment was done through a combination of what Ofwat called shallow dives (for companies with low materiality enhancement spend in the category) and what Ofwat called deep dives. The deep dive assessments involved company-specific analysis by Ofwat of the evidence for the enhancement allowance sought by the company, considering both capital expenditure and operating expenditure forecast over AMP7. When it considered schemes proposed by companies, Ofwat looked for a letter of support from DWI.

We show in the chart below the PR19 business plan proposals for raw water deterioration enhancement expenditure.

**Figure 27 PR19 Business plan proposals for raw water deterioration enhancement expenditure**



For a number of companies – including Severn Trent, Southern Water, Welsh Water and Wessex Water – the business plan proposals for raw water deterioration included a significant element of operating expenditure. Some of the schemes falling under this category included catchment management (see for example, Ofwat’s deep dive assessment for Severn Trent or for Wessex Water). However, we can also see that the majority of raw water deterioration enhancement expenditure that companies sought was for capital expenditure.



There are several other categories of enhancement expenditure on the wastewater side that might be relevant to catchment management. For instance, at PR19 Ofwat provided explicit enhancement allowances in the following categories (taken separately), which all fell under the WINEP:

- **Nitrogen removal:** Ofwat allowed companies claims in full at PR19, reporting that this was due to the low materiality across the industry for this category (only Southern Water and Wessex Water had made claims for this).
- **Phosphate removal:** This was worth a substantial amount of money at PR19. Ofwat's cost assessment for this enhancement category was done by econometric benchmarking on cross-sectional forecast costs. In contrast to some other enhancement areas, Ofwat's allowances were derived from the econometric benchmarking models without applying a cap based on the business plan allowance (i.e. not taking minimum of business plan forecast and allowance).
- **Chemicals removals.** In respect of most companies, Ofwat's cost assessment at PR19 was done by econometric benchmarking on cross-sectional forecast costs, with the modelling allowance not capped by what companies had put in business plans. One exception was Yorkshire Water, for which allowance was based on a shallow dive. A second exception was Thames Water, for whom Ofwat set allowances through a deep dive because it accepted the company's representation that the models did not capture cost drivers relevant to it.

There is the potential for catchment management to help with each of the enhancement areas above, especially if there is greater focus from the EA and Ofwat on system-wide or catchment-wide outcomes relating to river quality rather than the actions and impacts of individual system participants such as water companies, farmers, and industry.

### Concerns about capex bias hindering the scope of catchment management solutions

We have given particular attention in the project to the risks of an inefficient bias towards capex-based enhancement solutions. We consider that the risks identified in section 3.2 of the report are directly applicable to catchment management initiatives.

The following issues on cost structure seem relevant:

- We would expect that most, or all, costs associated with catchment management initiatives involve operating expenditure. Even where catchment management initiatives involve capital expenditure by third parties (e.g. investment carried out by farmers on their own sites) this is likely to translate into operating expenditure from the perspective of water companies, since companies will tend not to get ownership of assets.
- Depending on the type of catchment management initiative, these can involve significant operating expenditure, which needs to be incurred on an ongoing basis if the benefits are to be maintained from one year to the next.

- In some cases, water companies might pay farmers upfront (or incur upfront costs) for benefits that they will receive over a number of subsequent years. It is possible that this upfront payment is spread over the period in which those benefits are received, for the purposes of water companies' accounts and regulatory reporting of operating expenditure (i.e. upfront payment treated as a prepayment). If so, these costs would fit with what we define as enhancement-running-cost operating expenditure in section 2.2. In other cases, such upfront payments might not be treated as prepayments for accounting purposes, with the full amount recognised as operating expenditure in a single year. This would fit with our definition of enhancement-investment operating expenditure.
- Where catchment management expenditure provides benefits over a number of future years (e.g. awareness campaigns with farmers) the duration of benefits funded by expenditure incurred in the first AMP of the enhancement may be substantially shorter than for conventional capex-based enhancement projects.

The following aspects of Ofwat's PR19 regulatory approach are relevant:

- The explicit allowances that Ofwat provided at PR19 for enhancement initiatives aimed at resolving raw water deterioration are substantially more advantageous financially for companies planning conventional capex-based enhancements than catchment management initiatives that involve a higher proportion of operating expenditure.
- There does not seem to be any established funding channel within Ofwat's framework and cost assessment process for the ongoing operating expenditure from catchment management (though see the subsection below for the example of Ofwat's allowance for Wessex Water).
- We see no funding channel for any finance costs associated with risks faced by a water company. In contrast, a company that gets enhancement funding for a conventional capex-based enhancement will have the opportunity, in effect, to add part of that funding to its RCV and to earn a risk premium on it.
- As discussed further below, for capex-based enhancements that increase treatment complexity to deal with raw water deterioration, the base-plus models could provide allowances for operating expenditure (and perhaps ongoing capital maintenance expenditure) arising from those more complex treatment processes. The inclusion of treatment complexity variables in the base-plus models seem likely to give an additional source of advantage to a company adopting a conventional-based enhancement rather than catchment management.

Within the scope of this project, we have not sought to collate or review evidence on the scale of potential problems arising from approach to the cost assessment of catchment management schemes at PR19. Ofwat said the following in its PR19 final determinations: *"We are pleased to see catchment management becoming more of a mainstream activity, with 1,200 schemes by 2025 – but this is still only scratching the surface of what we think is*

possible”.<sup>48</sup> This indicates, at the very least, that Ofwat considers that catchment management approaches have much greater potential than is being harnessed at present, and any sources of regulatory bias against these could hold back the full potential.

### **The impact of the treatment complexity variable on concerns with the PR19 approach**

We see an additional deterrent to opex-based or nature-based approaches to raw water deterioration issues, which arises from the way that the econometric models of base-plus costs were specified at PR19 – and at price reviews before this. This feature acts to make the price control remuneration of traditional capex-based enhancement initiatives that improve water treatment processes seem more advantageous compared to capex-based enhancement initiatives in most other enhancement categories. It also has implications for a number of the other concerns with the PR19 arrangements that were as discussed in section 3.

At PR19, Ofwat’s econometric models for wholesale water base-plus models at PR19 included an explanatory variable associated with the complexity of treatment processes at companies’ water treatment works, drawing on data based on an established grading system for the complexity of treatment works in the range one to six where six is the most complex, insofar as these models were relevant to raw water quality and water treatment.<sup>49</sup> In particular:

- Models WRP1 and WW1 included an explanatory variable for the proportion of water treated at works of complexity levels 3 to 6.
- Models WRMP2 and WW2 included an explanatory variable based on a weighted average of the treatment complexity data.

Ofwat described the treatment complexity variable as reflecting both the quality of the raw water source(s) supplying the treatment process and the treated water output quality requirements.<sup>50</sup> We would expect raw water quality to differ much more between companies than the quality of water leaving treatment works, so the treatment complexity variable is particularly relevant to raw water deterioration enhancements.

The coefficients on these variables are positive, which means that the allowances from the base-plus models will be greater the more complex the water treatment processes used by a water company are (at least insofar as that complexity is captured by the treatment complexity variables).

This in turn gives rise to several features:

- If a company chooses to address raw water deterioration via a capex-based initiative to increase the scope of the treatment processes at a water treatment works, then it may

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<sup>48</sup> Ofwat (2019) *PR19 final determinations: Overview of companies’ final determinations*, page 9.

<sup>49</sup> The treated water distribution model TD1 did not include treatment complexity variables as this model applied to a separate part of the wholesale water value chain.

<sup>50</sup> Ofwat (2019) *Supplementary technical appendix: Econometric approach*, page 12.

be funded via the treatment complexity variables in the base-plus models for the ongoing operating expenditure (e.g. energy and chemical costs) associated with running these processes. This allows for the potential for fuller remuneration of long-term enhancement costs, covering capital and operating expenditure in future AMPs, than for capex-based solutions in the more usual case where there is no corresponding explanatory variable in the base-plus models.

- The industry-wide risks of under-funding capital maintenance from past enhancements (section 3.3 of the report) seem lower than for other enhancement categories, insofar as the past enhancements were capex-based and acted to increased measured treatment complexity.
- The risks of under-funding better-performing companies (i.e. companies that deliver the same quality of water to customers from worse environmental inputs) seem lower than for other enhancement categories, insofar as performance is achieved via solutions that act to increased measured treatment complexity.
- There is also a distinct possibility that, if a company chooses a capex-based initiative to increase the scope of the treatment processes at a water treatment works, it is actually over-remunerated. If differences between companies in treatment complexity have been quite long-standing, then it is possible that the coefficients on the explanatory variables for the treatment complexity variable will reflect not just differences between companies in operating expenditure, but also differences in capital maintenance (e.g. asset renewal), that are associated with differences in the complexity of water treatment processes. If so, the scale of those coefficients in the estimated models will be above the level that reflects the additional ongoing operating expenditure from more complex treatment processes. This could, in turn, may mean that – across the allowances from the base-plus models and explicit allowances for enhancement expenditure – a company choosing a capex-based enhancement initiative that increases measured treatment complexity may be over-remunerated for the total efficient costs of that enhancement.
- In contrast, if the company chooses to address raw water deterioration via an opex-based initiatives – or a nature-based solutions that involves capital expenditure but do not increase the measures complexity of the processes at water treatment works – it does not get any additional funding from the base-plus models for the ongoing operating expenditure or capital maintenance expenditure associated with these initiatives. It may be left, after the AMP in which the enhancement is introduced, with no funding for the ongoing costs of tackling raw water deterioration.

We consider that these issues, arising from the treatment complexity variables in the base-plus models act to exacerbate the risks of a capex bias in relation to catchment management to address raw water deterioration.

At PR19 Ofwat showed some awareness of the interactions between its explicit allowances for enhancements and the allowances from the base-plus models:<sup>51</sup>

*“We do not allow for operational costs related to new more complex treatment. These costs are captured in our modelled base allowance through the treatment complexity variable which is now based on companies’ view of complexity in 2020-25.”*

There is some logic for this aspect of Ofwat’s approach although its validity would also depend on the extent to which the coefficient on the treatment complexity variables provides a good estimate of the ongoing operating expenditure. However, Ofwat’s approach at PR19 did not seem to show awareness of the potential for capital expenditure, as well as operating expenditure, to be reflected in the coefficients for the treatment complexity variables. The second point above highlights that, in this example, there is a concern about double counting allowances to the detriment of customers, in addition to the concerns relating to the capex bias, for capex-based enhancements that increase treatment complexity.

The points highlighted above in relation to treatment complexity variables were also picked up by United Utilities in a discussion of how the current approach to cost assessment for enhancements still has an inherent bias towards capital solutions:<sup>52</sup>

*“Furthermore, if a company constructs a capital asset, there is also an increased likelihood that the approach to botex modelling (that accounts for treatment complexity) will capture future operating and maintenance requirements in future AMPs also. The same cannot be said of nature based solutions or partnership workings under the current approach. This inconsistency in assessments will therefore increase the likelihood that companies pursue the tried and tested (more risk averse) approaches of seeking to undertake capital interventions as the risk of not being able to recover sufficient expenditure is smaller”*

### **Risks of a capex bias affecting base expenditure**

Given the discussion above, we consider that the use of the treatment complexity variables in the base-plus is likely to present a financial deterrent to catchment management in companies management of their base expenditure (e.g. in deciding whether to maintain existing wastewater treatment processes as they come up for refurbishment or to switch to alternative approach such as catchment management). In short, if a company switches from conventional water treatment to catchment management it would face reduced allowances under the base-plus models, with no source of compensating source of revenue to cover the costs of catchment management (as far as we can tell). This issue reflects the use of a treatment complexity explanatory variable which captures inputs rather something closer to outcomes or impacts on ecosystem services.

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<sup>51</sup> Ofwat (2019) *PR19 final determinations: Securing cost efficiency technical appendix*, page 108.

<sup>52</sup> United Utilities (2020) *Evolving the Water Industry National Environment Programme to deliver greater value*, page 13.

The risks of some residual capex bias in relation to base expenditure is outside the scope of this project so we have not given further attention to it.

### The special treatment for some ongoing catchment management costs

The discussed above represents the general approach that Ofwat applied at PR19 to raw water deterioration enhancements, and the approach explained by Ofwat in its main final determination documents.

However, there is at least one exception which is relevant to Ofwat's PR19 final determinations for catchment management to tackle raw water deterioration. In the case of Wessex Water, Ofwat's final determination includes allowances in respect of both:

- The operating expenditure expected to be within AMP7 arising from new catchment management schemes introduced in AMP7.
- The ongoing operating expenditure expected to be incurred within AMP7 arising from the continuation of catchment management schemes introduced in AMP6.

The first of these was consistent with Ofwat's broader approach at PR19 but the second is a departure from that approach. Ofwat provided the following comments in the supporting spreadsheets for its PR19 final determinations for raw water deterioration, in respect of Wessex Water's enhancement operating expenditure claim:<sup>53</sup>

*"Wessex Water is seeking £2.298m opex. It identifies that opex associated with the blending plants is not included in this sum [App 6 Table 2-3, P7]. All opex has been allocated to the water resources price control. The company identifies opex of £2.05m for the continuation of catchment management projects started in AMP6 [App 6 P 9-10] and explains that this is to address nitrates and pesticides including metaldehyde. As Wessex Water was not subject to a metaldehyde undertaking we accept that these costs would not reduce and we allow £2.05m for this programme. We find no evidence for the remaining £0.248m opex spend for which we make no allowance."*

This was an issue that Wessex Water had made detailed submissions on in its response to Ofwat's IAP,<sup>54</sup> including arguments that the approach Ofwat had taken in its IAP acted as a disincentive to adopting catchment management, which was a retrograde step.

Ofwat did not explain this aspect of its decisions on cost assessment for catchment management in the 222-page appendix to its final determinations on cost assessment, but it is quite a significant development. It is a clear example of where Ofwat used its discretion in setting explicit enhancement allowances to provide funding for the ongoing operating expenditure of enhancements introduced in a previous price control period. Doing so is

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<sup>53</sup> Ofwat (2019) Raw water deterioration enhancement feeder model, [https://www.ofwat.gov.uk/wp-content/uploads/2019/12/FM\\_E\\_WW\\_raw-water-deterioration\\_FD.xlsx](https://www.ofwat.gov.uk/wp-content/uploads/2019/12/FM_E_WW_raw-water-deterioration_FD.xlsx).

<sup>54</sup> Wessex Water (2019) *Appendix 6 – Providing excellent drinking water quality: Response to IAP*.

inconsistent with the general approach that Ofwat takes. But it helps tackle the problems of that general approach in funding ongoing operating expenditure from past enhancements.

It is possible that this type of allowance was applied for other companies or enhancement categories; we have not had a chance to carry out a comprehensive review of all the company-specific comments in the supporting spreadsheets across all the enhancement categories funded at PR19. Nonetheless, our understanding is that it is very much a special – and potentially isolated case – that departs from Ofwat’s general and stated approach.

The special approach taken in the case of Wessex Water’s operating expenditure for catchment management schemes introduced in AMP6 acts to mitigate, to some degree, the risks of a bias towards capex-based enhancements. However, the effectiveness of this aspect of the PR19 final determinations to tackle the bias seems somewhat limited, for a number of reasons:

- The allowance provided for Wessex Water’s operating costs from catchment management seems to be buried away in one cell within a detailed spreadsheet supporting Ofwat’s final determinations and does not seem part of Ofwat’s stated methodology or intended approach.
- It is uncertain whether Ofwat would, at PR24 and beyond, provide corresponding allowances for operating expenditure from catchment management solutions from previous AMPs.
- While at PR19 Ofwat provided allowances for ongoing costs in respect of Wessex Water’s enhancement schemes from the previous AMP, it is uncertain whether it would have provided allowances in relation to enhancements from AMPs further back in time. This uncertainty is exacerbated by Ofwat’s tendency to take the view that certain costs are funded from the base-plus models (without necessarily much evidential basis for this position).
- The PR19 approach did not provide any funding for incremental costs of finance associated with opex-based enhancements.

Despite these limitations, we see this special approach as a step in the right direction, and a move towards the multi-amp enhancement funding approach that we discuss in the subsection that follows.

### **Potential application of the multi-amp enhancement funding approach**

We consider that the multi-amp enhancement funding approach described in section 4.4 of the report to be directly applicable to catchment management initiatives aimed at tackling raw water deterioration.

In the table below, we set out our initial thoughts on how the multi-amp enhancement funding approach might be applied to catchment management, using the tables of key elements from section 4.4. We focus here on aspects related to raw water deterioration.



**Table 14 Core elements of the adaptable multi-amp enhancement funding approach:**

Element	Comment
Enhancement benefits metric	<p>Several possible options for the types of measure that might be considered:</p> <ul style="list-style-type: none"> <li>Measures of concentration of pollutants in a specified stretch of river</li> <li>Estimated volume of phosphates or nitrates running off farmland in a specified part of a river catchment</li> <li>Quantity of phosphates or nitrates present in soil &amp; below root-level.</li> <li>Area of farmland for which agreements have been reached to use low-pesticide farming practices</li> </ul> <p>It would be important for any new and bespoke metrics to be defined in relation to a clear methodology, such that there is clarity and consistency between funding and delivery for how the scale of benefits is to be measured (perhaps with leeway for Ofwat to make/allow reasonable adjustments to the methodology for errors and unintended consequences).</p> <p>Some value, for future benchmarking exercises, if metrics are common across companies and schemes, as far as practical.</p>
The enhancement benefits schedule	<ul style="list-style-type: none"> <li>If the raw water deterioration issue is expected to be short- or medium-term problem only (e.g. because of known external factors driving changes in conditions over time) then the schedule might set enhancement benefits for a specified period of time only.</li> <li>Otherwise, it might be set so that enhancement benefits would be planned to be maintained indefinitely (though this plan would not be firm commitment).</li> </ul>
Funding expiry year (FEY)	<ul style="list-style-type: none"> <li>No specific comment</li> </ul>
Default funding expiry year (DFEY)	<ul style="list-style-type: none"> <li>If the raw water deterioration issue is expected to be short- or medium-term problem only (e.g. because of known external factors driving changes in conditions over time) then a default funding expiry year reflecting the expected duration of that problem might be appropriate – if the schedule of benefits is similarly over such a period.</li> <li>Otherwise, a default funding expiry year based on weighted-average asset lives for the types of conventional water treatment capital solutions that might otherwise be used could be appropriate, as explained in section 4.4</li> </ul>
Allowance for upfront costs (AUC <sub>i</sub> )	<ul style="list-style-type: none"> <li>Whether any such costs are material seems likely to depend on the type of catchment management initiatives used.</li> </ul>
Unit cost allowance (UCA <sub>i</sub> )	<ul style="list-style-type: none"> <li>This might be determined using company-specific deep dives as at PR19.</li> <li>There is also a potential to use benchmarking across companies and schemes, especially if common enhancement benefits metrics are used, but any benchmarking assessment should also take account of differences between companies' outside of their control which affect costs.</li> </ul>
Provision for early termination (or reduction)	<ul style="list-style-type: none"> <li>No specific comment.</li> </ul>

Element	Comment
Reporting of outturn enhancement benefits (OEB <sub>t</sub> )	<ul style="list-style-type: none"> <li>The reporting of the outturn benefits would need to be done at the level of granularity that matches each of the benefit schedules agreed as part of each price review, and not at the company-wide level.</li> </ul>
Reporting of outturn operating expenditure and outturn capital expenditure (OOE <sub>t</sub> and OCE <sub>t</sub> )	<ul style="list-style-type: none"> <li>As above, the reporting of costs would need to be done at the level of granularity that matches each of the benefit schedules agreed as part of each price review, and not at the company-wide level.</li> </ul>
Interactions with econometric benchmarking of base-plus costs	<ul style="list-style-type: none"> <li>No specific comment.</li> </ul>
Provisional multi-amp enhancement allowance	<ul style="list-style-type: none"> <li>See below</li> </ul>

We now provide a simplified illustrative example. Suppose that for a water company proposing an opex-intensive nature-based solution to address raw water deterioration:

- The chosen enhancement benefits metric is based on the estimated volume of phosphates or nitrates running off farmland in a specified part of a river catchment.
- The scheduled enhancement benefits are 100 unit per year from 2028/29 onwards, without any planned reduction in the future.
- Ofwat decides that the default funding expiry year should be 2044/45 based on an assessment that the weighted average economic life of assets from a conventional capex-based solution for the raw water deterioration would be around 15-20 years. The expiry year is the end of a price control period for practical purposes.
- Ofwat assesses the efficient unit cost as £4,000 per unit.

In these circumstances:

- At PR24, the water company would get an explicit enhancement totex allowance for AMP8 of £800,000 covering the estimated efficient costs of the scheduled benefits in 2028/29 and 2029/30.
- The provisional multi-amp enhancement allowance would be set at £6,000,000 for the price control periods covering AMP9, AMP10 and AMP11 (i.e. 2030/31 to 2044/45).
- As with the broader approach to PCDs, some funding would be returned to customers in the event of under-delivery against the scheduled benefits.

### **A3.3: Enhancing effective capacity in wastewater systems**

In this section we consider enhancements to the capacity of wastewater network infrastructure and at sewerage treatment works, and potential alternative enhancement initiatives that may play a similar role to these using more innovative approaches. This section is structured as follows:

- Introduction
- Relevant aspects of the PR19 approach to cost assessment.
- Some concerns with aspects of the PR19 approach.
- Potential approach for enhancement-investment operating expenditure.
- Potential application of the multi-amp enhancement funding approach.
- Further comments on candidate metrics and on schedule of enhancement benefits.

#### **Introduction**

We consider here the treatment of schemes related to enhancing the capacity of the sewerage system with a view to, ultimately, improving the quality of the waters to which discharges are made. This covers both schemes aimed at increasing the effective capacity of the system as well as ones that reduce the need for additional capacity (i.e. reduce peak demand on the wastewater system). More specifically, we consider here types of enhancements which, at PR19, Ofwat assessed under one of the following related enhancement categories:

- storage schemes at sewage treatment works (STW) to increase storm tank capacity;
- schemes to increase flow to full treatment; and
- storage schemes in the network to reduce spill frequency at combined sewer overflows.

Some of the schemes put forward by companies as part of their business plans for AMP7 which fell into the above categories related to innovative solutions that involve a greater proportion of operating expenditure than conventional solutions. These solutions are not necessarily opex-based in a pure sense, and might also involve substantial capital expenditure, or substantial operating expenditure that provides long-term benefits (what we call enhancement-investment operating expenditure). But they may have the feature of involving a higher proportion of ongoing operating expenditure than a conventional enhancement solution such as storage infrastructure, so concerns about a capex bias in enhancements would be relevant to them.

The more innovative solutions that may be relevant include various measures or initiatives falling under the broad category of sustainable drainage systems (SuDS), with examples of these including the use of bioswales, detention basins, street planters, rain gardens, tree pits, rainwater downpipe planters or of permeable paving. The cost structure will vary by the

type of measures or initiative applied but they may often involve significant ongoing operating expenditure or maintenance if their benefits are to be maintained over time.

We provide below some examples of potential enhancement solutions that may be opex-based from the perspective of water companies. The table comments on the types of cost structures that these impose on water companies and on third parties (e.g. local authorities).

**Table 15 Examples of SUDs and other nature-based initiatives and their cost structures**

Example initiative	Comments on cost structures	
	Cost structure to water company	Cost structure to third parties
<p><b>Creation of wetland</b></p> <p>The creation of a wetland to reduce flooding risk and filter surface water runoff near residential areas.</p> <p>Water companies may form one of multiple funding parties for the upfront costs of the wetlands project. This may include the local council and third party community improvement groups.</p>	<p>If water company does not have ownership of newly-created assets, then any upfront costs to the water company likely to be operating expenditure.</p> <p>If the company makes an upfront contribution to capital costs of a third party, without any recognition of this as a pre-payment in the company's accounts, this seems likely to be enhancement-investment operating expenditure.</p> <p>If the company has some form of ongoing services agreement with a third party for it to provide services and any upfront payment is treated as a pre-payment, or if it pays annually for ecosystem services from the wetland, costs could be enhancement-running-cost operating expenditure.</p> <p>Possible that water company makes annual contribution to ongoing costs incurred by third parties – if so this would be enhancement-running-cost operating expenditure.</p>	<p>Upfront costs for purchase of land (if not already owned by relevant stakeholder groups)' purchase of shrubbery/aquatic plants; and construction of the wetland.</p> <p>Ongoing costs for structural repairs, plant maintenance and replenishment, and disposal of contaminated sediment.</p>
<p><b>Permeable paving slabs</b></p> <p>Funding is provided to the local council to purchase and fit permeable paving slabs instead of traditional paving. The permeable paving slabs allow surface water to flow between slabs into ground storage, whilst removing some pollutants.</p>	<p>As above</p> <p>Simplest case would involve water company making contribution to third parties capital costs and this being enhancement-investment operating expenditure from the perspective of the water company, but other arrangements are possible.</p>	<p>Upfront costs for purchase and installation of permeable paving slabs, with ongoing costs for cleaning and replacement of blocked or damaged paving slabs.</p>
<p><b>Creation of a swale</b></p> <p>Funding is provided to the local council to create a swale as a means of both treating and directing surface water runoff downstream whilst mitigating flooding risk.</p>	<p>As above</p>	<p>Upfront costs for creation of a swale, and ongoing costs for cleaning and maintenance of the swale.</p>

These measures do not necessarily enhance the capacity or capabilities of the wastewater company's own assets and systems, and may instead be seen to reduce the demand – or the peakiness of the demand – placed on the company's surface water drainage system. In many cases, the successful deployment of these measures may require water companies to work in partnership with other parties (e.g. local authorities), with potential for funding to be spread across multiple parties. Even where there is significant upfront investment, the costs of this may be treated as water company operating expenditure if assets produced are to be owned by other parties (e.g. local authorities).

We expect these to grow in importance at PR24:

- to reflect the increased political, consumer and regulatory attention being given to CSO spills; and
- to reflect the greater focus being placed on seeking nature-based solutions to provide long-term improvements in the water industry.<sup>55</sup>

We give particular in this section to more innovative enhancement initiatives that might displace the need for conventional storage schemes at treatment works or in the wastewater network.

We refer in this section, as a short-hand, to alternative enhancement initiatives being opex-based. In practice, some of; they are not necessary primarily operating cost solutions.

### **Relevant aspects of the PR19 approach to cost assessment**

At PR19, Ofwat took a similar approach to the cost assessment of the three enhancement categories listed above. Specifically:

- For each of the three categories, Ofwat developed econometric models. The models were estimated using cross-sectional data, where companies' forecast totex costs over the AMP7, subject to reallocations by Ofwat, were regressed on factors considered by Ofwat to be cost drivers.
- For each of the three categories, the allowances were set by reference to the modelled costs predicted by (a triangulation of) a suite of econometric models, and were then subject to the WINEP-wide efficiency challenge.

We do not consider the details of the econometric models that Ofwat drew on in each of those categories, but there are two points we wish to bring out.

First, the set of costs assessed by Ofwat, and in respect of which funding for was made, related to the capital expenditure and the operating expenditure expected to be incurred over the subsequent AMP, i.e. AMP7. Funding was not provided for in respect of operating expenditure associated with running the enhancement scheme in the period subsequent to

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<sup>55</sup> See for example, the March 2022 "Consultation on the Government's storm overflows discharge reduction plan" published by Defra.

AMP7. This is not unique to these areas of enhancement; indeed, as discussed in the main report, it was Ofwat's default approach at PR19 across its assessment of all enhancement areas.

Second, and setting aside other comments on the merits or otherwise of the econometric models themselves, it seems to us that Ofwat's choice and definition of cost drivers allowed for nature based solutions to be brought into the benchmarking analysis on an equal footing with more traditional capex-based solutions. Specifically, in its assessment of enhancements on storage tank capacity, when deriving a measure of the cost driver associated with the capacity of the schemes being proposed by companies, Ofwat took account of the contribution of "volume of storage avoided" arising from nature-based schemes put forward by Welsh Water and Southern Water. In recognition of this, in those models, Ofwat's driver was the "effective additional storage capacity" of the schemes put forward by companies.

Further to the explicit funding for enhancement, there were a number of ODIs set at PR19 which allow further funding in these areas. For example:

- Wessex Water has an ODI defined in terms of the delivery of the number of CSO improvements made, beyond those required by WINEP. The metric for this ODI is the number of CSO improvements, and the performance commitment level was set to a baseline of 0.
- Thames Water and Southern Water both have ODIs related to surface water management. In the case of Thames Water the ODI is expressed in terms of the hectares of area disconnected from the sewerage system, and in the case of Southern Water it is expressed in terms of the reduction in volume entering the network as a result of rough sustainable urban drainage approaches (e.g. SuDS). In both cases, the ODIs allow for out- and underperformance.

Further to the above, we note that Welsh Water has an ODI related to its CSO enhancement programme, where the metric is defined in terms of the effective storage capacity delivered under its NEP obligations. Our reading is that this ODI is there for customer protection, i.e. to protect customers from the non-delivery by Welsh Water of elements of its CSO programme for which an allowance was made. The ODI allows for underperformance payments only, and no outperformance. The metric of the ODI is the volume of equivalent storage delivered.

### **Some concerns with aspects of the PR19 approach**

We highlighted earlier the view that this area of enhancement activity is one we expect to receive greater attention at PR24 and is one where nature-based solutions may have more of a role.

The concerns with aspects of the PR19 approach which we discuss in the main body of the report play out in these areas of enhancements too. We do not repeat those points here and, instead, highlight some issues that might be particularly problematic.

These areas of enhancements are ones where more opex-focused nature-based solutions may play a bigger role going forward. In this context, the concern we discuss in the report relating to the funding of operating expenditure of enhancement schemes, beyond the AMP in which the scheme is first put forward would be particularly relevant. The concern is that whilst the funding of a capex-based solution would cover the costs of the relevant capital asset, and allow the company to provide the enhanced service over the lifetime of that asset, the funding of an opex-based solution would not fund the scheme beyond the five-years of the AMP.

In practice, it could be that Ofwat takes a more flexible approach in its assessment and that, at each price review, it chooses to assess within its enhancement cost assessment the ongoing operating expenditure schemes which are already in place but which, because of their opex-based nature, had had an allowance made at the previous price review that did not extend funding into the future. We commented in section A2.2 that Ofwat took this approach in assessing a Wessex Water catchment management scheme relating to raw water deterioration. But we are not aware that Ofwat has codified that approach in any way, and it does not seem part of the established approach at PR19. While it is possible that Ofwat might allow funding for the ongoing operating expenditure of enhancement schemes introduced in previous price control periods, there seems substantial uncertainty around the long-term funding of the operating expenditure of such solutions.

### **Potential approach for enhancement-investment operating expenditure**

It is possible that, for some opex-based solutions in the areas of enhancements considered above, the vast majority (or all) of the costs to be incurred by the water company are upfront expenditure in the form of what we define in section 2.2 as enhancement-investment operating expenditure.

In these cases, one approach for setting explicit enhancement allowances for these initiatives is as set out in section 5.4 where we suggest that enhancement-investment operating expenditure might be treated similarly to conventional enhancement capital expenditure. For instance, this might involve the following:

- An explicit totex allowance at PR24 for the efficient expenditure to be incurred in AMP8.
- The value of enhancement-investment operating expenditure funded this way being excluded from the scope of operating expenditure used to calculate the PAYG rate.
- No explicit allowances for any ongoing costs in periods subsequent to AMP8 (there may be some implicit allowance from base-plus allowances).

However, this approach might not be suitable in all cases. In particular:

- Where the water company incurs significant annual operating expenditure on the enhancement (e.g. a contribution to ongoing maintenance costs of third party assets, an annual payment for ecosystem services to a third party, or upfront costs being classified as a prepayment for accounting purposes with costs apportioned across the life of the agreement).



- Where the duration of benefits (or implied economic lives) of the solutions that a water company pays upfront for are much shorter than the asset lives for capex-based solutions that the company might choose to implement instead.

In these cases, the types of approaches we discuss in section 4 might be more relevant. We consider in more detail below how the multi-amp enhancement funding approach from section 4.4 might be applied.

### Potential application of the multi-amp enhancement funding approach

In section 4.4 of the main body of the report we outlined a suggested a multi-amp approach to funding enhancements. We discussed then the core elements that would need to be defined to apply the approach. In the table below, we set out our thoughts on what such elements could be, or on how they might be defined, in the context of the enhancements relating to increasing the effective network or storm tank capacity.

**Table 16 Core elements of the adaptable multi-amp enhancement funding approach:**

Element	Comment
Enhancement benefits metric	<ul style="list-style-type: none"> <li>• There is a string of candidate metrics that could be used to measure benefits delivered by the schemes.</li> <li>• This includes, for example, the measure of “effective additional storage (or avoided volume) needed”, defined in relation to storm tank capacity and in relation to network capacity according to what the enhancement is targeting. We note Ofwat has included this metric in its April 2022 data request on enhancements.</li> <li>• See further discussion in section following this table.</li> </ul>
The enhancement benefits schedule	<ul style="list-style-type: none"> <li>• Ofwat would determine the scale of effective additional storage to be provided and maintained, drawing on companies’ business plans.</li> <li>• We consider that it would not be appropriate for schedule to be defined at a company-wide level, and that a methodology would be required to specify how the schedule would be updated over time. See further discussion in section beneath table.</li> <li>• In the simplest case, once the enhancement is fully operational, the schedule of benefits from that enhancement for all future years could be the same.</li> </ul>
Funding expiry year (FEY)	<ul style="list-style-type: none"> <li>• We have not identified a specific issue here.</li> </ul>
Default funding expiry year (DFEY)	<ul style="list-style-type: none"> <li>• See comments in row above.</li> </ul>
Allowance for upfront costs (AUC <sub>i</sub> )	<ul style="list-style-type: none"> <li>• Where the scheme benefits from a separate funding stream (e.g. due to it being run in partnership with other parties) the upfront cost allowance should be set so that it recognises the contribution of that external funding.</li> <li>• We have not identified further specific issues here.</li> </ul>

Element	Comment
Unit cost allowance (UCA <sub>t</sub> )	<ul style="list-style-type: none"> <li>• With regards to schemes done in partnership with other stakeholders and to which other parties are also making contributions towards running costs, the unit cost allowance set should be net of these.</li> <li>• If, for example, funding from the partnering entities is not assured beyond a given year, it may be appropriate to reflect in the unit cost allowance that varying contribution. The assumed level of partner funding might change from one AMP to the next.</li> <li>• We have not identified further specific issues here.</li> </ul>
Provision for early termination (or reduction)	<ul style="list-style-type: none"> <li>• It may be desirable to allow company to invoke early termination in a setting where the company's ability to deliver the enhancement is severely hampered, or impeded altogether, by the withdrawal of support of a partnering, and critical, stakeholder (e.g. a local authority).</li> </ul>
Reporting of outturn enhancement benefits (OEB <sub>t</sub> )	<ul style="list-style-type: none"> <li>• The reporting of the outturn benefits would need to be done at the level of granularity that matches each of the "alive" benefit schedules and not at the company-wide level.</li> </ul>
Reporting of outturn operating expenditure and outturn capital expenditure (OOE <sub>t</sub> and OCE <sub>t</sub> )	<ul style="list-style-type: none"> <li>• As above, the reporting of costs would need to be done at the level of granularity matching each of the benefit schedules in this area relating to past price control determinations.</li> </ul>
Interactions with econometric benchmarking of base-plus costs	<ul style="list-style-type: none"> <li>• No specific comment.</li> </ul>

### Further comments on candidate metrics and on schedule of benefits

We set out here some further comments candidate metrics for the enhancement benefits and, associated with that, on the methodology that may need to be in place in order to develop the schedule of enhancement benefits over time.

It may be possible to develop metrics based on the ultimate outcome that these schemes seek to deliver, which relate to the quality of waters to which discharges are made. There is an array of relevant indicators of river water quality that could be drawn on for this purpose and, if this outcome-based approach to defining metrics were used, it would be necessary to specify the precise set of indicators that would be used (e.g. measures of concentration of specific pollutants, measures of BOD, measures of wildlife/biodiversity). One concern with drawing on such metrics relates to risk that the measures are too removed from the output of the schemes implemented by water companies and for which funding was made. This could arise in settings where uncontrollable external factors (e.g. contribution to river water quality from discharges made by other parties or sources) can affect the metrics that would be used to assess the extent to which the water company has or had not delivered on expected enhancement benefits.

The metric we gave as an example of a candidate measure in the table – effective additional storage capacity – is more output rather than outcomes focused. Such a metric could, compared to outcomes-focused mentioned above, mitigate concerns about how instrumental the company was in delivering the measure benefit, because, by definition, the metric would be tied to outputs of the company. We note that effective additional capacity is a measure which Ofwat used at PR19 to construct one of the cost drivers in its econometric models to benchmark storm tank capacity enhancements.

Alternative candidate metrics which strike us as being closely linked to that, are measures relating to the reduction in volume of water entering the network, or to the number of hectares of drainage area disconnected from the network. Both of these alternative candidate metrics appear to us to capture the same dimension of the enhancement as “effective additional capacity” but are using different units to do so. It would be feasible to express either of these alternative measures in terms of effective additional capacity, on a cubic metre basis, using a set of assumptions for conversion purposes.

One dimension of the benefit of enhancements that would be different relates to the extent to which the enhancement scheme helps address capacity issues that arise from the “peakiness” of demand, e.g. at storm events. Where that is an important consideration, it may be more appropriate to consider a metric tied to the ability of schemes to attenuate peak demand on the sewerage network.

In the table above, we suggested that the schedule of benefits which the enhancements would be linked to would not be defined at a company-wide level. This is for two main reasons:

- Some of the enhancement schemes in this area are linked to meeting WINEP requirements, and so tied to resolving concerns at specific sites. It would not be appropriate to construct benefit schedules that gloss over this and do not take account of statutory obligations of the companies.
- A risk with using enhancement benefits metric that is not closely related to desired outcomes is that it may encourage action that is not well-targeted. In the absence of specific WINEP obligations, if companies were held to company-wide benefit metrics, there may be risks that companies could have a financial incentive to direct action towards locations/interventions that have relatively low unit costs, but which may make less benefit to outcomes than expected and funded.

In this light, we suggest that the benefit schedule could be linked to the particular schemes, or geographic areas, put forward in the business plan. However, there may also be value in the companies, having the flexibility to depart from those schemes initially set out where circumstances change such that this would be desirable (e.g. if other developments in the area render an initial scheme no longer necessary). Or there might be value in a more flexible approach in which the specific locations for intervention over the AMP are kept flexible with assurance on how these would be selected. For instance, a water company might develop a methodology that sets out how the set of schemes covered by the benefit schedule would be prioritised, or could be revised from an initial plan, so as to maximise

benefits to outcomes. The company could be held accountable to its enhancements delivered being targeted in a way that is consistent with that methodology.

More generally, if output or capability-based metrics are used for the enhancement benefits metric, there might be a role for supplementary conditions or safeguards to help ensure that delivery is well targeted at improving outcomes. For instance, the company might commit to a methodology for how it will decide where in the system to target interventions to improve capacity, so these are aligned with where capacity increases make the most contribution to improvements in outcomes (e.g. river quality or sewer flooding risk).

A last point to make regarding the benefit schedule is that we envisage a different schedule would be produced in respect of the set of schemes put forward, and assessed, at different price controls. That is to say, at a given point in time, there would be various benefit schedules that are active concurrently, each relating to benefits of schemes assessed at different price reviews. For example, there would be a benefit schedule in respect of enhancements assessed at PR24, one relating to those assessed at PR29 and so on. Ofwat will have made separate allowances in respect of the enhancement programs presented at each of those price reviews, and the water companies will have presented separate plans in respect of each.