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Date of submission: Friday, 20 June 2025

Your submission for this review:
This submission has been independently prepared by Arup Australia Pty Ltd (Arup). Our full submission (attached) responds to IPARTs Draft Report, and the report completed by its consultant, AtkinsRealis, both published by IPART. Our submission does not seek to respond in detail to each individual assertion in the IPART Draft Report, however, we consider that some claims in the Draft Report warrant a response, in particular the areas that relate to the prudency evaluation of the Prospect Pre-Treatment project and the associated questions raised by IPART. In our view, the review of the key issues that warrant a response are the finding that the project is not justified due to Sydney Water avoiding the issuance of boil water notices. We have focused our response on these topics because, as a global engineering company that helps water businesses around the world plan, build, operate and maintain water assets, we consider our deep understanding of the technical and economic considerations related to the risks to human health and the economy associated with failure of water treatment plants is relevant to IPARTs prudency evaluation of the Prospect Pretreatment project. We encourage IPART to consider the frameworks and guidance provided by other economic and technical regulators in considering the climatic risks that underpin the infrastructure planning effort associated with the Prospect Pretreatment project. We appreciate the opportunity to make this submission and hope that our comments are received as constructive and helpful.

ARUP

Sydney Water

IPART Review of Prices for Sydney Water

IPART Review of Prices for Sydney Water

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1. Introduction

1.1 Context

Sydney Water's current regulatory period expires on 30 September 2025. To support the development of recommended prices to apply over the next regulatory period (1 October 2025 to 30 June 2030), Sydney Water has submitted its *Price Proposal 2025-30.* This was published by the Independent Pricing and Regulatory Tribunal (IPART) on 1 November 2024 along with IPART's Issues Paper. Following a Public Hearing and feedback on its Issues Paper, IPART published its Draft Report on 20 May 2025.

Among other things, the Draft Report has found that Sydney Water's actual capital expenditure of $7.3 billion over the current 2020 Determination Period (covering 2019-20 to 2023-24) is efficient, with variances between allowed and actual capital expenditure being justified. [1]

It has also identified material reductions to Sydney Water's proposed forecast capital expenditure. IPART's draft decision is to allow $10.7 billion of forecast capital expenditure over the 2025 determination period, which is 35 per cent lower than the $16.6 billion proposed by Sydney Water. In arriving at its draft decision regarding future capital expenditure, IPART has acknowledged the need for Sydney Water to spend more on replacing existing, and building new, infrastructure. IPART has considered independent expert advice of its consultant, AtkinsRealis, and "the appropriate level of risk Sydney Water should accept, the needs of customers, environmental performance, the provision of infrastructure to service growth, water security and other emerging issues".[1]

IPART is now seeking feedback on whether its draft decision on the efficient capital expenditure for the 2025 Determination Period delivers the right outcomes for Sydney Water's customers.

1.2 This submission

This submission has been independently prepared by Arup Australia Pty Ltd (Arup). As part of our work in the water sector Arup provides services to Sydney Water in support of the planning, design, delivery and sustainment of their service infrastructure. In making this submission we note, for transparency, that in addition to a range of advisory services our work with Sydney Water includes:

- Our role as partner in Sydney Water's Planning Partner arrangements under the Partnering For Success (P4S) program; and
- Participation in design support at various stages for a number of Sydney Water capital projects including the Prospect Pre-treatment Plant project.

For avoidance of doubt this specific experience is not the basis for our feedback to IPART in this matter. Our feedback is not intended to in any way represent our work with Sydney Water, nor seek to advocate for, or defend, this work.

The comments made in this submission are intended to draw on our broader experience in the water sector, regulated utilities industries, and our overall insights from involvement in supporting infrastructure owners across sectors and their related governance models.

Our submission responds to IPART's Draft Report, and the report completed by its consultant, AtkinsRealis, both published by IPART. This submission does not seek to respond in detail to each individual assertion in the IPART Draft Report, however, we consider that some claims in the Draft Report warrant a response, in particular the areas that relate to the prudency evaluation of the Prospect Pre-Treatment project and the associated questions raised by IPART. In our view, the review of the key issues that warrant a response are the finding that the project is not justified due to Sydney Water avoiding the issuance of boil water notices.

[1] IPART (2025) Sydney Water prices 2025-2030: Draft Report, p. 59, available at: https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Draft-Report-Review-of-prices-for-Sydney-Water-Corporation-from-1-October-2025-May-2025.PDF

We have focused our response on these topics because, as a global engineering company that helps water businesses around the world plan, build, operate and maintain water assets, we consider our deep understanding of the technical and economic considerations related to the risks to human health and the economy associated with failure of water treatment plants is relevant to IPART's prudency evaluation of the Prospect Pretreatment project.

1.3 Disclaimer

The information, statements, statistics and commentary (together the 'information') contained in this submission have been prepared by Arup from publicly available material and discussions with industry experts.

Arup has relied upon the accuracy, currency and completeness of the information sourced in the public domain and takes no responsibility for the accuracy, currency, reliability or correctness of the information and acknowledges that changes in circumstances after the time of publication may impact on the accuracy of the Information. Arup does not express an opinion as to the accuracy or completeness of the information sources used, the assumptions made by the parties that provided the information, or any conclusions reached by those parties.

2. Prospect Pre-treatment project

We have prepared a response to the following questions but limited to the Prospect Pretreatment component of the program.

1. Our draft expenditure decision excludes most of the Pretreatment Program costs ($957 million or 75% of the program costs) in the capital allowance, as the case for the program in this determination period is not strongly justified. Are you comfortable with this trade-off of costs and benefits? Or would you prefer to pay higher water prices to ensure higher water quality in exceptional or unusual events?
2. What are the respective benefits and risks associated with the proposed Pretreatment Program?

In our view, the key issue that warrants a response relates to the AtkinsRealis finding that the project is not justified due to Sydney Water avoiding issuing boil water notices during historic adverse events.

2.1 Context for response

Poor raw quality events can be caused by several climatic or human-induced factors, such as heavy rainfall (where sediment, pollutants and/or nutrients enter water sources, leading to contamination), bushfires (where debris or ash enters reservoirs, increasing organic matter and affecting water clarity), or industrial / agricultural run-off (where chemicals, fertilizers or pesticides seep into waterways, degrading water quality).

The Prospect Water Filtration Plant (WFP) is one of Sydney's largest water treatment facilities, supplying almost 85% of the city's households with clean drinking water.[2] It is integral for ensuring water quality in the Greater Sydney Region, especially during extreme weather events like storms, droughts, and bushfires. Prospect WFP has a design capacity of between 2,500 ML/day[3] and 3,000 ML/day[4] under good and high raw water quality conditions.

During poor raw quality events, the capacity of the Prospect WFP is reduced to 1,500 ML/day**Error! Bookmark not defined.** due to increased contaminants in the raw water quality. Filtration becomes more difficult due to higher turbidity and organic matter being present in the raw water that requires removal and increased backwashing of the filters.[4]

When a WFP is unable to effectively treat raw water due to a poor raw water quality event, boil water notices (BWNs) may be issued to customers. BWNs are required to notify customers to boil tap water for at least one minute before using the water to ensure public health.

Sydney Water has proposed a program of work across eight water filtration plants to include an additional stage of treatment to remove contaminants from raw water.[5]

[2] Acciona (2024) *ACCIONA awarded Sydney Water's Prospect Pre-treatment Plant Project,* available at: https://www.acciona.com.au/updates/news/acciona-awarded-sydney-water-s-prospect-pre-treatment-plant-project

[3] Sydney Water (n.d.) *Prospect Water Filtration Plant,* available at: https://www.sydneywater.com.au/content/dam/sydneywater/documents/prospect-water-filtration-plant-report.pdf

[4] Sydney Water (2025) *Review of Environmental Factors; Prospect Pre-treatment Plant Augmentation Upgrade Package* 1, Page 8.

[5] IPART (2025) Sydney Water prices 2025-2030: Draft Report, p. 71, available at: https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Draft-Report-Review-of-prices-for-Sydney-Water-Corporation-from-1-October-2025-May-2025.PDF

The Prospect Pretreatment program represents a significant proportion of Sydney Water's proposed capital program. AtkinsRealis has described the Prospect Pretreatment Program project is driven by:[7]

- Increased frequency of poor raw water quality events that impact quality, capability and supply of water.
- Flooding risk at the Prospect WFP site due to operational requirements during heavy rainfall or poor raw water quality events to maintain compliance with the Australian Drinking Water Guidelines (ADWG) on turbidity. When a filter exceeds the ADWG's turbidity specifications, the filters are required to be taken offline and undergo backwash cleaning. Prospect WFP has a limited ability to reduce or divert raw water, which increases flooding risk, and
- Expected population growth.

We note that in its Review of Environmental Factors report, Sydney Water has described the project drivers as follows:[6]

> *"The proposal addresses the following key problems:*
>
> - *Increased risk of flooding at Prospect WFP due to changes to the 2011 Australian Water Drinking Guidelines (ADWG).*
> - *Increased frequency of poor raw water quality has decreased Prospect WFP's ability to meet current and future demand.*
> - *Increased frequency of poor raw water quality limits Prospect WFPs ability to produce drinking water"*

We note that expected population growth was not described as a project driver by Sydney Water. We consider it is important for IPART to resolve this discrepancy in reported project drivers to ensure that the project is evaluated properly.

2.1.1 AtkinsRealis review and IPART Draft Report

AtkinsRealis reviewed the Prospect WFP project. It found that it cannot be classified as 'very well justified, clearly has to happen now' on the basis that:

1. Sydney Water has avoided issuing boil water notices (BWNs) during historic poor raw water quality events.
2. The assumptions contained in the project's cost benefit analysis (CBA) "lean to favouring the pre-treatment plant".[5]

The CBA assumptions AtkinsRealis has identified as favouring construction are as follows:[7]

- **Uncertainty in the probability factors used to develop the CBA:** the CBA for the Prospect Pretreatment project evaluates benefits arising from three causes for instigating a BWN (being equipment failure, capacity limitations of the existing plant and deterioration in raw water quality). The probability for any single event causing a BWN were assumed to be 21 per cent per year, which was too high to apply in the CBA. As such, Sydney Water assumed that two events had to happen concurrently to instigate a BWN.
- **Customers affected by BWN exceed the capacity of the current plant over the appraisal period:** AtkinsRealis has stated that the WFP would not have the capacity to supply the number of customers that would be affected by BWNs.
- **Population forecast is not conservative in both the base and project case:** the CBA is based on the high population growth forecast, as opposed to the expected growth forecast, which leads to an increase in the risk of BWNs being issued.

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[6] Sydney Water (2025) *Review of Environmental Factors: Prospect Pre-treatment Plant Augmentation and Upgrade- Package 1 (February 2025),* p.2, available at: https://www.sydneywater.com.au/content/dam/sydneywater/documents/Prospect-Pre-treatment-Plant.pdf

- **CBA assumes immediate operation of the pretreatment plant at full capacity:** the CBA assumes that the plant can operate at full capacity, whereas there would likely be delays at start-up if the plant was required.
- **CBA does not consider transfer of purified recycled water (PRW):** catchment-related raw water quality risks may be offset by transferring PRW into the reservoir.
- **CBA bundles a package of work:** the CBA is based on a package of work and as such, the benefits may be overstated as a significant portion of the benefits are attributable to lower cost upgrade works rather than the plant itself.

However, AtkinsRealis has acknowledged the potential benefits of the project, particularly where climate change makes poor raw water quality events more likely. As such, it has included the Prospect Pretreatment Project in the upper range but has not made an allowance for it in its lower range.[7]

IPART's draft decision is to adopt AtkinsRealis' lower range expenditure, meaning the Prospect Pretreatment project is excluded on the basis that the program is not sufficiently justified, though it recognises variability in weather conditions due to climate change has created uncertainties that will make Sydney Water's management of adverse weather events more challenging.[5]

2.2 Response to key issues

We consider that stating the Prospect Pretreatment project is not needed due to Sydney Water avoiding the need to issue BWNs in the past could establish a problematic regulatory precedent and represent outcome bias.[8]

In New South Wales safety regulations, a near-miss is defined as an unplanned event that had the potential to cause injury, illness or damage, but did not result in hard due to timeline intervention of unexpected circumstances.[9] That is, it is a 'close call': an incident where something went wrong but did not lead to serious consequences. SafeWork NSW considers dangerous incidents (often referred to as near-misses) as notifiable if they expose someone to a serious health and safety risk. Reporting near-misses helps identify hazards and prevent future accidents.[10]

In our view, Sydney Water being able to manage historic adverse events without issuing BWNs represents a near-miss incident and should be treated more as a failure of the system rather than a success.

The effects of climate change are contributing to an increase in severe and unpredictable weather patterns, particularly in relation to high intensity short-duration events which impact our water infrastructure. [11]. There is also a rising occurrence of compound events, where multiple extreme weather or climate events happen close together or simultaneously, amplifying their impact. According to CSIRO and the Bureau of Meteorology, eastern Australia has the highest level of uncertainty in rainfall projections compared to other regions in the country.[12] Climate models present a wide spectrum of possibilities for mean annual rainfall,

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[7] AtkinsRealis (2025) *IPART Sydney Water Expenditure Review: Final report for issue,* p. 216-218, available at: https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Report-by-AtkinsRealis-IPART-Sydney-Water-Expenditure-Review-2025.PDF

[8] Dillon R. L. and Tinsley C. H. (2008) *How Near Misses Influence Decision Making under Risk: A Missed Opportunity for Learning*. Management Science, 54 (8), pp. 1425-1440

[9] SafeWork NSW (n.d.) *Glossary,* available at: https://www.safework.nsw.gov.au/advice-and-resources/campaigns/easy-to-do-work-health-and-safety.1/popover-tiles-1/glossary

[10] SafeWork NSW (n.d.) *How to Report a Serious Incident*, available at: https://www.safework.nsw.gov.au/resource-library/blogs/blogs-accordions/how-to-report-a-serious-incident

[11] Doerte Jakob, Luke Osburn, Pandora Hope, Lynette Smith (2020) *Short-duration, heavy rainfall is intensifying, but not everywhere, and not all the time – A literature review.* Bureau of Meteorology Research Report p17.

[12] Federal Department of Climate Change, Energy and Environment (2017) *Module to the National Water Initiative Policy: Guidelines for Water Planning and management – considering climate change and extreme weather events in water planning and management,* page 11, available at: https://www.dcceew.gov.au/sites/default/files/sitecollectiondocuments/water/climate-change.pdf

ranging from significant declines to notable increases, with seasonal rainfall projections showing a comparable level of variability.[12]

This means that avoiding BWNs during historic adverse events is not a reliable predictor of the potential outcomes for future events.

We consider that the risk of not proceeding with the Prospect Pretreatment project cannot be robustly quantified. Not only are rainfall patterns and events increasingly unpredictable, but the risk of compounding events also means that there is the possibility that the frequency of poor water quality events that may overwhelm the WFP could increase in a short period. Deciding that a project is not prudent on the basis of a near-miss for issuing BWNs does not enable efficient capital planning that delivers acceptable levels of service for Sydney Water's customers.

In its Final Position Paper on Climate Change Expenditure Review 2023, the Queensland Competition Authority (QCA) stated that in this environment:[13]

> *" the risks of capex being ill-planned, ill-timed, not fit-for-purpose, ill-designed or made obsolete may not impact only the regulated business. They can also have implications for customers through increased costs to fund works or through disruption"*

It is crucial that capital planning reflect well-designed, fit-for-purpose, and well-timed solutions that are clearly linked to project drivers to demonstrate project need. However, we acknowledge the significant challenges associated with enabling prudent and efficient capital planning in an environment characterised by unpredictability and uncertainty. It is difficult to establish the appropriate scale and timing of significant capital works where the project need is so heavily tied to unpredictable climatic events.

The consequences of the WFP being overwhelmed, triggering Sydney Water to issue BWNs to its customers are material. They range from increased costs to consumers (through increased reliance on electricity to boil water), health effects (from not boiling water correctly and increased probability of burns) to broader economic consequences arising from having unsafe and contaminated drinking water. For Sydney Water, there are material regulatory, reputational and social license implications associated with triggering a BWN event.

We consider that the views of Sydney Water's customers are fundamental inputs to IPART's final decision, as consumers ultimately bear the costs associated with both the project proceeding (and therefore being included in pricing) and the consequences associated with the issuance of BWNs.

IPART should consider the prudency of the project applying guidance related to climate change expenditure, such as that published by the Queensland Competition Authority (QCA) or by Ofwat, the U's water services regulation authority.

The QCA's view is that its existing frameworks for evaluating prudency and efficiency remain appropriate for reviewing climate-related expenditure and has categorised climate-related expenditure into two types:[13]

1. **Adaptation:** expenditure to improve infrastructure resilience to better manage extreme weather events, and
2. **Mitigation:** expenditure related to reducing CO^2-e emissions.

It is our view that the Prospect Pretreatment project reflects adaptation expenditure because there is the potential for higher probability of issuing BWNs due to climate change, there are flooding risks associated with meeting turbidity requirements in the ADWG and an inability to divert raw water flows during high rainfall events, and population growth.

Figure 1 sets out a flowchart showing the QCA's approach to considering climate-related expenditure by category. It will review the scope of the proposal – the cost of the event occurring – as part of the prudency

[13] QCA (2023) Final Position Paper: Approach to climate change related expenditure, page 2, available at: https://www.qca.org.au/wp-content/uploads/2023/09/qca-climate-change-final-position-paper-september-2023.pdf

and efficiency review of projects. Other considerations include whether the proposed solution addresses the drivers and whether the costs of construction are efficient.

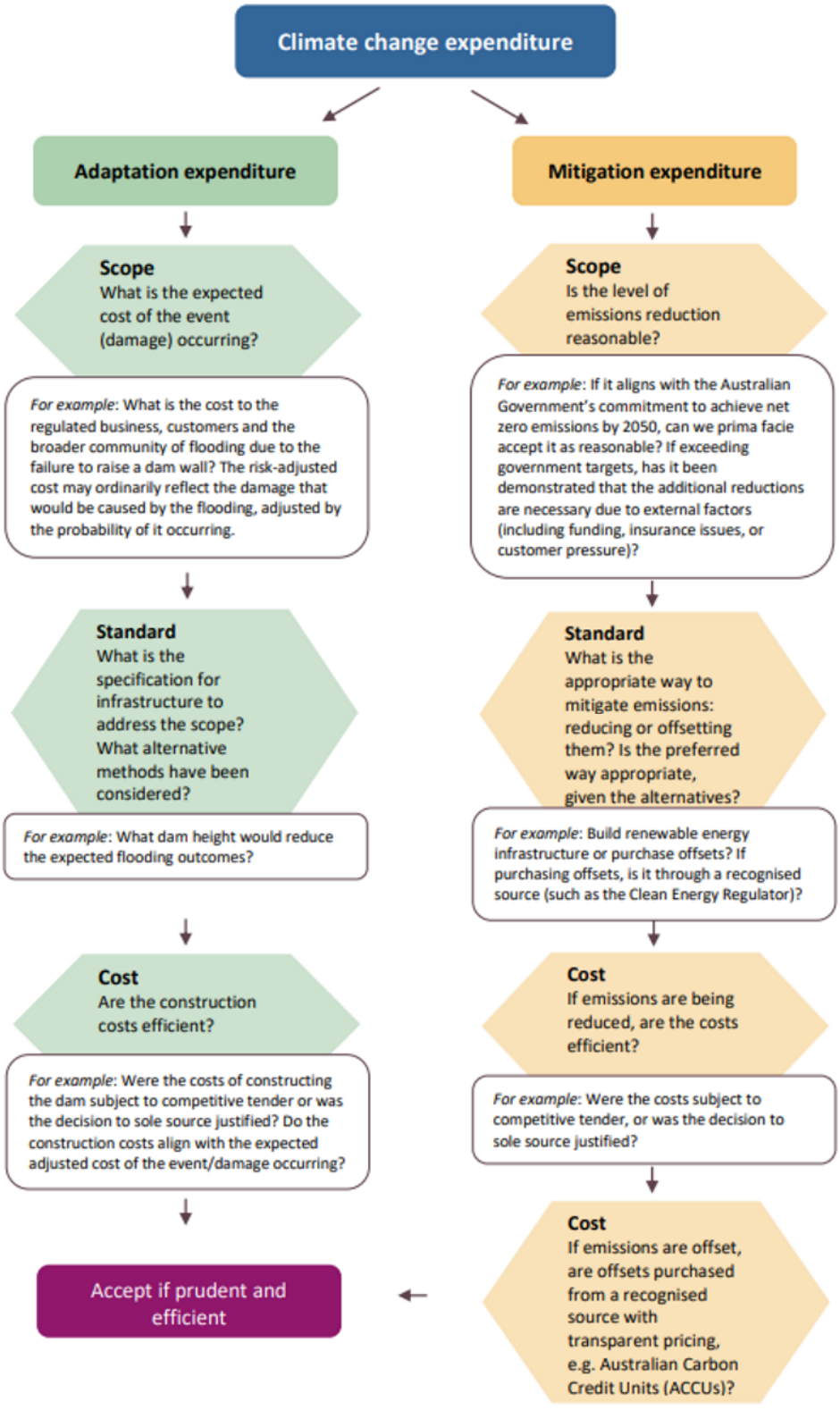

Figure 1: QCA's flowchart for assessing prudency and efficiency of climate expenditure[13]

Similarly in the UK, Ofwat recognised the significant challenges faced by water utilities in adapting to climate change, addressing the issue as far back as their 2009 review.[14] Ofwat recently released their 4th Climate Adaptation Report with objective of maintaining a regulatory framework that:[15]

> "*enables water companies to effectively and efficiently carry out their functions for customers and the environment, including adapting to the risks of climate change, and to hold companies to account if they fail to meet obligations [we] are responsible for enforcing".*

We note too the extensive guidance provided by the UK Environment Agency (supported by the UK Water Industry Research) to assess and manage risk and uncertainty related to the impact of climate change in developing water resource management plans.[16]

The provision of detailed guidance, and the consistent application of a water resource management plan framework across all the Environmental Agency regulated water utilities, has resulted in the evolution of mature, complex and sophisticated Monte Carlo modelling which is used in assessing headroom uncertainty and risk.[17]

We were unable to identify a similar regulatory function or framework in Australia. Arguably such an approach would offer a sophisticated and evidenced-based analysis of the risk we are facing to our water supplies (both quantity and quality). It would also minimise human tendency towards normalisation of deviance and outcome bias.[18]

We encourage IPART to consider the frameworks and guidance provided by other economic and technical regulators in considering the climatic risks that underpin the infrastructure planning effort associated with the Prospect Pretreatment project.

We appreciate the opportunity to make this submission and hope that our comments are received as constructive and helpful.

[14] Ofwat (2009). *Preparing for the future - Ofwat's climate change policy statement*, p.5., available at: https://www.ofwat.gov.uk/wp-content/uploads/2015/10/pap_pos_climatechange.pdf

[15] Ofwat (2025) *Ofwat's Fourth Climate Adaptation Report,* p.2, available at: https://www.ofwat.gov.uk/wp-content/uploads/2025/02/Ofwats-4th-Climate-Adaptation-Report.pdf#:~:text=As%20the%20economic%20regulator%20of%20the%20water%20sector,to%20meet%20obligations%20we%20are%20responsible%20for%20enforcing.

[16] GOV.UK (2023) *Guidance: Water resources planning guideline,* available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline#section-7--allowing-for-uncertainty

[17] UK Water Industry Research (2019) WRMP 2019 Methods – Risked Based Planning, pp.95-96, available at: https://ukwir.org/reports/16-WR-02-11/151120/WRMP-2019-Methods--Risk-Based-Planning

[18] Sean Brady (2013) *Near-misses and failure (part 1)*. The Structural Engineer volume 91, Issue 8 2013, pp 34-35, available at: https://www.istructe.org/journal/volumes/volume-91-(2013)/issue-8/near-misses-and-failure-(part-1)/