Anglian Water

15A. EVIDENCE ON NATURAL RATE OF RCV RUN-OFF

RESPONSIBLE BUSINESS OF THE YEAR 2017
BUSINESS IN THE COMMUNITY

THE QUEEN'S AWARDS FOR ENTERPRISE: SUSTAINABLE DEVELOPMENT 2015

love every drop.
anglianwater

Reckon LLP
Data analysis | Economic regulation | Competition law

14 August 2018

Evidence on the natural rate of RCV run-off: report for Anglian Water

1. Introduction and summary

As part of the preparation of its PR19 business plan, and completion of the Ofwat data tables, Anglian Water needs to develop proposals for RCV run-off rates, including the "natural RCV run-off rate", for each of its four wholesale price controls. Reckon LLP has been supporting Anglian Water with work on the natural rate of RCV run-off. We have worked closely with staff from Anglian Water, particularly in the development and calculation of indicators of the natural rate of RCV run-off and in the interpretation of this evidence.

Interpretation of the natural rate of RCV run-off

Ofwat describes the "natural" RCV run-off rate as the "rate which reflects the economic reality of the expenditure which the company is incurring and the long term nature of its investments". As far as we are aware, Ofwat has not provided a detailed definition. Ofwat expects water companies "to explain their choices of PAYG and RCV run-off rates by reference to the economic substance that underpins their business plans (that is, by reference to the substance of expenditure that is expensed and that which reflects the rate of RCV depreciation) and the balance between current and future customers".

We have sought to interpret the natural rate of RCV run-off based on its role within the price control framework for PR19. Our interpretation is that the natural rate of RCV run-off, expressed in £m for a given year, is an amount that represents a fair and reasonable allocation of capitalised costs to that year. This, in turn, supports a fair and reasonable allocation of capitalised costs over time, and between current and future consumers. By capitalised costs, we mean costs that are capitalised for the purposes of the RCV (i.e. those costs which do not form part of PAYG totex).

The natural rate of RCV run-off in, £m, is determined by the economic and technical aspects of the assets that are used to supply water and wastewater services, such as the costs/valuation of these assets and their economic lives. When it is expressed as a percentage of the RCV, the natural rate of RCV run-off will be mathematically dependant on the level of the RCV.

The natural rate of RCV run-off is conceptually different to that of a "depreciation rate" (where the depreciation rate is defined as an annual depreciation charge for an asset divided by the gross value of that asset). Measures of asset depreciation in £m per year can be relevant to both the

depreciation rate (%) and the natural rate of RCV run-off (%), but the calculations involved are different and there seems little basis to expect the RCV run-off rate to match the depreciation rate. For instance, if the depreciation rate for a set of assets is estimated to be 4% of the gross MEAV of those assets, this does not mean that the natural rate of RCV run-off will be 4%. If the value of the RCV is substantially less than the gross MEAV then, mathematically, a depreciation rate of 4% would imply an RCV run-off rate of substantially more than 4%. It is important not to underestimate the RCV run-off rate (%) by confusing it with the concept of a depreciation rate.

The natural rate of RCV run-off will be affected by changes over time, such as the extent and nature of enhancement expenditure.

Range of sources of evidence considered

The natural rate of RCV run-off is not something that we can measure or observe directly. There are various sources of relevant evidence, and different ways to estimate the natural rate of RCV run-off. None of these will be perfect; each will have its limitations. Our view is that it is best to consider a range of alternative indicators or measures, which make use of different sources of data and different methodologies, rather than seeking to focus on a single preferred approach.

We identified four broad sources of evidence that are particularly relevant to the natural rates of RCV run-off for Anglian Water's various wholesale activities:

- Estimates of annual depreciation charges derived from hypothetical new-build (or GMEAV) costing exercises, which represent depreciation on a current cost accounting (CCA) basis.
- Information used for statutory accounts purposes, particularly annual depreciation charges on a historical cost accounting (HCA) basis.
- Evidence from historical and forecast levels of capital maintenance expenditure.
- Evidence from Ofwat's regulatory precedent.

From this evidence we developed nine different indicators of the natural rate of RCV run-off for Anglian Water's wholesale water and wastewater activities.

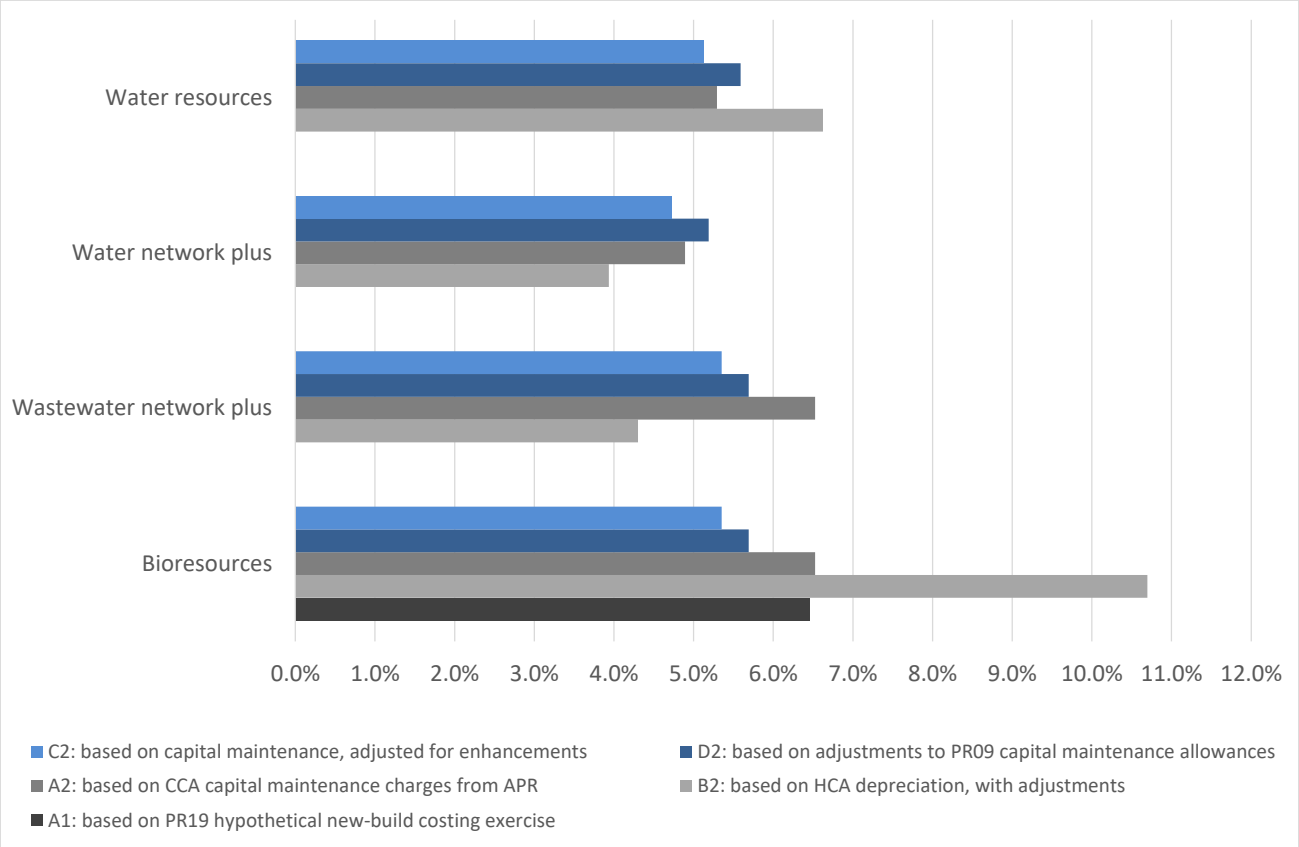
Summary of main results from analysis of indicators of RCV run-off

From an original set of nine indicators, we developed a shortlist of five preferred indicators that we judged to be most informative, in terms of the quality and relevance of the individual indicators within the shortlist and also in terms of the diversity of approaches and sources of evidence that this shortlist offered.

The original indicators that we used in our analysis relate, most directly, to the natural rate of RCV run-off for Anglian Water's activities in the financial year 2016-17. The natural rate of RCV run-off (%) for the period 1 April 2020 to 31 March 2025 may differ from the natural rate of RCV run-off in the financial year 2016-17, for a number of reasons. We calculated and applied adjustments to take account of two key factors: *(a)* increases over time in the natural rate of RCV run-off (£m) arising from enhancement expenditure in the period to 31 March 2025; and *(b)* changes over time to the level of the RCV, which is used as a denominator in the calculation of the RCV run-off rate (%). The adjustments we calculated varied by wholesale price control unit, and were approximations that drew on business plan forecasts provided to us by Anglian Water.

Figure 4 presents our preferred indicators of the natural rate of RCV run-off for the period from 1 April 2020 to 31 March 2025 for each price control unit.

Figure 1 Short listed indicators of natural rate of RCV run-off with adjustment for period 2020-2025



Guidance on the natural rate RCV run-off for PR19

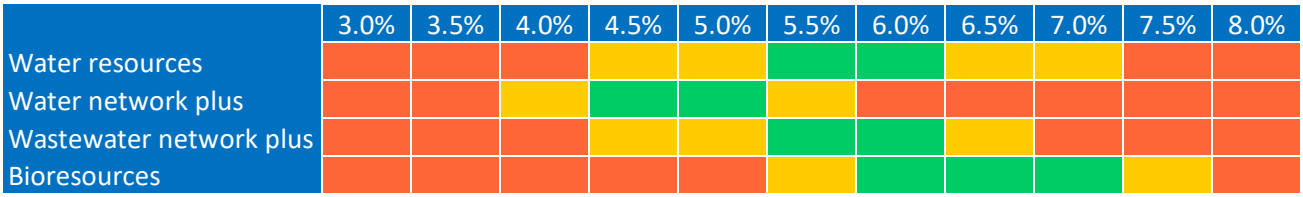
We can see from Figure 1 above that the indicators provide a range of estimates for the natural rate of RCV run-off (%). There is no need to choose a single preferred indicator. Instead, the main focus is in choosing appropriate figures or assumptions for the natural rate of RCV run-off for each

of the four wholesale controls, drawing on the range of evidence available. With this in mind, it is helpful to assess the merits of *alternative assumptions* for the natural rate of RCV run-off, rather than focusing exclusively on the merits of alternative indicators or information sources.

In Figure 2 we present a serious of options for the assumption on the natural rate of RCV run-off (%) from 3% to 8%, in discrete steps of 0.5%. For each discrete option, and for each of the four separate wholesale price controls for PR19, we provide a high-level assessment of the *relative* merits of that figure compared to other figures in the table. The green zone can be seen to represent the set of figures which we judge to be most well-supported by the analysis presented in this report as an assumption for the natural rate of RCV run-off. The ranking of red/amber/green reflects a degree of judgment, informed by our understanding of the relevance and drawbacks of the indicators used and of possible explanations for the differences in results that we see.

As set out more fully in the main body of report, a number of caveats apply to that assessment. For instance, the green zone does not mean the correct zone; it is a relative ranking compared to alternative possible assumptions for the RCV run-off rate, based only on the work presented in this report. Additional analysis and more detailed investigation could conceivably shrink, expand or shift the green zone. Furthermore, Anglian Water may have other evidence, or further considerations (e.g. bill impacts) beyond those captured in this report, which could affect the assessment of the appropriate RCV run-off rate. Despite the caveats, we consider that Figure 2 provides a useful tool to help guide Anglian Water's assumptions on the natural rate of RCV run-off as it prepares its PR19 business plan.

Figure 2 High-level comparisons of alternative run-off rate assumptions



Elements of the estimates in Figure 1 and of the assessment in Figure 2 draw on forecasts provided to us by Anglian Water for enhancement expenditure and RCV growth in the period to 31 March 2025. While we would not expect dramatic changes in results, it is possible that changes to these forecasts before the business plan is finalised could affect the red/amber/green ranking for specific figures.

Structure of report

The remainder of this report is structured as follows:

- Section 2 summarises our interpretation of the natural rate of RCV run-off, within the context of the Ofwat's PR19 review.
- Section 3 provides an overview of the various sources of evidence and indicators which we have used, explaining their relevance to the natural rate of RCV run-off, and explains how we have calculated adjustment to estimate the natural rate over the period to 31 March 2025.
- Section 4 presents results for the evidence and indicators we have used, and provides guidance to support Anglian Water's business plan proposals on the natural rate of RCV run-off for each of the PR19 wholesale price control units.

This report is supported by three appendices. Appendix 1 provides further information on our interpretation of the conceptual basis for the natural rate of RCV run-off. Appendix 2 provides further information on the nine indicators of the natural rate of RCV run-off that we used as part of our analysis. Appendix 3 discusses a possible adjustment to the run-off rate for the bioresources price control, beyond what we see as the natural rate of RCV run-off.

2. Interpretation of the natural rate of RCV run-off

This section provides a short introduction to the natural rate of RCV run-off, summarising our understanding of its interpretation and conceptual basis. Appendix 1 provides further explanation.

Ofwat's PR19 data tables require proposals from companies on the "natural RCV rate", which is described as the "rate which reflects the economic reality of the expenditure which the company is incurring and the long term nature of its investments".[1] Beyond this, Ofwat's PR19 final methodology document does not seem to provide any more detailed guidance on the definition of the natural rate of RCV run-off or how it should be determined. Ofwat's approach seems to allow flexibility to companies in the approach to the natural rate of RCV run-off, and the natural PAYG rate, but requires companies to justify the rates that they have chosen. Ofwat expects "companies to explain their choices of PAYG and RCV run-off rates by reference to the economic substance that underpins their business plans (that is, by reference to the substance of expenditure that is expensed and that which reflects the rate of RCV depreciation) and the balance between current and future customers".[2] As far as we are aware, Ofwat has not provided detailed guidance on the definition of the natural rate of RCV run-off.

One point first on terminology. The PR19 data tables seek input on the natural rate of RCV run-off, in percentage terms, for each year in the period 2020-21 to 2029-30. Our view is that the natural rate of RCV run-off is best thought about as something that exists in £m per year, which can then be converted to a percentage by dividing the natural rate of RCV run-off for that year (in £m per year) by the value of the RCV in that year (£m). As discussed further below, the underlying concept for the natural rate concerns the allocation of an amount of money over time and exists first and foremost in £m rather than as a percentage. We refer below to the "natural rate of RCV run-off (£m)" or the "natural rate of RCV run-off (%)" in cases where it is important to distinguish between these concepts.

We have sought to interpret the natural rate of RCV run-off based on its role within the wider price control framework for PR19.[3] Our interpretation is that the natural rate of RCV run-off, expressed in £m for a given year, is an amount that represents a fair and reasonable allocation of capitalised costs to that year. This, in turn, supports a fair and reasonable allocation of capitalised costs over time and between current and future consumers. By capitalised costs, we mean costs that are

---

[1] See tables W4, Wn4, WWn6, Bio5 (version sent to Reckon by Anglian Water 8 January 2018).

[2] Ofwat (2017) *Delivering Water 2020: Our methodology for the 2019 price review Appendix 12: Aligning risk and return*, page 110.

[3] We note that the term "RCV natural rate" is used in the CMA Bristol Water determination (2015, Appendix 11.1, pages 1-2). We do not consider that this is the same thing as Ofwat means for the PR19 natural RCV run-off rate. Nonetheless, we have taken account of the points made by the CMA on the PAYG rate and RCV run-off rate in our work here.

capitalised for the purposes of the RCV (i.e. those costs which do not form part of PAYG totex). The analysis presented in this report is based on this interpretation.

We do not consider that it is wise to specify the definition of the natural rate of RCV run-off more precisely than this. Doing so could distract attention from the underlying idea of a fair and reasonable allocation of capitalised costs over time. Methods for calculating a fair and reasonable allocation of capitalised costs over time that work well in one set of circumstances may be unsuitable or misleading in another set of circumstances.

As a guiding principle, but not a hard and fast rule, we consider that a reasonable allocation of capitalised costs over time for wholesale water and wastewater supplies is one which is consistent with the allocation we would expect in a hypothetical competitive market for those supplies. There is regulatory precedent for this principle: the use in previous price control reviews of CCA depreciation figures calculated by reference to hypothetical modern equivalent asset values (MEAV) can be supported by economic theory on how prices are formed in competitive markets involving long-lived assets and nominal price inflation. At the same time, we would not want to rely on the idea that (hypothetical) competitive markets would necessarily produce a fair and reasonable allocation of capitalised costs over time in all cases, so we should allow for the possibility of identifying an alternative basis for the allocation if justified by the circumstances. The overriding consideration is of a fair and reasonable allocation of capitalised costs over time.

Based on the contents and format of Ofwat's PR19 data tables, we consider that the natural rate of RCV run-off reflects the "economic reality" and "substance" of expenditure that is to be capitalised in the RCV and involves a reasonable balance between current and future customers. We highlight below a number of specific aspects of the natural rate of RCV run-off, as we understand it, which we have taken into consideration in this report:

- **Interactions with PAYG rate**. There are interactions between the approach taken to determining the PAYG rate and the natural rate of RCV run-off. Anglian Water told us that, for PR19, it plans to propose a PAYG rate that is consistent with the proportion of business plan totex that would be classified as opex, rather than capitalised, under the capitalisation policy used for its statutory accounts. We take this as a key assumption for our work, as this affects the natural rate of RCV run-off.

- **Interactions with level of RCV**. There is no causal link from the prevailing or forecast level of the RCV to the natural rate of RCV run-off in £m. The natural rate of RCV run-off in £m is determined by more fundamental factors, such as the costs/valuation of assets used to provide services and the economic lives of those assets. However, because of its mathematical role as the denominator in the calculation, the level of the RCV will affect the natural rate of RCV run-off when expressed as a percentage.

- **Separate concept to depreciation rate**. The natural rate of RCV run-off is conceptually different to that of a "depreciation rate", which can be defined as an annual depreciation charge for an asset divided by the gross book value or gross value of that asset. For instance, if the depreciation rate for a set of assets is estimated to be 4% of the gross MEAV of those assets, then this, by itself, tells us nothing about the RCV run-off rate. But we can draw some high-level inferences about the relationship with the natural rate of RCV run-off if we have a view on the relationship between the RCV and gross MEAV. If the value of the RCV is substantially less than the gross MEAV – and there are good grounds to expect this to be the case – then a depreciation rate of 4% of gross MEAV would imply an RCV run-off rate of substantially more than 4%. It is important not to underestimate the RCV run-off rate (%) by conflating it with the concept of a depreciation rate.

- **Interactions with enhancements**. In terms of a fair and reasonable allocation of capital costs over time, we would expect capital enhancement expenditure, which extends or augments the capital assets used, to be remunerated on a 0% PAYG basis, with an RCV run-off rate that reflects the economic lives of the enhancement assets (this fits with the assumption above that the PAYG rate will be consistent with the proportion of totex that would be classified as opex, rather than capitalised for accounting purposes). A programme of enhancement expenditure should increase the natural rate of RCV run-off in £m due to the additional run-off for the additional enhancement assets. However, a programme of enhancement expenditure could either increase or decrease the natural rate of RCV run-off (%). This is because the programme will affect both the natural run-off in £m (the numerator in the run-off rate (%) calculation) and the level of the RCV (the denominator) to different degrees, depending on the nature of the enhancement expenditure and other circumstances.

- **Customer contributions to enhancements**. We agreed with Anglian Water that it seems a reasonable approach to include, within the scope of the natural rate of RCV run-off, run-off for enhancement expenditure even where this is funded by upfront customer contributions (e.g. through charges to developments for new distribution network infrastructure). Under this approach, the upfront contribution would be treated as benefitting tariff customers over the long term, through a lower allowed return in the price control calculation (customer contributions being used to offset RCV growth from enhancements) and wholesale tariffs would include a contribution in relation to enhancement assets that the water company is liable to maintain and replace as and when needed.

- **Exclusion of financeability and affordability considerations**. On our interpretation, the natural rate of RCV run-off should exclude consideration of factors relating to financeability and affordability, such as variations to the amount of RCV run-off to support the transition from RPI to CPI, improve financial ratios used by credit rating agencies or help improve perceived affordability of bills. This is not to rule out an approach that makes separate adjustments to the

RCV run-off rate on account of these considerations, but we would not see these as part of the assessment of the natural rate of RCV run-off.

3. Sources of evidence on the natural rate of RCV-run off

Introduction

This section describes how we have used available evidence to produce indicators of the natural rate of RCV run-off for Anglian Water for the period 1 April 2020 to 31 March 2025. It is organised as follows:

- We provide an overview of main sources of evidence that we used.
- We take each of the four main sources of evidence in turn and describe its relevance to the natural rate of RCV run-off and what indicators we drew from that evidence.
- We present a high-level comparison of each of the indicators used, summarising the benefits and drawbacks of each.
- We explain our methodology for adjusting estimates for application to the 2020-2025 period.

This section is supported by appendix 2, which provides further information on how we calculated each of the indicators and on their benefits and drawbacks.

Overview of main sources of evidence used

The natural rate of RCV run-off is not something that we can measure or observe directly. There are various sources of relevant evidence, and different ways to estimate the natural rate of RCV run-off. None of these will be perfect; each will have its limitations. Our view is that it is best to consider a range of alternative indicators or measures, which make use of different sources of data, rather than seeking to focus on a single preferred approach.

We identified four broad sources of evidence that are particularly relevant to draw on:

- Estimates of annual depreciation charges derived from hypothetical new-build (or GMEAV) costing exercises, which represent depreciation on a current cost accounting (CCA) basis.
- Information used for statutory accounts purposes, particularly on annual depreciation charges on a historical cost accounting (HCA) basis.
- Evidence from historical and forecast levels of capital maintenance expenditure.
- Evidence from Ofwat's regulatory precedent.

Table 1 below provides an overview of nine specific indicators of the natural rate of RCV run-off (%) that we have defined and estimated for the purposes of this project. This set of measures reflects the data available to us and our prioritisation of the potential approaches. The table shows how the nine indicators relate to each of the four main sources of evidence listed above. The table is not intended to imply that each indicator only uses one type of data source: especially where we make adjustments we use multiple sources of information.

Table 1 Overview of potential indicators for natural rate of RCV run-off

Source of evidence forming basis for indicator	Indicators used of RCV run-off	Indicator ID
(A) Hypothetical new-build costing exercise	Indicator based on depreciation charge from PR19 hypothetical new-build costing exercise	A1
	Indicator based on CCA capital maintenance charges from APR	A2
	Indicator based on application of weighted-average asset life to non-infra insurance valuation	A3
(B) Statutory accounts depreciation charges	Indicator based on HCA depreciation from APR	B1
	Indicator based on HCA depreciation with adjustments	B2
(C) Capital maintenance expenditure	Indicator based on capital maintenance expenditure only	C1
	Indicator based on capital maintenance expenditure with partial adjustment for run-off enhancements	C2
(D) Ofwat regulatory precedent	Indicator based on adjustments to Ofwat PR04 FD capital maintenance allowances	D1
	Indicator based on adjustments to Ofwat PR09 FD capital maintenance allowances	D2

Indicators B1 and B2 are calculated separately for each PR19 wholesale price control unit (i.e. distinguishing between water resources, water network plus, wastewater network plus and bioresources). Indicator A1 is focused on bioresources only, for which there was a special asset valuation exercise in 2017. For the other indicators, limitations in available data meant that we calculated the indicators at the level of wholesale water and wholesale wastewater (indicators A2, A3, C1 and C2) or for water and wastewater activities combined (indicators D1 and D2).

There may be other types of evidence that we have not covered which could provide a useful additional perspective. For example, the PR19 assumptions on the natural rate of RCV run-off used by other companies could also be relevant. These were not available in time for this work. Any

comparisons between companies should take account of factors identified in Appendix 1, such as the PAYG rate and the extent of any RCV discount, which could give rise to significant differences between companies in the natural rate of RCV run-off.

In the sub-sections that follow, we provide further information and discussion on the various indicators we have used, organised according to the four main sources of evidence.

The bulk of our analysis for the nine measures is based on indicators that use data available up to the financial year 2016-17. At the time of our analysis, this is the most recent financial year for which audited statutory and regulatory accounting data are available. In addition, we identified that for the purposes of estimating the RCV run-off rate for the price control period from 1 April 2020 to 31 March 2025, there is merit in making adjustments to take account of anticipated changes over time. We discuss this in the final sub-section within this section.

Evidence from hypothetical new-build costing exercises

Drawing on the discussion in section 2 and Appendix 1, the most ***conceptually relevant*** evidence on the natural rate of RCV run-off (£m) for wholesale water and wastewater activities would come from measures of the current cost (CCA) annual depreciation charges for the assets falling under the RCV, calculated on a hypothetical efficient new-build basis (for both infrastructure and non-infrastructure assets) taking account of estimated economic lives of new-build assets.

In practice, whether current cost depreciation measures provide good evidence on the natural rate of RCV run-off will depend on the extent to which approximations are made in their estimation and on data issues affecting their calculation.

We have considered three main sources of evidence that fit within this category:

- **Indicator A1** is based on a calculation of the annual depreciation charge for bioresources activities based on the hypothetical efficient new-build costing for Anglian Water's bioresources assets, and assumptions on economic asset lives, from the 2017 bioresources asset valuation exercise.

- **Indicator A2** is based on the "capital maintenance charges" reported in table 4G of the APR, which provides financial performance information on a current cost rather than historical cost basis. Anglian Water told us that the figures for these charges are based on an inflation-adjusted roll-forward of figures reported up to 2015 in the regulatory accounts. They should cover both CCD and IRC.

- **Indicator A3** is based on an estimate of the new-build or replacement cost of Anglian Water's non-infrastructure assets, which was carried out in 2015 for insurance purposes. This has the benefit of being based on more recent data than indicator A2. To use this as an indicator of

RCV run-off we applied high-level assumptions on weighted-average asset lives to the aggregate figures for wholesale water and for wholesale wastewater. This indicator excludes account of run-off or depreciation for any infrastructure assets.

The indicator A3 uses a particularly approximate calculation methodology. It may be possible to produce a refined version of this indicator that uses more granular calculations of depreciation and also includes depreciation for any infrastructure assets. However, such an exercise would tend towards a fresh GMEAV / CCD estimation exercise across wholesale water and wastewater activities, and this was not possible within the context of this report.

Evidence from statutory accounts depreciation charges

Another source of information on the natural rate of RCV run-off (£m) is the depreciation charges based on historical cost data used for statutory financial reporting. Compared to the approach above, the key benefits of this source of information are that:

- It is does not rely on hypothetical new-build costing exercises, which may involve estimation error and, in any event, have not been fully updated since the PR09 exercise for any wholesale activities beyond bioresources.
- The underlying data are updated annually and used for wider financial reporting purposes.

One limitation of this source of information is that, being based on assets purchased and commissioned in the past, it does not take full account of changes over time (e.g. in terms of asset management practices, technologies and asset cost inflation).

Furthermore, there are limitations in the accounting information in the context of RCV run-off. Anglian Water told us that some pre-privatisation assets have been recorded in the asset register in a way that has led them being depreciation at a faster rate than would be the case for equivalent assets now, and that there are substantial amounts of pre-privatisation assets that are still in use but have been fully depreciated. These circumstances may lead to the depreciation measures based on statutory accounting information understating the level of depreciation that would be consistent with the natural rate of RCV run-off, particularly in relation to long-life infrastructure assets.

We used two indicators (B1 and B2) that draw on information used for statutory depreciation. Indicator B1 is based on depreciation and amortisation charges reported in table 2A of the APR. Indicator B2 is based on statutory depreciation and amortisation charges that are adjusted in two ways, to help make them more relevant to the natural rate of RCV run-off. First, to remove the effects of the fair value revaluation adjustment from 1 April 2013 (under IFRS). Second, to adjust for the effects of inflation over time, approximated using RPI indexation. Anglian Water's adjustments for inflation were calculated and applied at the granular asset level in the accounting information, taking account of asset age.

Evidence from capital maintenance expenditure

A further source of information on the natural rate of RCV run-off (£m) is the level of expenditure on capital maintenance activities (i.e. capital expenditure excluding enhancements).

In a theoretical steady state, capital maintenance spend would match the natural level of RCV run-off. However, in practice the natural RCV run-off could differ substantially from the level of capital maintenance spend, due to factors such as the lumpiness of capital expenditure, technological change and other innovations, and business growth.

Because of the differences between reality and a theoretical steady state, measures based on the level of capital maintenance expenditure have a conceptually weaker link to the natural rate of RCV run-off than the depreciation-based measures above. Indeed, the practices of depreciation and amortisation can be seen as a way to achieve a more appropriate allocation of capital costs over time than an approach based on cash spend in year. Nonetheless, there are potential benefits from considering indicators based on the level of expenditure on capital maintenance activities, especially if the spend can be averaged over a number of years to reduce the effect of investment lumpiness. Indicators based only on capital maintenance spend are not reliant on estimates of hypothetical new-build costs, asset values or asset lives.

We used two indicators based on capital maintenance data. Indicator C1 is based on the annual average of Anglian Water's forecast capital maintenance expenditure over period the ten-year period 2015-16 to 2024-25. This uses a combination of outturn expenditure data and expenditure forecasts provided to us by Anglian Water.

Where the asset base has grown (e.g. enhancements) the additional capital assets would contribute to the natural rate of RCV run-off upon commissioning, but there will tend to be a significant time lag (e.g. reflecting the asset life for the enhancement assets) before these new assets need replacement and show up as capital maintenance expenditure. So, all else equal, capital maintenance expenditure will tend to under-state RCV run-off in a growing business. Indicator C2 is based on C1, but includes an adjustment to make allowance for the RCV run-off from assets installed as enhancements that are not yet due for replacement. We calculated this using historical data on Anglian Water's enhancement expenditure, broken down by asset age categories.

Evidence from Ofwat regulatory precedent

A final source of information on the natural rate of RCV run-off is the assumption that Ofwat has made on the amount of capital maintenance charges (or RCV run-off) to include in its determinations for Anglian Water for previous price control periods.

At least for price reviews up to PR09, these assumptions represent regulatory decisions on the appropriate allocation of capital costs over time (these decisions would themselves have reflected

other relevant evidence such as CCA depreciation charges calculated from hypothetical new-build costing exercises).

We used two indicators, D1 and D2, which were based on Ofwat's price control allowances for Anglian Water's capital maintenance charges (covering CCD and IRC) at the PR04 and PR09 reviews respectively.

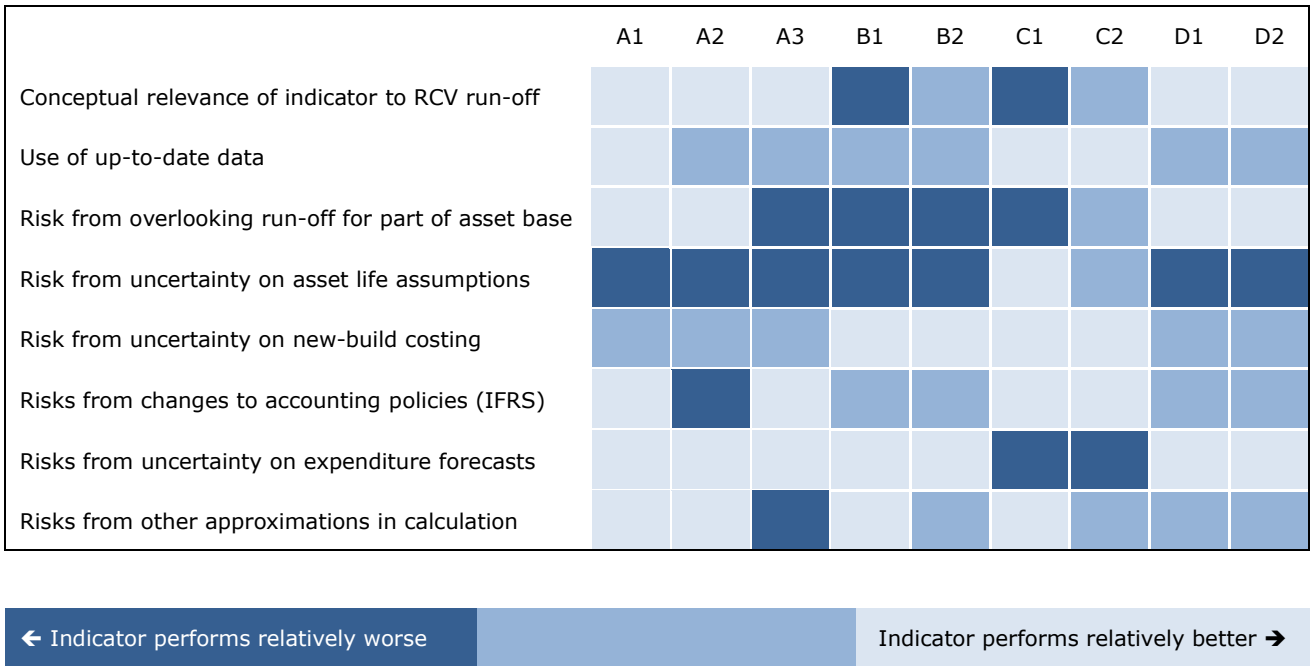
In making use of these past regulatory decisions it seemed important to try to make adjustments, as far as possible, for changes over time that would significantly affect the natural rate of RCV run-off. The changes we identified as particularly important were: *(a)* asset price/cost inflation; *(b)* growth in the scale of the asset based (e.g. due to customer growth and quality enhancements); and *(c)* accounting policy changes that affect the balance between PAYG expenditure and expenditure remunerated through the RCV.

We thought that Ofwat's final determinations for PR14 were unlikely to provide useful evidence on the natural rate of RCV run-off for PR19. PR14 was the first price control review following Ofwat's introduction of a totex approach. Our impression is that the approach to RCV run-off and depreciation allowances for PR14 did not give weight to the concept of the natural rate of RCV run-off or to a focus on fair allocation of charges between current and future customers. Instead, weight was given to the idea that the RCV run-off rate could be used to help manage any issues relating to credit rating metrics and to achieve nearer-term affordability objectives. Ofwat's approach to PR14 gave much less emphasis than the PR04 and PR09 reviews to the types of considerations that are relevant to the natural rate of RCV run-off. Ofwat's approach to PR19, which seeks input from companies on the natural rate of RCV run-off, before any adjustments for financeability are considered, seems closer to that for PR04 and PR09.

High-level comparison of indicators

Table 2 presents a high-level comparison of each of the indicators introduced above, summarising their benefits and drawbacks. We identify a number of dimensions in which each indicator may perform better or worse than the other indicators used, which affect the overall accuracy of the indicator as means to estimate the natural rate of RCV run-off. These include the conceptual relevance of the indicator to RCV run-off (i.e. how direct an indicator of the natural rate of RCV run-off is it?) and the vulnerability of the indicator to various risks that may affect its accuracy, given the data available. In the table, a darker blue shading shows where an indicator performs relatively worse against the specified criterion and a lighter shading shows where an indicator performs relatively better. The assessment made is entirely relative between the indicators; it does not indicate absolute levels of performance or risk. Where indicators are ranked at the same level, this does not necessarily mean that they are equivalent in respect of the assessment criterion, but they are treated as similar and not differentiated for the purposes of the comparison presented here.

Table 2 High-level comparison of indicators



This high-level comparison is intended to help draw out some of the differences between the indicators. It is not intended to provide a comprehensive evaluation of all relevant considerations or to allow the performance of each indicator to be condensed into a simple score. Judgement and wider knowledge is needed when interpreting results from these indicators: it is not appropriate to give equal weight to each issue in the table without understanding what lies behind them.

In any event, our key point is that, for the purposes of estimating the natural rate of RCV run-off, it makes sense to consider a range of different evidence and indicators, so that the benefits and risks from different approaches can be offset against each other.

Table 2 does not compare the various indicators in terms of their applicability to each of the four wholesale price control units for PR19. For instance, indicator A1 was only calculated for bioresources, some indicators were only calculated at the level off wholesale water and wholesale wastewater (e.g. A2 and C1) and some only for water and wastewater combined (D1 and D2). We comment further on this issue in section 4.

We provide further supporting information that the table draws on in appendix 2.

Methodology for adjusting estimates for application to 2020-2025 period

The various indicators set out above relate, most directly, to the natural rate of RCV run-off for Anglian Water's wholesale water and wastewater activities in the financial year 2016/17 (the most recent year for which audited data was available in time for this project). For the calculation of the

indicators, we have used the 2016-17 as the denominator and most indicators use data and estimates relating to the period up to, and including, 2016-17.

However, our ultimate interest is in the estimation of the natural rate of RCV run-off (%) for the period 1 April 2020 to 31 March 2025. This may differ from the natural rate of RCV run-off in the financial year 2016-17, in particular due to:

- Increases over the period to 31 March 2025 in the natural rate of RCV run-off (£m) arising from enhancement expenditure in that period (e.g. a system with greater asset capacity to serve more customers would tend to have a higher level of RCV run-off).

- Changes over the period to 31 March 2025 to the level of the RCV, which is used as a denominator in the calculation of the RCV run-off rate (%). The RCV will evolve over time according to a number of different factors, including the balance between RCV additions (reflecting enhancements and capital maintenance) and RCV run-off.

These strike us as the main factors that may lead to changes in the natural rate of RCV run-off over time, although they are not the only conceivable issues.

We have carried out analysis that takes account of the two main factors above so that we can make an adjustment to our estimated indicators of the RCV run-off rate for the 2016-17 business to enable it to be applied as a RCV run-off rate for the period 1 April 2020 to 31 March 2025. To do so, we draw on forecasts provided by Anglian Water of its enhancement programme to 2025 and of its RCV.

Our methodology is summarised as follows:

1. We used forecasts provided by Anglian Water of its enhancement expenditure in the period from 1 April 2017 to 31 March 2025. We combined this with approximate estimates provided by Anglian Water of the allocation of its enhancement expenditure between three high-level asset life categories, to produce an approximate estimate of the annual depreciation charge (in £) arising from this enhancement expenditure. We assumed as a simple approximation that the run-off applies from the start of the year in which expenditure is incurred. We took these depreciation charges as estimates of the natural rate of RCV run-off (in £m) arising from the enhancement spend forecast for each year of the period 1 April 2017 to 31 March 2025.

2. We calculated the implied RCV run-off in (£m) for a given assumption on the RCV run-off rate for the 2016-17 business (%). We added this to the figures for run-off from enhancements under item (1) above; this produced an estimate of total RCV run-off (£m) for the business in the period 1 April 2020 to 31 March 2025, taking account of both the assets at 2016-17 and forecast enhancements in the period to 31 March 2025.

3. We used initial forecasts provided by Anglian Water of its RCV over the period 1 April 2020 to 31 March 2025. In doing so, we recognised a potential internal consistency problem: our interest here is in estimating the RCV run-off rate but the forecasts of the RCV provided by Anglian Water were themselves based on initial assumptions on the RCV run-off rate. We made a revision to the RCV forecasts correct for differences between *(a)* the RCV run-off (in £m) assumed in the calculation of the RCV forecast provided to us and *(b)* the RCV run-off estimated under (2) above.

4. We divided the total RCV run-off in £m from (2) above by the revised RCV estimate in (3) above to produce an estimate of the natural rate of RCV run-off for each of the financial years in the period 1 April 2020 to 31 March 2025. We condensed the figures for each of the five years into a single figure, calculating a weighted average of the annual figures with weights based on the value of the RCV in each year.

We applied this methodology separately for each wholesale price control unit. We implemented the methodology in Excel and used this to estimate, for various different assumptions on the RCV run-off rate for the 2016-17 business, what the implied natural rate of RCV run-off (%) would be for the period 1 April 2020 to 31 March 2025. We present results from this analysis in section 4.

4. Results and guidance on the natural rate of RCV run-off

Introduction

This section presents the results for each of the indicators described in section 3, and provides guidance on their implications for the natural rate of RCV run-off for PR19. It is structured as follows:

- We present and discuss the evidence from the nine indicators of the natural rate of RCV run-off that we specified in section 3.
- We provide results from our methodology for calculating an adjustment to the RCV run-off rate to take account of impacts from forecasts of enhancement expenditure and RCV growth in the period to 31 March 2025.
- We provide indicators of the natural rate of RCV run-off for the period 1 April 2020 to 31 March 2025, drawing on a short list selected from the nine indicators and the application of the adjustment for enhancements and RCV growth.
- We draw out guidance for the choice of the natural rate of RCV run-off for each wholesale price control unit for the period 1 April 2020 to 31 March 2025.

Evidence from the indicators of the natural rate of RCV run-off

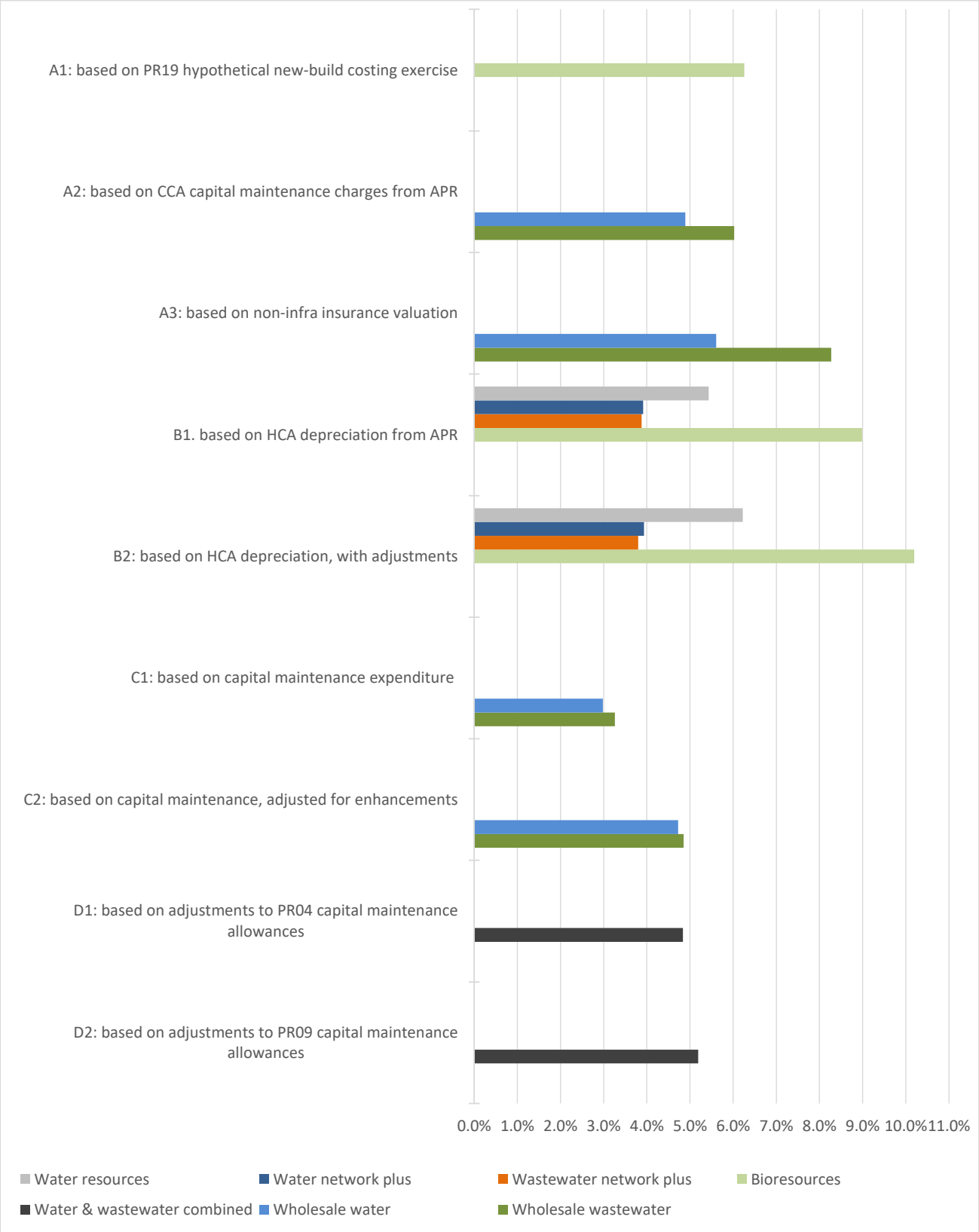
Figure 3 presents results for each of the indicators of the natural rate of RCV run-off introduced in Table 1 above. The estimates relate primarily to the financial year 2016/17. The indicators are presented in the order of magnitude to help the presentation. All of the indicators we use are approximations.

We highlight the following points on the interpretation of the results in Figure 3.

There is considerable variation across the indicators. This shows the benefit of considering a range of evidence. It also shows the level of uncertainty that arises in seeking to use available evidence to inform proposals for the nature rate of RCV run-off for each of the four wholesale price controls.

Conceptually the current cost depreciation indicators (A1, A2 and A3) are the most relevant to the natural rate of RCV run-off and, on their own, these point to figures towards the upper end of the range shown in Figure 3. However, the likely margin for error on these (and other indicators) is such that it would not be wise to rely on them exclusively.

Figure 3 Evidence from identified indicators of natural rate of RCV run-off (%) for 2016-17



The 2017 bioresources asset valuation exercise involved a detailed assessment of the costs of a hypothetical new-build design across the bioresources business and granular assumptions on economic asset lives. In the case of bioresources, indicator A1 is likely to be a more accurate indicator of the natural rate of RCV run-off than indicator A2, which is based on the PR09 MEAV exercise. That exercise is a little out-of-date and bioresources assets would have been a small aspect of the overall valuation and would not have been considered in as much detail as for the 2017 valuation exercise. Furthermore, indicator A2 may not fully reflect changes to accounting practices relating to IFRS and may over-state the relevant depreciation and RCV run-off (e.g. due to infrastructure expenditure previously categorised as IRE now falling under opex).

For wastewater network plus, and for wholesale water, indicator A2 is more relevant than indicator A1 which is focused on bioresources. We see the indicator based on the insurance valuation (A3) as providing an additional perspective, but not one that significant weight should be attached to on its own, given limitations in its coverage and the calculation of depreciation at an aggregate rather than granular level.

The indicators derived from historical cost information used for statutory accounting purposes (B1 and B2), provide an additional perspective. Based on the information available, our impression is that both indicators are more likely to understate than overstate the natural rate of RCV run-off, especially for water network plus and wastewater network plus, which involve a greater role for long-life infrastructure assets. Anglian Water told us that for the data feeding into HCA depreciation charges, there is under-representation of pre-privatisation infrastructure assets, combined with very long asset life assumptions for post-privatisation assets. If a more comprehensive and consistent approach was taken to the treatment of all infrastructure assets in the depreciation calculations we would expect both B1 and B2 to be higher.

Indicator B2 involves an attempt to adjust for inflation over time, and represents an improvement on indicator B1, but, all the same, it seems more likely to be an underestimate than an over-estimate due to the under-representation of pre-privatisation assets.

The difference between the indicator C1, based on Anglian Water's capital maintenance expenditure, and the various depreciation measures (A1 to A3) was greater than we had anticipated. While we would not expect a measure based on cash expenditure to match an annual depreciation figure, the extent of the difference is worthy of attention. Indicator C1 is relevant to the rate of RCV run-off in a steady state, where the scale and service levels of the company are unchanging. But Anglian Water's business is, and has been, far from a steady state. In a context of substantial enhancement expenditure, and adoption of assets such as private sewers, capital maintenance expenditure will tend to be a lagging indicator of RCV run-off. It may be some time before enhancement projects (and asset adoptions) give rise to significant capital maintenance

spend but they should form part of the natural rate of RCV run-off from the commissioning (or adoption) date.

Giving some attention, in the overall assessment, to indicators that take account of capital maintenance expenditure, alongside the depreciation figures, seems a good idea, as it brings a perspective that is not reliant on estimates of asset values or on asset life assumptions. However, our analysis showed that the effect of historical enhancement expenditure on the natural rate of RCV run-off could be very large. Focusing on capital maintenance expenditure alone could lead to a major error in the assessment, leading to a substantial under-estimation of the natural rate RCV run-off in a business that has experienced significant historical enhancement expenditure.

Indicator C2 involves a partial adjustment to allow for run-off of assets installed previously as enhancements and whose assumed asset life has not yet expired so that we would not expect them to show up in capital maintenance. While the adjustment used for indicator C2 involves some approximation (and does not capture enhancements before 1997-98), it seems better than indicator C1, because it makes some allowance for the RCV run-off that is appropriate for enhancements which would tend to be overlooked by indicator C1.

Given the issues affecting the various indicators above, we consider that it is also insightful to consider the two indicators based on Ofwat's PR04 and PR09 price control assumptions (D1 and D2). These indicators are less direct evidence of the natural rate of RCV run-off than indicators A1 and A2 above, because Ofwat's price control determination on allowances for CCD and IRC may have reflected considerations beyond those that matter to the natural rate of RCV run-off. We have made adjustments as part of the calculation of indicators to take some account of changes over time that will affect the natural rate of RCV run-off in the period to 2016-17, including enhancements and changes to accounting policies (IFRS).

Estimating RCV run-off for the 2020-2025 period

The various indicators set out above relate, most directly, to the natural rate of RCV run-off for Anglian Water's activities in the financial year 2016-17. As highlighted in section 3, the natural rate of RCV run-off (%) for the period 1 April 2020 to 31 March 2025 may differ from the natural rate of RCV run-off in the financial year 2016-17, particularly due to:

- Increases over time in the natural rate of RCV run-off (£m) arising from enhancement expenditure.
- Changes over time to the level of the RCV, which is used as a denominator in the calculation of the RCV run-off rate (%). These changes may be driven by factors such as the scale of enhancements and the balance between RCV run-off and capital maintenance expenditure over the period.

We have carried out analysis that takes account of these two main factors so that we can make an adjustment to our estimated RCV run-off rate for the 2016-17 business to enable it to be applied as a RCV run-off rate for the period 1 April 2020 to 31 March 2025. Our methodology is described in section 3 and draws on forecasts provided by Anglian Water of its enhancement programme and of its RCV in the period to 31 March 2025

The results from this analysis provide an adjustment that could be applied to an estimate of the natural rate of RCV run-off (%) for 2016-17 to better reflect the period 1 April 2020 to 31 March 2025. The size of the adjustment that we calculate varies according to the estimate made for the 2016-17 period and varies by price control business unit (we calculated the adjustment separately taking account of enhancement expenditure forecasts and RCV forecasts for each wholesale price control unit).

In the case of the bioresources price control unit, we calculate two different adjustments that apply to different indicators. One adjustment is to be applied to indicator A1 only. Indicator A1 is based on a hypothetical new-build costing of bioresources assets at 31 March 2020 and so the adjustment does not need to take account of enhancements in the period 1 April 2018 to 31 March 2020 as these should already be incorporated. For all other indicators, which relate primarily to the position in 2016-17, the adjustment takes account of enhancements in the period 1 April 2018 to 31 March 2020. This means we have two types of adjustments for bioresources. This is not an issue for other wholesale price control units because indicator A1 is only available for bioresources.

We present results, considering a range of hypothetical assumptions on the natural rate of RCV run-off for 2016-17, for each wholesale price control unit, in Table 3. In the table, the figures indicate the adjustment to apply as a percentage of RCV (not as a percentage of the run-off rate to be adjusted). For example, if the run-off rate for water resources for the 2016-17 business is considered to be 5% and the adjustment factor is indicated as +0.5% then the adjusted run-off rate would be 5.5%.

Table 3 Estimated adjustment to natural run-off rate for changes from 2016-17 to 2020-2025 period

Assumed RCV run-off rate for 2016-17 business	Estimated adjustment to the implied RCV run-off for 2020-2025 business based on forecast enhancements and RCV (weighted average across the five financial years)				
	Water resources	Water network plus	Wastewater network plus	Bioresources (indicator A1)	Bioresources (other indicators)
4.0%	+0.3%	+0.0%	+0.4%	+0.0%	+0.2%
5.0%	+0.4%	+0.0%	+0.5%	+0.1%	+0.2%
6.0%	+0.4%	+0.1%	+0.6%	+0.2%	+0.4%
7.0%	+0.6%	+0.3%	+0.8%	+0.4%	+0.6%

The results indicate that the natural rate of RCV run-off, expressed as percentage of the prevailing RCV, could change significantly in the period from now until 2024-25, with all estimated adjustments from our analysis being upward.

While there is some degree of approximation in these adjustments, we consider that, for the purposes of estimating the natural rate of RCV run-off for the period 1 April 2020 to 31 March 2025, it is better to make an adjustment of this nature than to use the same figure for this period as is estimated for the 2016-17 position.

For the purpose of using indicators for the natural rate of RCV run-off in 2016-17 to provide guidance on the run-off rate for the 2020-2025 period, we decided to apply an adjustment that varied across each wholesale price control. We used the following assumptions for the adjustments: +0.4% for water resources; 0% for water network plus; +0.5% for wastewater network plus; 0.2% for bioresources (indicator A1); and +0.5% for bioresources (other indicators). These assumptions reflect the estimated adjustments in the table above, informed by the estimates presented in this report for the 2016-17 RCV run-off rate (e.g. the adjustment for a run-off rate of 6% is more relevant for bioresources than for water network plus). These are approximations.

Shortlisted indicators adjusted to apply to 2020-2025 period

Based on the discussion in the previous sub-section, and on our broader consideration or the merits of alternative data sources and methodologies, we have developed a short list of preferred indicators. These are: A1 (bioresources only); A2; B2; C2 and D2. It is useful to consider this short list of indicators, because it helps the assessment to focus more on the set of indicators that seems most informative, in terms of the quality and relevance of individual indicators and also the diversity of approaches and sources of evidence across the short list.

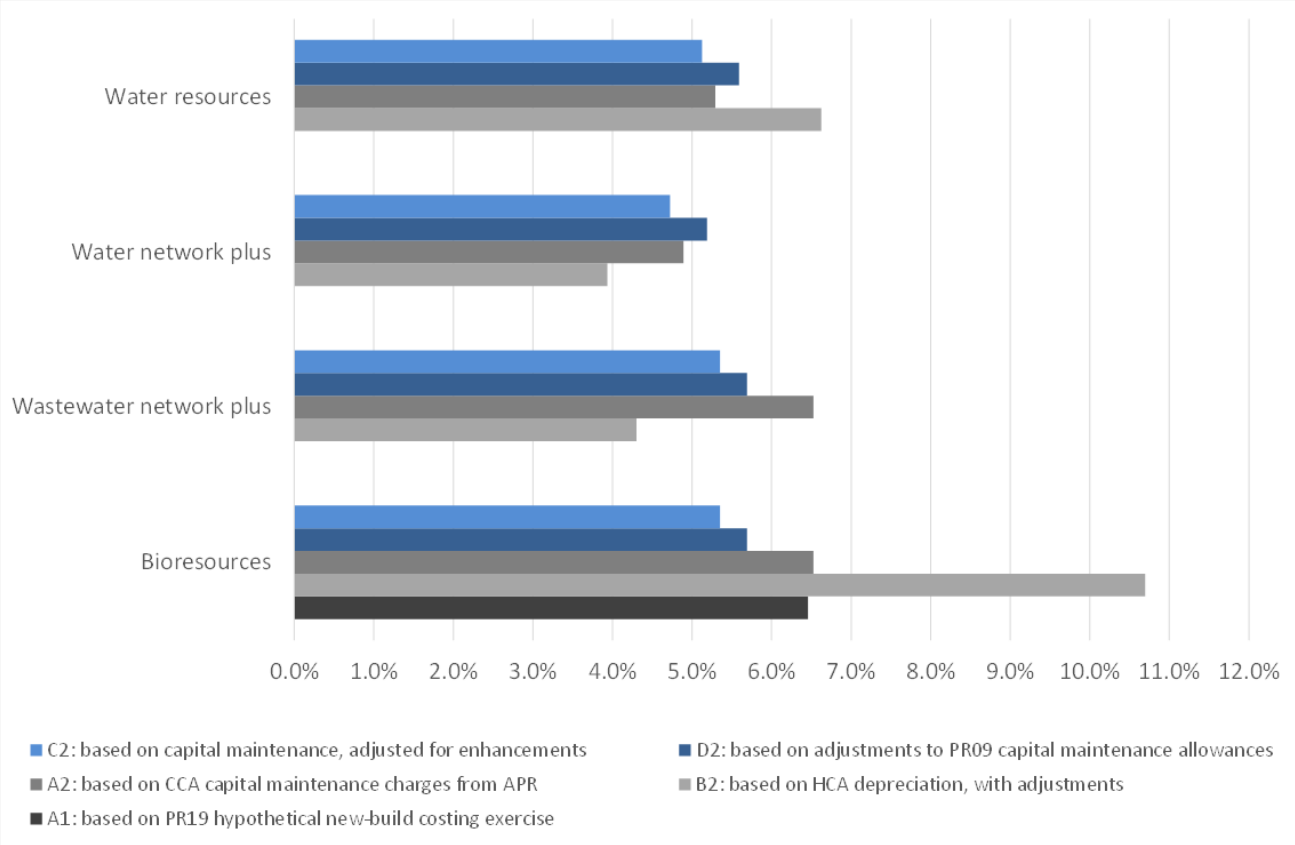
Our choice of short list is best explained by reference to those indicators omitted. We omitted indicator A3 because this involves a very approximate calculation of depreciation, done at an aggregate rather than granular level and, on the information available to us, we were concerned that this issue drove results out of line with those from other indicators (especially for wastewater). We omitted indicators B1 and C1 as these involved significant deficiencies which we felt were mitigated, to some degree, by the adjustments used in indicators B2 and C2. Indicators D1 and D2 provided similar results; we omitted indicator D1 as this was based on less recent data than D2, without offering countervailing benefits.

As discussed above, these indicators relate most directly to the natural rate of RCV run-off for the financial year 2016-17. For each indicator we used the methodology described in section 3 to make an adjustment to produce estimates of the run-off rate for the period 2020/21 to 2024/25.

This methodology draws on forecasts provided to us of Anglian Water's enhancement programme and RCV in the period to 31 March 2025. The exact magnitude of the adjustment differs slightly by indicator, because it depends on the value of the indicator for 2016-17, but these adjustments are within the range shown in Table 3 above.

Figure 4 presents our preferred indicators of the natural rate of RCV run-off with adjustment for the period from 1 April 2020 to 31 March 2025. We provide a separate indicator for each price control business unit. Where the 2016-17 indicators are not available broken down by price control unit (e.g. presented for wholesale wastewater or combined water and wastewater), we take the relevant available indicator for that price control unit (e.g. wholesale wastewater in the case of wastewater network plus) and apply the relevant adjustment for that price control unit (we calculated these separately, as shown in Table 3 above).

Figure 4 Shortlisted indicators of natural rate of RCV run-off with adjustment for period 2020-2025



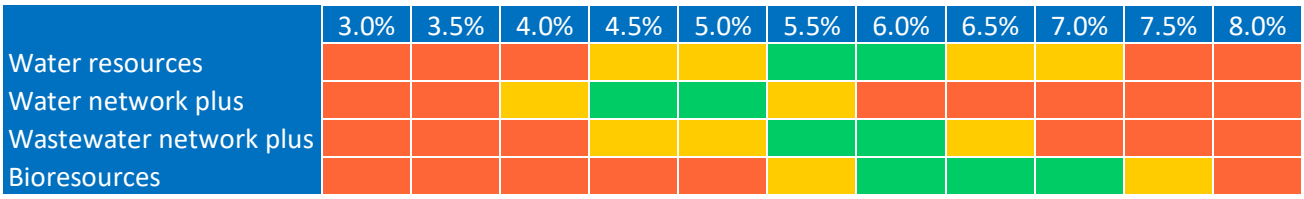
Guidance on the natural rate of RCV run-off for PR19

We can see from Figure 3 and Figure 4 above that the various different indicators provide a range of estimates for the natural rate of RCV run-off (%). There is no need to choose a single preferred indicator. Instead, the main focus is in choosing appropriate figures or assumptions for the natural rate of RCV run-off for each of the four wholesale controls, drawing on the range of evidence available. With this in mind, it is helpful to assess the merits of *alternative assumptions* for the

natural rate of RCV run-off, rather than focusing exclusively on the merits of alternative indicators or information sources.

In Figure 5 we present a serious of options for the assumption on the natural rate of RCV run-off (%) from 3% to 8%, in discrete steps of 0.5%. For each discrete option, and for each of the four separate wholesale price controls for PR19, we provide a high-level assessment of the *relative* merits of that figure compared to other figures in the table.

Figure 5 High-level comparisons of alternative run-off rate assumptions



The green zone can be seen to represent the set of figures which we judge to be most well-supported by the analysis presented in this report as an assumption for the natural rate of RCV run-off – and hence the rate that provides for a fair and reasonable allocation of non-PAYG costs over time and between current and future customers. The red zones indicate figures for the natural rate of RCV run-off that are the least well-supported by the analysis presented in this report. The amber zones indicate figures with an intermediate ranking between green and red.

Given the way that the red/amber/green ranking is applied, all figures within the green zone are ranked the same in terms of the extent to which they are supported by the analysis to date. But figures towards the middle of the green zone would tend to be less susceptible than figures at the edge of the green zone to a change of ranking as new evidence or analysis comes to light.

The ranking of red/amber/green reflects a degree of judgment, such as on the relative importance of the various drawbacks and limitations applying to the indicators used and the plausibility of possible explanations for the differences in results that we see. The discussion of results earlier in this section, the high-level comparison of indicators in section 3 and the further information in appendix 2 highlights some of the points and ideas that we have taken into consideration. For our assessment, we have taken account of differences between the price control units, although the ability to differentiate between price control units is limited by the data availability (e.g. some indicators are only available for more aggregate sets of activities such as wholesale water).

In the case of bioresources, we have given considerable weight to the estimates based on indicator A1, which reflects the 2017-2018 bioresources asset valuation exercise. We also took account of the fact that the other indicators were not estimated specifically for bioresources and that bioresources is a small part of wholesale wastewater. Indicator A1 is not available for the other

wholesale price controls and, for these controls, it seemed more important to take account of range of indicators.

Several important caveats apply to the interpretation of Figure 5:

- Figure 5 provides an assessment for discrete values only, in steps of 0.5%. For example, for water network plus, it provides an evaluation of amber for a rate of 4% and green for 4.5% and no assessment either way is provided on figures that lie between 4% and 4.5%. This approach is applied to help make the assessment manageable. A more detailed review of our results might provide guidance on intermediate figures (e.g. 4.75% versus 4.5%) but this is beyond the ambition of Figure 5.

- The green zone does not mean the safe or correct zone; it is a relative ranking compared to alternative possible assumptions for the RCV run-off rate, and based only on the work presented in this report. There is no end of further work that could hypothetically be done to investigate the natural rate of RCV run-off for different parts of Anglian Water's wholesale business. Further analysis and more detailed investigation could conceivably act to shrink, expand or move the green zone (so that a figure currently in the green zone becomes categorised under the amber or even red zone).

- Anglian Water may have other evidence, beyond that taken into account for this report, which could affect the assessment of the choices about the RCV run-off and provide a reasonable basis for informing the choice of value within the green zone, or even moving outside of it.

- The assessment in Figure 5 is based on forecasts provided to us by Anglian Water for enhancement expenditure and RCV growth in the period to 31 March 2025. These forecasts affect the adjustment we use to apply indicators primarily based on evidence up to the financial year 2016-17 to the price control period from 1 April 2020 to 31 March 2025. While we would not expect dramatic changes in results, it is possible that changes to these forecasts before the PR19 business plan is finalised could affect the red/amber/green ranking for specific figures.

- There is a potential case for a significant upward adjustment to the RCV run-off rate for the bioresources price control, beyond that indicated in Figure 5, to allow for amortisation over time of any part of the bioresources RCV that reflects a valuation of future income from ROCs. Using some provisional figures, we estimated a potential adjustment of the order of +1.5% of the bioresources RCV. However, this issue is far from clear-cut and seems a matter of charging policy for bioresources and wastewater network plus services, which lies outside the scope of the "natural" rate of RCV run-off for bioresources. We discuss this issue in more detail in appendix 3.

Despite these points, we consider that Figure 5 provides a very useful tool to help guide Anglian Water's assumptions on the natural rate of RCV run-off as it prepares its PR19 business plan.

Our focus in this report has been on the estimate of the natural rate of RCV run-off for each wholesale price control unit. Ofwat's PR19 data tables allow for different assumptions for different elements of the RCV, distinguishing between the "RPI linked RCV" and the "CPI/CPI(H) linked RCV". We have treated this further complication as beyond the scope of this report, and have focused on the natural rate of RCV run-off for the overall RCV in each wholesale price control business unit.

There is clearly uncertainty as to what represents the best estimate of the natural rate of RCV run-off for each of the four price controls. Taking account of the points above, this uncertainty is not just within the indicated green zone but beyond it. Insofar as there is uncertainty, it may be relevant to take account of other considerations beyond those covered in this report. For instance, if there is a strategic priority to limit bills in the near-term then, this might point to erring on the side of lower RCV run-off rates (accepting that this would tend to lead to higher prices further in the future). Similarly, if there is a strategic priority to improve certain financial metrics used by credit ratings agencies, then this may point towards a higher RCV run-off rates (accepting that this could come at the cost of worse metrics in the future). Such considerations should not drive the choice of the RCV run-off rate, but it may be reasonable to give them some weight in the overall decision-making process, given the degree of uncertainty around the natural rate.

Appendix 1: Conceptual basis for RCV run-off rate

This appendix provides further information on our interpretation of the conceptual basis for the natural rate of RCV run-off, which is relevant to the use of available evidence to produce estimates of this rate. We take the following points in turn:

- Interactions between the PAYG rate and the natural rate of RCV run-off.
- The influence of asset lives and asset costs on the natural rate of RCV run-off.
- The effect of the RCV discount on the natural rate of RCV run-off.
- The effect of enhancement expenditure on the natural rate of RCV run-off.
- Other factors that may influence the natural rate RCV run-off.

These issues seemed particularly important to highlight. This appendix is not intended to be a comprehensive explanation of the RCV run-off rate and does not delve into the regulatory precedent in this area (e.g. Ofwat's use of current cost depreciation for price controls up to PR09).

Interactions between the PAYG rate and the natural rate of RCV run-off

We can only think about the natural rate of RCV run-off properly if we consider it alongside the PAYG rate (the proportion of totex treated as PAYG). There may be differences over time, and between companies, in the PAYG rate due to differences in:

- The capitalisation policy affecting the balance of totex between PAYG and non-PAYG totex.
- Operational and asset management practices.
- The extent of enhancement expenditure within totex (the nature of enhancement expenditure is such that it would generally be 0% PAYG).

Anglian Water told us that, for PR19, it plans to propose a PAYG rate that is consistent with the proportion of business plan totex that would be classified as opex, rather than capitalised, under the capitalisation policy used for its statutory accounts. We take this as a key assumption for our analysis, which affects the natural rate of RCV run-off.

If there are changes to the capitalisation policy used to determine the balance between PAYG and non-PAYG totex, such that more expenditure is treated on a PAYG basis, this would tend to reduce the natural rate of RCV run-off. The recent changes to Anglian Water's accounting policies related to IFRS seem particularly important and have implications for analysis of the natural rate of RCV run-off. The APR data indicates that in 2016-17 Anglian Water reported approximately £25m of

"renewals" under opex for water and £30m of "renewals" under opex for wastewater. If these amounts were previously reported under IRE, the accounting change would have the effect of reducing the natural RCV run-off rate for 2016-17 by 90 basis points for water and 70 basis points for wastewater compared to a hypothetical scenario where the balance between PAYG and non-PAYG totex was determined using the pre-IFRS regulatory accounting policy (i.e. all IRE remunerated through capital charges via the RCV rather than expensed in year). The implication in this example is that, for the wholesale water service, if the natural rate of RCV run-off was about 5% on a pre-IFRS basis, it may be closer to 4% under IFRS (all else equal).

The influence of asset lives and asset costs on the natural rate of RCV run-off

In a highly simplified example, if the RCV was £500 and comprised a single new asset worth £1,000 and that single asset was known to have an economic life of 20 years, then we might estimate the natural rate of RCV run-off as £50 per year. In this simple case, £50 per year could be seen to represent a fair and reasonable allocation of the value of the asset to customers in each year. From this perspective, the natural rate of RCV run-off in £m will be influenced by:

- The value of assets on a new-build basis or hypothetical efficient new-build basis (e.g. higher asset values will tend to increase the natural rate of RCV run-off in £m, all else equal).
- The economic life of assets (e.g. shorter lives will tend to increase the natural rate of RCV run-off £m, all else equal).

There are two important caveats to keep in mind, when thinking about the relationship between asset lives and the natural rate of RCV run-off.

First, while the natural rate of RCV run-off rate (%) is affected by asset lives it is not something that can be calculated simply from the assumed asset lives or the depreciation rate used for accounting purposes. In the simple example above, the 20-year asset life can be seen as equivalent to a depreciation rate of 5% of new-build costs per year. But this provides no basis for inferring that the natural rate of RCV run-off is 5% per year. The natural rate of RCV run-off rate (%) is conceptually different to a depreciation rate applied to new-build costs; this is because the value of the RCV is not the same thing as the gross new-build costs of assets. In the simplified example above, the natural rate of RCV run-off, expressed as a percentage of the RCV, would be 10% (calculated as £50 per year on an RCV of £500) and not 5%.

Second, there are interrelationships between asset lives and asset values which mean that relationships that hold under a hypothetical "all else equal" analysis may be misleading in practice. Suppose that, in the example above, the company identified an alternative method of service delivery that was more efficient overall and involved a single asset with an economic life of 10 years rather than a single asset with a life of 20 years. On its own, this reduction in asset life might be

seen to increase the natural rate of RCV run-off (e.g. from £50 to £100 per year). But we would also need to think about the value of the alternative asset. If an asset that lasts 20 years costs £1,000 we might expect an asset that lasts 10 years to have a much lower value, which would reduce the natural rate of RCV run-off (£m) according to the first bullet point above. If the alternative asset had a new-build cost of £500 then, in the example, the natural rate of RCV run-off (in £m) would be £50per year, which is the same as for the asset with a 20-year life. The situation is further complicated because the natural rate of RCV run-off, expressed as a percentage, will depend on the value of the RCV which may, in turn, be affected by the costs of assets purchased by the company but not in a straightforward or direct way (e.g. complexities arise due to the totex approach to the RCV and the use of benchmarking across companies to set the totex allowances used to build up the revenue controls).

Following on from this last point, we can say that:

- Improvements or changes in the information about the economic life of a fixed set of assets should feed directly into changes to the natural rate of RCV run-off.

- Changes to economic asset lives that reflect the use of different types of assets or changes in asset management practices will not have a straightforward relationship with the natural rate of RCV run-off. The natural rate of RCV run-off in £m will reflect the combined effects of changes in asset lives and changes in asset costs, which may act in opposing directions. The natural rate of RCV run-off, in percentage terms, will reflect these things as well as their impact on the value of the RCV, which is complicated.

The effect of the RCV discount on the natural rate of RCV run-off

The value of the RCV should not, by itself, have a direct causal effect on the natural rate of RCV run-off in £m. But the value of the RCV will affect the natural rate of RCV run-off when this is expressed in percentages terms: mathematically, the level of the RCV is the denominator in the calculation of RCV run-off rate (%).

We use the term “RCV discount” to refer to the notion that the RCV is significantly and persistently below the economic value of the assets/expenditure subject to RCV capitalisation. By “economic value”, we mean the same concept as applied for the bioresources asset valuation exercise in 2017, which is a valuation by reference to a *hypothetical* competitive market.[4] Note that we would not consider that a differential between the RCV and gross hypothetical new-build costs to be indicative of an RCV discount; the economic value of a company’s actual assets will reflect their age and remaining life, and the economic value of assets that are not new will be less than the gross new-

[4] See Reckon (2017) *Support to allocate the bioresources RCV: report for Ofwat*, pages 59-64.

build costs (if a company's assets were on average halfway through their economic lives, the economic value would be approximately half of the gross new-build cost).

The RCV discount may be explained, at least in part, by the idea of a privatisation discount, such that the regional water and wastewater companies were privatised with a market valuation lower than the economic value, as defined above, and this market valuation has fed into the RCV. But the RCV discount might also be driven factors besides the approach to privatisation. For instance the cumulative effect, over many years, of upfront customer/developer contributions for new water and wastewater connections (e.g. infrastructure charges and requisition payments) should mean that the value of the RCV should be substantially less than the new-build costs of assets used to supply wholesale water and wastewater services adjusted for depreciation.

The RCV discount should not affect the natural rate of RCV run-off (£m) but the greater the RCV discount, the higher would be the natural rate of RCV run-off (%). To take a simple example, if the RCV run-off (in £m) was based on a depreciation rate of 4% of gross new-build costs (corresponding to a weighted-average asset life of 25 years), and if the economic value of assets was 50% of the gross new-build costs, and the value of the RCV was 50% of the economic value of assets, then the natural rate of RCV run-off rate would be 16%.[5]

This illustrates the point that we should not be surprised if evidence on the natural rate of RCV run-off points to a run-off percentage which is much higher than the depreciation rates used for accounting purposes or implied by the assumed economic lives of water and wastewater assets.

The effect of enhancement expenditure on the natural rate of RCV run-off

We now turn to consider the effects of enhancement expenditure on the natural rate of RCV run-off. There has been substantial enhancement expenditure by water companies over time, relating to growth in customer numbers and demand, service quality improvements and environmental factors.

Generally, the effect of enhancement expenditure will be to increase the natural rate of RCV run-off in £m. A larger asset base will go hand-in-hand with higher levels of capital charges and RCV run-off. As a high-level approximation, we would expect the natural rate of RCV run-off in £m to grow in line with the growth in the hypothetical efficient new-build costs (or gross MEAV) of assets forming part of the RCV. But this will depend on the details of the assets within the enhancement programme (e.g. mix of long-life vs shorter-life assets).

[5] In this example, an amount representing 4% of gross new-build costs would correspond to 8% of economic value (since economic value is half of new-build costs), and 16% of the RCV (since the RCV is half of economic value and a quarter of the gross new-build costs).

The **effect of enhancement expenditure on the natural rate of RCV run-off (%) could be upwards or downwards**, depending on a range of factors. The numerator in the calculation of the run-off rate (%) will increase with enhancements, as highlighted above, but the denominator will also increase. Whether the RCV run-off rate (%) increases or decreases will depend whether the increase in the numerator is more or less than the increase in the denominator. This will vary from case to case, depending for example, on the scale of any privatisation discount embedded within the opening RCV at the start of the price control period and the extent to which there are customer contributions to offset the RCV additions attributable to enhancement expenditure.

Other factors that may influence the natural rate of RCV run-off

Although we see the natural rate of RCV run-off as being linked to concepts of depreciation or amortisation, there may be other factors that are relevant to a fair and reasonable allocation of capitalised costs over time. Issues may come to light as consideration is given to the use of specific indicators to set the natural rate and the implications for the balance between current and future customers. We identified two points worth highlighting here:

- **Demand-side considerations and asset utilisation**. There may also be some interactions between the natural rate of RCV run-off and demand. For instance, if demand is expected to fall in the future, and if the capacity of assets needed to supply customers today is in excess of what is needed to supply customers in the future, there is an argument that the natural rate of RCV run-off would be higher in the near-term so that the costs of capacity are allocated more fairly between different generations of customers.

- **Indexation of the RCV versus asset cost trends**. The natural rate of RCV run-off over a period of time (e.g. a five-year price control period) will be affected by *(a)* any inflation-indexation applied to the calculation and roll-forward of the RCV over that period; and *(b)* the changes in the new-build costs/prices for assets over that period. The balance between these two factors will affect what is a reasonable and fair allocation of costs over time and between different generations of customers.

We gave some brief consideration to the practical implications for PR19 of the demand-side point above. We did not identify grounds for taking this into account in the immediate work on the natural rate of RCV run-off for wholesale water and wastewater supplies.

On the second point above, there is an argument that the long-term trend in water and wastewater new-build asset costs will tend to be lower than the inflation indexation that Ofwat applies to the RCV from PR19 (e.g. 50% RPI and 50% CPI on pre-2020 RCV). This could call for an *upward adjustment* to the natural rate of RCV run-off (%). Based on feedback from Anglian Water as part of initial discussions of this issue, we have not sought to explore this further in this project. We proceed on the assumption that Ofwat's PR19 policy on RCV indexation represents a reasonable

approximation of the long-term trend in the new-build costs and purchase prices for wholesale water and wastewater assets. This may be something that Anglian Water wishes to come back to at a later date (e.g. RCV indexation at a higher rate than implied by forecast asset cost/price inflation may make some financial ratios used by credit rating agencies worse without providing countervailing justification from the perspective of current and future customers).

Appendix 2: Indicators of RCV run-off used

This appendix provides further information on the nine indicators of the natural rate of RCV run-off that we have used as part of our analysis. We provide this information in a series of tables, taking each indicator in turn.

A1: Indicator based on depreciation charge from PR19 hypothetical new-build costing exercise	
Description of indicator and overview of calculation	• Indicator represents estimate of current cost depreciation charge for bioresources (straight line basis) divided by proposed RCV for bioresources. • Calculated from information used for asset valuation and RCV submission to Ofwat from September 2017. • Current cost depreciation charge calculated on straight line basis using hypothetical new-build asset cost and assumed asset lives. Depreciation charge calculated at the most granular asset level allowed for by the data and then aggregated across bioresources assets.
Benefits and drawbacks	• Direct conceptual relevance to RCV run-off rate • Based on recent analysis and forward-looking assessment for period from 1 April 2020. • Focused on bioresources assets and not directly applicable to other business units. • Will be sensitive to hypothetical costing exercise and asset life assumptions used

A2: Indicator based on CCA capital maintenance charges from APR	
Description of indicator and summary of calculation	• Indicator calculated from the current cost capital maintenance charges reported in table 4G of the 2016-17 APR, divided by average RCV 2016-17. • The capital maintenance charges include amounts in respect of both CCD of non-infrastructure assets and IRC for infrastructure assets. • Calculated separately for wholesale water and wholesale wastewater. • Data from 2016-17 APR does not include breakdown of capital maintenance charges between PR19 wholesale price control units. Some CCA depreciation data is available from the 2014-15 regulatory accounts for the more granular wholesale activities units. We decided against using this further data due to concerns that for the smaller parts of value chain (water resources and bioresources) these figures would be less accurate than at level of wholesale water and wholesale wastewater.
Benefits and drawbacks	• Direct conceptual relevance to RCV run-off rate • Following changes to Ofwat's price control framework, the regulatory reporting requirements for CCA capital maintenance charges were loosened, so these figures are likely to be more approximate than in the pre-PR14 period. • Hypothetical new-build costing / GMEAV from which this indicator draws on were not updated for PR19 or PR14: the capital maintenance charges reported in table 4G for non-infrastructure assets are based on the PR09 MEAV valuation exercise and have not been updated for any more recent revaluation.

	• Will be sensitive to hypothetical costing exercise and asset life assumptions used • The figures have not been fully updated for the effect of the change to IFRS, so the capital maintenance charge in respect of IRC may be overstated compared to that for the 2020-2025 period

A3: Indicator based on application of weighted-average asset life to non-infra insurance valuation	
Description of indicator and summary of calculation	• Indicator is a further measure of current cost depreciation, which uses information from Anglian Water's 2015 gross MEAV insurance valuation (which is more recent than the MEAV valuation feeding into indicator A2 above), and is divided by the 2016-17 RCV. • We calculated this indicator separately for wholesale water and wholesale wastewater. • Current cost depreciation charge calculated on straight line basis using 2015 GMEAV insurance valuation for non-infra assets, adjusted to 2016-17 prices using RPI, and estimates provided by Anglian Water (from its accounting system) for weighted average asset lives for water and wastewater non-infra assets.
Benefits and drawbacks	• Direct conceptual relevance to RCV run-off rate • Uses more recent new-build costing data than indicator A2. • Will be sensitive to hypothetical costing exercise and asset life assumptions used • Calculation allows for high-level approximation only. The depreciation charge is calculated at an aggregate level for wholesale water and wastewater rather than built up from information at the asset level, and such a calculation will be more approximate than the aggregation of depreciation charges calculated at a granular level. • This measure excludes any allowance for run-off for infrastructure assets (and intangible assets), so is an indicator for only a subset of the capital costs to be covered by the RCV run-off.

B1: Indicator based on HCA depreciation	
Description of indicator and summary of calculation	• Indicator is based on data reported for HCA depreciation in table 2A of the 2016-17 APR: the sum of "Depreciation – tangible fixed assets" and "Amortisation – intangible fixed assets", divided by average RCV 2016-17. The depreciation data in table 2A draws on statutory accounting information. • This is calculated separately for each price control business unit, using an approximate allocation of the 2016-17 RCV between the four wholesale controls.
Benefits and drawbacks	• This indicator has the benefit of drawing on information used elsewhere in the business for statutory accounting purposes. • The indicator is consistent with, and dependent on, the assumptions on asset lives used for statutory reporting. • For historical reasons there are some major limitations with the use of the statutory accounts HCA information as a guide to RCV run-off. Anglian Water told us that some pre-privatisation assets have been recorded in the asset register in a way that has led them being depreciated at a faster rate than would be the case for equivalent assets now, and that there are substantial

	amounts of pre-privatisation assets that are still in use but are fully depreciated (or not otherwise recognised in the accounts). These circumstances would tend to lead to the depreciation figures available on an HCA basis *understating* the level of depreciation that would be consistent with the natural rate of RCV run-off. This is particularly an issue for long-life infrastructure assets. • Furthermore, general inflation over time in asset costs means that historical cost depreciation measures will tend (all else equal) to substantially *understate* the natural RCV run-off rate, and this will be a greater issue the longer are the asset lives. • This indicator reflects a fair value revaluation adjustment which is used for statutory accounts depreciation charges. To some degree, this helps offset the issues indicated above of missing depreciation and inflation over time. But the methodology used for the fair value revaluation is not directly informative for the purposes of RCV run-off, especially in terms of the allocation of the adjustment between price control business units. • This indicator will also tend to reflect historical technologies and asset management decisions, which we consider less relevant conceptually to the natural rate of RCV run-off than the more forward-looking measures under A1 and A2 above.

B2: Indicator based on HCA depreciation with partial adjustment for inflation	
Description of indicator and summary of calculation	• Indicator based on depreciation charges used for statutory accounts, but adjusted in two ways to make it more relevant to the natural rate of RCV run-off. • First, Anglian Water stripped out the effects of the fair value revaluation adjustment used for depreciation in the statutory accounts. The revaluation adjustment used for statutory accounts is based on DCF of future regulated revenues and profits, which is not directly informative for the natural RCV run-off rate, so we excluded it from this indicator. • Second, an inflation adjustment was made by Anglian Water using changes in the RPI over time, applied at the individual of asset records, with inflation applied from data of capitalisation in the accounts. • The adjusted depreciation charge for 2016-17 is divided by the average 2016-17 RCV. • This indicator is calculated separately for each price control business unit, using an approximate allocation of the 2016-17 RCV between the four wholesale controls.
Benefits and drawbacks	• Indicator more conceptually relevant to RCV run-off than indicator B1, but still not a particularly direct indicator of the natural rate of RCV run-off. • Some adjustment inflation, to help tackle one of the deficiencies of B1, in terms of changes over time, although the inflation adjustment methodology is quite approximate. • As for indicator B1, there are limitations in the coverage of this indicator. Anglian Water told us that some pre-privatisation assets have been recorded in the asset register in a way that has led them being depreciated at a faster rate than would be the case for equivalent assets now, and that there are substantial amounts of pre-privatisation assets that are still in use but are fully depreciated (or not otherwise recognised in the accounts). These circumstances would tend to lead to the depreciation figures available on an HCA basis *understating* the level of depreciation that would be consistent with the natural rate of RCV run-off. This is particularly an issue for long-life infrastructure assets.

	• The impact of the inflation adjustment was less than expected and, following discussion with Anglian Water, it seems that this reflects (and helps to expose) the issue above that the depreciation on pre-privatisation assets seems to insufficiently recognised in the HCA figures feeding into the statutory accounts (before revaluation adjustment)

C1: Indicator based on capital maintenance expenditure only	
Description of indicator and summary of calculation	• Based on annual average of Anglian Water's forecast capital maintenance expenditure over period the ten-year period 2015-16 to 2024-25 (in 2016-17 prices) divided by average RCV in 2016-17. • Uses a combination of outturn expenditure data and expenditure forecasts provided to us by Anglian Water. • Capital maintenance expenditure is defined to comprise expenditure categorised as "Maintaining the long term capability of the assets – infra" and "Maintaining the long term capability of the assets - non-infra" and should equal gross capital expenditure minus the total value of enhancements. • Substantial changes in the accounting definition of capital maintenance (treatment of IRE) means that the data before 2015-16 is not on a like-for-like basis with 2016-17 and 2020-2025 period, so we do not use capital maintenance expenditure before 2015-16. • We calculated this indicator separately for wholesale water and wholesale wastewater.
Benefits and drawbacks	• Not a direct indicator of the natural rate of RCV run-off, but provides some approximate information, which is not reliant on estimates of asset lives and asset values • In a theoretical steady state, capital maintenance spend (£m) would tend to match the natural rate of RCV run-off (£m). However, in practice the level of capital maintenance spend can differ substantially from the natural rate of RCV run-off, due to factors such as: *(a)* the lumpiness of capital expenditure; *(b)* technological change and other innovation; and (c) business growth (e.g. system enhancements). • Where the asset base has grown (e.g. enhancements) the additional capital costs would form part of the natural rate of RCV run-off upon commissioning, but there will tend to be a significant time lag (e.g. reflecting the asset life for the enhancement assets) before these new assets need replacement and show up as capital maintenance expenditure; so (all else equal) capital maintenance expenditure will tend to under-state RCV run-off in a growing business.

C2: Indicator based on capital maintenance expenditure with partial adjustment for run-off from enhancements	
Description of indicator and summary of calculation	• Based on indicator C2, but with an adjustment to try to make some allowance for RCV run-off in respect of previous capital enhancement that is not yet due for asset replacement (i.e. capital maintenance spend) • The adjustment was intended to represent an approximate depreciation charge, for 2016-17, for the cumulative enhancements since 1997-98 • We calculated this adjustment using an analysis of historical data on Anglian Water's enhancement expenditure from 1997-98 to 2016-17, broken down by various asset age categories (we could not look further back than 1997-98 due to availability).

Benefits and drawbacks	• Benefits and drawbacks as for indicator C1, but with some degree of adjustment for inaccuracy relating to inflation to help tackle the deficiencies of C1 in relation to coverage of run-off for previous enhancements • This adjustment is approximate and does not cover any enhancements from 1997-98

D1: indicator based on adjustments to Ofwat PR04 FD capital maintenance allowances	
Description of indicator and summary of calculation	• This indicator is based on the assumption for capital maintenance allowances (covering CCA depreciation of non-infrastructure assets and IRC for infrastructure assets) that Ofwat used in its calculation of the PR04 price controls for Anglian Water (2005-2010), with three adjustments made to make the indicator more informative for the 2020-2025 period, divided by average RCV 2016-17. • The first adjustment is made to take account of inflation in asset costs (and hence capital maintenance charges and RCV run-off in £m) between the 2005-2010 period and 2016-17. The adjustment for inflation is made using the RPI. • The second adjustment is made to take account of growth in the scale of the asset base between the 2005-2010 period and 2016-17. The asset base will have grown in scale in particular because of (i) increases in the number of customers supplied and (ii) investment to achieve major improvements in quality of service and environmental outcomes. A larger asset base would mean a higher RCV run-off in £m. The calculation assumes 1.5% annual growth in the asset base; this figure was agreed with Anglian Water and is made in the light of analysis of the growth in the number of customers over time and our analysis of the growth over time in estimated GMEAV of water and wastewater assets, taking account of the effects of enhancement expenditure on GMEAV. • The third adjustment is made to take account of accounting policy changes (IFRS) which mean that some expenditure previously covered by capital maintenance charges moves to opex, reducing natural rate of RCV-run off. Adjustment based on Anglian Water's estimated value of the capex reclassified as opex, averaged over 2015-16 and 2016-7. • We calculated a single indicator covering wholesale water and wholesale wastewater combined, due to limitations in the publicly available data on Ofwat's PR04 and PR09 assumptions.
Benefits and drawbacks	• Brings perspective from Ofwat's regulatory precedent on the RCV run-off rate, with adjustments to make this more relevant to latest situation • There will inevitably be some approximation in these adjustments, especially on the growth/quality side. • Ofwat's original price control assumption will have reflected the information available at the time and potentially other considerations beyond those that matter to the natural rate of RCV run-off (e.g. bill impacts and financial ratios).

D2: indicator based on adjustments to Ofwat PR09 FD capital maintenance allowances	
Description of indicator and summary of calculation	• This indicator is based on the assumption for capital maintenance allowances (covering CCA depreciation of non-infrastructure assets and IRC for infrastructure assets) that Ofwat used in its calculation of the PR09 price controls for Anglian Water (2010-2015), with three adjustments

	made to make the indicator more informative for the 2020-2025 period, divided by average RCV 2016-17. • We calculated a single indicator covering wholesale water and wholesale wastewater combined, due to limitations in the available data. • The adjustments made are made using the same methodology as for the indicator D1 above and the same comments apply.
Benefits and drawbacks	• Same comments as for indicator D1, except that D2 uses more recent information than D1

Appendix 3: potential uplift to bioresources run-off for ROCs

This report has been concerned with the natural rate of RCV run-off and we have set out our interpretation of the natural rate of RCV run-off in section 2 and appendix 1. In relation to the bioresources business unit, an additional issue for RCV run-off arises as a consequence of Ofwat's policy statements on the RCV allocation between wastewater network plus and bioresources.

Ofwat's feedback to water companies on asset valuation and RCV allocation for bioresources clarified that Ofwat expects companies to make an upward adjustment to the valuation used for the bioresources RCV, to reflect the income expected to be generated by bioresources assets from renewable energy incentive schemes (e.g. ROCs), which would not be available for hypothetical modern equivalent assets, or a hypothetical new entrant, at each site.[6] Anglian Water told us that it may follow Ofwat's guidance on this matter for the purposes of its RCV allocation.

On the basis of Ofwat's feedback, a substantial part of the value of the bioresources RCV would represent an estimate of the NPV of future income from ROCs at bioresources sites. The income from these ROCs will gradually reduce over time, as ROCs expire. Anglian Water's estimates are that its income from ROCs will fall to zero from 2037.

We do not consider that the income from ROCs is relevant to the natural rate of RCV run-off, under our interpretation of that concept. It does not relate, for instance, to the fair allocation of capital costs over time, between current and future customers.

Nonetheless, if there is no RCV run-off, or other regulatory depreciation, in relation to the element of the bioresources RCV that reflects the valuation of ROCs, then the future bioresources RCV could become divorced from economic reality. For instance, in 2037 the RCV of the bioresources business would include the full value (adjusted for inflation) of the forecast, made in 2018, of income from ROCs in the period 2020 to 2036.

Given this issue, it could make sense to make an adjustment to the natural rate of RCV run-off for bioresources to allow for run-off in respect of the element of the RCV that represents the valuation of forecast income from ROCs. One approach would be to calculate an adjustment by taking the forecast value of bioresources income from ROCs and dividing by forecast RCV for bioresources. Based on data provided to us by Anglian Water, this would give an uplift to be applied to the bioresources RCV run-off of around 1.5% per year over the five-year period from 1 April 2020 to 31 March 2025. This approach would mean that the element of the RCV representing the valuation of income from ROCs would gradually fall over time, being reduced to zero by 2037, tackling the issue

[6] Ofwat (2018) *Economic value of bioresources assets – feedback to companies*, p29 and p51

itself. In Ofwat's PR19 data tables, we would not see this informing the assumption for "natural RCV run off rate" but it could relevant to the line: "Other adjustments to RCV run off rate".

Making an upward adjustment to bioresources RCV run-off, on this basis, would mean that the income from ROCs generated by the bioresources business in the period from 1 April 2020 to 31 March 2025 would not be used to help reduce charges for bioresources services in this period. Including run-off in respect of ROCs in the bioresources price control revenue allowance calculation would mean that additional revenue is to be collected from bioresources charges in this period, which would tend to offset the income generated by the ROCs (this income would otherwise act to reduce the revenue requirement of the bioresources business unit, in particular by reducing the totex requirement net of income from energy generation activities).

If such an adjustment were to be made to the bioresources RCV run-off, there would be an argument that a countervailing downward adjustment should be made to the wastewater network plus RCV run-off, so that the revenue increase for bioresources services (from higher bioresources RCV run-off) is offset by a revenue decrease for wastewater network plus (lower wastewater network plus RCV run-off). Given the size of the wastewater network plus RCV, this may not be material within the range of uncertainty about the natural rate of RCV run-off for wastewater network plus (e.g. a downward adjustment of 0.1% of the wastewater network plus RCV based on the same data as for the potential bioresources adjustment above).

Even the intended policy was to set bioresources charges at levels that would apply if bioresources companies received no income from ROCs, using the RCV run-off rate seems a convoluted and confusing way to achieve this policy. This policy could be more clearly and simply achieved outside of the RCV and RCV run-off, by including a revenue allocation rule between wholesale price control units, so that revenue from ROCs was treated as income to the wastewater network plus business rather than income to the bioresources business for price control purposes. The projected income from ROCs could be used to offset the estimated wholesale wastewater network plus revenue requirement rather than the estimated bioresources revenue requirement, when setting the PR19 controls. Under this rule, the forecast income from ROCs would not be attributable to the bioresources price control unit and would not, therefore, form part of the economic value of bioresources activities and would not feed into the PR19 bioresources RCV allocation in the first place.

Overall, there seems a potential case for making an adjustment to the natural rate of RCV run-off to allow for gradual amortisation of any part of the bioresources RCV that reflects the valuation of the time-limited future income stream from ROCs. However, this could raise questions of consistency with the broader price control and regulatory reporting framework for wastewater network plus and bioresources. In the absence of a clear policy or rule from Ofwat on the treatment of ROCs income in setting bioresources charges for the period 1 April 2020 to 31 March 2025, there does not seem a

strong case for making the adjustment(s) for run-off for ROCs identified above. Besides Ofwat's policy, this seems a matter of charging policy for bioresources services and wastewater network plus services that water companies may be concerned with, and there may be competition law compliance risks with approaches to setting charges for bioresources services to captive customers which do not take any account of the ROCs available to incumbent water companies from sludge treatment processes. These issues lie well outside the scope of the "natural" rate of RCV run-off and we have not considered them further in this report.