

# Southern Water Risk technical annex

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# 1. Introduction

Risk analysis plays a significant role in any price determination as it aims to measure the impact of the overall regulatory incentive package on the companies' ability to earn the base allowed return and manage risk and hence, by extension, on the business plan financeability and deliverability. It also provides insight into the appropriateness and robustness of cost of capital calibration as there is a direct link between risk and return.

This Annex provides further detail on the way we analysed the risks a notional company would face during AMP8, and the risks we will be subject to in delivering its business plan. It provides insight into whether the risk-reward balance of PR24 incentive package is reasonable and aligns with the base allowed return.

We assessed the risk ranges by reference to the return on regulatory equity (RoRE) metric and quantified the relative materiality of risks in relation to the notional equity by calculating RoRE risk ranges which set out potential variations around the base allowed return. This framework allowed us to establish the overall scale of risk to the notional company's ability to earn the allowed return on a median-expected basis. It also informed the analysis of potential mitigations that would bring the risk exposure more in line with the Capital Asset Pricing Model (CAPM) principle that returns are clustered around the mean with a symmetric distribution.

## 1.1 Executive Summary

The sector's risk landscape is changing significantly in AMP8, driven by an unprecedented step change in the scale of required investment, heightened macroeconomic volatility and interest rate increases, a downside asymmetrical regulatory incentive package, challenges associated with net zero, population growth and finally, greater frequency of severe weather events. At the same time, given the increasing investment, there is a growing need for the sector to attract new equity capital, which will be contingent on an alignment between allowed returns and forward-looking risk exposure. These challenges are at the heart of our risk analysis which targets to capture the impact of the changing risk landscape on potential variations in outturn equity return versus the allowed level.

Our risk analysis is based on the Monte-Carlo simulations that yield probability distributions of expected performance on each risk parameter, informed by the sector's standard deviation, and median. The starting point of the notional company RoRE ranges is the sector's historical performance in the first three years of AMP7 price control<sup>1</sup> given its similarity to AMP8 incentive regime and hence relevance for predicting future performance. The notional company RoRE ranges have also been refined to ensure they capture the changing risk landscape by incorporating the evolution of risk associated with:

- Larger and more complex enhancement programme driven by the statutory requirements and application of Price Control Deliverables (PCDs) to most of the enhancement spend which increase the downside;
- Risks to the notional firm from projects delivered under Direct Procurement for Customers (DPC) and alternative delivery routes;
- Energy price increases surpassing inflation and associated high volatility, which is not reflected in the Real Price Effects (RPEs);

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<sup>1</sup> Our analysis is based on the preliminary data for the sector's FY23 performance and does not reflect the data on the Water Companies Performance released by Ofwat on the 25<sup>th</sup> September 2023 due to the insufficient processing time before the deadline of BP submission on the 2<sup>nd</sup> October 2023. We intend to update our analysis in due course.

- Stretching performance targets, accompanied by the removal of most ODI caps, deadbands and collars, inherent asymmetry embedded in penalty-only ODIs, and not allowing exclusions related to the impact of severe weather events;
- Increase in the level of interest rates and high macroeconomic volatility affecting financing risk; and
- Continued use of asymmetric cost sharing rates, and the increased risk exposure due to larger revenue at risk.

As the relationship between different components of risk is complex, correlation analysis has been undertaken for ODIs as it cannot be assumed that the performance commitment risks are fully additive. Risk analysis resulted in the notional firm's RoRE exposure of -9.94% (P10, worst case scenarios) to +2.56% (P90, best case scenario), with expected risk to returns of -3.59% (P50, most likely scenario). This is significantly wider and asymmetrical to the downside than the illustrative ranges presented in Ofwat's PR24 final methodology, and so the overall package of incentives is unlikely to allow the notional company a reasonable opportunity to achieve the base allowed return. Moreover, nominal risk-adjusted equity return would be below the nominal cost of debt allowance<sup>2</sup>, negating the notional firm's ability to attract new equity.

**Table 1: The notional company RoRE ranges (before mitigation) – Our analysis**

Probabilities	Ofwat's notional company RoRE range	Notional company RoRE range	Difference
Upside (P90)	4.80%	2.56%	-2.24%
Most likely <sup>3</sup> (P50)	0.00%	-3.59%	-3.59%
Downside (P10)	-4.95%	-9.94%	-4.99%

Major drivers of risk asymmetry are totex, ODIs and retail, with the downside exceeding the upside several fold and respective P50 RoREs in the negative territory at -2.18%, -0.88% and -0.29%, respectively.

Totex ranges are asymmetric due to significantly greater proportion and scale of enhancement spend which has a fundamentally different risk profile to that of base spend exacerbated by the introduction of PCDs and the risk that totex allowance can be clawed back when part but not all deliverables are achieved. Additionally, the range also reflects underperformance against AMP7 base cost allowances by the sector on average driven by the energy and chemicals' cost increases surpassing general price inflation. The magnitude of the totex RoRE impact is driven by the sheer scale of the enhancement programme for a notional firm which is more than two times larger in AMP8 than it was in AMP7, reflecting the scale of investment faced by a company operating in the South-East of England.

The asymmetry in the ODI RoRE range stems from the presence of penalty only ODIs such as Compliance Risk Index (CRI) and Discharge Compliance, where Discharge Compliance will no longer benefit from a deadband while the deadband for CRI will become narrower and confined to failures caused by customers' internal fittings. Incentive regime on other ODIs is also becoming more punitive, including supply interruptions and pollution incidents. While the sector is benefitting from a collar on supply interruptions in

<sup>2</sup> Based on the Cost of Equity (CoE) and Cost of Debt (CoD) allowances as per Ofwat's PR24 final methodology (Sept'22 cut-off) of 4.14% and 2.60% in CPIH real terms, respectively, the outturn real risk-adjusted equity return would be 0.82%, resulting in debt yield higher than return than equity.

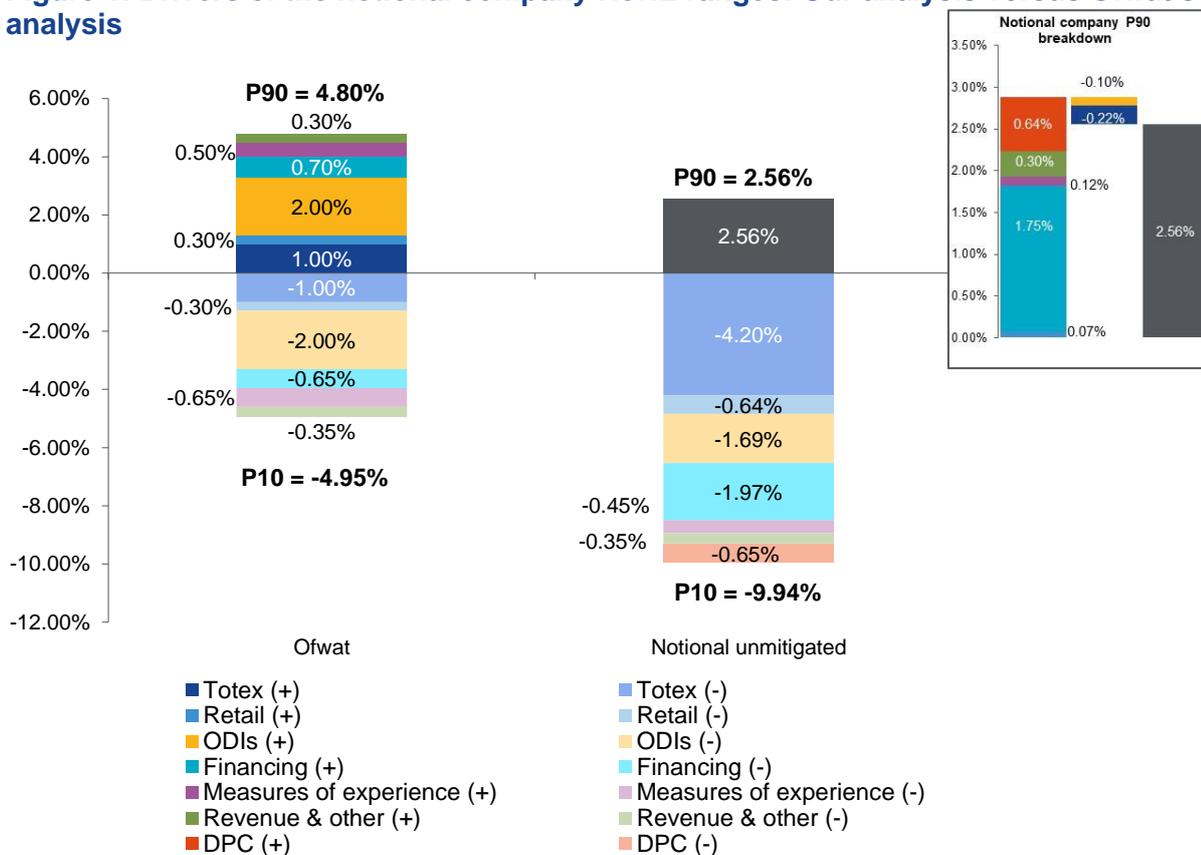
<sup>3</sup> Assuming normal probability distribution.

AMP7, our unmitigated notional company risk analysis assumes that the collar that applies in AMP8 is much wider, exposing companies to potentially very significant downside from one-off but severe events. Similarly, the downside on pollution incidents is increasing because pollutions occurring due to named storms will no longer be excluded from the penalties. Per capita consumption is another area of asymmetry where companies have limited ability to influence customer behaviour, as was evidenced by sector-wide underperformance in AMP7 due to a shift in customer consumption patterns during and after Covid-19.

Retail RoRE ranges reflect sector underperformance in AMP7, which on average amounted to -0.60% in terms of return on notional equity.

In addition to the overall RoRE range being asymmetrical to the downside, it is also wider than estimated by Ofwat, with financing risk, DPC and alternative delivery adding more volatility to both upside and downside of the overall risk exposure.

**Figure 1: Drivers of the notional company RoRE ranges: Our analysis versus Ofwat's analysis**



As stated by Ofwat, a balanced package of incentives should allow the notional company to have a reasonable prospect of achieving a base allowed return. However, our risk analysis has identified that the notional company will only have a reasonable prospect of achieving a return that is 3.59% below allowed, given the myriad of risks it is exposed to and asymmetry of incentives. Moreover, the notional company risk exposure is inconsistent with Capital Asset Pricing Model (CAPM) principle that returns are clustered around the mean with a symmetric distribution and instead suggests that the incentive package introduces asymmetry that requires an adjustment to CAPM-derived cost of equity. Absent such an adjustment, the risk and return proposition in PR24 is imbalanced, which could cause financeability and deliverability issues and would not attract the equity capital required to fund investment.

From this analysis we conclude that the notional company is subject to an excessive downside risk asymmetry resulting in it being unable to earn the allowed cost of capital on a mean expected basis. Adjustments are therefore required to the balance of risk and return.

Ofwat noted that it would seek to address any perceived asymmetry within the balance of incentives because it considered this preferable to adjusting allowed returns. It also remarked that it would seek to limit the exposure of companies to risks they cannot effectively manage or control. To address the notional company risk asymmetry, we followed Ofwat's principles and developed a range of risk mitigations that would address the problem at source.

A package of the notional company risk mitigations is presented below. This particular package represents one of many possible combinations of risk mitigating measures. It serves as an example of the sheer degree of mitigations required to balance out the risk inherent in the PR24 FM package. Both financeability and financial resilience of the notional company greatly depend on its ability, under the base case scenario, to earn the allowed return. Absence or insufficiency of the risk mitigations would, therefore, render the notional company not financeable and not financially resilient.

**Table 2: Notional company risk mitigations**

Area of risk mitigation	Mitigations applied to notional company
ODIs	<ol style="list-style-type: none"> <li><b>1. ODI rates</b> <ul style="list-style-type: none"> <li>• Reduction in ODI rates on total pollutions based on sector's performance in AMP7 to £0.4m from £0.9m (scaled to 0.5% of FY23 wastewater regulated equity), 44% of Ofwat's proposed rate</li> <li>• Reduction in ODI rate for supply interruptions to £0.13m from £0.68m based on sector's performance in AMP7 (scaled to 0.6% of FY23 water regulated equity), 18% of Ofwat's proposed rate</li> <li>• Reduction in ODI rates for PCC and Business demand (scaled to c. 0.5% of water regulated equity) to £0.18m and £0.07m, respectively, 20% of Ofwat's proposed rate. PCC and Business Demand are mostly outside of companies' control so companies are not best placed to manage the associated risk, and a reduced strength of an incentive would be appropriate</li> </ul> </li> <li><b>2. Individual caps and collars</b> <ul style="list-style-type: none"> <li>• Collar on Water supply interruptions (at 52-64 normalised duration in mins) – 0.5% water regulated equity</li> <li>• Collar on External sewer flooding (at 17-20 normalised incidents) - 0.5% wastewater regulated equity</li> <li>• Caps and Collars on the newly introduced common ODIs (Bathing water quality, Storm overflows, River water quality, Serious pollution incidents, Business demand) and other asset health ODIs (Mains repairs and Unplanned outages)</li> </ul> </li> <li><b>3. Deadbands</b> <ul style="list-style-type: none"> <li>• Introduction of deadbands on CRI (of 3.3), Discharge permit compliance (of 98.2%) and Serious pollution incidents (of 1.0)</li> </ul> </li> </ol>
Totex	<ul style="list-style-type: none"> <li>• Reduced impact of Price Control Deliverables (PCDs): coverage down to 30% from 90% of total enhancement spend</li> <li>• Limited use of PCDs in relation to enhancement schemes that form legislative requirement or fund performance improvement as it would result in a duplication of penalty</li> <li>• Grouping PCDs for the larger categories of enhancement spend to allow for offsetting / diversification impact within those groups</li> <li>• Implementation of RPEs for power costs</li> <li>• Asymmetric sharing rate for enhancement totex: the notional company bears 0% of underperformance risk but benefits from the 50% outperformance</li> <li>• Removal of the negative adjustment to WACC related to retail margin as it unwarranted based on the sector's actual performance in AMP7</li> </ul>
Return Adjustment Mechanisms (RAMs)	<ul style="list-style-type: none"> <li>• Introduction of Return Adjustment Mechanisms (RAMs) that would replace Aggregate ODI sharing mechanism and cover all the risk related to operational performance, including ODIs, Totex, DPC/alternative delivery, retail and measures of experience</li> <li>• RAMs are being applied by Ofgem in its RII0-2 price controls across gas and electricity networks with sharing 50% of out/(under) performance when RoRE reaches +/- 3.00% and 90% of out/(under) performance when RoRE reaches +/- 4.00%</li> </ul>

Alongside the ODI and totex mitigations, we are also proposing to extend the current aggregate ODI sharing mechanism to cover all areas of operational performance, similar to the RAMs applied by Ofgem, given the very material downside risk that a notional company is exposed to by the virtue of the overall incentive package.

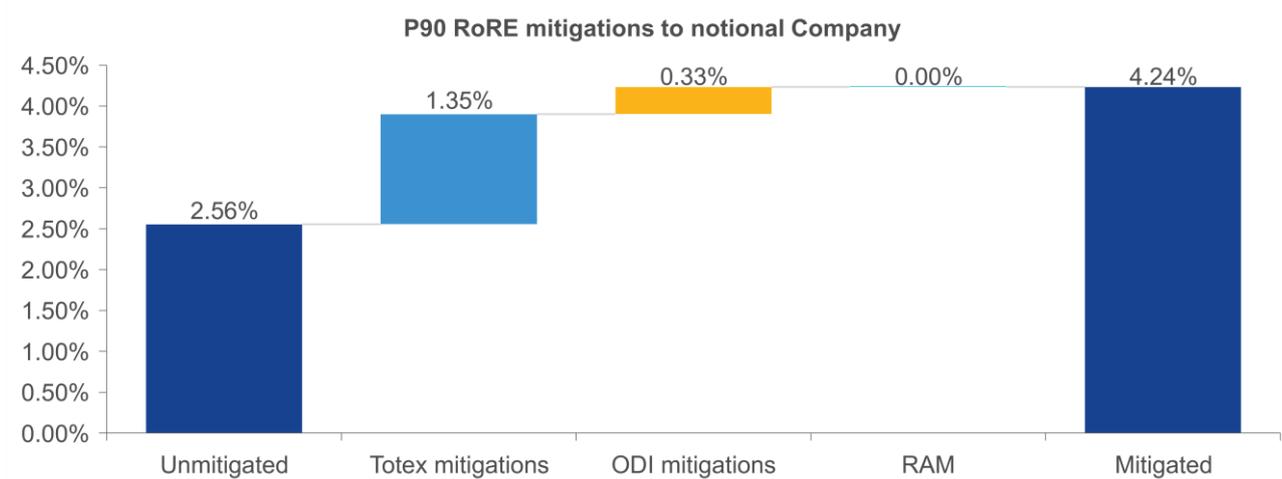
The purpose of RAMs would be to provide protection to consumers and investors if a water company return is significantly higher or lower than anticipated at the time of setting the price control. Consumers and investors will benefit from the introduction of RAMs as they would be protected against the possibility of unreasonably high or low returns in the AMP8 price control. RAMs will also help to ensure the fairness of AMP8 by protecting consumers and investors against ex post overall returns deviating greatly from ex ante expectations and would significantly improve a case for new equity. We suggest that similar to the precedent, RAMs should:

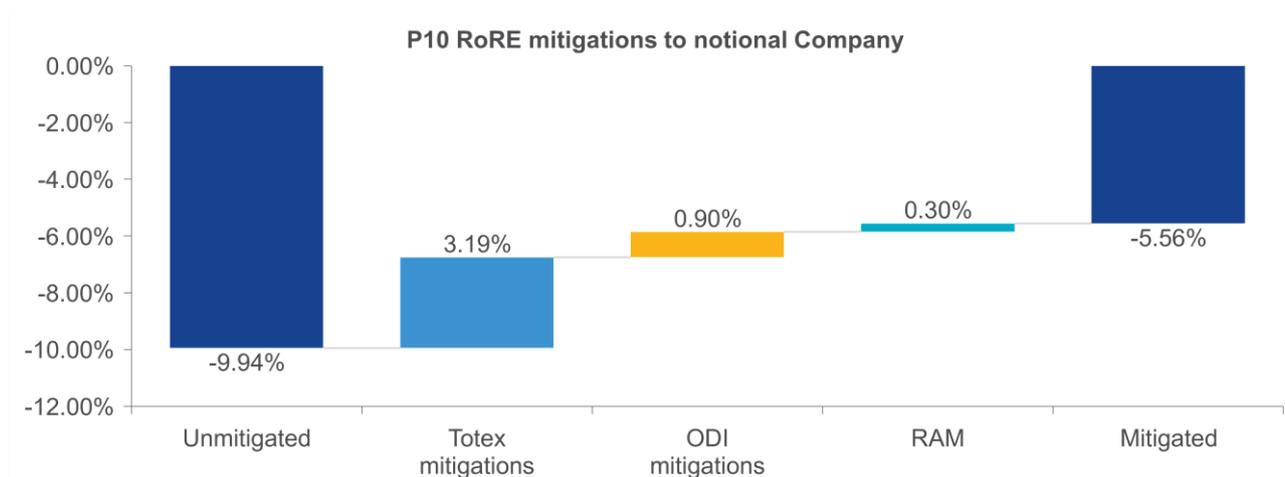
- Be symmetrical, providing for adjustments both due under- and outperformance as this represents a fair balancing of the interests of consumers and investors;
- Account for any trade-offs between Totex and ODI performance;
- Exclude financial performance as that would cause customers bear the risk associated with actual capital structures;
- Exclude QAA performance to preserve the value of the business plan incentive; and
- Serve as an end of period true-up, implemented as a part of the close-out of AMP8, with a sharing rate of 50% of out/(under) performance when RoRE reaches +/- 3.00% and 90% of out/(under) performance when RoRE reaches +/- 4.00%.

RAMs would align the interests of companies and investors with those of customers, so that the sector remains attractive to investors, with both customers and investors being protected against the extremes.

This proposed suite of mitigations is one of the possible combinations that is targeted to mitigate risk at source. Each category of mitigations brings the notional company's RORE risk range closer to Ofwat's expectations of the notional company's RoRE risk range: totex mitigations and RAMs increase the upside and decrease the downside due to the application of fewer PCDs and asymmetric sharing rates on enhancement totex, while ODI mitigations just reduce the downside. Figure 2 presents the degree of impact of each group of mitigations on the notional company's P10 and P90 risk ranges.

**Figure 2: Relative contribution of risk mitigation to the reduction of risk exposure**





On a mitigated basis, the notional company ranges become more narrow and less asymmetric, but some asymmetry remains, with P50 at -0.84% and hence the mean-expected return still below allowed equity return. This residual asymmetry is distributed between totex, ODIs, retail and C-MeX and could be eliminated at source by setting more realistic performance commitment targets recognising the notional company’s starting point or increasing wholesale and retail totex allowances. It could also be addressed by appropriately adjusting the cost of capital allowance if no other changes to the incentive package occur.

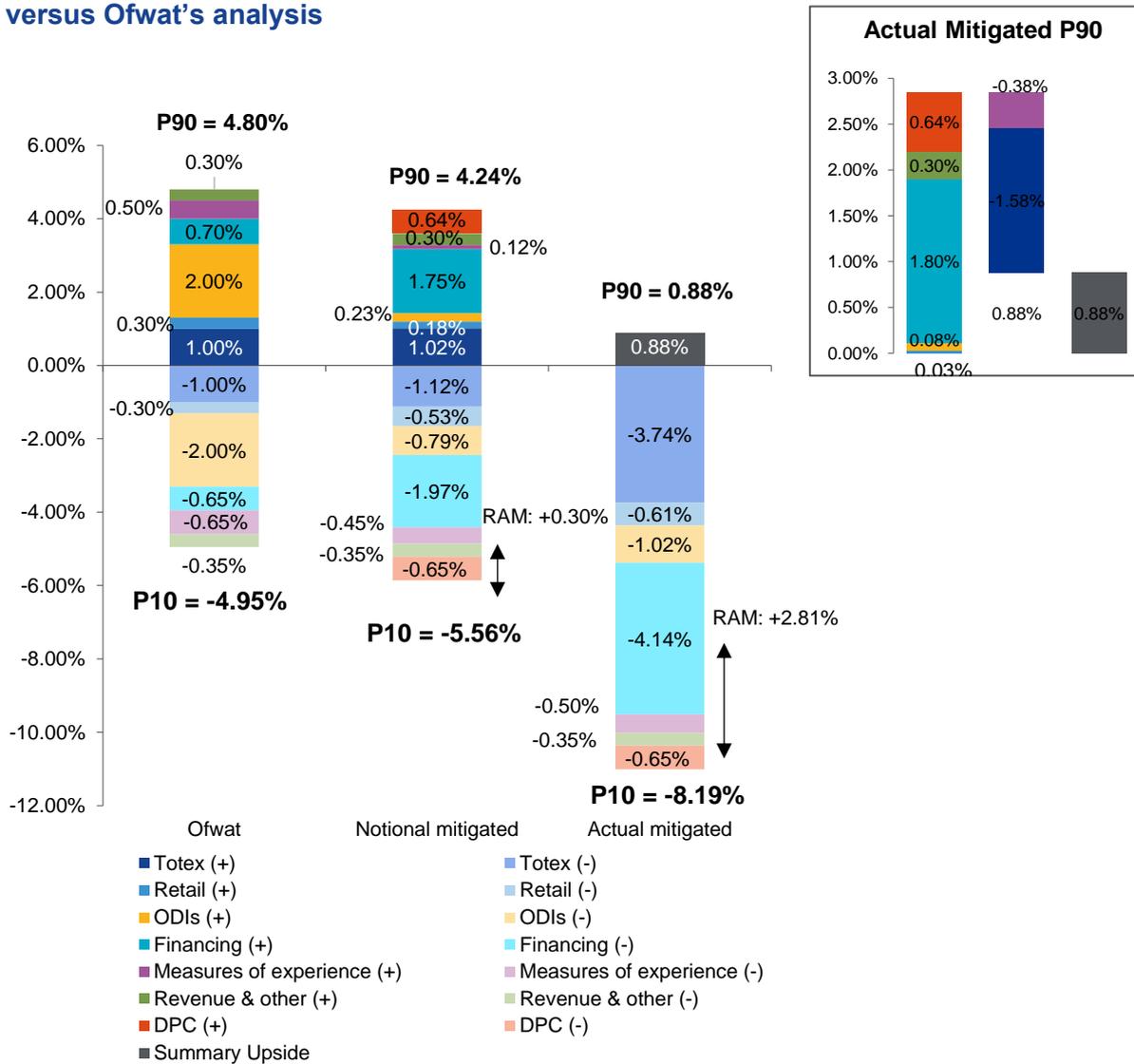
Similar to the notional company, we also propose a suite of risk mitigations as part of our PR24 submission, which, in addition to the notional company’s mitigations also includes different ODI targets, with a glide path to improve our performance towards the end of AMP8. Our board assurance statements on financeability and financial resilience are predicated on these risk mitigations being accepted by Ofwat.

**Table 3: Notional and actual company RoRE ranges (after mitigation) – Our analysis**

	Ofwat’s notional company RoRE range	Notional company mitigated RoRE range	Actual company mitigated RoRE range
Upside (P90)	4.80%	4.24%	0.88%
Most likely (P50)	0.00%	-0.84%	-4.46%
Downside (P10)	-4.95%	-5.56%	-8.19%

For Southern Water, a company in a turnaround, mitigated RoRE ranges are even more asymmetric, with the mean risk-adjusted return close to zero, as cost of equity allowance is offset by the remaining risk at P50. While we are working hard to ensure that we deliver on our turnaround plan, it is important that we are not exposed to unlimited amounts of risk. An unmitigated risk exposure would place an immense financing challenge on us. If our return is not commensurate with the level of risk in the plan, we may not be able to secure the needed capital to fund the turnaround plan and improve the level of service we provide to our customers. Proposed risk mitigations are, therefore, in the best interest of customers, as they would help us secure appropriate funding to improve our performance.

**Figure 3: Drivers of the mitigated RoRE ranges: Our notional and actual company analysis versus Ofwat’s analysis**



A balanced overall risk and return package is a necessary condition for the notional company to be able to finance its plan and attract both debt and equity capital at efficient rates and on continuous basis. Any disconnect between the likely revenue at risk and the level of allowed returns would negatively affect the sector’s access to capital.

It is critical that we have access to the capital we need to deliver our commitments to customers and to ensure financial resilience, that is, the ability to avoid, cope with and recover from disruption. As Ofwat recognised in its consultation on strengthening ring-fencing conditions<sup>4</sup>, financial resilience is requisite to deliver operational performance:

*“Weakened financial resilience can lead to reduced levels of operational performance and erode a company’s capacity to cope with financial pressures or shocks without compromising service to customers.”*

<sup>4</sup> Ofwat, July 2022. Consultation under sections 13 and 12A of the Water Industry Act 1991 on proposed modifications to strengthen the ring-fencing licence conditions of the largest undertakers.

In our case, if we are not financially resilient, it will make it harder to attract and retain capital and undermine our ability to achieve a successful turnaround at the pace that we want. It would dramatically reduce and delay improvements in service outcomes for customers. Our customer research shows that customers would far rather get the right level of service than small discounts on bills. The risk mitigations we propose would allow our planned improvement in service outcomes to be delivered. It is in the long-term interest of customers that the overall risk and return package is balanced to support financial resilience and to allow us to deliver enduring improvements in our service.

## 2. Approach to Risk Analysis

### 2.1 General approach

To assess the level of risk the notional company would be exposed to in AMP8, we calibrated the top-down risk analysis based on observed sector performance and PR24 FM. The risk analysis enabled us to identify areas causing downside asymmetry and design a suite of possible mitigations to better align risk and return.

The top-down risk analysis systematically incorporates the sector's historical performance to inform what level of risk the notional company may be exposed to in financial terms. The analysis assumes that past performance is a good proxy for future performance and thus uses historical data to create probabilistic distributions and perform Monte Carlo simulation to examine potential outcomes in AMP8.

We note that this analysis assumes the median and standard deviation from AMP7 will persist through AMP8. This approach may potentially understate the level of risk should AMP8 outturn standard deviation be higher than the values observed during AMP7. Given the scale and complexity of capital programmes, this is a plausible scenario.

We followed these steps to undertake the top-down risk assessment process:

- 1) Gathered the sector and actual company data from the Ofwat water company performance reports and annual performance reports for FY21, FY22 and FY23. While we note that Ofwat published the Water Company Performance Report 2022/23 on Monday, 25 September 2023, it was not incorporated into the analysis due to limited time. We will update this analysis in due course;
- 2) Calculated the distribution parameters, including standard deviation of the sector performance and sector-median performance on each granular risk factor;
- 3) Constructed historical probability distributions based on the medians and standard deviations by using Monte-Carlo simulations with the aid of statistical software ("At risk");
- 4) Using historical probability distributions and the PR24 business plan assumptions, we undertook Monte-Carlo simulations to construct forward-looking probability distributions. Normal distribution was used for most of the parameters, and a triangular distribution for penalty only PC commitments having no upside potential such as CRI and Discharge compliance. For the notional company unmitigated ODI and totex risk simulations, we assumed no collars or deadbands, and no botex adjustment for the Real Price Effects (RPEs) in relation to energy cost or the cost of chemicals;
- 5) Using the expected PR24 ODI rates, we converted the forward-looking probability distributions into financial impacts for each category of risk. For totex, this step was not required, as performance distribution was simulated in financial terms; and
- 6) We further converted the pound million financial impact into the RoRE terms by dividing it by the forecast notional equity and applied aggregate ODI sharing mechanism, where relevant, to share any ODI-related exposure exceeding 300 basis points.

To conduct the risk analysis, we collected historic data at the sector and company level for totex, performance commitments, financing cost, measure of customer experience and residential retail. We elected to use AMP7 data due to its relative similarity to AMP8 in the range of performance commitments present, its scale, and complexity. For enhancement spend due to using only historical data, we considered increase in scale of spend, rather than a change in median or standard deviation.

For new ODIs, AMP7 data was considered where available and supplemented with AMP6 data where necessary (e.g., Bathing water quality). Due to lack of historical data, risk related to Greenhouse Gas

Emissions, Biodiversity, and business customer and retailer measure of experience (BR-Mex) has not been assessed. Therefore, the resulting ODI risk ranges potentially understate risk by excluding the impact of these measures if there is negative asymmetry or non-zero median expected outcomes.

We used the following sector data:

- Historical totex allowances per company;
- Actual totex and by company split between base vs enhancement and water vs waste;
- Historical targets on each PC, per company;
- Actual performance of the sector on each PC, per company;
- Historical fluctuation of inflation and cost of new debt performance;
- Retail profit outturn per company and retail residential revenue;
- Totex variance due to timing; and
- Data corrected for outliers such as Hafren Dyfrdwy.

We used the following SWS-specific inputs to inform the notional company analysis:

- AMP8 forecast notional equity, totex programme split by base vs enhancement and water vs wastewater, so that the scale of enhancement in relative terms is representative of our specific programme relative to our expected notional equity;
- AMP8 Enhancement spend subject to PCD in relative terms;
- DPC and alternative delivery route estimated spend in relative terms to the RCV and regulated equity; and
- AMP8 expected ODI targets and rates for consistency with forecast notional equity.

In reference to the data we collected, totex utilises cumulative AMP to date data for AMP7. Cumulative performance across the AMP is more closely related to full AMP performance than considering individual years. While there are fewer data points in a cumulative approach, the resulting output is a better proxy for full AMP outcomes. Totex was also considered not as a homogenous bundle of similar risk but rather five subcomponents with differing risk profiles. Firstly, totex was split between water and wastewater where wastewater had slightly higher variation observed in AMP7 performance versus allowance than water. This is especially relevant for our business as wastewater totex has historically been a larger component of totex while in AMP8 the relationship is reversed. Secondly, totex for water and wastewater was split between enhancement and base costs. Base costs were observed to have significantly less volatility than enhancement costs and a negative correlation was identified between base and enhancement performance. Finally, the wastewater base costs were split between bioresources and wastewater networks price controls as they carry different sharing rates (0% and 50%, respectively). The resulting five components of totex were used as an input for Monte Carlo simulations using the distribution parameters identified in our analysis, assuming 50% symmetrical sharing rates on all components of totex except for bioresources one.

Totex was also adjusted for self-reported timing components of performance on totex spend versus allowance in AMP7 according to data table 4U. To assess retail risk, the RoRE outturn in £m was used. C-MeX risk was simulated as a score distance from sector average, with a penalty of 2.3% of total per score point deviation applied to 18% of retail revenues. However, the modelled C-MeX risk could be understated as implementation of recent proposals in Ofwat's consultation on measures of experience would shift comparison of performance to wider economy, which could have negative impact on distribution of scores for the water sector. Similarly, D-Mex was simulated as a score distance from sector average, with a penalty of 0.17% and 0.08% reward of developer services revenues. However, the modelled D-Mex risk could materially change depending on the results of the Ofwat consultation on measures of experience.

PCDs are taken into account by considering both the portion of spend subject to PCDs and the delivery risk estimated for the company in not meeting its PCD commitments. The estimation of delivery risk is largely

qualitative as PCDs have not been implemented before and there is limited data available to simulate the probability of PCDs being applied at a granular level. The combination of the proportion of enhancement spend subject to PCDs and the delivery risk factor were used to reduce the upside related to enhancement spend and also increase the downside, but to a lesser degree. Based on our assessment of the risk to the average water company, PCD is more likely to make up a material portion of outperformance and comparatively less so for underperformance.

DPC and alternative delivery routes could carry significant risk related to the difficulty of setting accurate ex-ante allowances and exposure to delay and overspend risks. To capture that risk, we estimated the notional company's blended exposure to these types of delivery based on multiple methods. These have resulted in a broad outcome that the notional company would retain c. 25% of risk related to these schemes, and that the associated risk would be similar to the risk embedded in the enhancement spend. These assumptions were used to simulate forward-looking probability distributions.

To capture the granular elements of risk on notional basis, we undertook bottom-up correlation analysis between different elements of risk, which was based on our underlying data due to the lack of sector-wide data being available. This allowed us to incorporate the interrelationship of the components of risk in the probability simulations.

We used the outputs of the risk simulations to understand the forward-looking risk exposure on a granular basis and inform calibration of risk mitigations.

## 2.2 Specification of the notional company

Appropriate specification of the notional company is important for producing meaningful RoRE risk ranges that are achievable in practice. It should reflect objective and realistic characteristics of an efficient water company that can achieve the set package of cost efficiencies and standards of service. While we recognise Ofwat's objective to incentivise companies to achieve further gains in cost efficiency together with stretching service quality targets to improve outcomes and reduce bills for customers, we also note that the notional company efficiency assumptions should be practically achievable based on the level of performance improvements delivered by the sector in the past.

Bearing in mind the practical ability of the same efficiently run company to achieve cost savings and improve performance against a wide suite of commitments, we calibrated the notional company's operational performance based on the sector-average performance across totex, ODIs and retail for the purpose of the forward-looking risk analysis. Our forward-looking probability distribution is informed by the sector's median performance and the sector's standard deviation around the median, which effectively assumes that the notional company achieves sector-average performance on each of the performance components, a rather stretching target, given the actual sector performance in AMP7.

The sector's overall level of performance across totex, ODIs (including bespoke ODIs) and retail during the first three years of AMP7 is demonstrated in Table 4. The shaded cells highlight performance at or above sector average. Only one company consistently achieved average or above average performance on each of the performance components in each of the three years, and 4 more achieved it in two out of three years. This means that if the notional company is calibrated to the sector's mean performance for each of the operational performance components and each of the five years of AMP8, it is effectively calibrated to the top performers.

**Table 4: Sector RoRE performance on totex, ODIs and Retail<sup>5</sup>**

	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Co8	Co9	Co10	Co11	Co12	Co13	Co14	Co15	Co16	Co17
<b>Totex RoRE - notional equity</b>																	
2021	0.2%	-5.1%	0.4%	-2.0%	-0.1%	2.8%	0.4%	-0.2%	-0.2%	0.2%	-1.6%	1.8%	2.0%	0.4%	-1.1%	-1.4%	-0.9%
2022	0.8%	-4.5%	-0.7%	-3.0%	0.0%	0.7%	2.1%	-0.8%	-0.1%	0.1%	-0.9%	1.9%	0.4%	1.7%	0.5%	-0.1%	0.1%
2023	-2.1%	-11.3%	-0.4%	-10.1%	0.0%	-4.5%	0.7%	-0.7%	-2.9%	-4.6%	-1.5%	-2.3%	-1.7%	1.7%	-3.1%	-4.3%	-4.8%
<b>ODI RoRE - notional equity</b>																	
2021	0.2%	-1.8%	0.1%	-2.1%	1.7%	-0.8%	-0.6%	0.3%	-0.3%	-0.1%	0.0%	-1.1%	-0.9%	0.1%	-0.5%	-1.1%	-0.3%
2022	-0.4%	-2.3%	-1.2%	-1.7%	1.4%	0.1%	-0.7%	0.4%	-0.5%	0.1%	-0.6%	-0.8%	0.0%	-0.3%	0.3%	-0.4%	-0.5%
2023	-0.7%	-1.7%	-0.2%	-1.8%	0.6%	-0.2%	-1.5%	0.4%	-0.9%	-0.1%	-0.7%	-2.1%	-1.5%	-0.5%	-0.8%	-0.7%	-2.1%
<b>Retail RoRE - notional equity</b>																	
2021	-0.3%	0.1%	-1.2%	-1.5%	-0.5%	0.1%	-1.4%	-0.3%	-1.3%	-0.7%	-0.2%	-0.6%	-1.3%	-0.6%	-3.1%	-0.4%	-0.4%
2022	0.5%	2.7%	-0.7%	-1.2%	-0.1%	0.1%	-0.7%	-0.2%	-0.8%	-0.5%	-0.8%	-0.2%	0.3%	-0.2%	-3.0%	-0.6%	-1.9%
2023	-0.2%	1.4%	-0.5%	-0.3%	-0.1%	-0.1%	-0.9%	-0.2%	-1.2%	-0.1%	-0.2%	-0.5%	-0.2%	-2.0%	-2.2%	-0.7%	-0.7%

Moreover, the sector's first quartile performers struggled to earn the allowed equity return across Totex, ODIs and Retail, as presented in Table 5. This provides information regarding the calibration of the AMP7 incentive package, which assumed that the notional company could achieve the required standards across all of the performance parameters simultaneously.

**Table 5: Sector P75 RoRE performance across totex, ODIs and Retail**

	Totex RoRE - notional equity			ODI RoRE - notional equity			Retail RoRE - notional equity		
	2021	2022	2023	2021	2022	2023	2021	2022	2023
Sector P75	0.4%	0.7%	-0.7%	0.1%	0.1%	-0.2%	-0.3%	-0.1%	-0.2%

Additionally, the notional company was calibrated to reflect some of the objective characteristics of a company operating in the South-East of England and facing the scale of enhancement spend similar to Us in relative terms, representing 54.7% of the opening RCV including delivery through DPC and alternative delivery routes and 36.5% excluding them. Specifically, our analysis factors in the requirement to have more onerous wastewater permits and restrictions on abstraction licenses due to the presence of environmentally protected areas and coastal regions. We accounted for this by adjusting the median expected performance for the notional company on discharge permit compliance to incur a higher rate of failure due to limitations associated with the degree of treatment that best available technology could deliver. We did not alter the notional company's exposure to the energy price risk but note that we expect our water sourcing to become more energy-intensive given the restrictions associated with abstraction.

We also reflected some of the company-specific correlations between several ODIs, based on an in-depth analysis of our data. Below is a summary of our analysis for each relationship with further evidence provided later in this section.

- **Water quality contacts and compliance risk index:** the data shows a positive correlation of 0.74 between these PCs. This is due to water quality contacts for appearance, taste and odour triggering the DWI to conduct testing. If customers identify a water quality issue and the DWI confirms this with their testing, the incident is logged in the CRI score. There is a substantial number of incidents of water quality contacts leading to CRI score impact and at times multiple contacts about the same incident.
- **External sewer flooding, internal sewer flooding and total pollution incidents:** the data show a positive correlation between each of these PCs due to network blockages causing failures on each of these PCs. The relationship between external sewer flooding and internal sewer flooding is the strongest at 0.52 given the more significant overlap in root causes. Total pollution incidents showed a smaller but

<sup>5</sup> Source: APRs for FY21-FY23, Table 1F.

still positive relationship of 0.37 and 0.38 to internal and external sewer flooding, respectively, as there are other causes of pollution incidents that do not affect sewer flooding.

- **Total pollution incidents and storm overflows:** based on a qualitative assessment of the relationship, some storm overflows would qualify as category 3 pollution incidents under the Environment Agency's classification system and would be counted in both PCs for the same incident. Therefore, we have used a positive correlation of 0.50 between these PCs.

We also identified a small negative correlation between enhancement and base totex of -0.20 due to the sectors' precedent and the theoretical possibility to manage the overall totex spend across the two categories, although such flexibility is expected to reduce in AMP8 due to the wider use of PCDs.

### 3. The Notional Company RoRE Ranges

Our analysis of the notional firm’s risk exposure during AMP8, given the changing risk landscape, has resulted in ranges that are wider than Ofwat’s and more asymmetric to the downside. Key drivers of risk are presented in table 6 and on the chart in Figure 4.

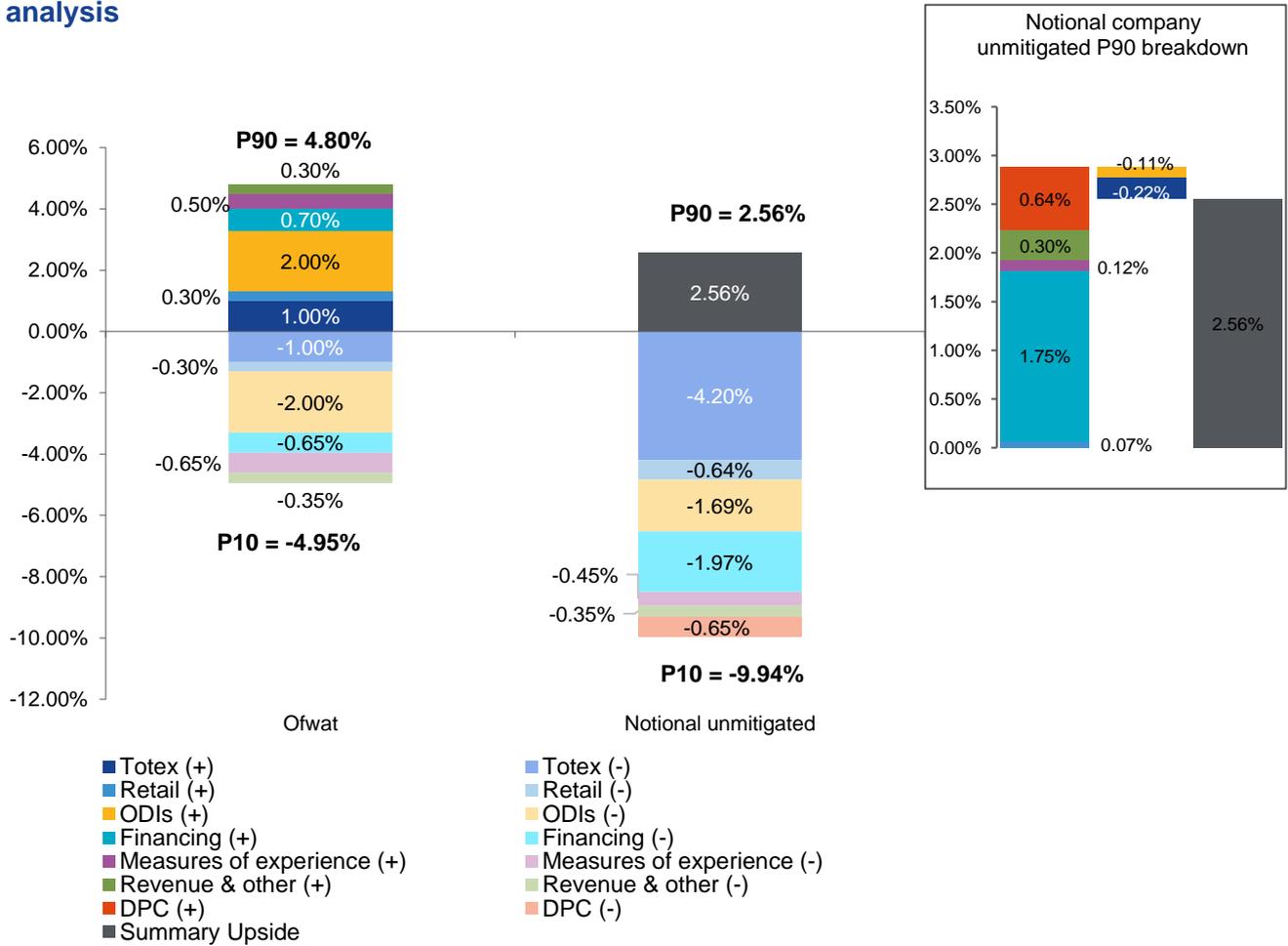
**Table 6: Unmitigated notional company RoRE ranges**

	P10	P50	P90
<b>Total risk to the notional company’s allowed return implied by the PR24 incentive package</b>	<b>-9.94%</b>	<b>-3.59%</b>	<b>2.56%</b>
<b>Totex</b>			
Totex: retail	-0.64%	-0.29%	0.07%
Base costs - water	-1.34%	-0.60%	0.14%
Base costs - wastewater	-2.16%	-0.73%	0.70%
Base costs - bioresources	-0.49%	-0.17%	0.16%
Enhancement costs - water	-1.44%	0.00%	0.46%
Enhancement costs - wastewater	-1.92%	0.00%	0.61%
<b>Totex (Base + enhancement)</b>	<b>-4.20%</b>	<b>-2.18%</b>	<b>-0.22%</b>
<b>Performance Commitments</b>			
Leakage	-0.02%	0.00%	0.02%
Water quality contacts	-0.05%	0.00%	0.05%
Water supply interruptions	-0.62%	-0.19%	0.09%
Compliance risk index (CRI)	-0.16%	-0.10%	-0.05%
Per capita consumption (PCC)	-0.32%	-0.21%	-0.10%
Mains Repairs	0.00%	0.00%	0.00%
Unplanned outage	0.00%	0.00%	0.00%
Total pollution incidents	-0.63%	-0.12%	0.39%
Sewer flooding	-0.19%	-0.05%	0.08%
Sewer collapse	-0.09%	-0.01%	0.07%
Discharge compliance	-0.14%	-0.11%	-0.09%
Bathing water quality	-0.31%	0.05%	0.41%
Storm overflows	-0.09%	-0.01%	0.07%
External sewer flooding	-0.34%	-0.02%	0.31%

	P10	P50	P90
<b>Total risk to the notional company's allowed return implied by the PR24 incentive package</b>	<b>-9.94%</b>	<b>-3.59%</b>	<b>2.56%</b>
Serious pollution incidents	-0.25%	-0.12%	0.00%
Business demand	-0.10%	0.16%	0.42%
River water quality (phosphorus)	-0.36%	-0.08%	0.20%
Aggregate sharing mechanism - shared risk	0.00%	0.00%	0.01%
<b>Total ODI</b>	<b>-1.69%</b>	<b>-0.88%</b>	<b>-0.10%</b>
<b>Measures of experience</b>			
C-MeX	-0.44%	-0.16%	0.13%
D-Mex	-0.04%	-0.01%	0.01%
<b>Total measure of experience</b>	<b>-0.45%</b>	<b>-0.17%</b>	<b>0.12%</b>
<b>DPC</b>			
DPC - construction	-0.65%	0.00%	0.64%
DPC - post commissioning	0.00%	0.00%	0.00%
<b>Total DPC</b>	<b>-0.65%</b>	<b>0.00%</b>	<b>0.64%</b>
<b>Financing risk</b>	<b>-1.97%</b>	<b>-0.08%</b>	<b>1.75%</b>
<b>QAA Penalty</b>	<b>-0.30%</b>	<b>0.00%</b>	<b>0.30%</b>
<b>Revenue risk</b>	<b>-0.05%</b>	<b>0.00%</b>	<b>0.00%</b>

Note: The sum of individual risk elements will not equal the aggregate amount due to correlations being less than 1.0x and non-normal distributions.

**Figure 4: Drivers of the notional company RoRE ranges: Our analysis versus Ofwat's analysis**



Each of the following sub-chapters expands on the key drivers of risk in greater detail and provides supporting analysis.

### 3.1 Totex

Totex is a key driver of operational out- or under-performance for water companies and a material component of overall RoRE risk. During AMP8, the notional company will face significantly higher totex risk than in AMP7 due to larger investment requirements arising from statutory obligations, environmental drivers, the transition to Net Zero, and asset resilience. We aimed to reflect the magnitude of these risk drivers on the notional company RoRE ranges in our risk analysis.

Ofwat's notional company assessment considers Totex as a single block, which overlooks the fundamentally different risk profiles that expenditure in the different parts of our business – base, enhancement, water and wastewater – have. To ensure that we capture the risk exposure inherent to each category of spend, we broke totex spend down into five components for the purpose of our analysis: base water costs, base wastewater costs, bioresources base costs, enhancement water costs, and enhancement wastewater costs.

Historical cumulative performance over AMP7 is considered across the five components with the median and standard deviation of sector performance versus the allowance used as a starting point for generating random scenarios that form probability distributions. An assumption of a 50% baseline sharing rate is used



for both outperformance and underperformance in AMP8. The bioresources base costs rely on the base wastewater historical performance and use a sharing rate of 0% consistent with the PR24 FM. We use the first three years of AMP7 price control given its similarity to AMP8 incentive regime and hence relevance for predicting future performance.

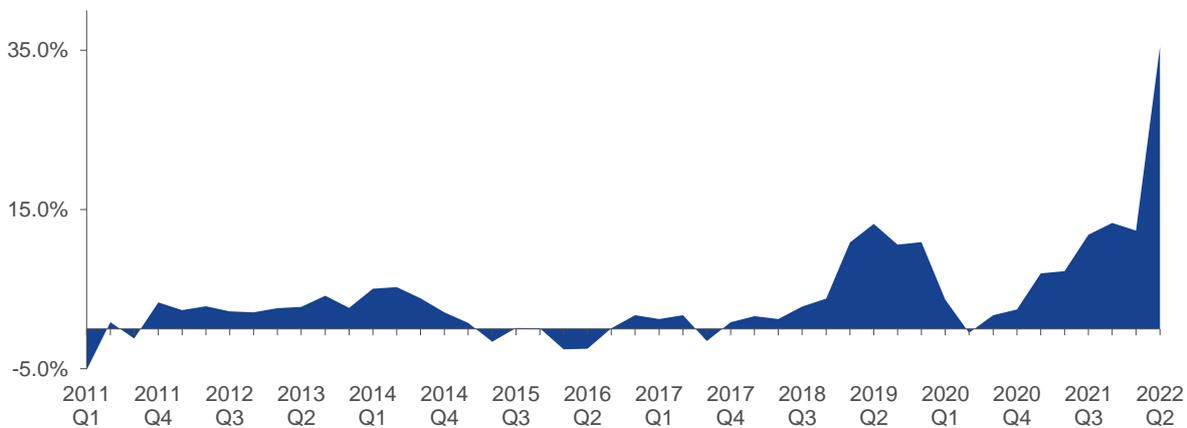
**Botex (base totex) risks**

Base costs are routine, year-on-year costs, which companies incur in the normal running of the business to provide a base level of service. Companies recover efficiently incurred costs established through an ex-ante cost assessment that considers anticipated efficiency improvements throughout the price control period.

Botex-specific risks largely stem from the cost calibration uncertainty. While Ofwat assumes that the notional company spends in line with its botex allowance on a mean expected basis in AMP8, we consider this to be an upward bias as PR19 variances from ex ante expectations indicate presence of cost miscalibration. Sector-wide underperformance on botex in the first 3 years of AMP7 was largely caused by inflationary issues and a mismatch between outturn cost increases and the regulatory treatment of cost indexation.

WaSCs rely on chemicals to supplement the biological processes of wastewater treatment, and the cost of these chemicals has outpaced inflation. Additionally, the sector has been exposed to unprecedented energy price volatility in recent years, which affected botex performance as energy costs account for a material proportion – roughly 10-20% – of the sector’s base costs. Electricity prices increased 35% over the CPIH index in Q2 2022 (see Figure 5 below), the highest increase in real terms across the whole sample period that Ofwat considers for its base cost models. The high energy inflation was not anticipated at PR19, and so was not reflected in cost allowances or captured by the RPE indexation mechanism, leading to underperformance for the sector.

**Figure 5: Wedge between electricity price and CPIH**



Source: BEIS and ONS data.

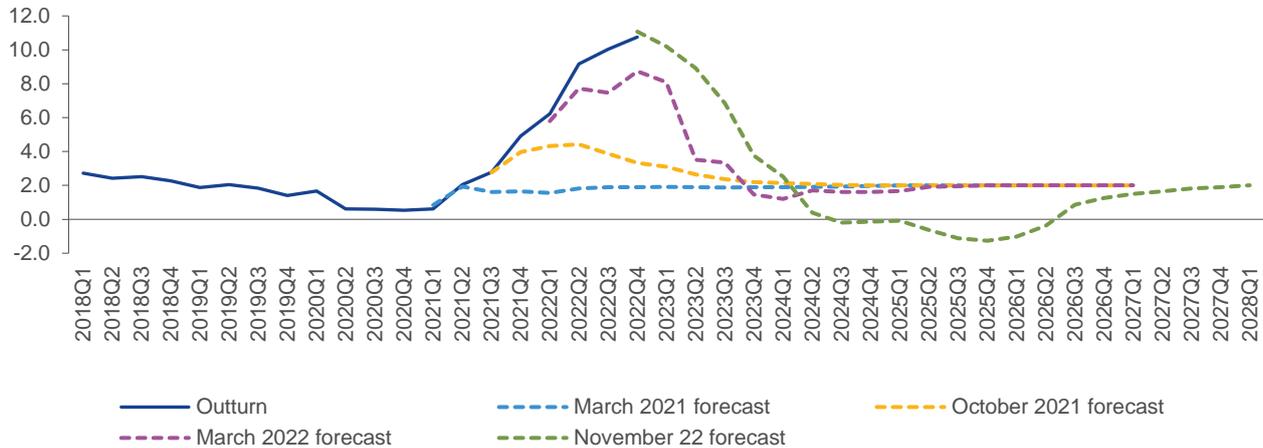
Energy expenditure for a notional company in the South of England can also be expected to increase in AMP8 and onwards due to the use of more energy-intensive ways to source water. Supply and demand forecasts show a supply-demand deficit which will lead to more energy intensive operational measures such as temporary pumps. Additionally, the significant long-term reductions of chalk groundwater abstractions proposed in WRMP24 will lead to more water abstracted from rivers, which needs greater treatment and may have a significant influence on energy usage.

In addition to energy price increases, the coronavirus pandemic had the effect of closing down significant parts of the world economy. Although supply chain pressures have eased in 2022, they remain elevated by historical standards and the economy continues to experience disruption due to supply chain issues. The path of inflation is uncertain and, as shown in Figure 6, the OBR has made significant revisions to even



short-term forecasts in recent releases. The extent of the CPI inflation increase in 2021-22 is the largest difference between forecast and outturn since the OBR began forecasting in 2010. Around one-third of the difference is due to rising energy costs, with the remainder reflecting a tighter than expected domestic labour market, persistent supply and logistic bottlenecks and an unexpectedly strong recovery in demand in advanced economies<sup>6</sup>.

**Figure 6: Successive OBR inflation forecasts**



The rapidly changing inflationary environment, input price volatility and the unpredictability of further supply shocks defines the AMP8 economic landscape and macroeconomic conditions and contributes to the notional company’s RoRE risk ranges. The RoRE ranges estimated by Ofwat for the notional company are based on AMP6 and available AMP7 data. During that period, energy costs were not subject to RPEs. Our consideration of the notional company risks rests on an assumption that this policy is continued and consequently estimates the potential downside risks (on an unmitigated basis).

**Enhancement totex risks**

Across the sector, there is a major step up in investment requirements related to enhancement spend. Overall totex spend in AMP8 is expected to increase by c. 60-90% versus the last five years (FY18-FY22). The overall scale and complexity of the proposed enhancement programme is a significant driver of the totex risk for both the notional company and ourselves.

This is primarily driven by the Water Industry National Environment Programme (WINEP) programme, which includes investment required to reduce storm overflows, remove phosphorus from rivers and ensure environmental nutrient neutrality. The WINEP programme is driven by company submitted River Basin Management Plans (RBMP), Water Resource Management Plans (WRMP), Drainage and Wastewater Management Plans (DWMP) and Flood Risk Management Plans (FRMP). The government’s Storm Overflows Discharge Reduction Plan (SODRP) is estimated to require up to £56 billion capital investment – the largest infrastructure programme in water company history. The plan covers a 25-year period, however, there is a target that water companies will have to improve all storm overflows discharging into or near every designated bathing water; and improve 75% of overflows by 2035. For phosphorus removal and nutrient neutrality, the Environment Agency (EA) is implementing tightening standards around the levels of phosphorus and quality of discharges into rivers.

For a notional company operating in the South East of England, increase in the enhancement spend is also driven by the Water Resource Management Plan (WRMP), which includes targets to reduce abstraction from the environmentally protected chalk streams, curb leakage, increase water efficiency and expand supply options to respond to population growth and climate change. Outside the statutory requirements of WINEP, WRMP and DWMP, other drivers of enhancement spend include maintenance and renewals investment as

<sup>6</sup> Forecast evaluation report, OBR, January 2023.



long-run assets reach the end of their useful lives, population growth related costs, net zero and bioresources investment. Table 7 below presents primary drivers of enhancement spend in the sector in the next 10-25 years and the overall estimated size of spend.

**Table 7: Drivers of enhancement spend over the next 25 years<sup>7</sup>**

Programme of spend	Overall estimated size of spend (17/18 prices)	Time period	Yearly estimated size of spend (17/18 prices)
DWMP	£88-£143bn	FY25-FY50 (25 years)	£3.5 – 5.7 bn
WRMP	£14-£18bn	FY25-FY35 (10 years)	£1.4 – 1.8bn
Total programme spend	£102-161bn	FY25-FY50 (25 years)	£4.9 – 7.5bn
Allowed AMP7 industry enhancement spend in FY21-FY22	£3.4bn	FY21-22 (2 years)	£1.7bn

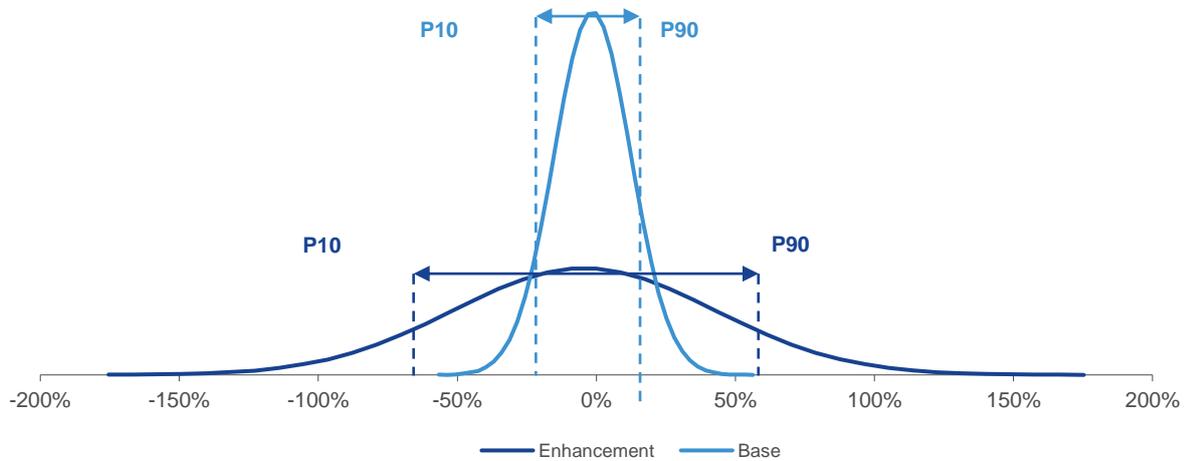
At PR19 final determinations, Our allowed enhancement expenditure was £0.9bn in 2017/18 prices or £1.0bn in 2022/23 prices for the 5-year price control period. At PR24, our current estimate of enhancement expenditure is £3.3bn in 2017/18 prices or £3.9bn in 2022/23 prices. While some of this enhancement spend is likely to be delivered through alternative delivery routes and DPC (c. 33%), it highlights the step-change in the enhancement expenditure, and consequently higher risk profile associated with the PR24 expenditure plan. For the purpose of the forward-looking risk analysis, risk inherent in the smaller enhancement programme, consistent with AMP7, was extrapolated to AMP8, accounting for an increase in its size relative to RCV. The greater complexity and higher risk of a larger enhancement programme relative to a smaller one has not, however, been captured in the notional company's totex risk due to the lack of comparable sector data on the standard deviations and medians.

Large-scale projects and capital programmes tend to be inherently more complex and are subject to greater uncertainty than smaller, less complex programmes. Step changes in the levels of expenditure create heightened exposure to supply chains, input costs, and deliverability risks. Some of the risks associated with large enhancement schemes include input price inflation, including the cost of materials and labour, supply chain limitations, which can cause delays in the delivery of materials and equipment, labour market shortages and overall delivery risk. All these factors could result in delays and/or cost overruns, exacerbated by the need to run multiple investment strands and multiple large projects simultaneously, which means the totex risk is asymmetrical to the downside. Lack of comparable historical data also introduces the risk of mis-calibrating the ex-ante allowances as there are fewer relevant prior projects to underpin ex ante estimates.

Figure 7 demonstrates the relative differences in the probability distributions of the base and enhancement spend. While probabilities of the base spend are concentrated within a relatively narrow variance in performance, the probabilities of the enhancement spend spread out much further, reflecting greater variance in the potential outcomes.

<sup>7</sup> Source: Companies published DWMPs and WRMPs, Ofwat's PR19 FDs; capital maintenance assumes an average historic percentage of spend in real terms relative to RCV.

**Figure 7: Base vs enhancement cost performance distribution (illustrative)**



Overall, there is more scope for variance (positive and negative) on enhancement programmes and this can be observed from historical performance on enhancement costs for SWS and the sector. We aim to capture these variances in the notional company RoRE ranges.

**PCD risks**

Risks associated with the larger and more complex enhancement programme are exacerbated by the introduction of PCDs, which reflects the risk that totex allowances can be clawed back when some but not all deliverables are achieved.

Ofwat’s PR24 guidance on PCDs suggests that companies should use price control deliverables where investment is material, and the delivery of benefits cannot be easily or directly linked, or the costs fully covered, by performance commitments and outcome delivery incentives. Given the increased proportion of enhancement spend, we have based our preliminary view on an interpretation of the guidance and assumed that at PR24 companies will be asked to develop PCDs on a significantly larger scale than the similar measures in PR19, in addition to having significantly larger enhancement programmes. This is likely to imply downside-only risk and reduce flexibility to offset underperformance against outperformance across a portfolio of projects or achieve economies of scale.

In AMP8, we expect PCDs to impact the totex risk in 4 ways:

- 1) PCDs are, in the main, downside only incentive mechanisms which are likely to reduce totex upside and could also increase downside. Any totex savings when schemes are not being fully delivered would be clawed back. In the instances when totex allowances are spent but PCDs are only partially delivered for example due to delays and longer project timeframes, part of the allowances could be clawed back increasing the downside;
- 2) The scale of the planned enhancement spend at AMP8 is considerably larger than at AMP7 which implies that PCDs will be applied to a larger proportion of the overall totex;
- 3) Under Ofwat’s proposals, PCD penalties are based on average cost, plus an uplift for the forgone customer benefit. However, if a company under-delivers it only saves the marginal cost of the undelivered unit creating a penalty-cost wedge; and
- 4) The uncertain nature of the mechanisms could potentially give Ofwat higher regulatory discretion to claw back totex allowances. There is currently no clarity on how this mechanism would work in practice, which makes it difficult to plan and manage the associated risk effectively.

Figure 8: Enhancement cost performance distribution pre and post PCDs (illustrative)

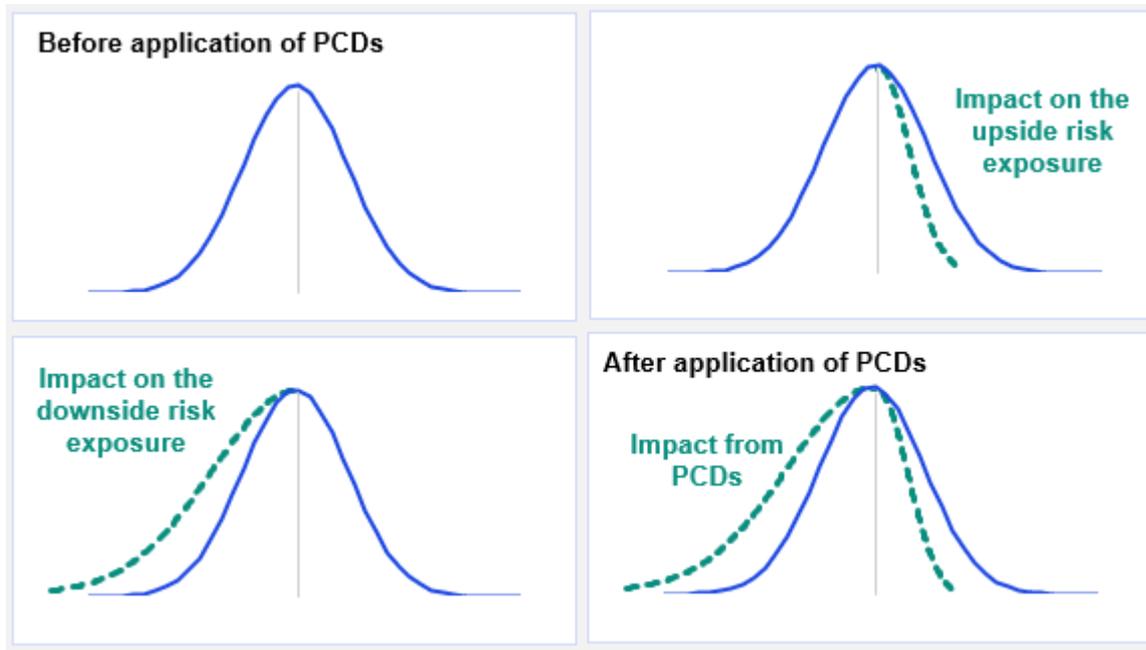
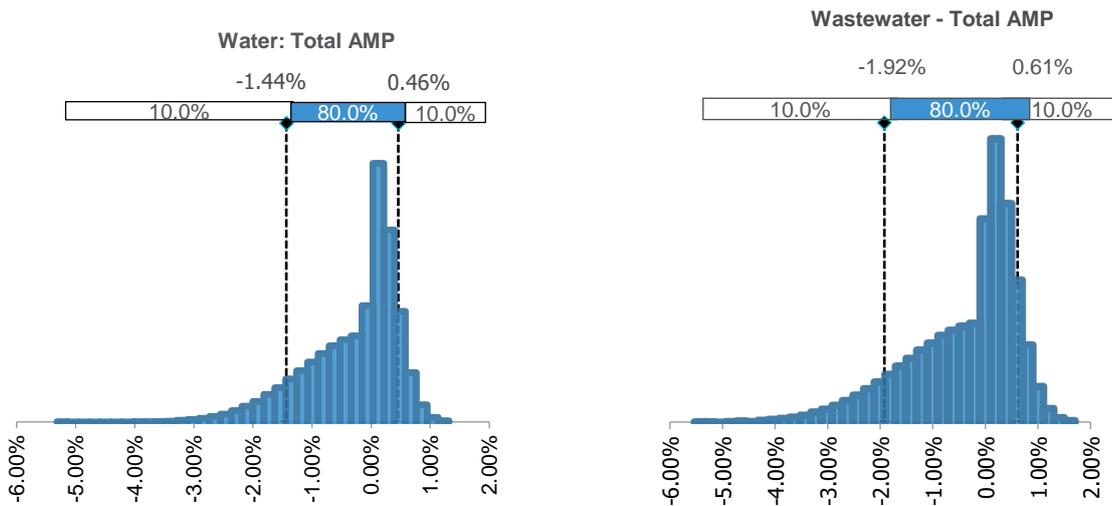


Figure 9: Enhancement cost performance distribution pre and post PCDs (modelled impact)



The impact of PCDs on enhancement spend is captured by considering the proportion of enhancement spend that is expected to be subject to PCDs (c. 90%) and a company specific delivery risk factor (65%). The combination of these (59%) is used to reduce the scale of outperformance on enhancement under the assumption that this portion of outperformance is due to under delivery. Half of this amount is also used to increase the scale of underperformance on enhancement.

**Uncertainty mechanisms (UMs)**

There are several areas where there is material uncertainty in the parts of the business plan. Many of these uncertainties relate to legal / policy decisions that are yet to be made at the point of business plan submission. UMs act as a 'true-up' for totex requirements related to specific programmes that are influenced by various regulatory bodies including the EA, Natural England and Ofwat. UM's effectively address the risk

of totex increase due to circumstances outside of companies' control as they are intended to be used when the timings of projects, their scope or other decisions from the regulators change.

Including uncertain costs in plans would make plans significantly more costly. Also, in most cases, it is not clear whether these additional costs are required. Therefore, we have excluded these costs from our cost proposals, and from the notional company RoRE risk, and set out below the uncertainty mechanisms required to provide the needed funding should these uncertainties materialise. For us, these potential costs could reach £2.5 billion in value and so if they were to materialise, we would require an adjustment to revenue allowances within the control period. It would not be feasible to leave any true-up to an end of period adjustment, as the business would be unable to shoulder additional costs of this scale without an associated revenue allowance. For the notional company, the risks associated with the uncertain timing and scope of projects due to pending regulatory decisions / approvals have not been reflected in our RoRE range because there is insufficient data available to undertake such analysis. We do, however, recognise that uncertainty mechanisms serve as risk mitigation, and we make use of them in our business plan.

UMs are added to specific programmes, and in our plan, we have proposed the following UM's:

**Table 8: Proposed uncertainty mechanisms**

<i>Uncertainty mechanism</i>	<i>Description</i>	<i>Estimated value of uncertainty</i>	<i>RoRE impact</i>	<i>Date of uncertainty determined</i>
WINEP re-profiling	EA proposed consideration of phasing of plan.	725	3.9%	Dependent on various regulatory approvals.
WRMP finalisation	WRMP plan contingent on receiving final sign-off from the secretary of state	402	2.2%	Dependent on various regulatory approvals
Enhanced NIS requirements	NIS CAF (eCAF) publication to the Water Industry setting out the need to achieve full compliance by 2028	100	0.5%	March 2024
Bioresources farming rules for water	Uncertainty surrounding the application of Rule 1 of the Farming Rules for Water	83	0.4%	2025
Bioresources IED	Material uncertainty surrounding the AMP8 IED proposals	247	1.3%	Ongoing
Capital maintenance	Improve asset management practices in response to strategic water industry challenges.	384	2.1%	Early 2024
Alternative delivery routes	Projects identified for an ADR at a nascent stage, with most pre-tender development activities yet to commence	600	3.2%	Ongoing
<b>Total</b>	-	<b>£2,541</b>	<b>13.7%</b>	-

## Conclusion

The indicative RoRE ranges presented in its PR24 FM do not accurately reflect Totex risks faced by the notional company in AMP8 due to:

- Analysing totex as a single coherent block of expenditure, while enhancement expenditure is inherently more complex and risky;
- Not reflecting the impact of a step change in the enhancement spend;
- Omitting the downside asymmetry stemming from the greater use of PCDs; and
- Not considering the impact of historical input price volatility on the base cost.

Accounting for these different strands of the changing risk landscape results in a downside asymmetrical totex RoRE range, which reduces the chances of the notional company earning a base allowed return.

**Table 9: The notional company totex RoRE range: Our analysis versus Ofwat’s indicative range**

	Notional company totex RoRE range (Our analysis)	Ofwat’s notional company RoRE range	Difference
Upside (P90)	-0.22%	1.00%	-1.22%
Most likely <sup>8</sup> (P50)	-2.18%	0.00%	-2.18%
Downside (P10)	-4.20%	-1.00%	-3.20%

## 3.2 Direct Procurement for Customers (DPC) and Alternative Delivery Routes (ADR)

The sector is facing a significant programme of capital works required to be delivered in AMP8 and beyond, which poses a significant deliverability and financeability challenge. It is expected that the sector will deliver some of its enhancement expenditure outside the typical in-house delivery methods, via both DPC and alternative delivery routes (ADR).

DPC was established by Ofwat at PR19 as an alternative delivery approach for large capital schemes. It involves the procurement of a Competitively Appointed Provider (CAP) to Design, Build, Finance, Operate and Maintain (DBFOM) the required infrastructure. Under DPC, we would appoint a third party to execute a DBFOM under a single contract. The CAP is paid through a applied revenue directive (ARD) over life of the contract for their services and the contracts are expected to be 25+ years. Beyond DPC, Ofwat has suggested that it was open to ADR in relation to major projects. ADR would imply appointing a third party to execute a DBFOM contract but without the protection of a TRS.

Delivery of a large part of the capital programme outside the in-house model creates several strands of risk which have not been captured or reflected in Ofwat’s notional company RoRE and could consequently drive risk asymmetry.

<sup>8</sup> Assuming normal probability distribution

## DPC risks

### 1: Cost estimation risks

An identified area of risk associated with alternative delivery routes is the cost estimation risk that an Appointee to the contract would carry. For example, during the development of the Havant Thicket reservoir by Portsmouth water, the procurement process resulted in an outturn project cost of £370.4m, an increase of £235.1m or 173% from the original allowance of £135.8m (all in Nov 2021 prices). This translates into development cost risks for companies pursuing DPC projects and depending on the risk allocation between the Appointee and the Competitively Appointed Provider (CAP), part of this risk may well reside with the Appointee.

### 2: Credit rating risk

Implementation of DPC carries accounting and credit rating risks for the Appointee. The current expectation is that under the accounting rules DPC projects will be recognised as a lease liability, with a corresponding right of use asset on the balance sheet. Credit rating agencies have varying approaches to dealing with this issue, including the extreme one to include the lease liability in debt but not increase respective RCV, and the more balanced one where both debt and RCV are adjusted upwards. Under either of these scenarios credit metrics will be worse than the completely de-consolidated approach, hence impacting credit rating outcomes.

### 3: Operational risk

Due to licensing conditions, Appointees may not be able to pass all liabilities to the CAP (e.g. DWI requirements). This could mean that Appointees are potentially exposed to risks for assets that they do not own. These risks could materialise if the CAP is responsible for operational failure that has a knock-on impact on Appointee PCD performance or affect performance commitments and cause ODI penalties.

## ADR risks

### 1: Exposure to entire cost overrun risk

ADR presents significant risk not accounted for in Ofwat's illustrative RoRE analysis, most notably the full cost overspend risk. Under this delivery model, a water company would not receive any RCV and yet would not be protected by any cost sharing mechanisms resulting in the full exposure to the cost estimation, contracting, overspend, operational and reputational risks.

## **Our assessment of the risk ranges applicable to enhancement spend outside of in-house delivery methods**

In assessing the notional company risk from DPC and ADR, we assumed that the cost sharing rate for DPC is close to 100%, with most risks borne by the CAP, despite the risks outlined above. Conversely, we assumed that the cost sharing for ADR is close to 50% given the lack of regulatory framework surrounding ADR and water company protections. Consequently, in our analysis, we assumed a blended average sharing rate of 75% based on the 50/50 split between DPC and ADR delivery of enhancement spend outside typical in-house delivery methods. This means that water companies still bear c. 25% of cost risk associated with these delivery methods, which we deem a conservative but plausible estimate given the information available. Further, we only considered the risks associated with the construction phase as post commissioning risks are unique for every project.

The projects included in our analysis are similar to enhancement projects, so we based the probabilities on the sector's standard deviation on enhancement in AMP7. Mean expected performance was set to zero, assuming that the allowances are set based on actual procurement processes. We note that this assumption carries additional risk and that Ofwat has not accounted for this in their estimation of the RoRE ranges. Further, we have assessed only the construction period costs as development costs are contained within Appointee totex.

The notional company RoRE ranges incorporate an assumption that its relative scale of DPC and ADR enhancement delivery is similar to Us. This assumption is important to accurately measure and present the risk pertinent to a notional company operating in the South-East of England. We are proposing a significant programme of capital works for AMP8 and beyond, driven by the WRMP, DWMP, the WINEP and other statutory requirements. The size of our estimated AMP8 enhancement expenditure £3.95bn in 22/23 prices poses a significant deliverability and financeability challenge. We have explored a range of options to deliver part of the enhancement via DPC and ADR, which resulted in the preferred option to deliver £1.32bn or 33% of the enhancement spend via the DPC/ADR.

### 3.3 Retail

Retail cost risk is another key driver of operational out- or under-performance for water companies and a material component of overall RoRE risk. Ofwat's assessment of retail cost risk is based on the average outturn expenditure compared to allowance across PR14. Ofwat has indicated a retail RoRE range of between -0.30% and +0.30%, with a mean of 0.

Our risk assessment considers retail performance of the sector over the three years of PR19, which is a more recent and more relevant data sample. The sector underperformed on retail in each of the three years of the current price control. Average performance in RoRE terms fluctuated between -0.30% and -0.60%, as presented in Table 10. This underperformance was predominantly due to companies' actual costs exceeding the allowances provided to them in PR19 final determinations (FD).

**Table 10: Sector's retail performance in RoRE terms by percentile, AMP7**

	90 <sup>th</sup> percentile	10 <sup>th</sup> percentile	50 <sup>th</sup> percentile
<b>FY21</b>	-0.12%	-1.41%	-0.56%
<b>FY22</b>	0.40%	-1.46%	-0.45%
<b>FY23</b>	-0.11%	-1.53%	-0.26%

**Table 11: Sector's reported retail performance in RoRE terms, AMP7<sup>9</sup>**

	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Co8	Co9	Co10	Co11	Co12	Co13	Co14	Co15	Co16	Co17
<b>Retail RoRE - notional equity</b>																	
<b>2021</b>	-0.3%	0.1%	-1.2%	-1.5%	-0.5%	0.1%	-1.4%	-0.3%	-1.3%	-0.7%	-0.2%	-0.6%	-1.3%	-0.6%	-3.1%	-0.4%	-0.4%
<b>2022</b>	0.5%	2.7%	-0.7%	-1.2%	-0.1%	0.1%	-0.7%	-0.2%	-0.8%	-0.5%	-0.8%	-0.2%	0.3%	-0.2%	-3.0%	-0.6%	-1.9%
<b>2023</b>	-0.2%	1.4%	-0.5%	-0.3%	-0.1%	-0.1%	-0.9%	-0.2%	-1.2%	-0.1%	-0.2%	-0.5%	-0.2%	-2.0%	-2.2%	-0.7%	-0.7%

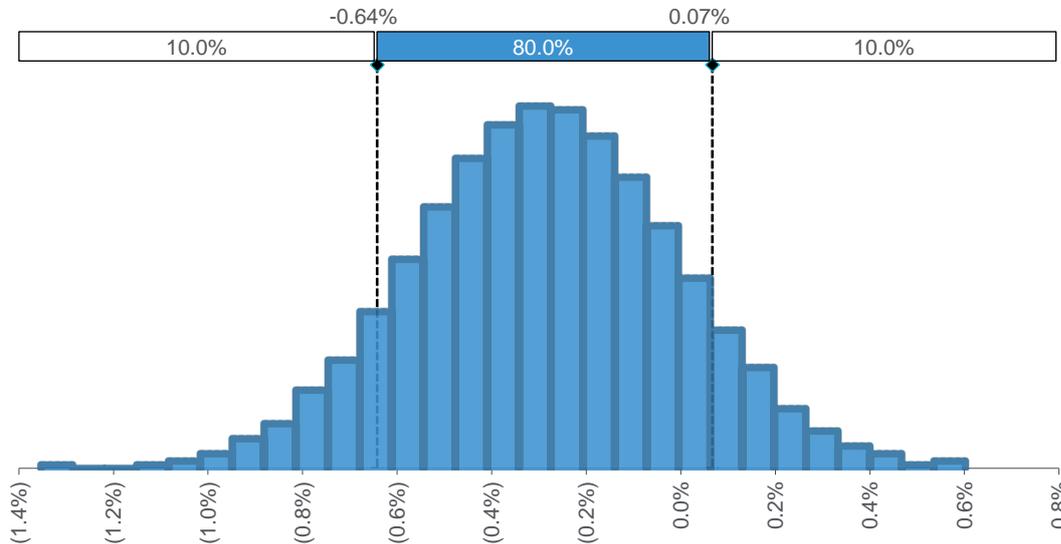
Extreme macroeconomic volatility exerted pressure on staff and other costs and has led to elevated bad debts due to the cost-of-living shocks and raised unemployment forecasts. As the FD cost allowances are not indexed by inflation and retail underperformance is not shared with customers, the sector experienced a meaningful hit in financial terms, reducing allowed return by c. 40 basis points on average across the three years of AMP7. Moreover, outturn performance of the sector on household retail has been clustered in the negative RoRE territory, with limited reported upside. This is a stark difference versus Ofwat-assumed mean of 0 and upside of 0.30%.

Since the turbulent macroeconomic environment is expected to persist, and there is great uncertainty around forward-looking inflation, our forward-looking notional company RoRE ranges are informed by the sector's

<sup>9</sup> Source: Annual performance reports for FY21-FY23.

standard deviation and median performance in AMP7, and result in the expected underperformance of c. -0.29% at P50. This figure excludes outliers such as Thames Water and Hafren Dyfrdwy.

**Figure 10: Probability distribution of the sector’s retail performance in AMP8**



### 3.4 Outcome Delivery Incentives

ODI risk in AMP8 is increasing as most of the caps, collars and deadbands are being removed, performance commitment targets are becoming more difficult to achieve, new ODIs are being introduced which are correlated with the existing ODIs, particularly on the wastewater side, and ODI rates are being recalibrated exposing greater proportion of return to risk. In this section, we focus on drivers of risk on each material ODI for the notional company operating in South East England and discuss some of the ODI correlations. The materiality of an ODI was judged on the basis of the notional company’s RoRE exposure in AMP8.

One of the major risk factors affecting performance on nearly all ODIs is increasing frequency of severe weather events, which can be of different type and therefore have a different impact. In the notional company ranges we only included the impact of severe weather events occurring as frequently as during the first three years of AMP7, which is an underestimation.

Extreme cold followed by heat causes damage to assets where ground levels are moving rapidly. The damage tends to be related to underground assets that require high-cost interventions and result in substantial leakage. Storms are becoming more frequent, increasing storm overflows and pollution incidents, leakage, mains repairs and supply interruptions. This arises in due to the higher volume of water coming through the sewer system to treatment works and damage to assets and delays in accessing and repairing those assets due to power failures, fallen trees obstructing roads and the sheer number of issues occurring at the same time stretching the workforce. Droughts cause the need for short-term measures to manage demand e.g., water-use restrictions, which affect customer satisfaction scores, and ground movements which in turn cause pipe damage and increase leakage levels.

### 3.4.1 Leakage

Major drivers of leakage for the sector are severe weather patterns which cause pipe fractures due to ground movements and growing demand for water because of population growth as it could be challenging to distinguish between leakage and consumption. Both risk factors are increasing in AMP8, with population growing and severe weather events becoming more frequent, elevating the risk associated with achieving the leakage target for the sector.

In its PR24 FM, Ofwat expressed ambition for companies to deliver national long-term leakage targets, and all companies have committed to delivering a 50% reduction in leakage from 2017-18 levels by 2050. At the same time, the marginal cost of reducing leakage increases as the level of leakage goes down because of the need to deploy more cost-intensive methods of tackling leaks. This factor will also be increasing the risk in AMP8 and beyond, as more companies reach economically justifiable level of leakage.

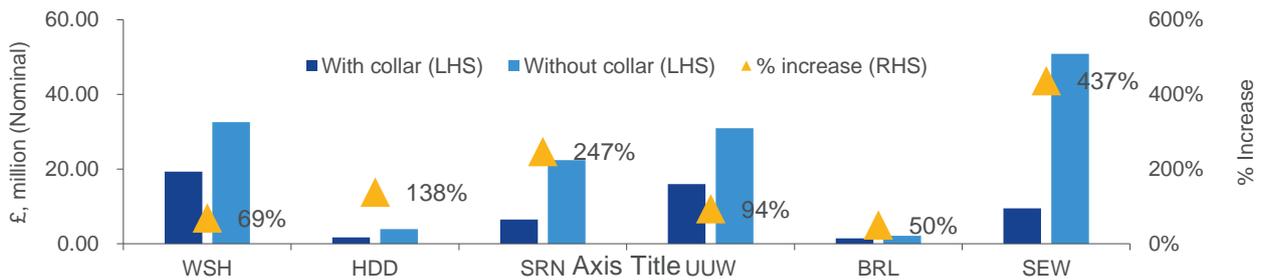
### 3.4.2 Supply interruptions

The ability to outperform in relation to supply interruptions, is structurally limited: the best outcome is bound to 0. On the contrary, the level of underperformance has no such logical bounding, potentially meaning an unlimited penalty if no collar is applied. Therefore, the supply interruptions performance commitment is excessively asymmetric by design, and companies face large risks in terms of the potential for a small number of events to cause significant underperformance.

Indicative of this asymmetry is the sector’s performance to date: 13 companies out of 17 were in a net penalty position for the available AMP7 reporting years. Of these 13 companies, 6 companies had their underperformance limited due to the use of the supply interruption collars as stated in outcomes performance commitment appendices.

The total sector penalty for the years FY21-FY23 was £140.55 million in nominal terms or -0.37% in RoRE terms. If the collar was not present, this penalty would have increased the total sector penalty by 63.09% to £229.22 million or -0.63% in RoRE terms<sup>10</sup>. For companies which utilized the collar, its removal would have translated to a simple average increase in net penalty of 173.61%. Figure 11 demonstrates how companies that utilized the collar would have performed should they not have had this protection for AMP7 to date.

**Figure 11: Total sector AMP7 supply interruption penalty**



NB: Figure 11 displays values with and without collars on the left-hand axis and the respective % increase on the right-hand axis.

There is, therefore, a strong rationale for retaining the collar which would limit the maximum penalty to 0.50% RoRE or below. This is not assumed in the notional company’s unmitigated RoRE ranges but is added as a mitigation.

<sup>10</sup> 2017/18 CPIH using FD outcomes performance commitment appendices and APR data.



### 3.4.3 Compliance Risk Index (CRI)

Similar to the supply interruptions PC, the ability to outperform on CRI is structurally limited, with the best outcome bound to 0. On the contrary, the level of potential underperformance is unlimited. By design CRI is structurally asymmetric as a company’s outperformance is heavily restricted whilst relatively unlimited on the underperformance side. Additionally, the target set by the DWI is difficult to achieve in practice, which materialised in 13 companies out of 17 underperforming on this ODI in AMP7 and the industry-average CRI of 3.07 for AMP7 to date.

The total sector penalty for FY21-FY23 was £76.30 million or -0.20% in RoRE terms. It was limited because companies benefitted from the existence of a deadband of 2. If the deadband was not applied, this penalty would have increased by 95% to £149.13 million or -0.39% in RoRE terms<sup>11</sup>. Additionally, a multiplier is applied to the CRI score for sites that are under regulatory notices increasing the impact of any incident at one of these in most cases to a score of four out of five. The final impact to the CRI score depends on how large an area the site services and the nature of the incident.

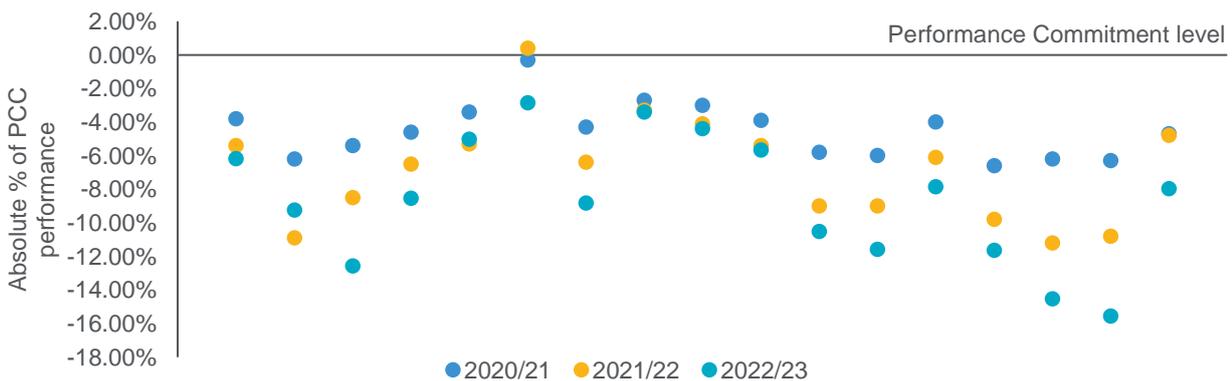
There is, therefore, a strong rationale for retaining the deadband which would limit the maximum penalty to 0.50% RoRE or below. This is not assumed in the notional company’s unmitigated RoRE ranges but is added as a mitigation.

### 3.4.4 Per Capita Consumption (PCC)

In the context of water scarcity and sustainability concerns, at PR19, companies have targeted consistent reductions in PCC throughout AMP7. Changes in household water consumption patterns prompted by the onset of COVID-19 have resulted in this performance commitment being a particularly difficult one to achieve across the sector.

Observation of company performance to date during AMP7 has shown that companies have widely fallen short of these targets, with PCC across the sector increasing on average by 4.35% during the AMP7 as demonstrated in Figure 12 below.

**Figure 12: Total sector PCC performance versus targets in the first three years of AMP7**



Despite increasing smart metering penetration, the sector was not able to materially shift consumer demand patterns. A target of reducing the PCC in AMP8 appears very challenging, with water companies only partially able to manage the associated risk but exposed to potential penalties which result from factors outside of their control.

<sup>11</sup> 2017/18 CPIH using FD outcomes performance commitment appendices and APR data.



### 3.4.5 Discharge compliance

Water and wastewater companies are required to ensure that the treatment of wastewater works is designed and operated to meet both the discharge permit levels and other conditions to reduce the overall pollutant load discharged to the environment. The EA sets permit levels based on effluent discharges by considering the substances the discharge is likely to contain, the environmental quality standard of substances the receiving water, the sensitivity of the receiving water and use of use of the receiving water. In effect, tighter permit levels are set in some geographical areas than others, and in the AMP8 regulatory period permit levels are expected to become more stringent. This increases the risk to companies operating in tighter control areas and given that Ofwat’s RoRE ranges are set on historical data, increases the notional company risks associated with the discharge compliance ODIs.

Ofwat at PR24 is introducing a new ODI for River Water Quality, which is described as the percentage reduction in the phosphorus emissions relative to the 2020 baseline volume. There is a direct correlation of such an ODI to already existing ODI - Treatment Works Compliance – which implies an overlap in potential penalty. A potential double ODI penalty from the same performance exposes the notional company to the multiplied level of risk.

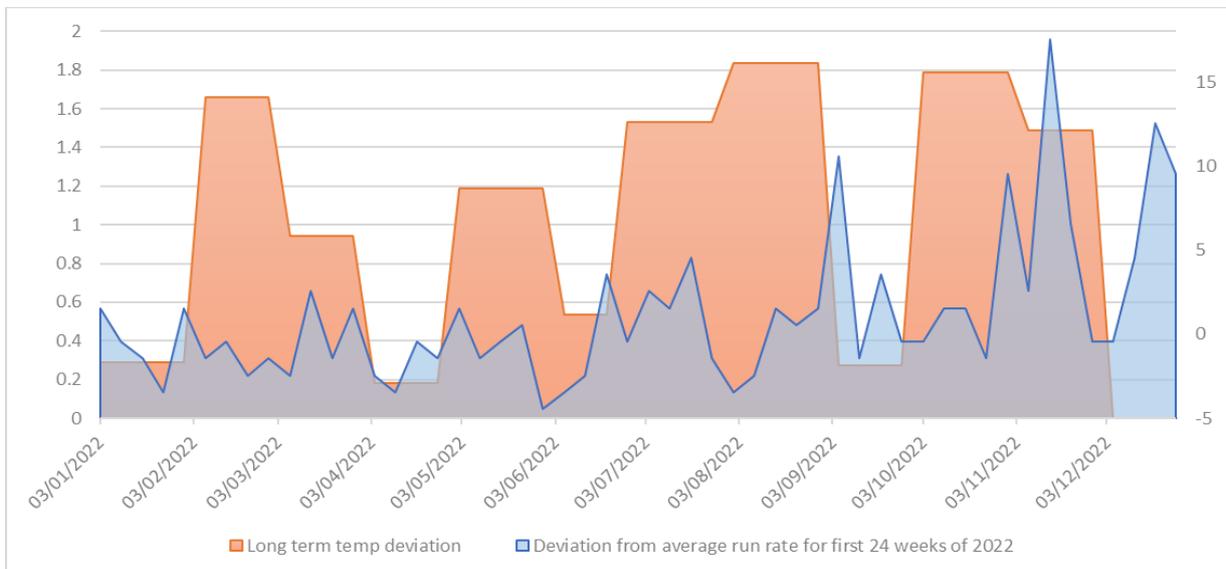
### 3.4.6 Pollutions

Pollution incidents performance commitment is designed to incentivise companies to promote improved water bodies by reducing the number of times that harmful substances from company assets impact them.

Extreme weather events lead to companies incurring substantial additional costs and ODI penalties. Using our own data as an example, we demonstrate the adverse environmental impact observed from extreme weather occurrences that is likely common across the industry.

During the heat wave through July and August 2022, where average temperatures were 1.50 to 1.80 degrees higher than the 30 yr. average, we saw a sustained higher weekly incident run rate, as can be seen in figure 13 below. July saw the highest proportion (34%) of category 3 incidents (compared to the other categories) for the last two years. This is an indicator of the increased environmental impact of releases due to strong crude and reduced dilution as watercourse levels were low. The average for 2022 was 23% and for July in 2021 was 11.20%. Reduced flow through the network resulted in an increase of foul sewer pollutions caused by blockages.

**Figure 13: 2022 Weather impacts: summer heat wave & low flow conditions**



Due to climate change extreme weather patterns are becoming more severe and more common. During the first three years of AMP7, companies could apply for exemptions on particular ODIs after extreme weather events and named storms. This served as an effective downside risk protection for the notional company. For the rest of AMP7 and for AMP8, Ofwat has proposed that water and wastewater companies bear the full risk associated with extreme weather events which significantly increases the risk and expands the RoRE risk range for the notional company associated with pollution ODIs specifically, as well as other ODIs.

### 3.4.7 Storm overflows

The storm overflows are the new common ODI set out in PR24 FM which aims to encourage water companies to reduce the frequency and volume of stormwater overflows, which can lead to the discharge of undertreated sewage into rivers and other water bodies during heavy rainfall events. The key drivers of risk for the notional company which affect the storm overflows ODI also impacts pollutions and serious pollutions, resulting in the potential multiplication of penalties in financial terms.

For the notional company in AMP8, risks associated with CSOs could be caused by:

- Climate change: More frequent and intense rainfall events can lead to increased pressure on the sewer system, resulting in more frequent CSO discharges;
- Urbanization: As urban areas expand, there is an increase in impermeable surfaces, which can lead to more surface runoff entering the sewer system, exacerbating the risk of CSO discharges;
- Population growth: An increase in population can lead to higher wastewater volumes, putting additional strain on the sewer system and increasing the likelihood of CSO discharges; and
- Regulatory requirements: Stricter environmental regulations may require water companies to invest in infrastructure improvements to reduce the frequency and impact of CSO discharges.

Additionally, non-compliance with storm overflow targets could cause failures to reach EA's environmental and DWI's water quality standards. The potential scale and cost of fines and penalties from these key stakeholders could be a large source of risk. These are not captured in PR24 FM illustrative RoRE ranges or in our risk assessment for the notional company due to the lack of data.

## 3.5 Correlation analysis

In undertaking our risk analysis, we strived to capture the complex and dynamic nature of relationships between different risks by examining correlations between granular components of performance. To establish the correlations, we analysed our own granular performance data as the sector-wide data lacked required granularity. We ran correlations and regressions on the areas where sufficiently robust data was available. We also applied a materiality threshold to the resulting correlations: any correlation at or above +/- 0.40 was considered statistically significant. Only statistically significant correlations were incorporated in our analysis. If no data was available to support the numerical estimation of the correlations, we have not used any correlations at all, save for one exception on pollutions and storm overflows, as qualitative evidence was sufficiently robust to assume a correlation of at least 0.50x.

We acknowledge the limitations of our analysis: first, correlations derived from our own data may not be reflective of the sector as a whole, and second, our analysis did not cover all the areas of performance, and so is incomplete. It is therefore likely that we have understated the overall correlations and consequently the RoRE ranges. Despite these shortcomings, we found those correlations that we have established helpful for projecting forward-looking performance probabilities, as incorporation of some relationships across performance commitments is still an improvement on applying no correlations at all. We will continue our analysis to incorporate sector-wide data and expand it to all the areas of performance.

We found that there are groups of highly correlated ODIs with similar or overlapping risk drivers, which creates a multiplier effect across all ODIs, affecting both the upside and the downside. If a company is significantly outperforming on one of the ODIs within a correlated group, there is a high likelihood of it to outperform on other related ODIs. Similarly, if a company is significantly underperforming on one of the ODIs within a correlated group, that would likely result in penalties on other related ODIs. This effect increases both the downside and upside and distorts the incentives which could lead to unintended consequences.

The groups or related ODIs are as follows:

1. CRI, Water quality contacts;
2. C-MeX and performance on other ODIs;
3. Total pollutions, serious pollutions, internal sewer flooding and external sewer flooding;
4. Discharge compliance and river water quality; and
5. Storm overflows, bathing water quality and total pollutions.

**Table 12: Adopted notional company correlations**

@RISK Correlations	Leakage	WQCs	Supply interruptions	CRI	PCC	Mains Repairs	Unplanned outage	Total pollution incidents	Sewer flooding	Sewer collapse	Discharge compliance	Bathing water quality	Storm overflows	External sewer flooding	Serious pollution incidents	Business demand	River water quality
Leakage	1.0																
WQCs	0.0	1.0															
Supply interruptions	0.0	0.0	1.0														
CRI	0.0	<b>0.7</b>	0.0	1.0													
PCC	0.0	0.0	0.0	0.0	1.0												
Mains Repairs	<b>0.5</b>	0.0	0.0	0.0	0.0	1.0											
Unplanned outage	0.0	0.0	0.0	0.0	0.0	0.0	1.0										
Total pollution incidents	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0									
Sewer flooding	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.4</b>	1.0								
Sewer collapse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0							
Discharge compliance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0						
Bathing water quality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0					
Storm overflows	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.5</b>	0.0	0.0	0.0	0.0	1.0				
External sewer flooding	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.4</b>	<b>0.5</b>	0.0	0.0	0.0	0.0	1.0			
Serious pollution incidents	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0		
Business demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	
River water quality	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0

### ODI and C-MeX

Based on the analysis of our own data, a multiplier effect on C-MeX is estimated at 3% where C-MeX scores are amplified by performance on ODIs as estimated by the difference between the CES score before and after adjusting for the respondents who referenced ODI performance. Analysis of reputational score, which contributes 50% to the C-MeX, resulted in a difference in score of 6% when we removed any response referring to our ODI performance. As the data set was specific to us, we did not apply this correlation to the notional company ranges, however we would expect a similar multiplier effect to be true for other water companies.



### CRI and WQC

The annual CRI score incorporates breaches due to taste, odour, and appearance. Similarly, the water quality contacts ODI also includes contacts due to taste odour and appearance. Both ODIs are targeting the same element of performance, so are likely driven by common risk factors to a significant degree.

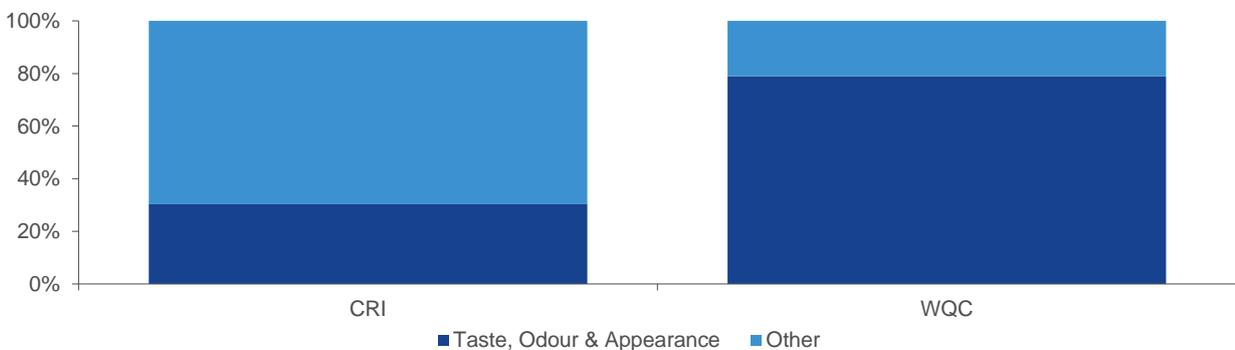
To examine occurrence of overlap between the CRI and water quality contacts (WQC) ODIs, we gathered historical performance data from both ODIs for the reporting years 2020, 2021, and 2022 as shown by figure 14 below:

**Table 13: CRI and WQC granular data**

Year	Data	Total WQC	Total CRI
2020	Water Quality Contacts Log & CRI Breach report	3493	4.62
2021	Water Quality Contacts Log & CRI Breach report	3729	6.69
2022	Water Quality Contacts Log & CRI Breach report	4069	6.38

Both data sets contain more granular information including date and root cause of the respective CRI of WQC allowing for further analysis. We split the data in each CRI breach report by month and quarter, with their respective CRI totals monthly and quarterly totals calculated. This process was then repeated for water quality contacts. Both CRI and WQC data were also split by cause category as originally specified in the raw data.

**Figure 14: illustrates the proportion overlap present between CRI & WQCs at an aggregate level**



Using the historical data now totalled on a monthly and quarterly basis, we performed correlation analysis to examine the interrelationship between water quality contacts and the CRI. Overlap between the two metrics was gauged by the strength of the relationship indicated by the resulting correlations between WQC and CRI. Our analysis indicated a strong positive correlation of 0.74 for quarterly CRI and WQC totals. The data suggests that poor CRI performance will generally carry over to poor performance in WQC and vice versa.

Evidence points to double counting since both CRI and WQC tackle the same criteria: water taste, appearance, and odour. The closely correlated performance underscores the overlap in these ODIs. Considering the impact on AMP8 RoRE ranges, the overlap in performance between CRI and WQC broadens the potential range of RoRE outcomes. Poor performance is seen to possess a compounding effect due to the observed crossover and this should be reflected any a simulation of AMP8 RoRE outcomes. Failure to do so ignores the interrelatedness of performance in AMP8 and would result in understating the risk in underlying operations.



## Wastewater ODIs

We have tested the relationship and corresponding correlations between several of the wastewater ODIs. Company performance in meeting different ODI targets may be driven by the same factor which would imply that companies are penalised multiple times for the same performance indicator. Understanding the relationship between various factors that contribute to pollution, internal sewer flooding, external sewer flooding, and storm overflows can help establish the multiplier effects across ODIs.

In AMP7, there are 14 performance commitments for wastewater, 4 of which are common – internal sewer flooding, pollution incidents, sewer collapses and treatment works compliance. Pollution and flooding incidents can be caused by blockages or defects within a sewerage network which in turn causes overloading in sewers. Consequently, it is misguided to assume that outturn values for performance areas which have the same drivers, occur independently of one another. A single blockage could have a knock-on impact on several wastewater performance commitments, and our risk model aims to capture the interrelationship of the components of performance and within the simulation.

Based on available data, we ran correlations analysis on the 3 common – sewer collapses, internal sewer flooding, total pollutions - and 1 bespoke performance commitment – external sewer flooding. The results are presented in table 14 below.

**Table 14: Wastewater performance commitment correlations**

	Sewer collapses	External sewer flooding	Internal sewer flooding	Total pollutions	Discharge compliance
Sewer collapses	1.00				
External sewer flooding	0.16	1.00			
Internal sewer flooding	0.20	<b>0.52</b>	1.00		
Total pollution incidents	0.09	<b>0.38</b>	<b>0.37</b>	1.00	

There is close correlation between total pollution incidents and external and internal sewer flooding – 0.38 and 0.47 respectively. Additionally, internal and external sewer flooding is closely correlated at 0.52 and sewer collapses are correlated to all the variables at an average of 0.15. The correlated performance highlights an overlap between performance commitments, which broadens the potential range of RoRE outcomes for a notional company in AMP8. Poor performance on one commitment is likely to have a knock-on compounding effect on the others.

There are several relationships within the wastewater ODIs, confirmed by empirical observations, which we could not reliably quantify due to the data issues. One of them is a relationship between storm overflows (CSOs), bathing water quality and total pollutions. An increase in CSOs near bathing waters would translate to a reduction in bathing water quality. An increase in CSOs overall would increase total pollutions. This is because CSOs are designed to release untreated wastewater, combined with stormwater runoff, directly into water bodies during heavy rainfall to prevent overwhelming the sewer system. Under-performance in CSOs is likely to have a negative impact on performance for bathing water quality and pollutions.

Another example of relationships within the wastewater ODIs is the overlap in the drivers of discharge compliance and river water quality. Discharge compliance is driven by measuring the release of effluents against a set threshold. One of the effluents measured is phosphorous. River water quality is defined as a percentage reduction in phosphorus discharged versus the 2020 baseline. The quality river water depends on the quality of treated and discharged wastewater - these two ODIs overlap. Failure to meet discharge compliance targets on phosphorous would likely cause adverse performance on the river water quality.

And lastly, a new common ODI, serious pollution incidents (category 1 and 2 from sewerage and water supply assets), overlaps with total pollution incidents (category 1 to 3 from sewerage assets), as the latter would have to include the former by definition.

## 3.6 Financing

Evidence suggests that the magnitude of financing risk in the PR24 FM illustrative RoRE ranges is substantially underestimated due to assumed very small variation in inflation, not reflecting the sector's most recent performance versus iBoxx and disregarding the basis risk. This section expands on each dimension of risk and our approach to producing forward-looking financing RoRE ranges.

**Table 15: The notional company financing RoRE range: Our analysis versus Ofwat's indicative range**

	Notional company financing RoRE range (Our analysis)	Ofwat's notional company RoRE range	Difference
Upside (P90)	1.75%	0.70%	+1.05%
Most likely <sup>12</sup> (P50)	-0.08%	0.00%	-0.08%
Downside (P10)	-1.97%	-0.65%	-1.32%

The allowed cost of debt for the notional company makes several important assumptions about capital structure, specified by Ofwat, including gearing, the ratio of embedded to new debt, the proportion and structure of index-linked debt, and indexation of new debt issuance. The cost of debt allowance is set in real-terms, making assumptions for CPIH inflation, the RPI-CPIH wedge, and implicitly the CPI-CPIH wedge.

The notional company is exposed to risk where the index-linked assumptions used to set the allowance do not reflect the sector's actual exposure, and where outturn inflation varies from the assumptions. The notional company is also exposed to risk in relation to performance against the cost of new debt allowance reference index, and performance against the cost of embedded debt allowance. Financing risk can be separated into inflationary and non-inflationary components as shown in table 16.

**Table 16: Summary of components of financing risk for the notional company**

Risk	Impact on	Description
<b>Inflationary</b>		
Outturn CPIH variance to assumption	Embedded and new, fixed debt	CPIH may outturn higher or lower than the 2% long-term assumption used to set the allowance. This gives rise to out or under-performance on fixed rate debt against the real-terms allowance
Outturn RPI-CPIH wedge variance to assumption	Embedded, RPI-linked debt	The sector has very limited exposure to either CPI or CPIH index-linked debt due to the large volume of legacy RPI-linked debt raised to hedge against the RPI-linked RCV in price controls preceding AMP7. This debt is often long-dated and there may be a material cost associated with transitions the basis to CPI(H), consequently the notional company is expected to have material exposure to the RPI-CPIH wedge in AMP8. The cost of debt allowance assumes a 90bps RPI-CPIH wedge and the notional company is exposed to risk where the outturn wedge varies from this assumption
Outturn CPI-CPIH wedge variance to assumption	Embedded, CPI-linked debt	The notional capital structure assumes all index-linked debt is linked to CPIH, however in practice embedded debt that is not linked to RPI is linked to CPI. The cost of debt allowance implicitly assumes a nil CPI-CPIH wedge, where the outturn wedge varies from this assumption, the notional company is exposed to risk
Outturn CPI-CPIH wedge variance to assumption	New, CPI-linked debt	The notional capital structure assumes all new index-linked debt is linked to CPIH, however in practice the notional company would be expected to raise new debt as CPI-linked due to lack of liquidity in CPIH. The cost of debt allowance implicitly assumes a nil CPI-CPIH wedge, where the outturn wedge varies from this assumption, the notional company is exposed to risk
<b>Non-inflationary risk</b>		
Changes in interest rates	Embedded, Floating rate debt	Embedded cost of debt allowance is fixed, and if actual level of interest rates deviates from the forecast, that could lead to out- or underperformance against floating-rate embedded debt.

<sup>12</sup> Assuming normal probability distribution.

Risk	Impact on	Description
<b>Inflationary</b>		
Performance against allowance	Embedded, all	Due to the estimation approach used to set the cost of embedded debt allowance, the notional company faces the risk of not being remunerated in line with efficiently incurred costs and consequently may over- or under-perform against the allowance.
Performance against adjusted index	New debt, all	The cost of new debt is indexed to the average A/BBB average iBoxx indices after deducting a 15bps wedge for perceived outperformance. The notional company may out or under-perform against this allowance due to misspecification of the benchmark, market sentiment or other uncontrollable factors. The most recent sector performance against iBoxx exhibits downside asymmetry.

**Inflationary risk: CPIH**

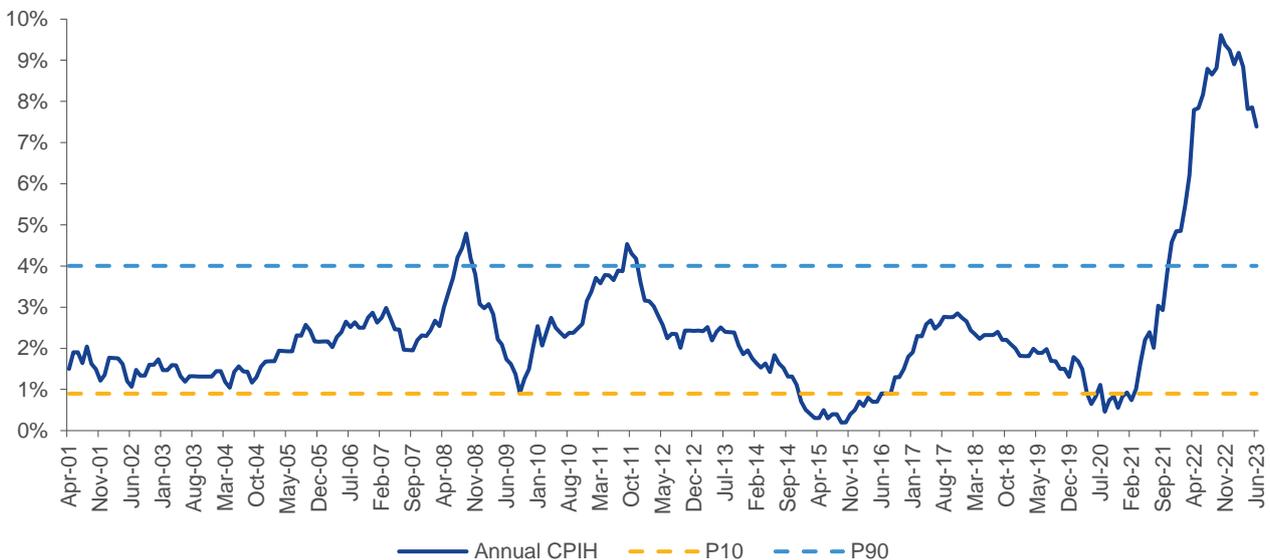
Ofwat calculates the inflationary risk on fixed debt arising from outturn CPIH variance to assumption using the following equation:

$$\text{Inflation variation} \times (1 - \text{proportion of non-IL debt}) \times (\text{gearing} / 1 - \text{gearing}) \times (1 - \text{tax rate})$$

Based on the historical inflation series to April 2000, the P10-P90 range for CPIH is 0.9%-4.0% on an annual basis as shown in figure 15. Subtracting the 2% CPIH assumed in the cost of debt allowance from the P90 gives a variance of 2%. Ofwat’s analysis of financing risk in the PR24 Final Methodology assumes a 1% variance – this is not considered credible given the above-historical average variance since early 2021, necessitating significant intervention from the BoE. Moreover, macroeconomic forecasters such as the OBR highlight the degree of uncertainty around inflation given very high and volatile energy prices.<sup>13</sup>

Inflation is currently above the long-run P50 value, and above the Bank of England inflation target and therefore -2%/+2% could be considered a plausible symmetrical range for CPIH variance. Applying the notional capital structure assumptions, this translates to a post-tax RoRE risk range of -1.23%/+1.23%.

**Figure 15: annual percentage change in CPIH index: April 2001 to June 2023**



<sup>13</sup> Office for Budget Responsibility: Economic and fiscal outlook March 2023, p24-25.



### **Inflationary risk: RPI-CPIH wedge**

For the notional company, a substantial proportion of embedded debt is linked to the RPI index as all price controls prior to AMP7 were indexed by RPI, and for the AMP7 period 50% of opening RCV continued to be indexed on the same basis.

This debt is often long-dated and there may be a material cost associated with transitions the basis to CPI(H), it is likely a substantial proportion of this RPI-linked debt will remain in place during AMP8. Consequently, the notional company will have risk exposure in respect of the RPI-CPIH wedge during AMP8, specifically the impact on accretion and cost of debt from outturn variance of the wedge to the 0.9% assumption used in setting the cost of embedded debt allowance.

For WaSCs and the largest WoCs<sup>14</sup>, analysis of balance sheet data<sup>15</sup> updated for latest interest rates shows that 94.1% of embedded index-linked debt is linked to RPI and the remainder to CPI. Multiplying this proportion by the 33% notional proportion of index-linked debt assumption and then by 75% embedded debt assumption suggests that 23.3% of debt could be exposed to the RPI-CPIH wedge risk factor. Based on the historical inflation series to April 2000, the P10-P90 range for the RPI-CPIH wedge is 0.0%-2.1% on an annual basis, with P50 of 0.9%. Subtracting the 0.9% RPI-CPIH wedge assumption used in setting the cost of debt allowance gives a range of -0.9%-1.2% for wedge variance. Applying the remaining notional capital structure assumptions, this translates to a post-tax RoRE range of -0.25%/+0.19%.

### **Inflationary risk: CPI-CPIH wedge**

The notional capital structure assumes 100% of index-linked debt is linked to the CPIH index. In practice, all embedded debt that has not been linked to RPI on issuance, has been linked to CPI. This is expected to be the case with respect to new debt raised in AMP8 absent any significant market developments in CPIH, which result in a premium for CPIH-linked debt due to liquidity. The cost of debt allowance implicitly assumes a nil CPI-CPIH wedge, which exposes the notional company to the risk that the outturn wedge is not 0.

The notional company will have basis risk exposure in respect of the CPI-CPIH wedge in AMP8, specifically the impact on accretion and cost of debt from an outturn wedge that is non-zero. This risk exposure is in relation to embedded debt not linked to RPI, and to new debt.

For WaSCs and the largest WoCs<sup>16</sup>, 5.9% of embedded index-linked debt is linked to CPI. Multiplying this by the assumed 33% proportion of index-linked debt and 75% proportion of embedded debt for a notional company suggests that 1.5% of embedded debt could be exposed to this risk factor. Based on the historical inflation series to April 2000, the P10-P90 range for the CPI-CPIH wedge is -0.3%-0.7% on an annual basis, with P50 around zero. Applying the remaining notional capital structure assumptions, this translates to a post-tax RoRE range of -0.01%/+0.00% in respect of embedded debt.

It can be assumed that for the notional company, all index-linked debt issued during AMP8 would be linked to CPI, consistent with the full transition in respect of RCV and revenue. Based on the notional capital structure assumptions, this suggests 25% of new debt, 8.3% of total debt, is exposed to this risk. Applying the remaining notional capital structure assumptions to the P10-P90 range for the wedge, this translates to a post-tax RoRE range of -0.05%/+0.02% in respect of new debt. In total for embedded and new debt, the post-tax RoRE range is -0.06%/+0.03%.

### **Non-inflationary risk: embedded debt performance against allowance**

The cost of embedded debt allowance is set based on the sector median company's forecast average cost of debt across AMP8 in real terms, considering WaSCs and large WoCs<sup>16</sup>.

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<sup>14</sup> Defined in the same way as the allowed cost of embedded debt calculations i.e. WaSCs, South East Water and Affinity Water.

<sup>15</sup> Ofwat: PR24 Balance sheet cost of embedded debt model, published December 2022.

<sup>16</sup> Defined in the same way as the allowed cost of embedded debt calculations i.e. WaSCs, South East Water and Affinity.

Based upon balance sheet data published by Ofwat in its cost of debt model, updated for current market rates, cost of embedded debt in nominal terms across the sector is distributed with a P10-P90 range of 4.14%/5.06%, with a P50 of 4.64%. Variation within this range is due to controllable and uncontrollable factors including timing of issuance, debt strategy, frequency of issue, company size and capital structure. This allowance is set ex post based on the sector’s historical issuance and a refinancing assumption, and consequently the notional company is unable to calibrate its past debt strategy with regard to the allowance.

Due to the estimation approach used to set the cost of embedded debt allowance, the notional company faces the risk of not being remunerated in line with efficiently incurred costs and consequently may over- or under-perform against the allowance. Applying the notional capital structure assumptions to the P10-P90 range for cost of embedded debt for the sector translates to a post-tax RoRE range of -0.35%/0.27%.

**Non-inflationary risk: new debt performance against adjusted index**

The cost of new debt allowance is indexed against A/BBB average iBoxx indices after deducting a 15bps wedge for outperformance expected by Ofwat. The notional company may out or under-perform against this allowance due to misspecification of the benchmark, market sentiment or other uncontrollable factors.

Analysis of recent issuance in the sector (debt issued between June 2021 and June 2023) shows that issue yield has been close to, and in several cases above the index after 15bps adjustment, as can be seen in figure 16.

**Figure 16: Issue yield compared to Ofwat’s benchmark index**

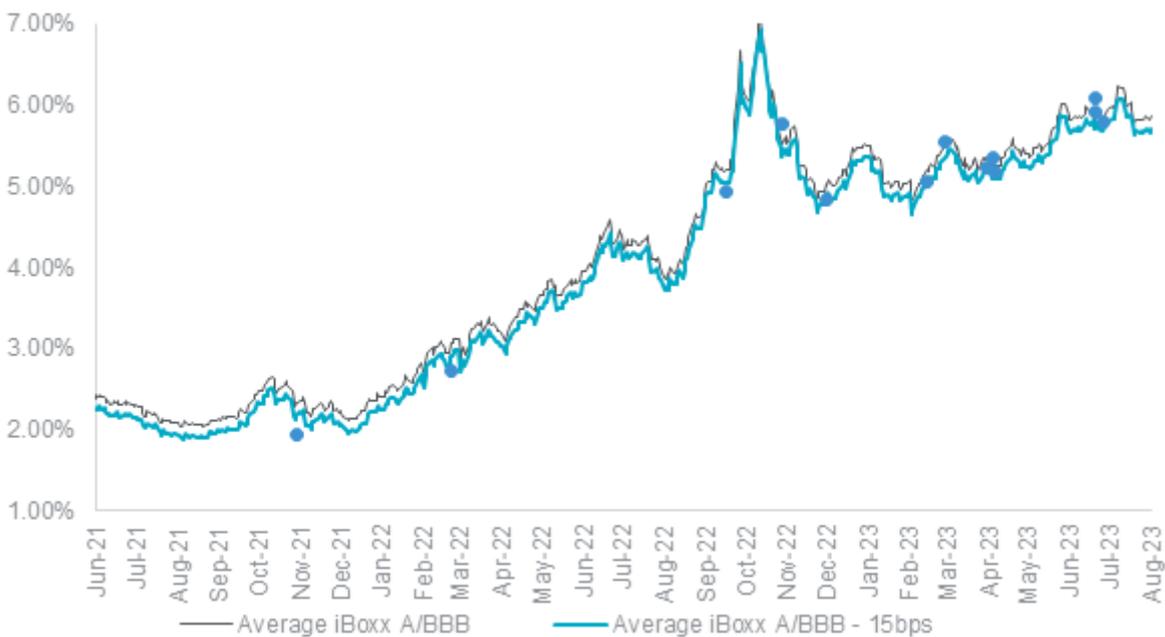


Table 17 shows that P50 performance against the index after 15bps adjustment was -0.08% underperformance, with a P10-P90 range of -0.35%-0.16%. This suggests in the current market environment of higher interest rates, the notional company is exposed to downside asymmetrical risk and expected underperformance. Applying the notional capital structure assumptions, this translates to a post-tax RoRE range of -0.05%/+0.02%.

**Table 17: Out/(under)-performance: issue yield compared to Ofwat's benchmark index after 15bps adjustment<sup>17</sup>**

Out/(under)-performance		
Percentile	Nominal	CPIH-real
-	-0.40%	-0.39%
<b>10</b>	<b>-0.35%</b>	<b>-0.35%</b>
20	-0.24%	-0.23%
30	-0.21%	-0.20%
40	-0.13%	-0.13%
<b>50</b>	<b>-0.08%</b>	<b>-0.08%</b>
60	-0.01%	-0.01%
70	0.02%	0.02%
80	0.09%	0.09%
<b>90</b>	<b>0.16%</b>	<b>0.16%</b>
100	0.23%	0.23%

**Non-inflationary risk: embedded floating-rate debt performance vs the cost of embedded debt allowance**

This risk arises if actual level of interest rates deviates from the forecast, as floating rate part of the embedded debt could out- or underperform against the fixed allowance. In its notional company risk analysis, Ofwat assumes that notional company doesn't have any floating-rate debt, therefore, we did not add the related risk to the revised RoRE ranges. Actual sector data, however, suggests that around 8% of total debt is floating rate, hence the risk is underestimated as interest rates could fluctuate substantially.

Table 18 summarises the total impact of the financing risks discussed. The post-tax RoRE range is -1.97%/+1.75% with risk asymmetrical to the downside. The interest rate risk related to floating-rate embedded debt has been omitted from the analysis. We continue our analytical work on that front and will be updating the financing range in due course.

**Table 18: Financing risk for the notional company, expressed as post-tax RoRE**

Risk	Post-tax RoRE impact (%)		
	Downside (P10)	Central (P50)	Upside (P90)
<b>Inflationary</b>			
CPIH variance	-1.23	–	1.23
RPI-CPIH wedge variance	-0.25	0.00	0.19
CPI-CPIH wedge variance	-0.06	0.00	0.03
<b>Non-inflationary</b>			
Embedded debt performance	-0.35	-0.06	0.27
New debt performance	-0.08	-0.02	0.04
<b>Total</b>	<b>-1.97</b>	<b>-0.08</b>	<b>1.75<sup>18</sup></b>

<sup>17</sup> Data source: Bloomberg (yield at issue) versus average iBoxx (A/BBB) less 15 bps.

<sup>18</sup> Does not equal total of components due to rounding.

### 3.7 C-MeX

C-MeX is a customer measure of experience incentive designed to incentivize water companies to provide an excellent customer experience by measuring their performance in customer service and satisfaction. The increased asymmetry for this incentive mechanism is driven by Ofwat’s proposal to move to comparative assessment of performance based on the wider economy, and a multiplier effect where poor performance is penalized through both specific ODIs and C-MeX. Water companies will have less scope for outperformance than for underperformance.

The C-MeX mechanism comprises of two surveys, a customer experience survey (“CES”) and a customer service survey (“CSS”). Responses to the CES are obtained from random members of the public regarding customer satisfaction with their water/wastewater company, likelihood of recommendation and reasons for their responses, whereas the responses for the CES are obtained from residential customers who have recently contacted their company and covers aspects of the interaction.

The responses to the CES and CSS are used to calculate the CES and CSS scores. The C-MeX score, out of 100, is calculated with a 50% weighting to the CES and CSS scores. The Companies’ C-MeX scores are then ranked and then are awarded incentives or penalties based on their performance.

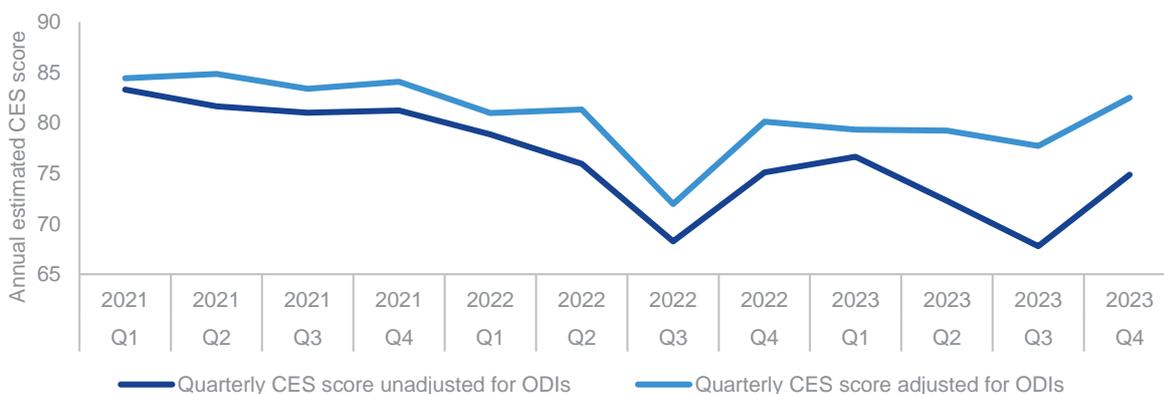
The CES and CSS surveys are conducted on a quarterly basis and the scores are published by Ofwat.

There are several issues identified with the current version of the C-MeX mechanism, which may result in unconsidered downside risk for the C-MeX score:

- 1) C-MeX measure can result in a multiplier effect, for example where a company is performing poorly, it is further penalised through the performance specific ODI and then is further penalized through C-MeX. For example, a company which has a high level of pollution or water quality incidents are captured within the customer water quality ODI and is subsequently also reflected in negative survey responses from customers resulting in a poor CES and C-MeX score.
- 2) The CES score is impacted by negative media attention, which is outside the companies’ control and results in a double count of performance where the negative media relates to other ODIs.

It is important to establish which responses to the CES relate to other ODIs. To illustrate that, we analyzed our own quarterly data for FY21-FY23. The Figure 17 below plots the unadjusted quarterly CES scores and the adjusted CES score after removing survey responses which relate to ODIs. As demonstrated in the graph, the impact of adjusting the CES score for ODIs, results in an increase in the CES score for all quarters from Q1 2021 to Q4 2023. The variance between the two lines represents the double-count of performance in C-MeX and the ODIs.

**Figure 17: Difference in CES scores related to ODIs**



The graph below plots the CES scores against the sentiment from various media for the period between Q1 2021 and Q2 2023. The graph demonstrates that the movements in the positive/balanced sentiment on the CES score largely coincides with the movement in the positive/balanced sentiment in media coverage. This results in the C-MeX measure capturing movement in the media sentiment, which is not only outside our control, but also reflects a double count of performance where the media sentiment relates to other ODIs.

**Figure 18: CES scores in combination with media sentiment**



There are several issues identified with the current C-MeX mechanism, potentially resulting in additional layers of downside risk. These issues include the double counting of performance factors already captured within other ODIs, a multiplier effect where poor performance is penalized through both specific ODIs and C-MeX, and the impact of negative media attention on the CES score, which is outside the control of water companies and may also result in double counting of performance.

### 3.8 The notional company RoRE range unmitigated

Table 19 presents a detailed split of notional company AMP8 RoRE ranges by granular groups of risks. Risks within the totex and ODI sub-groups are brought together in a random way, unless a correlation was specified, resulting in the P10 and P90 ranges sub-ranges being closer to the P50 than to the sum of their individual components. Risk ranges across the totex, ODI, C-MeX, DPC/ADR, financing, QAA and revenue sub-groups are additive, similarly to the approach used by Ofwat.

**Table 19: Unmitigated notional company granular RoRE range**

	P10	P50	P90
<b>Total notional risk to allowed return implied by the PR24 incentive package</b>	<b>-9.94%</b>	<b>-3.59%</b>	<b>2.56%</b>
<b>Totex</b>			
Totex: retail	-0.64%	-0.29%	0.07%
Base costs - water	-1.34%	-0.60%	0.14%
Base costs - wastewater	-2.16%	-0.73%	0.70%
Base costs - bioresources	-0.49%	-0.17%	0.16%
Enhancement costs - water	-1.44%	0.00%	0.46%
Enhancement costs - wastewater	-1.92%	0.00%	0.61%
<b>Totex (Base + enhancement)</b>	<b>-4.20%</b>	<b>-2.18%</b>	<b>-0.22%</b>
<b>Performance Commitments</b>			



	P10	P50	P90
<b>Total notional risk to allowed return implied by the PR24 incentive package</b>	<b>-9.94%</b>	<b>-3.59%</b>	<b>2.56%</b>
Leakage	-0.02%	0.00%	0.02%
Water quality contacts	-0.05%	0.00%	0.05%
Water supply interruptions	-0.62%	-0.19%	0.09%
Compliance risk index (CRI)	-0.16%	-0.10%	-0.05%
Per capita consumption (PCC)	-0.32%	-0.21%	-0.10%
Mains Repairs	0.00%	0.00%	0.00%
Unplanned outage	0.00%	0.00%	0.00%
Total pollution incidents	-0.63%	-0.12%	0.39%
Sewer flooding	-0.19%	-0.05%	0.08%
Sewer collapse	-0.09%	-0.01%	0.07%
Discharge compliance	-0.14%	-0.11%	-0.09%
Bathing water quality	-0.31%	0.05%	0.41%
Storm overflows	-0.09%	-0.01%	0.07%
External sewer flooding	-0.34%	-0.02%	0.31%
Serious pollution incidents	-0.25%	-0.12%	0.00%
Business demand	-0.10%	0.16%	0.42%
River water quality (phosphorus)	-0.36%	-0.08%	0.20%
Aggregate sharing mechanism - shared risk	0.00%	0.00%	0.01%
<b>Total ODI</b>	<b>-1.69%</b>	<b>-0.88%</b>	<b>-0.10%</b>
<b>Measures of experience</b>			
C-MeX	-0.44%	-0.16%	0.13%
D-Mex	-0.04%	-0.01%	0.01%
<b>Total measure of experience</b>	<b>-0.45%</b>	<b>-0.17%</b>	<b>0.12%</b>
<b>DPC</b>			
DPC - construction	-0.65%	0.00%	0.64%
DPC - post commissioning	0.00%	0.00%	0.00%
<b>Total DPC</b>	<b>-0.65%</b>	<b>0.00%</b>	<b>0.64%</b>
<b>Financing risk</b>	<b>-1.97%</b>	<b>-0.08%</b>	<b>1.75%</b>
<b>QAA Penalty</b>	<b>-0.30%</b>	<b>0.00%</b>	<b>0.30%</b>
<b>Revenue risk</b>	<b>-0.05%</b>	<b>0.00%</b>	<b>0.00%</b>

Given the very significant increase in enhancement expenditure in AMP8, the notional company has a substantial requirement for new capital, both debt and equity. To attract this capital, the notional company must be able to earn a sufficient risk-adjusted return, noting that the investment universe is competitive and there are substantial demands for capital in adjacent sectors, including energy through the net zero

transition. Compared to a counterfactual company with a modest increase in enhancement totex, the notional company has a much greater requirement for new equity to maintain notional gearing. Equity investors are likely to require additional return to offset the overall RoRE risk. Additionally, investors would prefer cash return versus return provided via RCV growth because of the uncertainty associated with the timing and ability to realise the benefit of real RCV growth. This makes the case for new equity more difficult as the notional company would offer greater proportion of returns from growth compared to cash yield compared to a 'steady-state' company with low real RCV growth.

Absent any mitigations, the notional company is exposed to P10/P90 RoRE risk range of -9.94% / +2.56% with a P50 view of -3.59% i.e. expected underperformance. This range is far broader than Ofwat's notional company range of -4.95%/+4.80% and asymmetrical to the downside. Such a range would adversely impact the notional company's credit profile in the view of credit rating agencies and debt investors as the quantum of risk exposure could be considered more than the company could reasonably bear. The credit risk premium would be expected to increase accordingly, giving rise to a circular effect as underperformance on cost of debt would put further downwards pressure on the risk range.

In the cost of capital annex<sup>19</sup> of our business plan, we set out our view on the most appropriate methodology to set cost of capital, factoring in latest market movements in interest rates. Using the 3.77% cost of capital and 4.83% wholesale cost of equity aligned to the PR24 Final Methodology parameters as set out in our Business Plan, the notional company would earn a P50 risk-adjusted return of 1.24%, with a P10-P90 range of -5.11%/+7.39%. This implies the notional company would not be expected to earn the notional cost of equity, with the downside implying a negative equity return, or a requirement of an equity injection. Consequently, investors are unlikely to perceive investment in the notional company as a 'fair bet' and this limited expectations of earning a return on a forward-looking basis makes raising new equity even more challenging.

In the downside scenario, there would be a loss of existing equity value and the notional company would likely encounter difficulties in attracting new equity investment as confidence would be low and returns would be insufficient to meet investor requirements. If the notional company is unable to attract sufficient new equity, this would challenge its ability to deliver on its business plan, resulting in a negative spiral of underperformance against performance commitments, poor service to customers, statutory obligations not delivered, and underperformance on cost of new debt due to increases in gearing and adverse credit ratios.

It is critical for the notional company to be able to earn risk-adjusted equity return sufficient to attract new equity, either through setting an allowed cost of equity commensurate with the level of risk, or through risk mitigations. RoRE upsides/downsides should be calibrated in such a way that they put allowed return at risk but not the substantial amounts of existing equity. Otherwise, equity and debt investors would lose confidence in the notional company while the notional company is set to finance its largest capital programme to date in AMP8.

A narrower RoRE range, in line with Ofwat's intention, with less downside asymmetry and P50 as close to zero as possible, would significantly improve notional company attractiveness to investors, and, consequently, its ability to deliver its business plan. With this view in mind, we explored possible risk mitigations that would appropriately reduce the notional company risk exposure at source.

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<sup>19</sup> Technical annex: cost of capital.

## 4. Proposed Notional Company Mitigations

The notional company is expected to have effective risk management processes and to mitigate the key areas of risk identified within its business plan. Water companies routinely manage risks associated with geo-political tensions, macroeconomic uncertainty, supply chain fragmentation, the climate crisis, the aftereffects of the Covid-19 global pandemic and cybersecurity threats. However, if the regulatory incentive package is calibrated in such a way that it exposes the notional company to the asymmetric downside risk to start with, it sets it up to underperform against the allowed return because under the most likely scenario (P50) the notional company will earn a return below the one allowed. Additionally, if the overall amplitude of return at risk (difference between P10 and P90 in RoRE terms) exceeds the cost of equity allowance, that could lead to unexpected consequences, such as an extreme increase in customer bills in the case of an upside and an erosion of the notional company's financial resilience over time in case of a downside, as the worst-case scenario would require fresh equity simply to continue operations.

To mitigate the risk to the notional company's returns during AMP8, we have first identified the largest contributors to risk and then calibrated risk mitigations that would best reduce the risk at source. The largest components of the notional company risk in RoRE terms are totex and ODIs, so the suite of mitigations is focussed on them. Additionally, an overarching mechanism is proposed to mitigate the extreme outcomes in relation to operational performance, similarly to the one applied in the regulated energy sector by Ofgem.

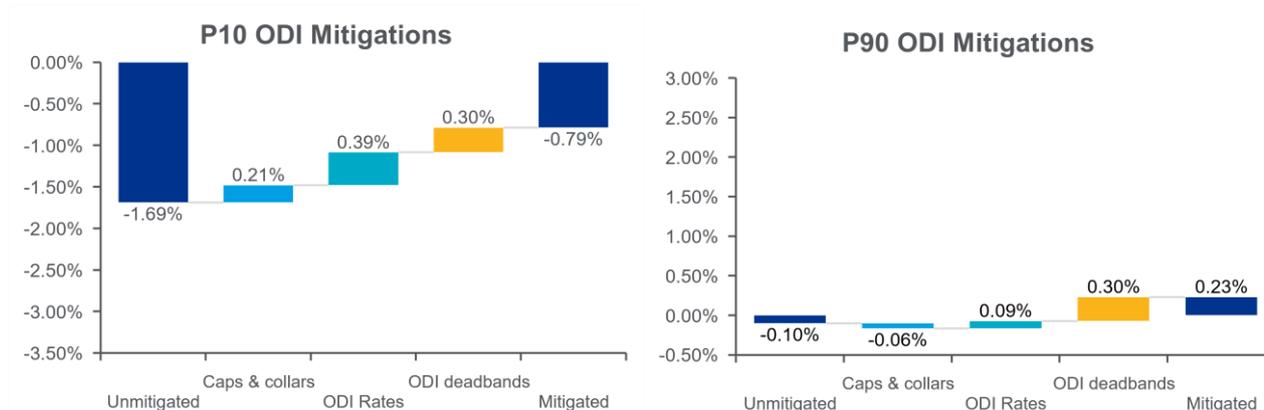
Our objective was to reduce the notional company's risk exposure and downside asymmetry as far as possible, and the suite of mitigations we developed fulfils this purpose. We do, however, recognise that some of the mitigations, specifically the proposed ODI deadbands on CRI and discharge compliance and asymmetric sharing rates on enhancement spend are not fully aligned with PR24 FM. We also recognise that there is an infinite number of combinations of potential mitigations, and the one presented in our analysis is an example selected by us that balances risk and return while maintaining incentive properties of the overall price control. We note that the main purpose of our analysis was to demonstrate just how far mitigations would need to go to curb risk asymmetry. While we adopted a similar suite of mitigations in our own business plan, we note that there are alternative mitigations which would achieve a comparable effect. For example, instead of using an asymmetric sharing rate for enhancement totex to correct for asymmetry, an increase in the ex-ante enhancement totex allowances implying greater contingency would also correct the balance between the downside risk and the upside.

### 4.1 ODI mitigations

To reduce the risk exposure and downside asymmetry related to ODIs, we adopted the following broad mitigations, the overall impact of which is presented in Figure 19:

- 1) Introduced caps and collars on the ODIs that were earmarked in the PR24 FM;
- 2) Changed ODI rates on total pollutions, supply interruptions, PCC and business demand; and
- 3) Introduced deadbands on CRI, discharge compliance and serious pollution incidents.

Figure 19: Impact of each group of notional company mitigations to the ODI RoRE range



The application of the mitigations has shifted the P10, P50 and P90 RoRE upwards, by 0.90%, 0.59% and 0.33%, respectively, with the greatest impact on the downside.

While the caps and collars are helpful in managing risk, their impact was not as significant as that of other mitigations because most of the underlying performance commitments eligible for caps and collars under PR24 FM did not appear to carry excessive risk. The exact levels of caps and collars, each calibrated to +/- 0.50% respective notional equity, are presented in Table 20.

Table 20: Caps and collars on ODIs permitted by PR24 FM

ODIs	Caps					Collars				
	FY26	FY27	FY28	FY29	FY30	FY26	FY27	FY28	FY29	FY30
Water supply interruptions	0.00	0.00	0.00	0.00	0.00	52.19	58.23	62.95	65.45	65.21
Mains repairs	111.24	100.70	95.36	90.98	89.97	188.76	196.10	205.88	211.38	215.83
Unplanned outage	0.00%	0.00%	0.00%	0.00%	0.00%	9.45%	10.01%	10.41%	10.52%	10.36%
Sewer collapses	0.00	0.00	0.00	0.00	0.00	19.62	19.68	19.86	20.61	20.45
Bathing water quality	84.51%	84.48%	84.42%	84.26%	84.27%	89.49%	89.52%	89.58%	89.74%	89.73%
Storm overflows	1.63	1.19	0.79	0.00	0.00	39.57	39.61	40.01	41.03	39.26
External sewer flooding	14.13	13.48	12.81	12.02	10.94	20.01	19.44	18.89	18.48	17.37
Serious pollution incidents	0.00	0.00	0.00	0.00	0.00	11.27	11.40	11.61	12.27	12.23
Business demand*	-68	-83	-96	-105	-109	68	83	97	106	110
River water quality*	-14,306	-14,534	-14,907	-16,038	-15,974	21,052	21,279	21,652	22,784	22,720

\* The target is YoY change, so caps and collars are variations around the target

The impact of ODI rate changes was more meaningful, as it has adjusted the amount of relevant regulated equity at risk, based on the recent risk exposure of the sector. Updated ODI rates were calibrated on the basis of AMP7 data, which is more volatile for total pollutions, supply interruptions and PCC than the AMP6 data. The re-calibration was consistent with PR24 FM, whereby we ensured that c. 0.5%-0.6% of the respective (water or wastewater) notional equity was put at risk, factoring in the sector's overall performance. We also calculated the ODI rates for PCC and business demand on a standalone basis rather than as a bundle with leakage. The resulting rates are presented in Table 21.

**Table 21: Re-calibrated ODI rates on certain performance commitments**

Performance commitment	ODI rate, as per Ofwat's guidance (SWS)	Re-calibrated ODI rate
Water supply interruptions	0.68	0.13
PCC	0.94	0.18
Total pollution incidents	0.90	0.40
Business demand	0.36	0.07

There are objective reasons why we believe it is appropriate to further reduce the amount of notional equity at risk by scaling the ODI rates on PCC and Business demand further down. Water demand ODIs including PCC and business demand are not directly controllably by water companies and can be only indirectly influenced by their actions. This is evidenced by the step up in the household consumption levels during and after Covid-19, with the increase in working from home. Exposing a significant amount of notional equity to risk for the household and non-household demand would misallocate the risk as water companies are not best placed to manage it.

Applying the changes that are fully aligned with PR24 FM (caps and collars, and re-calibrated ODI rates on selected ODIs) left ODI RoRE range with a large asymmetry of c. 0.59% in P50 terms. To address this, we investigated the main sources of the remaining asymmetry, which were within discharge compliance (-0.11% RoRE at P50), compliance risk index (CRI, -0.10% RoRE at P50) and serious pollution incidents (-0.12% RoRE at P50). Application of deadbands on these ODIs worked as an appropriate risk mitigation, designed to reduce the P50 to zero for each of them. The resultant deadbands on CRI and Discharge permit compliance, however, are lenient, and we acknowledge that in practice these may not be acceptable to various regulatory bodies. Nevertheless, our analysis indicates that it may be necessary to continue to use deadbands for the penalty-only ODIs to manage risk exposure in AMP8, contrary to the guidance provided in PR24 FM.

**Table 22: Simulated deadbands that fully mitigate the P50 RoRE risk on the selected ODIs**

	FY26	FY27	FY28	FY29	FY30
CRI	3.30	3.30	3.30	3.30	3.30
Discharge permit compliance, %	98.20	98.20	98.20	98.20	98.20
Serious pollution incidents	1.00	1.00	1.00	1.00	1.00

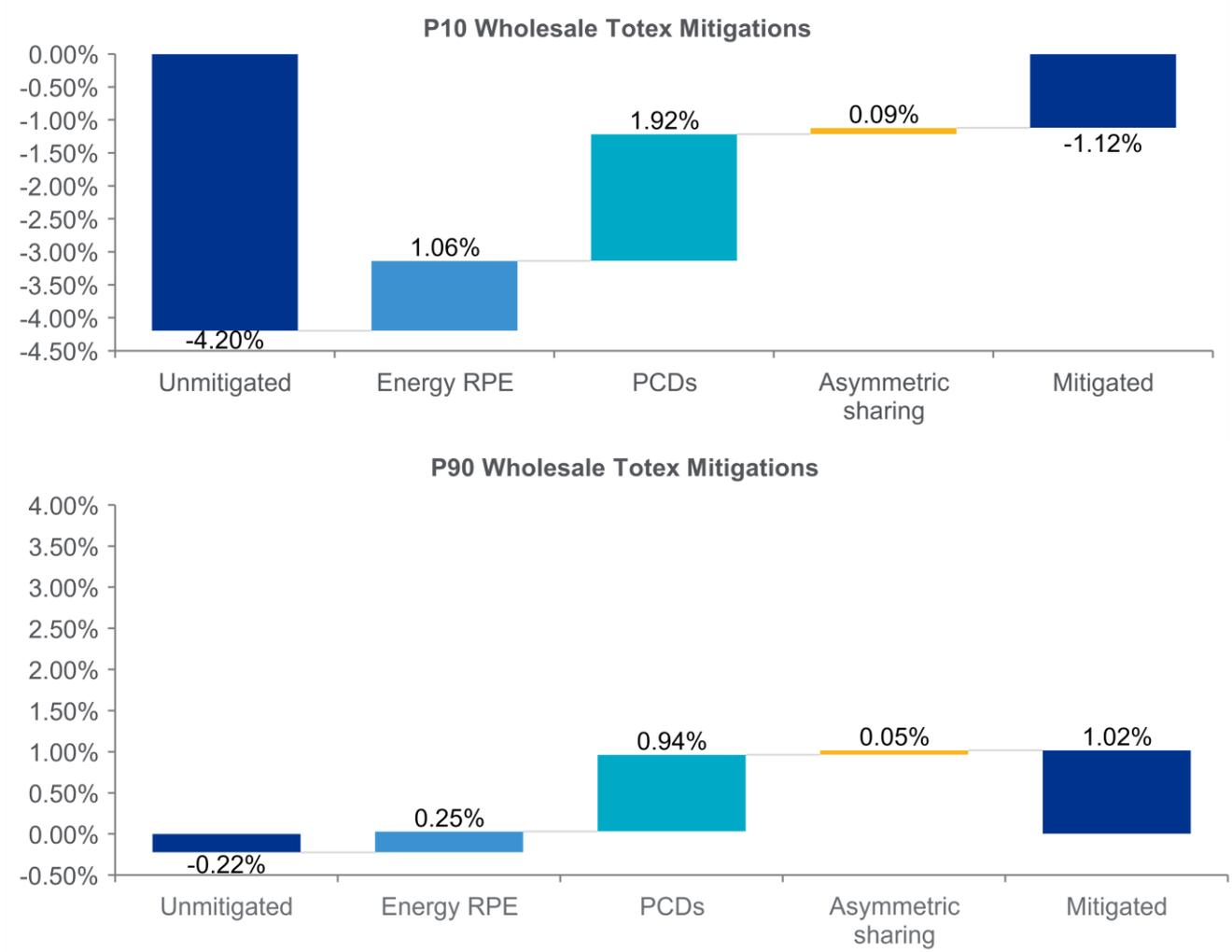
## 4.2 Totex mitigations

To reduce overall risk exposure and mitigate the asymmetry within the totex RoRE ranges, we developed the following mitigations:

- 1) Modified use of Price Control Deliverables (PCDs), limited to schemes that do not relate to legislative requirements or fund performance improvement as it would result in a duplication of penalty, and grouping PCDs for the larger categories of enhancement spend to allow for offsetting impact within those groups;
- 2) Implementation of RPEs for power costs;
- 3) Asymmetric sharing rate for enhancement totex; and
- 4) Removal of the negative adjustment to WACC related to retail margin as it is unwarranted based on the sector's actual performance in AMP7

Figure 20 below presents the impact of each mitigation on the wholesale totex RoRE range.

**Figure 20: Impact of each group of notional company mitigations on the wholesale totex RoRE range**



The application of the mitigations has shifted the wholesale totex P10, P50 and P90 RoRE upwards, by 3.08%, 2.05% and 1.24%, respectively, with the greatest impact on the downside.

**Table 23: Impact of notional company mitigations on retail totex RoRE range**

	Retail Totex	Retail Totex: mitigated	Difference
Upside (P90)	0.07%	0.18%	0.11%
Most likely (P50)	-0.29%	-0.18%	0.11%
Downside (P10)	-0.64%	-0.53%	0.11%

The first group of mitigations implemented was related to the application of price control deliverables. In the PR24 Final Methodology, Ofwat set out the expectation for companies to use PCDs as a tool to protect customers for under- or non-delivery of funded enhancements. AMP8’s totex plan has a significantly greater proportion and scale of enhancement spend than AMP7’s. Enhancement carries a fundamentally different risk profile to that of base spend, which is further exacerbated by the introduction of PCDs, as downside only mechanisms which could duplicate the penalties companies are already exposed to due to legislative

requirements and performance commitment targets. Additionally, penalty rates on PCDs would need to include foregone customer benefits, in addition to the cost of undelivered outputs, which could result in a clawback larger than costs not incurred by companies.

Wide application of PCDs to a larger and more complex enhancement programme driven by the statutory requirements creates significant downside totex risk. Absent any mitigations, the notional company is exposed to expected underperformance on totex equivalent to of -2.18% RoRE at P50, significant part of which is due to risk exposure on enhancement. We, therefore, re-calibrated the application of PCDs to the notional company's enhancement spend in such a way that it reduces both the overall risk exposure and the downside asymmetry. This has resulted in the value of enhancement spend subject to PCDs reducing from 90% (unmitigated notional) to 30% (mitigated notional), and had the effect of improving P10, P50 and P90 of totex RoRE by 1.92%, 1.14% and 0.94%.

Notional company risk mitigation has taken a more specific shape for our specific application of PCDs. Table 24 below presents our PCD risk mitigation strategy, whereby c. 30% of the overall enhancement spend is subject to PCDs, which avoids double counting of penalties related to legislative requirements and ODIs, bundles some schemes together to allow for the diversification impact and follows Ofwat's published guidance on the application of PCDs.

**Table 24: Application of Price Control Deliverables**

Enhancement spend	Total value of enhancement case (£m)	Reasoning for including or not including the value in PCDs and comments	Updated value of PCD (£m)
WTW Growth	293	Overlap with existing PCs - double penalty	-
First Time Sewerage (s101a)	6	Below materiality threshold	-
IED	138	Retained	138
Resilience - power	32	Below materiality threshold	-
Resilience - Infiltration	39	Below materiality threshold	-
Resilience - heat	7	Below materiality threshold	-
Resilience - flooding	5	Below materiality threshold	-
Resilience - coastal	17	Below materiality threshold	-
WINEP - Bioresources cake storage	51	Bundled WINEP programme enhancements	51
WINEP - Enhancing Waste treatment	611	Bundled WINEP programme enhancements	182
WINEP - Storm Overflows	370	Bundled WINEP programme enhancements	
WINEP - monitoring	140	Bundled WINEP programme enhancements	
WINEP - wider environmental enhancement	66	Bundled WINEP programme enhancements	
Supply Resilience Enhancement Programme (4-sites)	319	Retained	319
Tightening Water Quality Standards and Raw Water Deterioration	100	Retained	94
Lead	2	Below materiality threshold	-
Water Resources - Supply	469	Retained	160
Water Resources - Demand	260	Overlap with existing PCs - double penalty	-
Water Resources - Smart metering	63	Overlap with existing PCs - double penalty	-
Water resources – SROs	232	Overlap with exiting RAPID and DPC processes	-
WINEP – Supporting water abstraction	74	Retained	74
Reservoir Drawdown Capacity Increase	25	Below materiality threshold	-
SEMD	12	Below materiality threshold	-
NIS Standard profile	23	Below materiality threshold	-
<b>Total</b>	<b>3,354</b>		<b>1,019</b>

After removing the programmes below the materiality threshold and those overlapping with legislative requirements and performance commitments, £1.02bn of the £3.85bn enhancement programme remains subject to PCDs. Ofwat's guidance suggests companies define material investments as 1% of totex, hence, given our current estimated totex of £2.59bn for water and £3.57bn for wastewater, we have excluded the immaterial enhancement spend below £25.90m and £35.70m respectively from PCDs. We have also bundled the WINEP enhancement spend to allow for risk diversification between individual projects within this group of spend and consequently reduction of the downside risk. Further, we have recognised the impact of enhancement spend on our performance commitments and reduced the amount of PCD to reflect this. Both our WINEP and our Water resources supply enhancements will have a material impact on our performance commitments, but the quantification of this is difficult, therefore we have set the PCDs at 30% of the enhancement expenditure to be consistent with the overall risk exposure we believe is acceptable.

The second group of totex mitigations implemented was related to the application of Real Price Effects in relation to energy cost allowances included in botex. The sector has been exposed to unprecedented energy price volatility in recent years, which affects botex performance as energy costs account for a material proportion – roughly 10-20% – of the sector's base costs. A water company's cost base is different from a consumer's typical "shopping basket", and as a result the actual inflation faced by the water sector may not be captured accurately by general inflation measures, such as CPIH. There is strong evidence of a significant positive wedge of energy prices above CPIH in the historical data and this is further exacerbated by volatility in very recent years. Further volatility in energy prices resulting from recent economic and geopolitical events has created uncertainty which results to the heightened risk levels. One of the key principles of economic regulation is that risks should be allocated to parties best placed to manage such risks. As external energy price movements are outside of companies' control, it is inappropriate to allocate the associated risk to them.

In the context of the unformulated approach to RPEs for PR24 and the sector's significant risk exposure in this area, we assumed that energy RPEs would not apply for the purpose of calculating the unmitigated notional company RoRE risk ranges. This was done to demonstrate the difference in risk exposure in RoRE terms relevant to the application of energy RPEs. RPE application reduces the downside risk by acting as a true-up mechanism to the actual costs faced by water companies, resulting in the improvement in the notional company P10, P50 and P90 wholesale totex RoRE ranges of 1.06%, 0.85% and 0.25%, respectively.

Applying the changes that are conceptually aligned with PR24 FM and regulatory principles (targeted application of PCDs and full application of energy RPEs) left totex RoRE range with an asymmetry of c. -0.19% in P50 terms. To address this, we investigated what mitigations would be capable of reducing the downside asymmetry and concluded that either an increase in the level of contingency within totex allowances, or an asymmetric sharing rate on out- and underperformance would be suitable. As an illustration, we applied asymmetric sharing rates to enhancement totex in such a way that the notional company would benefit from 50% of underspend but would not be exposed to the overspend. This has reduced the risk asymmetry and improved the wholesale totex RoRE risk ranges by 0.09%, 0.07% and 0.05% for P10, P50 and P90, respectively. We acknowledge that in practice asymmetric sharing rates that do not expose the notional company to the risk of overspend on enhancement may not be acceptable. Nevertheless, our analysis indicates that it may be necessary to use additional mitigations to manage the notional company's totex risk exposure in AMP8.

In addition to the mitigations applied to wholesale totex, we have also mitigated the risk related to retail. The PR24 FM includes a retail margin adjustment (RMA) of 6 basis points to the allowed WACC to avoid double counting compensation for retail. Whilst the remuneration for retail risks is provided separately using a margin approach, it is argued that the appointee beta (and hence the appointee CoE) implicitly reflects retail as well as wholesale risks, potentially resulting in a double count of remuneration. Based on the sector's actual underperformance against the retail totex allowance equivalent to c. 0.40% in RoRE terms, the RMA is not warranted because the notional company does not earn any return on retail. Implementing this as one of the retail risk mitigations resulted in the retail P50 RoRE improving by c. 0.11%.

## 4.3 Return Adjustment Mechanisms

After applying the ODI and totex mitigations, the notional company's overall RoRE has improved to -0.84% in P50 terms, however, the downside in P10 terms (-5.86%) is still materially higher than the upside in P90 terms (4.24%). To ensure that the notional company has a fair chance to out- and underperform its allowed cost of equity, we considered a mechanism that would limit the extremes in operational RoRE.

An extension of the aggregate ODI sharing mechanism featured in PR24 FM out to cover all areas of operational performance, similarly to the RAMs applied by Ofgem, would appropriately balance out the extremes of the overall incentive package.

The purpose of RAMs would be to provide protection to consumers and investors if a water company's actual return ends up being significantly higher or lower than anticipated at the time of setting the price control. Consumers and investors will benefit from the introduction of RAMs as they would be protected against the possibility of unreasonably high or low returns in the AMP8 price control, and the associated impact on the customer bills as well as the level of service. RAMs will also help to ensure the fairness of AMP8 by protecting consumers and investors against ex post overall returns deviating greatly from ex ante expectations and would significantly improve a case for new equity. We suggest that similar to the precedent within the energy sector, RAMs should:

- Be symmetrical, providing for adjustments both due to under- and outperformance as this represents a fair balancing of the interests of consumers and investors;
- Cover the aggregate RoRE ranges including ODIs, totex, retails, DPC/Alternative delivery and C-MeX;
- Account for any trade-offs between Totex and ODI performance;
- Exclude financial performance as that would cause customers bear the risk associated with actual capital structures;
- Exclude QAA performance to preserve the value of the business plan incentive; and
- Serve as an end of period true-up, implemented as a part of the close-out of AMP8, with a sharing rate of 50% of out/(under) performance when RoRE reaches +/- 3.00% and 90% of out/(under) performance when RoRE reaches +/- 4.00%.

**Table 25: Thresholds for application of Return Adjustment Mechanisms (RAMs)**

Parameter	Value
Primary threshold level	3% plus or minus the baseline allowed return on equity
Primary adjustment rate	Adjustment of 50% applied to returns above or below the primary threshold level
Secondary threshold level	4% plus or minus the baseline allowed return on equity
Secondary adjustment rate	Adjustment of 90% applied to returns above or below the secondary threshold level

These thresholds will mean that the primary RAMs threshold will be triggered at 7.83% RoRE (3% above the baseline RoRE, adjusted for the recent market parameters and the scale of investment programme of 4.83%) and 1.83% of RoRE (3% below the baseline RoRE of 4.83%). In extremis, the secondary threshold will come into effect at 8.83% of RoRE (4% above the baseline RoRE of 4.83%) and 0.83% of RoRE (4% below the baseline RoRE of 4.83%).

As calibrated, RAMs would ensure that consumers and investors are protected whilst also allowing for water companies to be incentivised to deliver against their output targets. In our assessment of the notional company mitigations, application of RAMs would lead to a reduction in the level of the downside at P10 of 0.30% RoRE, but no impact to either the median RoRE at P50 or the upside at P90. Therefore, RAMs will improve the symmetry of the incentive package and reduce the risk of severe return erosion while preserving incentives for the companies to outperform. To trigger the RAMs, the notional company would need to have

a considerable overspend or underspend on totex either alone or in conjunction with a significant out or underperformance against ODIs, which is not likely but possible, according to our analysis.

Our impact assessment based on the AMP7 operational RoRE reported in the APRs for FY21-FY23 indicates that 11 companies would have pierced the RAM primary threshold level of -3% and 9 companies would have pierced the RAM secondary threshold level of -4% at least in one of the three reporting years. Triggering primary and secondary thresholds by so many companies suggests that the AMP7 price control may have been miscalibrated. In line with the regulator's principal objective and statutory duties, the RAMs would serve to protect existing and future consumers, as well as investors against price control miscalibration in AMP8, if significant outperformance or underperformance materialises.

RAMs would ensure that the sector remains attractive to investors, with both customers and investors being protected against the extremes. It would avoid excessive increases in customer bills in case of an extraordinary upside, and an erosion of the notional company's financial resilience over time in case of an extraordinary downside. It would not result in double-counting of the other regulatory mechanisms, if it replaces the aggregate ODI sharing mechanism.

Figure 21: Improvements in the notional company RoRE ranges due to mitigations

	Notional company unmitigated RoRE ranges			Impact of totex mitigations			Impact of ODI mitigations			Impact of RAMs			Notional company mitigated RoRE ranges		
	P10%	P50%	P90%	P10%	P50%	P90%	P10%	P50%	P90%	P10%	P50%	P90%	P10%	P50%	P90%
<b>Total RoRE</b>	<b>-9.94%</b>	<b>-3.59%</b>	<b>2.56%</b>	<b>3.19%</b>	<b>2.16%</b>	<b>1.35%</b>	<b>0.90%</b>	<b>0.59%</b>	<b>0.33%</b>	<b>0.30%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>-5.56%</b>	<b>-0.84%</b>	<b>4.24%</b>
<b>Totex: retail</b>	<b>-0.64%</b>	<b>-0.29%</b>	<b>0.07%</b>	<b>0.11%</b>	<b>0.11%</b>	<b>0.11%</b>							<b>-0.53%</b>	<b>-0.18%</b>	<b>0.18%</b>
Base costs - water	-1.34%	-0.60%	0.14%	0.67%	0.30%	-0.07%							-0.67%	-0.30%	0.07%
Base costs - wastewater	-2.16%	-0.73%	0.70%	1.08%	0.36%	-0.35%							-1.08%	-0.36%	0.35%
Base costs - bioresources	-0.49%	-0.17%	0.16%	0.25%	0.08%	-0.08%							-0.25%	-0.08%	0.08%
Enhancement costs - water	-1.44%	0.00%	0.46%	1.44%	0.00%	0.45%							0.00%	0.00%	0.92%
Enhancement costs - wastewater	-1.92%	0.00%	0.61%	1.92%	0.00%	0.61%							0.00%	0.00%	1.22%
<b>Totex (Base + enhancement)</b>	<b>-4.20%</b>	<b>-2.18%</b>	<b>-0.22%</b>	<b>3.08%</b>	<b>2.05%</b>	<b>1.24%</b>							<b>-1.12%</b>	<b>-0.13%</b>	<b>1.02%</b>
<b>ODIs</b>															
Leakage	-0.02%	0.00%	0.02%				0.00%	0.00%	0.00%				-0.02%	0.00%	0.02%
Water quality contacts	-0.05%	0.00%	0.05%				0.00%	0.00%	0.00%				-0.05%	0.00%	0.05%
Water supply interruptions	-0.62%	-0.19%	0.09%				0.51%	0.15%	-0.07%				-0.11%	-0.03%	0.02%
Compliance risk index (CRI)	-0.16%	-0.10%	-0.05%				0.03%	0.09%	0.15%				-0.13%	-0.01%	0.10%
Per capita consumption (PCC)	-0.32%	-0.21%	-0.10%				0.26%	0.17%	0.08%				-0.06%	-0.04%	-0.02%
Mains Repairs	0.00%	0.00%	0.00%				0.00%	0.00%	0.00%				0.00%	0.00%	0.00%
Unplanned outage	0.00%	0.00%	0.00%				0.00%	0.00%	0.00%				0.00%	0.00%	0.00%
Total pollution incidents	-0.63%	-0.12%	0.39%				0.35%	0.07%	-0.22%				-0.28%	-0.05%	0.17%
Sewer flooding	-0.19%	-0.05%	0.08%				0.00%	0.00%	0.00%				-0.19%	-0.05%	0.08%
Sewer collapse	-0.09%	-0.01%	0.07%				0.00%	0.00%	0.00%				-0.09%	-0.01%	0.07%
Discharge compliance	-0.14%	-0.11%	-0.09%				0.11%	0.11%	0.09%				-0.03%	0.00%	0.00%
Bathing water quality	-0.31%	0.05%	0.41%				0.00%	0.00%	-0.04%				-0.31%	0.05%	0.36%
Storm overflows	-0.09%	-0.01%	0.07%				0.00%	0.00%	0.00%				-0.09%	-0.01%	0.07%



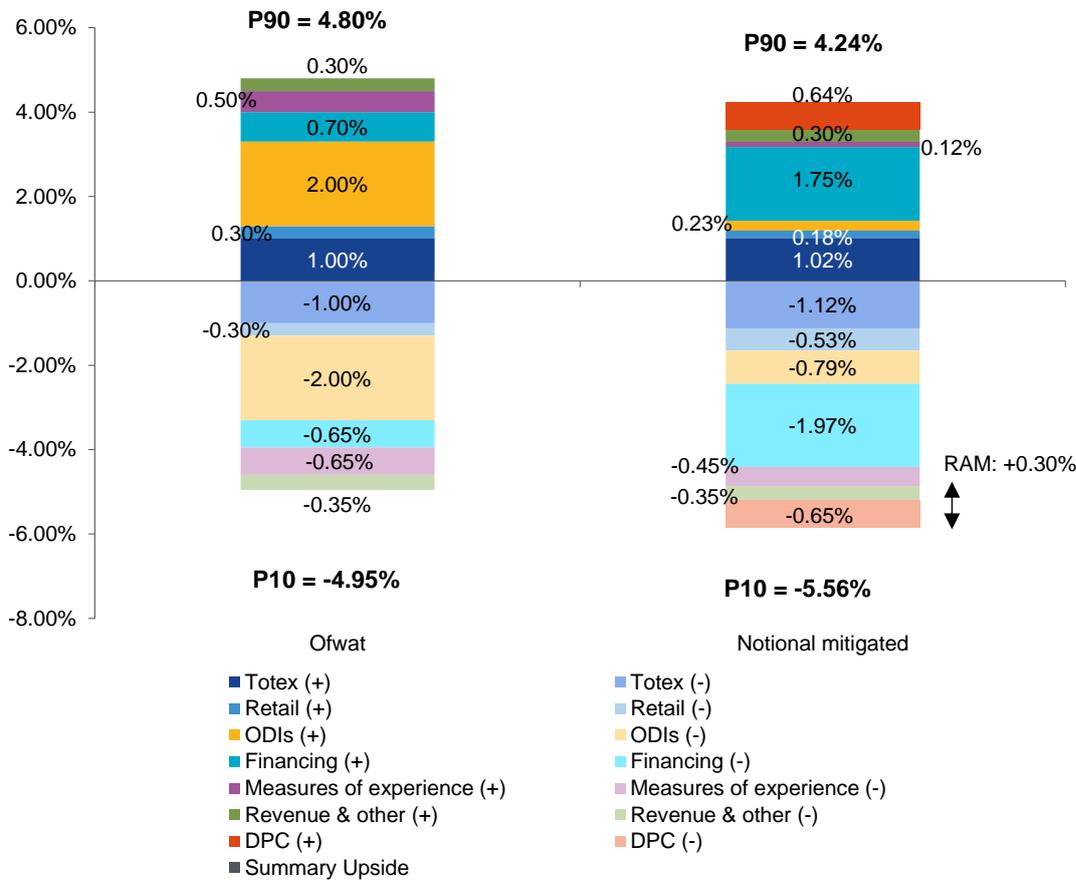
	Notional company unmitigated RoRE ranges			Impact of totex mitigations	Impact of ODI mitigations			Impact of RAMs	Notional company mitigated RoRE ranges		
External sewer flooding	-0.34%	-0.02%	0.31%		0.01%	0.00%	0.00%		-0.33%	-0.02%	0.31%
Serious pollution incidents	-0.25%	-0.12%	0.00%		0.12%	0.12%	0.00%		-0.12%	0.00%	0.00%
Business demand	-0.10%	0.16%	0.42%		0.08%	-0.13%	-0.34%		-0.02%	0.03%	0.08%
River water quality (phosphorus)	-0.36%	-0.08%	0.20%		0.01%	0.00%	0.00%		-0.35%	-0.08%	0.20%
Aggregate sharing mechanism - shared risk	0.00%	0.00%	0.01%		0.00%	0.00%	-0.01%		0.00%	0.00%	0.00%
<b>Total ODI</b>	<b>-1.69%</b>	<b>-0.88%</b>	<b>-0.10%</b>		<b>0.90%</b>	<b>0.59%</b>	<b>0.33%</b>		<b>-0.79%</b>	<b>-0.28%</b>	<b>0.23%</b>
C-MeX	-0.44%	-0.16%	0.13%		0.00%	0.00%	0.00%		-0.44%	-0.16%	0.13%
D-MeX	-0.04%	-0.01%	0.01%		0.00%	0.00%	0.00%		-0.04%	-0.01%	0.01%
<b>Total measure of experience</b>	<b>-0.45%</b>	<b>-0.17%</b>	<b>0.12%</b>		<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>		<b>-0.45%</b>	<b>-0.17%</b>	<b>0.12%</b>
<b>DPC</b>											
DPC - construction	-0.65%	0.00%	0.64%						-0.65%	0.00%	0.64%
DPC - post commissioning	0.00%	0.00%	0.00%						0.00%	0.00%	0.00%
<b>Total DPC</b>	<b>-0.65%</b>	<b>0.00%</b>	<b>0.64%</b>						<b>-0.65%</b>	<b>0.00%</b>	<b>0.64%</b>
<b>Financing risk</b>	<b>-1.97%</b>	<b>-0.08%</b>	<b>1.75%</b>						<b>-1.97%</b>	<b>-0.08%</b>	<b>1.75%</b>
<b>QAA Penalty</b>	<b>-0.30%</b>	<b>0.00%</b>	<b>0.30%</b>						<b>-0.30%</b>	<b>0.00%</b>	<b>0.30%</b>
<b>Revenue risk</b>	<b>-0.05%</b>	<b>0.00%</b>	<b>0.00%</b>						<b>-0.05%</b>	<b>0.00%</b>	<b>0.00%</b>
<b>RAM</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.00%</b>				<b>0.30%</b>	<b>0.00%</b>	<b>0.00%</b>	<b>0.30%</b>	<b>0.00%</b>



## 5. Mitigated Notional Company RoRE Range

After applying all the mitigations set out in Chapter 4, the notional company RoRE risk range improves dramatically, with P50 now at -0.84% versus -3.59% previously. Figure 22 presents the contribution of each group of performance variables to the overall risk exposure.

**Figure 22: Drivers of the mitigated RoRE ranges: Our notional company analysis versus Ofwat’s analysis**



The risk mitigations proposed, including RAMs, result in a narrower range for the notional company, with less asymmetric downside, however some asymmetry remains. Although the use of mitigations improves alignment between the allowed return and risk exposure, it is not fully consistent with the CAPM principles that returns are normally distributed, i.e. that they are clustered around the mean with a symmetric distribution. As a result, even with the risk mitigations, the incentive package would not constitute a ‘fair bet’ and would therefore warrant an adjustment to cost of equity to compensate for the downside risk asymmetry.

CAPM assumes that all possible future outcomes, including, in particular, downside risks with certain probabilities attached to them, are fully reflected in expected cashflows, i.e. that allowed cashflows already reflect all one-sided or asymmetric downside risks. Where this is not the case, the required returns will increase to compensate investors for these downside risks for the investment overall to constitute a ‘fair bet’. These are typically captured through added premia to the required return.

Both corporate finance theory and regulatory precedent (such as CMA decisions for PR19 and SONI appeals, as well as Ofcom's implementation of the fair bet principle) suggest that presence of unremunerated and not-fully mitigated asymmetry is an important criterion for selection of a point estimate for the cost of equity. Asymmetry could also be captured via an asymmetric risk premium. In the instance of the mitigated notional company, the appropriate premium for the unmitigated asymmetric risk exposure would be 0.84%. This is reflected in our view of appropriate WACC discussed in the technical annex on the cost of capital<sup>20</sup> to ensure that any future investment in the notional company represents a 'fair bet', and that the notional company can attract the necessary new equity to fund its enhancement programme.

The tables below provide detail on the physical level of performance on ODIs implied by the notional company's unmitigated and mitigated RoRE ranges in perms of P10, P50 and P90.

**Table 26: Physical performance on PCs assumed by unmitigated notional company – P10**

Performance Commitment	P10	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage	-3.44%	79.39	78.07	75.86	73.34	70.76
Customer contacts	-25.09%	0.94	0.96	0.97	0.97	0.95
Water supply interruptions	-696%	50.00	44.27	39.22	31.68	29.24
CRI	(5.44)	6.98	7.04	7.08	7.11	7.14
PCC	-10.05%	140.44	139.29	137.99	136.42	134.74
Mains repairs	-0.11%	120.06	120.06	120.06	120.06	120.06
Unplanned outage	8.80%	0.01	0.00	0.00	0.00	0.00
Total pollution incidents	-158.89%	47.35	45.49	43.09	37.61	36.57
Internal sewer flooding	-79.34%	2.07	1.83	1.74	1.66	1.59
Sewer collapses	-101.99%	8.15	7.84	7.06	6.92	6.79
Discharge permit compliance	-2.25%	0.98	0.98	0.98	0.98	0.98
Bathing water quality	-3.20%	84%	84%	84%	84%	84%
Storm overflows	-30.78%	20.92	19.85	18.86	17.98	17.17
External sewer flooding	-18.87%	19.07	18.61	18.19	17.75	16.84
Serious pollution incidents	-200.00%	2.00	2.00	2.00	2.00	2.00
Business demand	-1024.92%	1.82	1.82	5.97	5.92	5.86
River water quality	-22.43%	4129.52	4129.52	4129.52	4129.52	4129.52

<sup>20</sup> Technical annex: cost of capital

**Table 27: Physical performance on PCs assumed by unmitigated notional company – P50**

Performance Commitment	P50	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage	-0.03%	76.77	75.49	73.35	70.92	68.42
Customer contacts	0.34%	0.69	0.70	0.72	0.72	0.70
Water supply interruptions	-206.37%	19.24	17.04	15.09	12.19	11.25
CRI	(3.48)	5.02	5.08	5.11	5.15	5.18
PCC	-6.58%	136.02	134.90	133.64	132.13	130.50
Mains repairs	-0.01%	119.94	119.94	119.94	119.94	119.94
Unplanned outage	40.10%	0.00	0.00	0.00	0.00	0.00
Total pollution incidents	-29.69%	23.72	22.79	21.59	18.84	18.32
Internal sewer flooding	-22.95%	1.42	1.26	1.19	1.14	1.09
Sewer collapses	-12.14%	4.52	4.35	3.92	3.84	3.77
Discharge permit compliance	-1.82%	0.98	0.98	0.98	0.98	0.98
Bathing water quality	-0.39%	86.61%	86.61%	86.61%	86.61%	86.61%
Storm overflows	3.49%	15.44	14.65	13.92	13.26	12.67
External sewer flooding	0.95%	15.89	15.51	15.16	14.79	14.03
Serious pollution incidents	-100.00%	1.00	1.00	1.00	1.00	1.00
Business demand	1628.70%	-2.47	-2.47	-8.11	-8.05	-7.96
River water quality	-1.29%	3416.33	3416.33	3416.33	3416.33	3416.33

**Table 28: Physical performance on PCs assumed by unmitigated notional company – P90**

Performance Commitment	P90	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage	3.39%	74.15	72.91	70.84	68.50	66.08
Customer contacts	25.77%	0.43	0.45	0.46	0.46	0.44
Water supply interruptions	100.00%	0.00	0.00	0.00	0.00	0.00
CRI	(1.70)	3.24	3.29	3.33	3.37	3.40
PCC	-3.12%	131.60	130.51	129.30	127.83	126.26
Mains repairs	0.09%	119.82	119.82	119.82	119.82	119.82
Unplanned outage	71.38%	0.00	0.00	0.00	0.00	0.00
Total pollution incidents	99.43%	0.11	0.10	0.10	0.08	0.08
Internal sewer flooding	33.40%	0.77	0.68	0.65	0.62	0.59
Sewer collapses	77.66%	0.90	0.87	0.78	0.77	0.75
Discharge permit compliance	-1.45%	0.99	0.99	0.99	0.99	0.99
Bathing water quality	2.41%	67%	68%	70%	70%	68%
Storm overflows	37.78%	9.95	9.44	8.97	8.55	8.17
External sewer flooding	20.77%	12.71	12.40	12.12	11.83	11.22
Serious pollution incidents	0.00%	0.00	0.00	0.00	0.00	0.00
Business demand	4281.52%	-6.77	-6.77	-22.19	-22.01	-21.78
River water quality	19.83%	2703.87	2703.87	2703.87	2703.87	2703.87

**Table 29: Physical performance on PCs assumed by mitigated notional company – P10**

Performance Commitment	P10	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage	-3.45%	79.39	78.07	75.86	73.34	70.76
Customer contacts	-25.09%	0.94	0.96	0.97	0.97	0.95
Water supply interruptions	-696%	50.00	44.27	39.21	31.67	29.23
CRI	(2.13)	5.43	5.43	5.43	5.43	5.43
PCC	-10.05%	140.44	139.29	137.99	136.42	134.74
Mains repairs	-0.11%	120.06	120.06	120.06	120.06	120.06
Unplanned outage	8.79%	0.01	0.00	0.00	0.00	0.00
Total pollution incidents	-158.91%	47.36	45.50	43.10	37.62	36.57
Internal sewer flooding	-79.30%	2.07	1.83	1.74	1.66	1.59
Sewer collapses	-101.96%	8.15	7.84	7.06	6.92	6.79
Discharge permit compliance	-0.50%	0.98	0.98	0.98	0.98	0.98
Bathing water quality	-3.20%	84%	84%	84%	84%	84%
Storm overflows	-30.78%	20.92	19.85	18.86	17.98	17.17
External sewer flooding	-18.87%	19.07	18.61	18.19	17.75	16.84
Serious pollution incidents	-100.00%	2.00	2.00	2.00	2.00	2.00
Business demand	-1026.64%	1.82	1.82	5.98	5.93	5.87
River water quality	-22.43%	4129.27	4129.27	4129.27	4129.27	4129.27

**Table 30: Physical performance on PCs assumed by mitigated notional company – P50**

Performance Commitment	P50	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage	-3.45%	76.77	75.49	73.35	70.92	68.42
Customer contacts	-25.09%	0.69	0.70	0.72	0.72	0.70
Water supply interruptions	-696%	19.24	17.04	15.09	12.19	11.25
CRI	(2.13)	3.47	3.47	3.47	3.47	3.47
PCC	-10.05%	136.02	134.90	133.64	132.13	130.50
Mains repairs	-0.11%	119.94	119.94	119.94	119.94	119.94
Unplanned outage	8.79%	0.00	0.00	0.00	0.00	0.00
Total pollution incidents	-158.91%	23.72	22.79	21.59	18.84	18.32
Internal sewer flooding	-79.30%	1.42	1.26	1.19	1.14	1.09
Sewer collapses	-101.96%	4.52	4.35	3.92	3.84	3.77
Discharge permit compliance	-0.50%	0.98	0.98	0.98	0.98	0.98
Bathing water quality	-3.20%	86.61%	86.61%	86.61%	86.61%	86.61%
Storm overflows	-30.78%	15.44	14.65	13.92	13.26	12.67
External sewer flooding	-18.87%	15.89	15.51	15.16	14.79	14.03
Serious pollution incidents	-100.00%	1.00	1.00	1.00	1.00	1.00
Business demand	-1026.64%	-2.47	-2.47	-8.11	-8.04	-7.96
River water quality	-22.43%	3416.35	3416.35	3416.35	3416.35	3416.35

**Table 31: Physical performance on PCs assumed by mitigated notional company – P90**

Performance Commitment	P90	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage	-3.45%	74.15	72.91	70.84	68.50	66.08
Customer contacts	-25.09%	0.43	0.45	0.46	0.46	0.44
Water supply interruptions	-696%	0.00	0.00	0.00	0.00	0.00
CRI	(2.13)	1.69	1.69	1.69	1.69	1.69
PCC	-10.05%	131.59	130.51	129.29	127.83	126.25
Mains repairs	-0.11%	119.82	119.82	119.82	119.82	119.82
Unplanned outage	8.79%	0.00	0.00	0.00	0.00	0.00
Total pollution incidents	-158.91%	0.09	0.09	0.08	0.07	0.07
Internal sewer flooding	-79.30%	0.77	0.68	0.65	0.62	0.59
Sewer collapses	-101.96%	0.90	0.87	0.78	0.77	0.75
Discharge permit compliance	-0.50%	0.98	0.98	0.98	0.98	0.98
Bathing water quality	-3.20%	67%	68%	70%	70%	68%
Storm overflows	-30.78%	9.96	9.45	8.98	8.56	8.17
External sewer flooding	-18.87%	12.71	12.40	12.12	11.83	11.22
Serious pollution incidents	-100.00%	1.00	1.00	1.00	1.00	1.00
Business demand	-1026.64%	-6.77	-6.77	-22.18	-22.00	-21.77
River water quality	-22.43%	2703.78	2703.78	2703.78	2703.78	2703.78



## 6. Our RoRE Range (Unmitigated)

Our RoRE range is materially larger than the notional company's range due to the use of our own AMP7 performance data, including the median and standard deviations. Our simulated AMP8 risk assumes that our performance remains alike to the first three years of AMP7, while our enhancement spend increases and ODI targets become more challenging.

Key components of our risk exposure are presented in Table 32 and Figure 23,

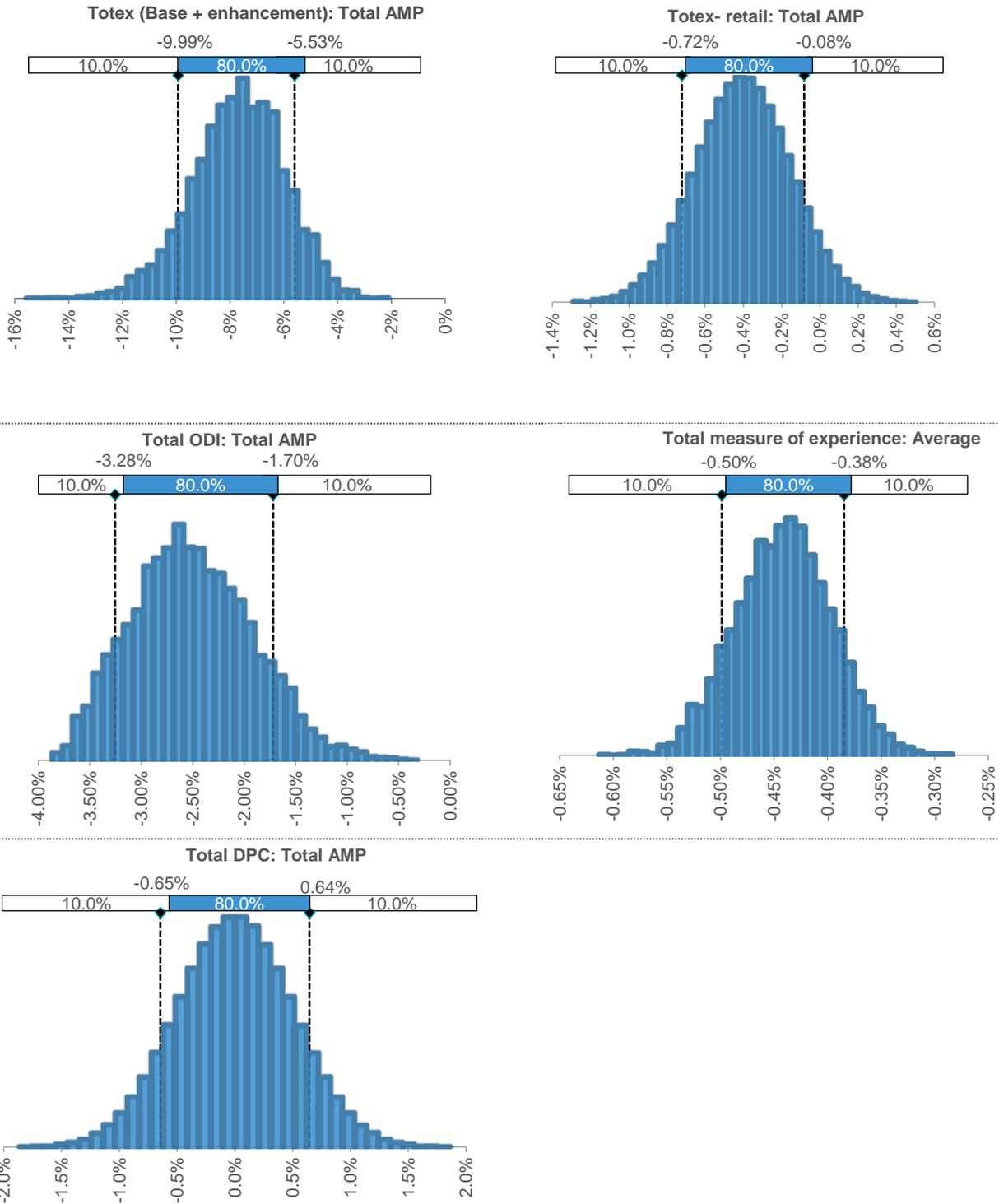
**Table 32: Our RoRE range on an unmitigated basis**

Risk factor	P10	P50	P90
<b>Total actual unmitigated risk to allowed return implied by the PR24 incentive package</b>	<b>-19.62%</b>	<b>-12.02%</b>	<b>-4.96%</b>
<b>Totex</b>			
<b>Totex: retail</b>	<b>-0.72%</b>	<b>-0.40%</b>	<b>-0.08%</b>
Base costs - water	-3.50%	-2.77%	-2.03%
Base costs - wastewater	-4.58%	-3.15%	-1.72%
Base costs - bioresources	-1.05%	-0.72%	-0.39%
Enhancement costs - water	-1.96%	-0.19%	0.41%
Enhancement costs - wastewater	-2.35%	0.00%	0.62%
<b>Totex (Base + enhancement)</b>	<b>-9.99%</b>	<b>-7.64%</b>	<b>-5.53%</b>
<b>Performance Commitments</b>			
Leakage	-0.05%	-0.02%	0.02%
Water quality contacts	-0.06%	-0.03%	0.00%
Water supply interruptions	-1.38%	-0.47%	0.09%
Compliance risk index (CRI)	-0.28%	-0.21%	-0.16%
Per capita consumption (PCC)	-0.30%	-0.21%	-0.11%
Mains Repairs	-0.20%	-0.06%	0.08%
Unplanned outage	0.00%	0.00%	0.00%
Total pollution incidents	-1.68%	-1.10%	-0.51%
Sewer flooding	-0.22%	-0.12%	-0.01%
Sewer collapse	-0.04%	-0.03%	-0.01%
Discharge compliance	-0.16%	-0.14%	-0.12%

Risk factor	P10	P50	P90
<b>Total actual unmitigated risk to allowed return implied by the PR24 incentive package</b>	<b>-19.62%</b>	<b>-12.02%</b>	<b>-4.96%</b>
Bathing water quality	-0.20%	0.00%	0.19%
Storm overflows	-0.06%	-0.04%	-0.01%
External sewer flooding	-0.11%	-0.05%	0.01%
Serious pollution incidents	-0.50%	-0.25%	0.00%
Business demand	0.14%	0.16%	0.17%
River water quality (phosphorus)	-0.12%	-0.06%	0.00%
Aggregate sharing mechanism - shared risk	0.00%	0.04%	0.67%
<b>Total ODI</b>	<b>-3.28%</b>	<b>-2.52%</b>	<b>-1.70%</b>
C-MeX	-0.48%	-0.43%	-0.38%
D-Mex	-0.04%	-0.01%	0.01%
<b>Total measure of experience</b>	<b>-0.50%</b>	<b>-0.44%</b>	<b>-0.38%</b>
<b>DPC</b>			
DPC - construction	-0.65%	0.00%	0.64%
DPC - post commissioning	0.00%	0.00%	0.00%
<b>Total DPC</b>	<b>-0.65%</b>	<b>0.00%</b>	<b>0.64%</b>
<b>Financing risk</b>	<b>-4.14%</b>	<b>-1.01%</b>	<b>1.80%</b>
<b>QAA Penalty</b>	<b>-0.30%</b>	<b>0.00%</b>	<b>0.30%</b>
<b>Revenue risk</b>	<b>-0.05%</b>	<b>0.00%</b>	<b>0.00%</b>

These RoRE ranges are underpinned by the granular simulated probability distributions on each specific parameter. The charts in figure 23 present these.

**Figure 23: Our RoRE range probability distributions in AMP8 (unmitigated)**



The main reason that our RoRE risk range is much wider and more asymmetric than the notional company's range is related to us being in a turnaround: we are spending more to catch-up on the previous AMP's enhancement and to facilitate our turnaround. We are also underperforming on many ODIs and on the cost of financing. We anticipate that additional spend and a conservative financial policy will help us improve our performance in AMP8 and beyond. Additionally, there are some objective differences between our and the notional company's risk exposure that are not related to inefficiencies or turnaround. These include risks that



are outside of our control and that ought to be considered in the calibration of the incentive package specific to us. We consider these risks, among others, in the following sub-sections.

### Totex

The notional company analysis does not fully capture the degree of risk that we face on totex because of specific factors that apply to us. These include catch-up investments, turnaround spend, inefficiencies, inflationary pressures and factors associated with our geographical location.

As part of the turnaround plan, we are investing heavily in improving performance. This includes significant additional enhancement totex as well as maintenance spend included in base totex. Consequently, we expect there to be a greater range of risk around totex performance than the notional company that is not in turnaround. We reported material totex underperformance in notional RoRE terms for the first three years of AMP7 of 2%-10%, with an average of around 5% based on Table 1F. Our methodology for calculating risk on totex is based on the standard deviation of spending relative to allowances and, as it is applied to a larger totex programme relative to opening RCV in AMP8, the risk in RoRE terms is amplified, resulting in the P50 RoRE of -7.64%.

We expect to continue investing in service improvements during AMP8 and anticipate that additional investment will yield results. In our turnaround plan 2023-25 we promised to deliver a short sharp ambitious improvement by 2025, particularly in terms of our environmental performance.

Due to our geographic location and the way our assets have been historically developed, we are exposed to greater pumping and maintenance costs than the notional company. These factors are outside of our control and ought to be considered in calibrating AMP8 cost allowances, as not reflecting them in allowances increases our totex risk. Firstly, greater corrosion from saline water and salt spray lead to higher maintenance and repair costs compared to inland assets. Secondly, for historical reasons many of our wastewater flows are pumped to an inland treatment works, then pumped back to a seafront location for discharge. This 'double-pumping' is energy intensive and adds significant power costs. And thirdly, we incur additional maintenance costs due to lane rental schemes implemented by some councils in densely populated areas. Lane rental fees and permits in 2023/24 are forecasted to be £3m, and 2024/25 £4m. It is appropriate for these to be funded as pass-through costs as we have no means of influencing them.

### Retail

Our retail performance has been weaker than the sector average historically, however performance in 2023 improved compared to the beginning of AMP7 (-0.3% retail RoRE in 2023 compared to -1.5% in 2021), driven by a significant reduction in the bad debt charge and resumption of debt collection activities following the pandemic.

Costs currently remain higher than allowed due to debt management costs, additional meter reads, and our transformational activities taking longer than planned. These have partially been offset by outsourcing of customer services.

### Outcome Delivery Incentives (ODIs)

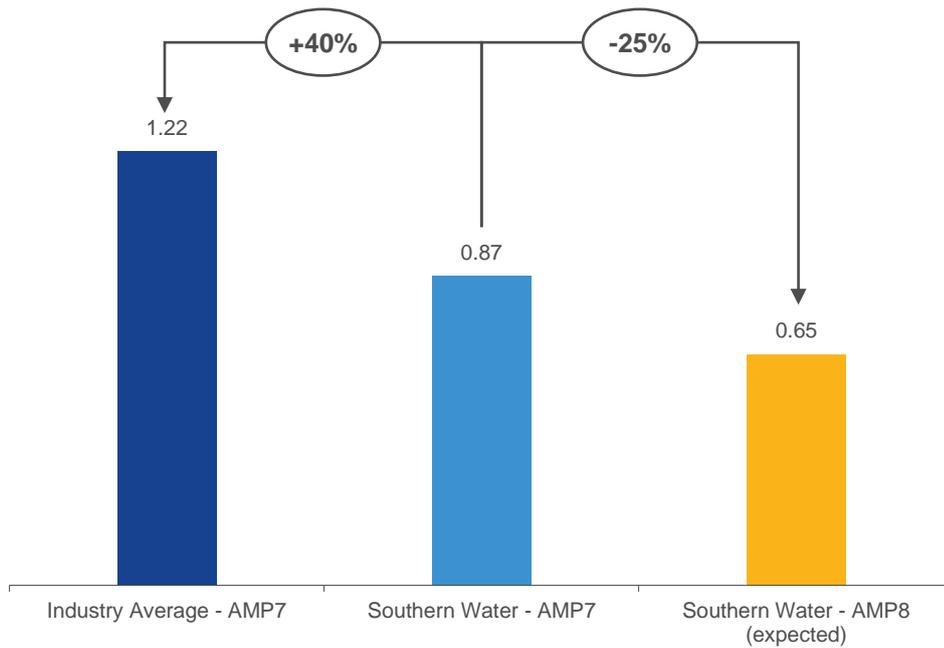
We are working hard to deliver on our operational turnaround and recognise that our reported performance in AMP7 required improvement. We aspire to be a third quartile performer among our peers by the end of AMP7 and achieve at least a 3-star performance rating from the Environmental Agency. Our unmitigated forward-looking ODI risk ranges are based on our performance in AMP7, which is applied to the Upper Quartile performance targets for AMP8. As the turnaround continues, we remain exposed to the risk of underperformance against these targets although we expect overall performance improvement versus the past.

As with totex, we are also exposed to some ODI risks that are outside of our control, and these need to be addressed in our incentive package to ensure it is balanced and allocates to us only those risks which we are well-placed to manage.



Firstly, we have one of the strictest discharge permits across the industry – ranking 1 for Phosphorus and 3 for Ammonia and BOD5. For phosphorus, the average Phosphorus for is 0.87mg/L compared to the industry average of 1.22mg/L (40% lower). Additionally, our Phosphorus permit levels are expected to be tightened by 25%, as shown in figure 24 below. This is due to our region, the South-East, being considered more environmentally sensitive than others. The stricter permit levels are harder to comply with using currently available technology and require increased use of complex operational practices, including dosing quality, quantity and frequency and consequently require adequate spending allowances for advanced technologies. These need to be reflected in our botex allowances to reduce the underlying risk of non-compliance and bring our risk exposure in line with that of the notional company.

**Figure 24: Our Phosphorus permit limits<sup>21</sup>.**



Additionally, we bear the risk related to customer behaviours on water consumption, which we have limited ability to influence, similar to the rest of the sector and the notional company. We have the highest household smart metering and conventional metering penetration in the industry, as demonstrated in table 33, but we struggled to influence our customers’ choice to use less water during AMP7. The PCC incentive in the form it currently takes places undue financial risk on us, as we are not best placed to manage the risk.

<sup>21</sup> Source: Permit levels published by the Environment Agency.

Table 33: Water sector's conventional and smart meter penetration

	HH Meter penetration			HH Smart Meter penetration		
	2023	2022	2021	2023	2022	2021
ANH	86%	85%	85%	33%	23%	18%
HDD	58%	58%	57%	24%	21%	18%
NES	53%	52%	51%	8%	6%	4%
<b>SRN</b>	<b>88%</b>	<b>88%</b>	<b>88%</b>	<b>55%</b>	<b>55%</b>	<b>55%</b>
SVE	51%	50%	49%	39%	34%	30%
SWB	83%	83%	82%	18%	18%	17%
TMS	54%	52%	49%	22%	19%	11%
UUW	48%	47%	46%	29%	27%	26%
WSH	48%	47%	46%	1%	1%	1%
WSX	73%	71%	70%	1%	1%	1%
YKY	60%	59%	58%	51%	52%	54%
AFW	68%	65%	63%	27%	24%	21%
BRL	65%	62%	60%	6%	6%	6%
PRT	36%	34%	34%	0%	0%	0%
SES	66%	66%	64%	0%	0%	0%
SEW	90%	90%	90%	14%	17%	20%
SSC	50%	49%	48%	35%	33%	32%
Average	63%	62%	61%	21%	20%	18%
P90	87%	86%	86%	44%	41%	41%

## Financing

Our exposure to financing risk is higher than that of the notional company due to the differences capital structures and our cost of embedded debt exceeding the sector's median. Table 34 summarise the key differences in assumptions between the notional company and us.

**Table 34 Differences in key financing assumptions between the notional company and our actual structure**

Assumptions	Actual	Notional
Gearing	73.3% <sup>22</sup>	55.0%
Proportion of index-linked debt	60.0%	33.3%
RPI-linked debt as proportion of index-linked debt	100.0%	93.4% <sup>23</sup>
P10-P90 range: new debt performance against adjusted index	-0.56%/-1.42%	-0.35/+0.16%

We are currently rated BBB+ (negative)/BBB (negative)/Baa3 (stable) by S&P/Fitch/Moody's, respectively. Consequently, our risk on cost of new debt performance against the A/BBB average adjusted index is expected to be greater than for the notional company with an assumed rating of BBB+ (Stable).

Furthermore, we are also exposed to risk in relation to performance against the cost of embedded debt allowance. Our actual cost of embedded debt is 2.80% in CPIH-real terms (4.85% in nominal terms), which compares to a 2.50% embedded debt allowance based upon the PR24 balance sheet model, updated for latest interest rates<sup>23</sup>. This is likely to cause underperformance under most interest rate and inflation scenarios. Combined with the risk in respect of new debt performance and differences in capital structures, this widens our post-tax RoRE to -4.14%/+1.80%, with a central view of -1.01%, as shown in table 35.

**Table 3536 Our actual financing risk, expressed as post-tax RoRE**

Risk	Post-tax RoRE impact		
	Downside	Central	Upside
<b>Inflationary</b>			
CPIH variance	-1.65%	0.00%	1.65%
RPI-CPIH wedge variance	-1.08%	0.00%	0.81%
CPI-CPIH wedge variance	-0.22%	-0.01%	0.10%
<b>Non-inflationary</b>			
Embedded debt performance	-0.46%	-0.46%	-0.46%
New debt performance	-0.73%	-0.54%	-0.29%
<b>Total</b>	<b>-4.14%</b>	<b>-1.01%</b>	<b>1.80%</b>

<sup>22</sup> Estimated average forecast gearing for AMP8

<sup>23</sup> Average for WaSCs and large WoCs from Ofwat PR24 Balance sheet cost of embedded debt model, published December 2022 and updated for latest market data

## 7. Mitigated Actual Company RoRE Range

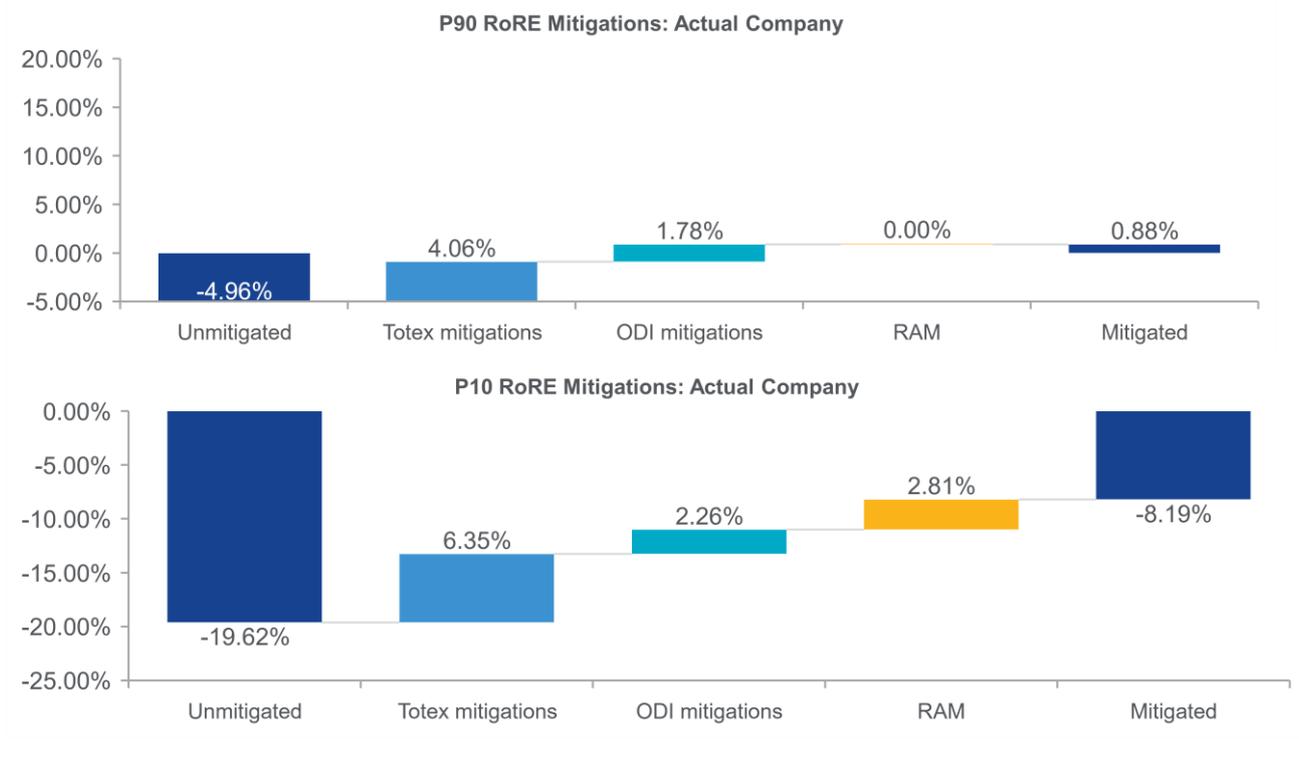
We have appropriate systems and processes in place to identify, manage and mitigate material risks by following a robust risk governance model that ensures that we can monitor and report on our principal risks to maintain a resilient business. In this vein, we are developing a business plan that is as de-risked as it could be, in the context of an ongoing turnaround.

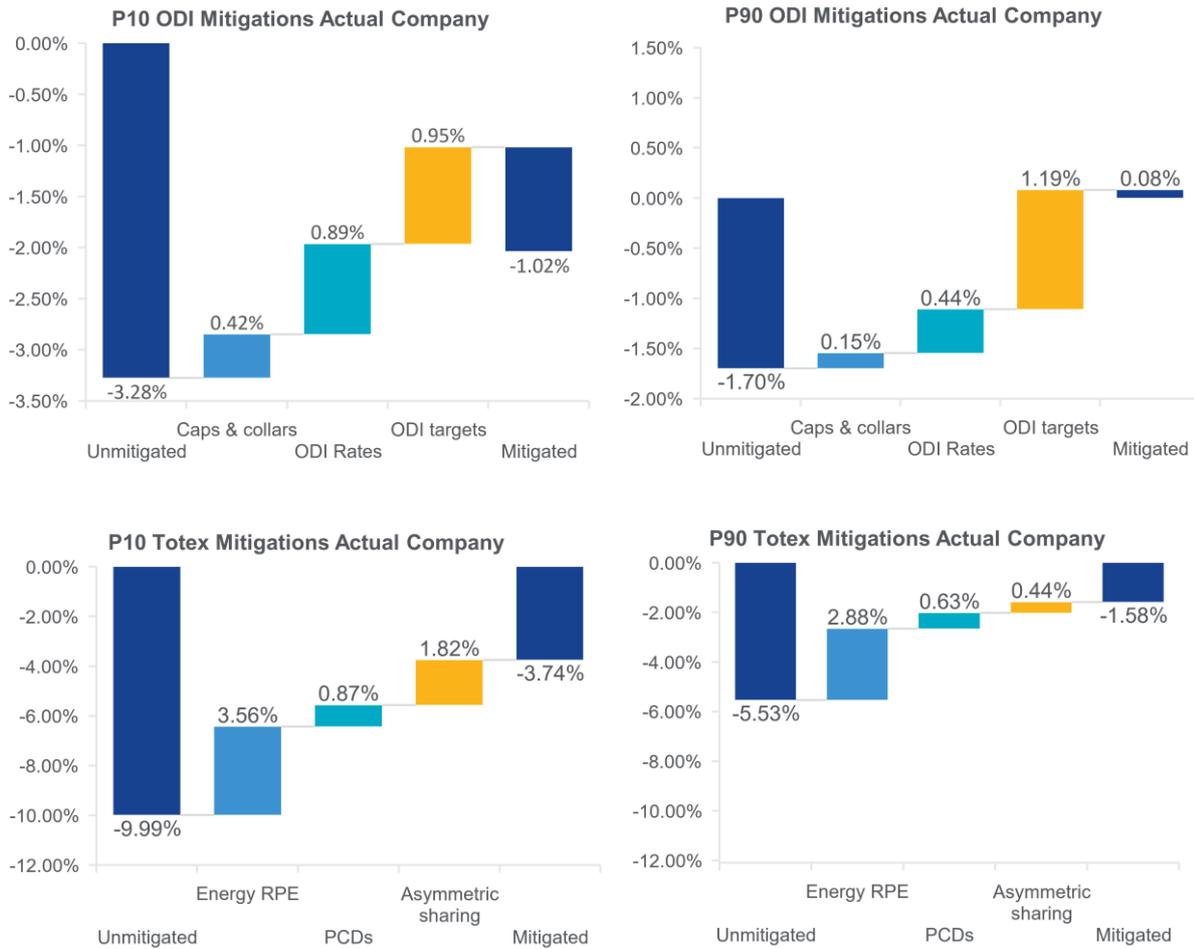
We expect to face a very significant risk exposure in AMP8 that stems from the combination of the (1) calibration of the regulatory incentive package, and (2) our ongoing turnaround. Without any mitigating measures, we would be exposed to a P50 RoRE risk of -12.02%, which implies a very substantial erosion to our financial profile and precludes availability of capital. This compares to the notional company's unmitigated P50 RoRE risk of -3.59%.

To mitigate our risk to returns, we applied most of the mitigations developed for the notional company. Additionally, we also used ODI targets based on our expected performance rather than upper quartile performance. In total, totex and ODI mitigations reduced the P50 risk by 4.90% and 2.10%, respectively. Additionally, RAMs worked as a protective mechanism limiting the residual extreme financial exposure. As presented in Figure 25, the impact of RAMs is material for us, removing c. 2.81% and 0.45% of risk in P10 and P50 terms.

**Figure 25: Mitigations drivers of the actual company**

Totex mitigations include values for base and enhancement as well as retail.





As part of the overall mitigations, we proposed to set our ODI targets at the levels below upper quartile in acknowledgment that we remain in turnaround which will extend into AMP8. Adopting the ODI targets we think we can achieve improves our median expected performance presented in Table 36, reduces the downside asymmetry and improves our chances of a successful turnaround by enabling us to remain financially resilient.

**Table 36: Our proposed AMP8 performance commitments**

		Apr-25	Apr-26	Apr-27	Apr-28	Apr-29
		Mar-26	Mar-27	Mar-28	Mar-29	Mar-30
Leakage	Units 3-year average ML/D	76.75	75.47	73.33	70.90	68.40
Customer contacts	Customer contacts per 1,000 population	1.00	1.00	0.90	0.90	0.80
Water supply interruptions	hh:mm:ss	0:14:48	0:12:13	0:09:39	0:07:23	0:04:31
CRI	Number	4.59	3.94	3.29	2.65	2.00
PCC	3-year average l/p/d	127.62	126.57	125.39	123.97	122.44
Mains repairs	Number of repairs per 1,000km of mains	150.00	148.40	150.62	151.18	152.90
Unplanned outage	Per cent of peak weekly production capacity	5.00%	4.53%	4.06%	3.60%	3.13%



		Apr-25	Apr-26	Apr-27	Apr-28	Apr-29
Units		Mar-26	Mar-27	Mar-28	Mar-29	Mar-30
Total pollution incidents	Incidents per 10,000km of sewer	42.26	35.47	28.71	21.98	15.53
Internal sewer flooding	Incidents per 10,000km of sewer	1.76	1.60	1.44	1.28	1.13
Sewer collapses	Incidents per 1,000km of sewer	6.11	6.00	5.89	5.78	5.67
Discharge permit compliance	Per cent of compliance sites	99.10%	99.10%	99.10%	99.10%	99.10%
Bathing water quality	Per cent of total with score of good or excellent	87.00%	87.00%	87.00%	87.00%	87.00%
Storm overflows	The average number of spills per storm overflow	20.60	20.40	20.40	20.20	18.50
External sewer flooding	Incidents per 10,000km of sewer	17.07	16.46	15.85	15.25	14.16
Serious pollution incidents	Number	1	1	1	1	1
Business demand	YoY ML/D change	0.16	0.16	0.53	0.53	0.52
River water quality	P-load removed year over year in kg/y	3,372.85	3,372.85	3,372.85	3,372.85	3,372.85

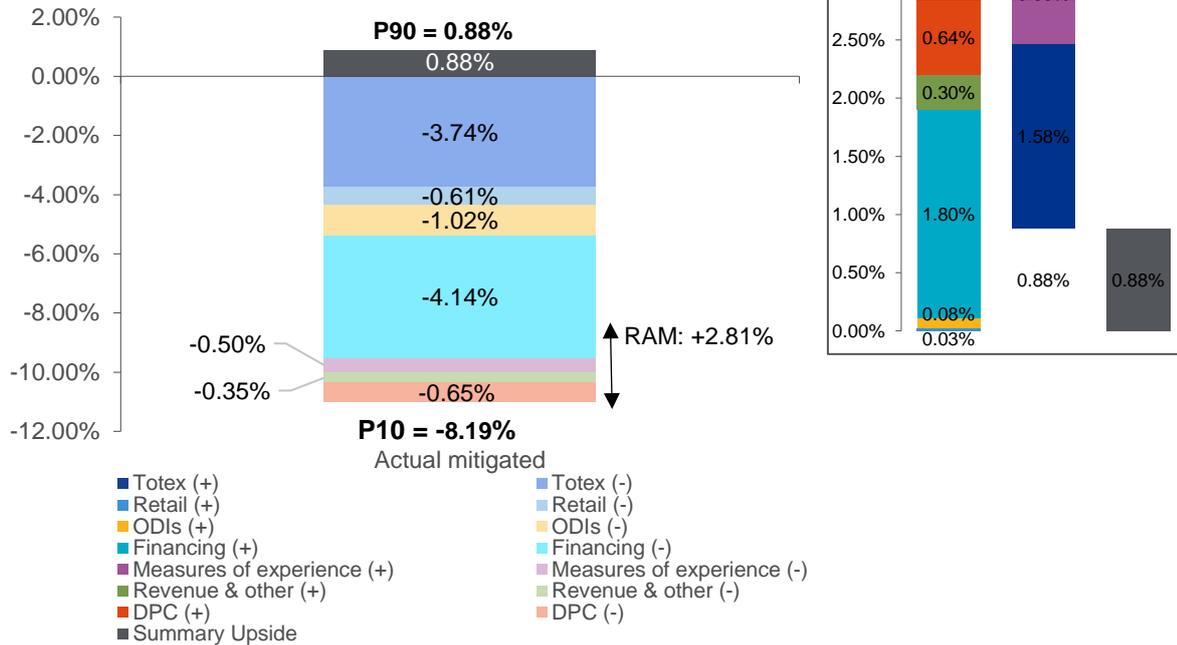
Our approach to setting ODI targets for AMP8 considers customer research into priority areas our customers want to see improvements in, our baseline performance ambition for 2024/25, expected benefits from our enhancement programme and the natural rate of deterioration of our assets. We also took into account the industry's historical performance, expected upper quartile performance and the government's targets where applicable. We consider our ODI targets stretching but achievable. We recognise that meeting our customers' expectations has been challenging but we are committed to improving our performance.

As discussed in our [SRN18: Performance Commitment Methodologies](#), we have a clear pathway to achieving our target performance based on significant investment to bring us in line with industry performance. Committing to the targets aligned with an upper quartile would equate to an excessive amount of risk in our Business Plan, which would negatively impact our financial resilience and access to debt and equity capital. Performance commitment targets that we propose, on the other hand, would incentivise us to improve performance without exposing us to the extreme financial risk. While we are strongly committed to improve our performance, it is not possible for us to achieve it immediately. A reasonable glide path to performance improvement is preferred by our customers over lower bills with a limited or disrupted improvement.

Our customers told us total pollutions and serious pollutions are top priority areas for improvement and we have created a plan that improves as rapidly as we can based on significant investment and ambitious targets. In recognition of our historical performance and demonstrated commitment to improve, our proposed targets work on a straight-line basis to help support our success in achieving our targets and financing the turnaround plan.

Overall, setting stretching but achievable performance targets significantly improve our risk ranges. There is 0.95% improvement on P10, 1.13% improvement on P50 and 1.24% improvement on P90. This mitigation is key to our success and without it we may not be able to deliver the P24 Business Plan.

Figure 26: Our RoRE risk range on a mitigated basis



Post mitigation our P50 RoRE risk position remains substantially negative at -4.46%, mostly reflecting sub-optimal performance in AMP7, but also other factors as discussed in the previous Section 6. While we accept that we should bear the turnaround risk and strive to improve our performance, the overall design of the incentive package as presented in PR24 FM would imply additional risk in the form of a multiplier effect on penalties that we incur. This is due to correlations between performance commitments and many ODI drivers being very similar or even the same. For example, our C-MeX score depends on our overall ODI performance; our total pollutions, serious pollutions, and storm overflows move in tandem, similar to river water quality and discharge compliance. The multiplier effect increases with the size of underperformance and causes the risk exposure to be greater than if there was no overlap in performance commitments and double counting of penalties.

On an actual basis after mitigations, our RoRE range is still broader than the notional company range. Using the PR24 FM CoE estimate updated for the recent market parameters of 4.83%, we would earn a P50 risk-adjusted return of 0.37%, with a P10-P90 range of -3.36%/+5.57%. This implies that on a P50 basis we would earn a marginally positive return on equity, with the downside implying a negative equity return, or a requirement of an equity injection. Any amount of risk exceeding these ranges would make the case for new equity very challenging and would substantially reduce our chances of successfully improving operational performance for the benefit of our customers and the environment.

Exposure to an unreasonable amount of risk in AMP8 could significantly derail the progress towards turning around our operational performance, as it would erode our financial resilience quicker than performance improvements can be achieved. This could deter the new equity needed to finance the AMP8 capital programme and jeopardise our ability to deliver a successful turnaround. In this context, all of the proposed mitigations, including the application of RAMs to limit excessive exposure to operational risk, would materially improve our chance of success to deliver first and foremost for our customers.

## 8. Conclusion

The risk landscape at PR24 is changing. There is an unprecedented step up in our capital programme, heightened macroeconomic volatility and interest rate increases, challenges associated with net zero, population growth and greater frequency of severe weather events. The calibration of PR24 incentive package also adds to the risk, as the PR24 Final Methodology (FM) proposes to substantially reduce the scope of risk protecting features on ODIs such as deadbands, caps and collars, while the application of the price control deliverables will also reduce the scope for outperformance on totex.

The overall scale and complexity of our proposed enhancement programme for AMP8 is significantly greater than in previous price controls. Our estimated capex spend for AMP8 totals £3.3bn (2017/18 prices), an increase of 285% compared to an allowance for AMP7 and of 103% compared to an allowance for AMP6. Such a step-up in investment increases our exposure to supply chain and labour market risks and heightens deliverability risk.

To fund and deliver this programme, significant capital is required, including substantial new equity to enable us to maintain our target gearing throughout AMP8. We need to ensure we can attract the capital we require, which, in turn boils down to a sufficient alignment between the risk and return under the PR24 incentive package.

Our risk analysis presented in this Annex shows that absent mitigations, PR24 incentive package would expose the efficient notionally geared company to the level of risk not consistent with allowed returns. It would also put at risk our ability to raise new debt and equity capital, deliver on our turnaround and improve the level of services we provide to our customers. The application of the risk mitigations proposed in our Business Plan, therefore, is fundamentally important for our financial resilience and our ability to deliver successfully for our customers and the environment.

The risk mitigations we propose include ODI caps and collars, updated ODI rates on four specific performance commitments, adjusted performance targets with a glide path to an Upper Quartile performance, application of the PCDs that avoids double counting of risk, asymmetric sharing rate on the enhancement totex or a greater amount of enhancement totex contingency and return adjustment mechanisms. The application of these measures results in a narrower, less asymmetric risk range, which, in combination with an appropriate capital return would be critical for our financial resilience and our ability to improve operational performance.

## Annex 1

This annex provides greater detail on our mitigated RoRE risk range and our physical ODI performance implied by the unmitigated RoRE risk ranges in terms of P10, P50 and P90

**Table 37: Total mitigated actual risk to allowed return implied by the PR24 incentive package**

	P10	P50	P90
<b>Total actual mitigated risk to allowed return implied by the PR24 incentive package</b>	<b>-8.19%</b>	<b>-4.46%</b>	<b>0.88%</b>
<b>Totex</b>			
<b>Totex: retail</b>	<b>-0.61%</b>	<b>-0.29%</b>	<b>0.03%</b>
Base costs - water	-1.75%	-1.38%	-1.02%
Base costs - wastewater	-2.29%	-1.58%	-0.86%
Base costs - bioresources	-0.52%	-0.36%	-0.20%
Enhancement costs - water	0.00%	0.00%	0.82%
Enhancement costs - wastewater	0.00%	0.00%	1.22%
<b>Totex (Base + enhancement)</b>	<b>-3.74%</b>	<b>-2.74%</b>	<b>-1.58%</b>
<b>Performance Commitments</b>			
Leakage	-0.05%	-0.02%	0.02%
Water quality contacts	-0.03%	0.00%	0.03%
Water supply interruptions	-0.15%	0.00%	0.03%
Compliance risk index (CRI)	-0.27%	-0.12%	-0.02%
Per capita consumption (PCC)	-0.06%	-0.04%	-0.02%
Mains Repairs	-0.16%	0.00%	0.16%
Unplanned outage	0.00%	0.00%	0.00%
Total pollution incidents	-0.46%	0.00%	0.31%
Sewer flooding	-0.16%	0.00%	0.16%
Sewer collapse	-0.03%	0.00%	0.03%
Discharge compliance	-0.11%	-0.08%	-0.05%
Bathing water quality	-0.20%	0.00%	0.19%
Storm overflows	-0.03%	0.00%	0.03%
External sewer flooding	-0.06%	0.00%	0.06%
Serious pollution incidents	-0.25%	0.00%	0.00%
Business demand	0.03%	0.03%	0.03%
River water quality (phosphorus)	-0.12%	-0.06%	0.00%
Aggregate sharing mechanism - shared risk	0.00%	0.00%	0.00%

	P10	P50	P90
<b>Total actual mitigated risk to allowed return implied by the PR24 incentive package</b>	<b>-8.19%</b>	<b>-4.46%</b>	<b>0.88%</b>
<b>Total ODI</b>	<b>-1.02%</b>	<b>-0.42%</b>	<b>0.08%</b>
C-MeX	-0.48%	-0.43%	-0.38%
D-Mex	-0.04%	-0.01%	0.01%
<b>Total measure of experience</b>	<b>-0.50%</b>	<b>-0.44%</b>	<b>-0.38%</b>
<b>DPC</b>			
DPC - construction	-0.65%	0.00%	0.64%
DPC - post commissioning	0.00%	0.00%	0.00%
<b>Total DPC</b>	<b>-0.65%</b>	<b>0.00%</b>	<b>0.64%</b>
<b>Financing risk</b>	<b>-4.14%</b>	<b>-1.01%</b>	<b>1.80%</b>
<b>QAA Penalty</b>	<b>-0.30%</b>	<b>0.00%</b>	<b>0.30%</b>
<b>Revenue risk</b>	<b>-0.05%</b>	<b>0.00%</b>	<b>0.00%</b>
<b>RAM</b>	<b>2.81%</b>	<b>0.45%</b>	<b>0.00%</b>

**Table 38: P10 levels of performance assumed by PCs for mitigated actual company**

Performance Commitment	P10	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage		82.28	80.91	78.62	76.01	73.33
Customer contacts		1.15	1.15	1.05	1.05	0.95
Water supply interruptions		163.73	135.15	106.76	81.68	49.97
CRI		9.10	8.45	7.80	7.16	6.51
PCC		139.64	138.49	137.20	135.65	133.97
Mains repairs		203.99	201.81	204.83	205.59	207.93
Unplanned outage		0.06	0.05	0.05	0.04	0.04
Total pollution incidents		104.56	87.76	71.04	54.39	38.42
Internal sewer flooding		2.55	2.32	2.09	1.86	1.64
Sewer collapses		7.40	7.26	7.13	6.99	6.86
Discharge permit compliance		0.97	0.97	0.97	0.97	0.97
Bathing water quality		85%	85%	85%	85%	85%
Storm overflows		22.76	22.54	22.54	22.32	20.44
External sewer flooding		17.65	17.02	16.39	15.77	14.64
Serious pollution incidents		3.00	3.00	3.00	3.00	3.00
Business demand		-2.23	-2.23	-7.31	-7.25	-7.17
River water quality		3519.72	3519.72	3519.72	3519.72	3519.72

**Table 39: P50 levels of performance assumed by PCs for mitigated actual company**

Performance Commitment	P50	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage		78.69	77.38	75.19	72.70	70.13
Customer contacts		1.00	1.00	0.90	0.90	0.80
Water supply interruptions		14.83	12.24	9.67	7.40	4.53
CRI		6.52	5.87	5.22	4.58	3.93
PCC		135.93	134.81	133.55	132.04	130.41
Mains repairs		150.01	148.41	150.63	151.19	152.91
Unplanned outage		0.05	0.05	0.04	0.04	0.03
Total pollution incidents		42.26	35.47	28.71	21.98	15.53
Internal sewer flooding		1.76	1.60	1.44	1.28	1.13
Sewer collapses		6.12	6.00	5.89	5.78	5.67
Discharge permit compliance		0.98	0.98	0.98	0.98	0.98
Bathing water quality		87.01%	87.01%	87.01%	87.01%	87.01%
Storm overflows		20.60	20.40	20.40	20.20	18.50
External sewer flooding		17.07	16.46	15.85	15.25	14.16
Serious pollution incidents		1.00	1.00	1.00	1.00	1.00
Business demand		-2.48	-2.48	-8.11	-8.05	-7.96
River water quality		3372.88	3372.88	3372.88	3372.88	3372.88

**Table 40: P90 levels of performance assumed by PCs for mitigated actual company**

Performance Commitment	P90	2025/26	2026/27	2027/28	2028/29	2029/30
Leakage		75.11	73.85	71.76	69.38	66.93
Customer contacts		0.85	0.85	0.75	0.75	0.65
Water supply interruptions		0.00	0.00	0.00	0.00	0.00
CRI		4.93	4.28	3.63	2.99	2.34
PCC		132.22	131.13	129.91	128.44	126.85
Mains repairs		96.03	95.01	96.43	96.79	97.89
Unplanned outage		0.04	0.04	0.04	0.03	0.03
Total pollution incidents		0.00	0.00	0.00	0.00	0.00
Internal sewer flooding		0.96	0.87	0.79	0.70	0.62
Sewer collapses		4.83	4.74	4.65	4.57	4.48
Discharge permit compliance		0.98	0.98	0.98	0.98	0.98
Bathing water quality		98%	98%	88%	88%	78%
Storm overflows		18.44	18.26	18.26	18.08	16.56
External sewer flooding		16.49	15.90	15.31	14.73	13.67

Performance Commitment	P90	2025/26	2026/27	2027/28	2028/29	2029/30
Serious pollution incidents		1.00	1.00	1.00	1.00	1.00
Business demand		-2.72	-2.72	-8.92	-8.85	-8.75
River water quality		3226.16	3226.16	3226.16	3226.16	3226.16



## Annex 2

Data table RR30 summarises the output of the risk analysis and is a required data table for the PR24 Business Plan submission. We have populated it on the basis of the mitigated notional company as presented in this technical annex. The tables were prepared according to Ofwat's guidance and the following assumptions: (1) water and wastewater ODIs were split according to the treatment for the Aggregate Sharing Mechanism; (2) the Financing RoRE high and low cases include the risk to embedded debt as well as new debt and inflation; (3) the other RoRE line items include the risk associated with the QAA penalty of +/- 30bps, the risk related to DPC and alternative delivery routes at -65/+64bps, and the impact of RAMs on the low case of +30bps. We have not populated Retail ODIs and additional control ODIs consistent with the assumptions laid out due to the lack of information to base our assessment on. We also did not populate BR-Mex due to uncertainty on how this metric would be calculated to model potential outcomes. The total RoRE ranges in both Table 41 and Table 42 match the mitigated notional company ranges presented in this annex, however individual components had to be adjusted to make the totals match. This is because the RR 30 data table is setup to add the individual components together not accounting for the impact of correlations.

We chose to present the notional company on a mitigated basis because it is the most appropriate representation of the risk facing an efficient company operating in South East of England like us. It does not account for company specific risk like risk related to the turnaround programme. We presented risk post mitigations because the mitigations are required for us to successfully fund our capital programme and to appropriately balance risk and return. Without this level of mitigations, we may not be able to deliver the programme as it stands. Therefore, the notional company post mitigations was the most appropriate choice to populate the data tables.

We have presented two tables to account for the binary nature of the uncertainty mechanisms. At this point the projects in question and associated spend are not required and therefore the relevant risk has not been analysed or included in the notional company RoRE. However, they could become a requirement during the AMP8, and the uncertainty mechanisms hedge against this risk. Table 41, therefore, presents the data table assuming that the notional company bears the risk associated with the larger investment programme and that the uncertainty mechanisms help mitigating the risk: under the high case we assume that 50% of totex subject to UMs is spent, and under the low case we assume that 100% of totex subject to UMs is spent. In the low case, RoRE exposure absent UMs would be very significant – it assumes that additional capex is not added to the allowances. The application of UMs, therefore, reduce that risk. Table 42 presents the data table assuming that the additional capex requirements do not materialise and does not include uncertainty mechanisms as a mitigation.

The uncertainty mechanisms included are detailed in the respective technical annex where more information can be found.

Table 41: Data table RR30 RORE Analysis with the impact of the Uncertainty Mechanisms

RoRE - high case						
Totex RoRE - high case	-4.03%	-4.03%	-4.03%	-4.03%	-4.03%	-4.03%
Outcome delivery incentives RoRE - high case	0.23%	0.23%	0.23%	0.23%	0.23%	0.23%
Financing RoRE - high case	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
Customer measures of experience RoRE - high case	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%
Revenue & other RoRE - high case	-0.67%	-0.67%	-0.67%	-0.67%	-0.67%	-0.67%
RoRE - high case ~ total	-2.60%	-2.60%	-2.60%	-2.60%	-2.60%	-2.60%

RoRE - low case						
Totex RoRE - low case	-12.09%	-12.09%	-12.09%	-12.09%	-12.09%	-12.09%
Outcome delivery incentives RoRE - low case	-0.79%	-0.79%	-0.79%	-0.79%	-0.79%	-0.79%
Financing RoRE - low case	-1.97%	-1.97%	-1.97%	-1.97%	-1.97%	-1.97%
Customer measures of experience RoRE - low case	-0.45%	-0.45%	-0.45%	-0.45%	-0.45%	-0.45%
Revenue & other RoRE - low case	-3.93%	-3.93%	-3.93%	-3.93%	-3.93%	-3.93%
RoRE - low case ~ total	-19.23%	-19.23%	-19.23%	-19.23%	-19.23%	-19.23%

Impact of proposed uncertainty mechanisms						
Uncertainty mechanisms - high case	223.326	244.062	258.887	269.583	274.392	254.050
Uncertainty mechanisms - low case	446.652	488.124	517.774	539.166	548.784	508.100

<b>RoRE - impact of proposed uncertainty mechanisms</b>						
RoRE impact of proposed uncertainty mechanisms - high case	6.83%	6.83%	6.83%	6.83%	6.83%	6.83%
RoRE impact of proposed uncertainty mechanisms - low case	13.67%	13.67%	13.67%	13.67%	13.67%	13.67%

<b>RoRE - total post uncertainty mechanisms</b>						
Total RoRE post proposed uncertainty mechanisms - high case	4.24%	4.24%	4.24%	4.24%	4.24%	4.24%
Total RoRE post proposed uncertainty mechanisms - low case	-5.56%	-5.56%	-5.56%	-5.56%	-5.56%	-5.56%



**Table 42: Data table RR30 RORE Analysis without the impact of the Uncertainty Mechanisms**

<b>RORE Analysis</b>						
Line Description						Average
	2025-26	2026-27	2027-28	2028-29	2029-30	2025-30
<b>RoRE - high case</b>						
Totex RoRE - high case	1.19%	1.19%	1.19%	1.19%	1.19%	1.19%
Outcome delivery incentives RoRE - high case	0.23%	0.23%	0.23%	0.23%	0.23%	0.23%
Financing RoRE - high case	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
Customer measures of experience RoRE - high case	0.12%	0.12%	0.12%	0.12%	0.12%	0.12%
Revenue & other RoRE - high case	0.94%	0.94%	0.94%	0.94%	0.94%	0.94%
RoRE - high case ~ total	4.24%	4.24%	4.24%	4.24%	4.24%	4.24%
<b>RoRE - low case</b>						
Totex RoRE - low case	-1.65%	-1.65%	-1.65%	-1.65%	-1.65%	-1.65%
Outcome delivery incentives RoRE - low case	-0.79%	-0.79%	-0.79%	-0.79%	-0.79%	-0.79%
Financing RoRE - low case	-1.97%	-1.97%	-1.97%	-1.97%	-1.97%	-1.97%
Customer measures of experience RoRE - low case	-0.45%	-0.45%	-0.45%	-0.45%	-0.45%	-0.45%
Revenue & other RoRE - low case	-0.70%	-0.70%	-0.70%	-0.70%	-0.70%	-0.70%
RoRE - low case ~ total	-5.56%	-5.56%	-5.56%	-5.56%	-5.56%	-5.56%



Impact of proposed uncertainty mechanisms						
Uncertainty mechanisms - high case	0.000	0.000	0.000	0.000	0.000	0.000
Uncertainty mechanisms - low case	0.000	0.000	0.000	0.000	0.000	0.000

RoRE - impact of proposed uncertainty mechanisms						
RoRE impact of proposed uncertainty mechanisms - high case	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
RoRE impact of proposed uncertainty mechanisms - low case	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

RoRE - total post uncertainty mechanisms						
Total RoRE post proposed uncertainty mechanisms - high case	4.24%	4.24%	4.24%	4.24%	4.24%	4.24%
Total RoRE post proposed uncertainty mechanisms - low case	-5.56%	-5.56%	-5.56%	-5.56%	-5.56%	-5.56%

