Asset Health Cost Change 2026

Asset Health Business Case: Protecting Rapid Gravity Filters

UUW26-12

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United Utilities

Water for the North West

Executive Summary

United Utilities Water (UUW) welcomes Ofwat's consideration of evidence-based proposals for additional asset health investment, focused on priority assets identified in the Roadmap for Enhancing Asset Health Understanding in the Water Sector.

Description

This case, which is a standard – single main submission, sets out our plans for additional investment to accelerate the remediation of structural aspects of Rapid Gravity Filters (RGFs) at five Water Treatment Works with a total totex claim of £17.9m (net of repair savings) to prevent the erosion of treatment headroom and to reduce the risk of expensive, disruptive and reactive remedial work.

The evidence and analysis presented in this case demonstrates that a step change in investment is needed now to deliver the most cost effective, whole life cost, long term plan to safeguard asset health and prevent unsustainable deterioration that will impact service and cost over the long term. The need for this investment has arisen through the identification and escalation of asset health risks via our established asset and operational risk management processes, including Drinking Water Safety Plan risk assessments.

An RGF traditionally removes suspended sediment by passing untreated or partially treated water downwards through either mineral or carbon media, utilising gravity. Once the media has become saturated with removed sediment, it is cleaned by ejecting water and air from the floor, back up through the media to dislodge captured sediment. The dirty water is then removed through the backwash system inherent to the RGF. Over time the filter media may become saturated with contaminants, requiring the filter to be periodically taken out of service, and the media replaced. The investment case covers two types of intervention:

- **Overall concrete remediation**. This typically comprises significant maintenance of the tank's concrete structure as required; and,
- **Floor refurbishment**. This includes replacement of the filter flooring where backwash pipework and nozzles have started to fail. The scope is likely to include replacement of the plenum floor, replacement or renewal of media and replacement of the pipework and nozzles.

Our proposal is consistent with our asset class strategy and complementary but distinct from our existing AMP8 plan. It comprises a defined and deliverable programme of refurbishment and renewal where base expenditure is no longer sufficient to meet long-term water quality, resilience and safety requirements cost effectively.

Asset Class Strategy Vision

- **We will deliver a reliable and resilient supply of potable drinking water** meeting all statutory water quality commitments whilst ensuring customer acceptability focussed on taste, smell and appearance.
- **We will maximise the asset life of Rapid Gravity Filters** (RGFs) through targeted refurbishment and where asset design lives have been exceeded, deliver asset renewals.
- **We will use an asset data driven approach to risk management** to focus on long-term resilient solutions to ensure long-term structural integrity of assets.
- **We will deliver a step-change in the asset health of Rapid Gravity Filters** on United Utilities water treatment works, building on increased levels of investment.

Need

UUW operates 483 RGFs across 41 water treatment sites, of varying sizes and media content, treating around 93% of the water that is provided to customers. A significant proportion of these assets, like much of the company's asset base, were installed prior to 1970, and will be operating past their original design life within the current AMP.

As our asset base ages, performance data and regular inspections start to show evidence of deterioration across various aspects of the assets, often requiring significant reactive interventions, thereby eliminating our in-built protection to production capacity, increasing the consequence of any further failure. Completing refurbishment work prior to reaching the unacceptable threshold of deterioration reduces the risk held by these aging assets. The risk is increasing faster than can be managed through our base allowances so this proposal outlines the steps we plan to mitigate this.

What Base Buys

Our AMP8 base programme is actively prioritised and focused on managing immediate risks across our water treatment works (WTW). However, evidence shows that for this asset class, while base expenditure continues to manage immediate risks, funding is increasingly utilised for reactive, short-term interventions that maintain operability, but do not restore long-term asset health. Without additional proactive intervention, non-linear deterioration of critical civil element will continue, increasing both the likelihood and consequence of failure, resulting in higher long-term costs to customers and greater environmental risk.

Ofwat's implicit base allowance for RGFs in AMP8 is calculated as £8.5m, based on the industry-derived PR24 methodology. In contrast, UUW historically spent around £37m per AMP on RGFs on average over AMP6 and AMP7, reflecting reactive catch-up and asset ageing. AMP8 base funding is driven by the following two components which are both higher-priority regulatory and water-quality drivers:

- Granular Activated Carbon (GAC) media replacement; and,
- End to end refurbishment at a collection of water treatment works built early post-privatisation. These sites were all built over a short period of time and have deteriorated together, and this investment is absorbing a significant proportion of the planned base maintenance programme for AMP8.

This leaves insufficient headroom to address structural RGF risks. The business case therefore proposes only the incremental funding required above the industry-defined implicit allowance ensuring no double-funding.

Benefits of additional investment

Customer research shows that customers expect companies to prioritise safety, service reliability and regulatory compliance. The primary benefit of the proposed investment is to progress towards sustainable health of this critical asset class which will continue to safeguard the quality and resilience of supply to customers. By refurbishing ageing filter floors and concrete structures, the programme reduces the risk of failure, protects peak-week production capacity and restores throughput at several of the region's largest works.

This improves water-quality performance by addressing issues such as underdrain damage, poor scour patterns and declining media effectiveness. It also enhances Health & Safety by replacing deteriorated structures that currently require intrusive and reactive maintenance. Crucially, proactive refurbishment avoids the far higher cost, disruption and environmental impact of emergency failures, delivering strong whole-life value and ensuring long-term service continuity for customers. The case also demonstrates that the current condition of a small number of our RGF sites requires this investment to prevent the erosion of treatment headroom and to reduce the risk of expensive and disruptive reactive repairs. This headroom is necessary to protect the security of supply for customers in the North West.

Cost efficiency and best option for customers

Efficiency has been embedded through disciplined scope control, external benchmarking of our estimates against third party comparable costs, targeted intervention selection, and use of established AMP8 delivery models consistent with our PR24 approach and asset strategy. Customer protection is provided through output-based Price Control Deliverables (PCDs), ensuring that customers only fund efficiently delivered outcomes.

This business case represents a proportionate, evidence-led, and low-regret response to material and accelerating asset health risks, consistent with Ofwat's expectations and with customer preferences for proactive maintenance that protects the environment, service reliability, and long-term value for money.

This case aligns with our strategic objectives of ensuring a reliable, wholesome water supply to customers in the North West of England, whilst playing our part in the national water supply by providing resources to support other regions of the country including future water resource options.

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1. Introduction

This business case, which is a standard – single main submission, proposes to address deterioration across the structural components of Rapid Gravity Filters (RGFs) at five Water Treatment Works. The 44 filters in scope represent around 9% of UUW's total RGF fleet but include some of the [✂]. RGFs provide around 93% of regional treatment capacity, making their reliability essential to maintaining production headroom and safeguarding drinking water quality.

Our proposal outlines a programme of structural and floor refurbishments where asset age, condition surveys and failure history show that the risk profile has escalated beyond what base maintenance funding can help manage.

1.1 What the investment will involve

1.1.1 RGFs are a key function in the water treatment process, removing suspended sediment from either untreated or partially treated water. Depending on the source and quality of the water, this may be preceded by a clarification stage to aid the filtration. The water is passed downwards through either mineral, carbon, or hybrid media, utilising the gravity of the water in the top of the filter. After the media has become saturated with filtered out sediment, the media goes through a cleaning process (backwashing), whereby nozzles in the floor eject clean water and air, separately and combined, to scour the media and remove the captured sediment. This dirty water is then removed from the filter structure using weirs and valves contained within the RGF.

1.1.2 Over time, the media may lose efficiency when filtering, requiring more frequent backwashes, often when the media is saturated with contaminants. When this occurs, the filter will need to be removed from service, and the media replaced, regaining efficiency.

1.1.3 This case has been developed to address identified shortfalls in the structural aspects of our RGFs. In addition to our base programme for AMP8, the scope of this business case covers two broad intervention categories.

- Overall concrete remediation: Returning RGF filter bodies to a suitable structural integrity. For 3 of the identified sites overall evidence of concrete deterioration has led to poor structural integrity, putting at risk the continued operation of these assets. We plan to deliver a programme of structural remediation, including media renewal for a further 23 filters in addition to our base investment programme.
- Floor refurbishment: Replacing the filter floors, nozzles, pipework and filter media. Where filters in a bank were constructed at the same time, with the same materials and have had the same utilisation pattern as filters that have started to evidence floor failure we have identified these for proactive remediation. We plan to deliver a programme of floor remediation for a further 21 filters in addition to our base investment programme.

1.1.4 RGFs with either traditional mineral media, with Granular Activated Carbon (GAC) or with hybrid media provide approximately 93% of our total treatment capacity. These are supplemented by a small number of pressure filters, membrane filters and a very few unfiltered groundwater sources. RGFs therefore provide the primary backbone of our treatment capacity to provide sustainable water supplies to customers in the North West. It is essential that we continue to manage the health of these assets and to prevent gradual degradation and erosion of headroom.

1.1.5 Effective structural refurbishment extends the residual life of an asset. Widespread industry experience indicates that the performance of a filter deteriorates with age; hence a regular refurbishment programme (including media replacement) can restore and maintain the original performance.

1.2 Where we are planning to invest

1.2.1 Using operational intelligence and corporate systems, we collated an unconstrained list of sites where we identified known risks with the RGFs. These risks were categorised according to their root issue, and assessed against three main criticality conditions: service, environment and high cost. We progressed all sites where the identified risk meets the criticality assessment.

1.2.2 We then addressed the deliverability, considering the base funded asset health investment on other parts of the treatment process. The work includes filters at both [✂]Planning large scale outages for these sites is challenging and typically requires multi-year programmes of enabling activities. However, we have recent experience of the required remediation work at [✂] during AMP7, and have working practices that do not require site-wide outages, rather a cell-by-cell programme of work. [✂] has existing outages planned towards the end of the AMP8 period that we intend to leverage to support delivery of this programme. We have therefore selected sites where we can credibly plan to complete the work during the AMP8 period, albeit under a challenging schedule.

1.2.3 A summary of the selection process is provided in Figure 2.

Candidate sites

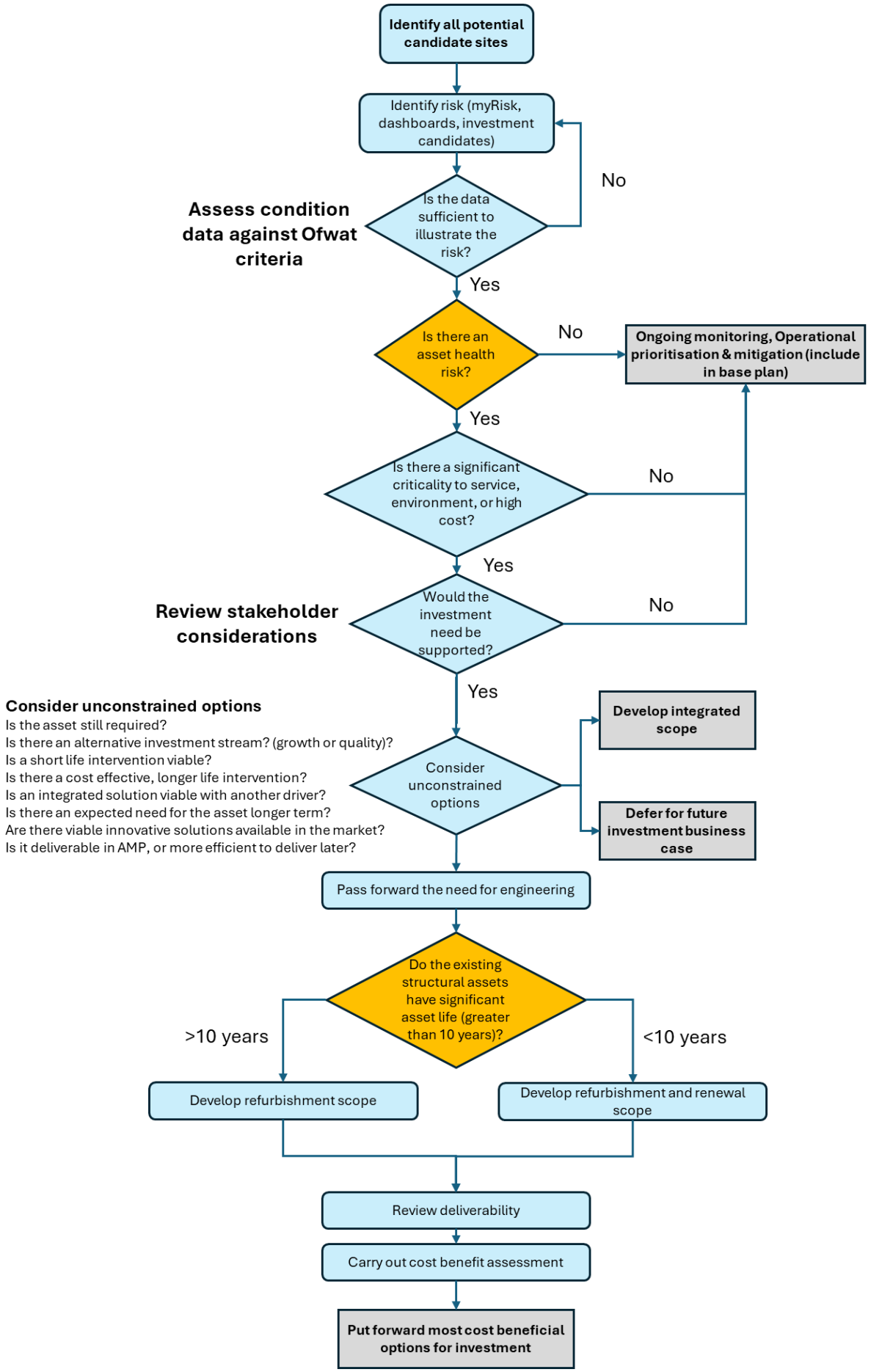
1.2.4 We are planning to invest at RGF remedials at five WTWs in addition to our base programme. We have identified 44 RGF filters within the proposed programme, this is approximately 9% of our operational filters.

1.2.5 Figure 1 indicates the geographical location of the sites alongside the work that we have included within the planned programme. Further details of specific sites are provided in Section 10.

Figure 1: Map of planned Rapid gravity filter programme

Source: UUW analysis

Figure 2: Asset health optioneering process



Source: UUW analysis

1.3 Regional and site factors

1.3.1 The programme of work proposed in this business case will be delivered alongside the existing AMP8 programme. The outages associated with working on core process assets at our two largest works, [✂]will require judicious planning. The remaining works in the programme will typically be able to be carried out under our permitted development rights.

1.3.2 There are two sites that have been identified as requiring investment on the filters through asset health requirements, but due to current ongoing investment funded through base projects on these sites, deliverability is a significant concern. We plan to address these sites in the AMP9 program. These sites are discussed further in Section 10 Site Specific Cases.

2. Guide to evidence

Table 1 below highlights where the key evidential components of our case are located within the document. It is designed to help readers easily navigate to the supporting information that underpins our assessment and justification. It also provides clarity on which key evidential requirements our document is focused on.

2.1 Asset health document signposting

Table 1: Signposting to key sections of document

Assessment area	Key requirements	Section reference
Need for step change in investment	Historical investment and asset management approach	3.5 and 3.6
	'What base buys' assessment	4
	Asset health risk to service environment	3.1
	Future asset health and risk	3.2
	Aligned long-term strategies	3.5
	Stakeholder engagement	5.5
Best option for customers	Unconstrained credible options	5.2
	Our proposed solutions	5.3
	Benefits versus the current position	5.4 and 0
	Customer engagement on options	5.5
Robust and efficient costs	Costing methodology for option and solution costs	6.1
	Efficient option and solution costs and good industry practice	6.2
	Cost benchmarking	6.2
	Solution costs	6.1
Customer protection	PR24 base expenditure plan	3.5 and 0
	Investment proposed in this cost-change	0
Investment delivery plans	Design and delivery risks log	8.2
	Aligned long-term asset strategies	3.5
	Stakeholder and supply chain engagement in delivery plan	8.1 and 8.5
	AMP8 investment delivery is on track	8.4
	Outline delivery schedule	8.3

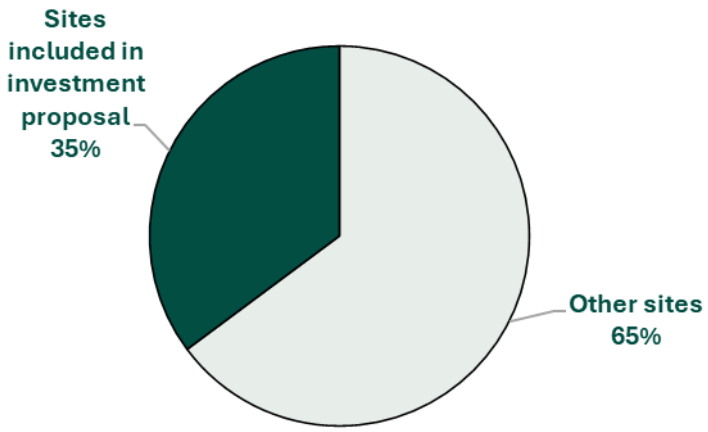
3. Need for a step change in investment

RGFs are now a mature asset class with a significant number of 'life expired' assets. Many were built in the 1950s–1970s, with a nominal 60-year design life; 86 filters already exceed this, and a further 67 will do so during AMP8. Evidence shows escalating structural degradation (concrete spalling, floor failure, underdrain damage) and increasing operational impact. Without the proposed additional investment, the base programme cannot prevent a rising number of failures across the backbone of the region's treatment capacity.

3.1 Risks mitigated by the investment

3.1.1 Our proposed investment through this business case relates to major refurbishments for either RGF filter floors or filter tanks. The main risk these interventions are aiming to address relate to the loss of security of supply and headroom. As shown below in Figure 3, the five sites included within this proposal cumulatively provide 35% of the water supplied by UUW.

Figure 3: Water treatment works outputs of sites included within this proposal compared to UUW's total regional supply



Source: UUW analysis

3.1.2 Whilst redundancy is currently built in the overall filter capacity of our supply system (i.e. provisions are made for allowing one filter out for repair and one filter out for backwashing), the strategic importance of these works from a water supply perspective provide a sound basis for prioritisation of investment.

3.1.3 It is also important to ensure the condition of these assets is maintained as their age increases. Degradation of structural condition can have a gradual impact upon the throughput of the filters, thereby increasing the risk of a supply shortfall, especially during peak demand events. Returning throughput towards the maximum operational limit is a key benefit associated with the renewal proposals.

3.2 How the risks are changing

3.2.1 A growing number of our RGF asset base is now entering its end of asset life stage. As we enter AMP8 these works will be key in maintaining supply demand balance in the region especially during periods of peak week demand. The increasing age of these assets creates a risk of possible failure of a filter which would in turn result in reduced efficiency and throughput of the remaining filters. The most cost effective way to maintain appropriate levels of security of supply is to maximise the throughput of existing assets.

3.2.2 This is also important to accommodate the localised growth predicted in parts of our supply area. Increased growth in the northwest region puts more demand onto our current assets. With 93% of our treatment capacity going through RGFs, most growth will impact their usage.

3.2.3 These two factors along with additional pressures such as changing environmental water quality create the need for improving the health of the assets as much as possible to ensure they are ready to perform their function and withstand possible failure modes.

3.3 Why this is the right time to invest

3.3.1 Base maintenance allowances covers all asset types and is prioritised on an asset health and performance basis and is balanced against other business priorities and regulatory requirements. This approach means that investment the filters asset class can fluctuate over time. As our AMP8 programme is focussing on GAC media replacement and end to end refurbishment at a collection of water treatment works built early post-privatisation, these allowances will allow refurbishment at a growing number of our RGF asset base now entering its end of asset life.

3.3.2 As discussed in Section 1.1, RGFs provide the primary backbone of our capacity to provide sustainable water supplies to customers in the North West. Many were built in the 1950s–1970s, with a nominal 60 year design life; 86 filters already exceed this, and a further 67 will do so during AMP8. These filters which comprise either traditional mineral media, GAC or hybrid media provide approximately 93% of our total treatment capacity. It is therefore critical that we maintain the health of these assets to provide reliable services to customers. Our AMP8 programme includes two schemes of works associated with RGFs, which focus on GAC media replacement, and investment at a collection of water treatment works built early post-privatisation.

3.3.3 Our historical investment on RGFs has mainly been driven by reactive investment as assets failed. However, we recognise that our RGF asset base is ageing, and requires proactive management in order to ensure continuity of supplies for customers.

3.3.4 Table 2 illustrates the increasing age of the assets which have a design life of 60 years. As can be seen below, a large number of our RGFs that we are putting forward for investment are close to reaching their end of asset life.

Table 2: Construction year of RGFs at sites included in this business case

Site	Stage	Constructed	Number of filters included in proposal	In scope?	
				Walls	Floor
[✂]	First	c1960	15	No	Yes
[✂]	First	c1969	5	Yes	No
[✂]	First	C1958	6	No	Yes
[✂]	First	c1973	10	Yes	No
[✂]	First (1-4)	c1960	8	Yes	No
	First (5-8)	c1977		Yes	No

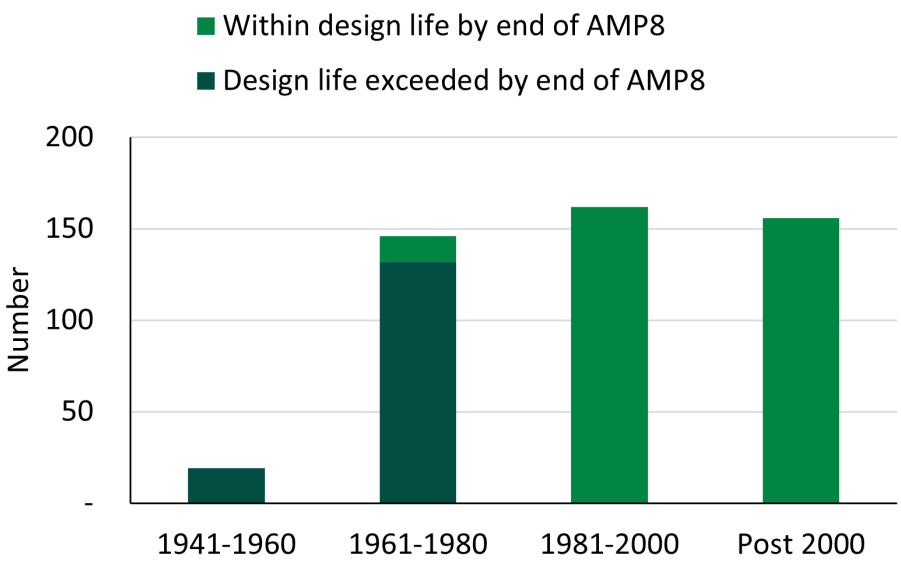
Source: UUW analysis

3.3.5 We are looking to invest now so that we can ensure a reliable throughput from some of our key treatment sites, as we see an increasing number of assets exceeding their design life.

3.3.6 The investment proposal supplements our existing investment programme for AMP8, addressed below (Section 3.5) which focusses on end-to-end process refurbishment and media replacement.

3.3.7 As can be seen in Figure 4 below, a large number of filters constructed in the 1950s and 1960s are now approaching or are already exceeding their asset life. With the design life of a RGF being 60 years, we have 86 filters that already exceed this, and a further 67 that will exceed this in the current AMP.

Figure 4: Profile of construction year of UUW RGF asset base



Source: UUW analysis

3.3.8 In addition to asset age, there are other drivers that could have an impact on the asset base. In particular, the population has grown by 8.6% since 2002 and around an additional one million people are forecast to live in the North West region by 2050, increasing demand for water services.

3.3.9 Our asset class strategy for RGFs has been developed to address identified shortfalls in the structural aspects of our RGFs and supports the business' risk-based approach and the need for a step change in investment accounting for the impact of maturing risks like climate change and emerging chemicals. It aligns with our long-term strategy to invest in our RGFs as appropriate mitigation to water quality risks and changing environmental water quality and this may require changes to operation of RGFs, including new media options and backwash frequencies.

3.3.10 Our aim is therefore to enhance asset resilience, reducing exposure to risk and the potential impact on customers.

3.4 Evidence of deterioration

3.4.1 The base asset health dashboard for RGFs indicates a profile of a mature asset base which has recently received a mix of renewal and refurbishment. Much of the mechanical and electrical aspects of these assets are mid-life, with many of the civil and structural assets aging, and in some instances exceeding their design life. There are therefore substantial and ongoing maintenance needs; on average, work associated with RGFs required six outages a month at water treatment works in AMP7. By refurbishing old and obsolete structures, we plan to reduce the risk of failure and the associated health and safety risks.

3.4.2 To provide further evidence Figure 5 on the following page shows three views of UUW's asset health dashboard:

- Scenario A projects the baseline position with no proactive or reactive capital investment; most of this asset base will exceed its design life within 30 years;
- Scenario B is a forecast with our existing AMP8 investment profile. Our plan addresses the most pressing needs so substantially fewer assets are at the end of their end of life. However, there remains an aging asset base shown by an upward trend with more assets in the upper range over successive times steps; and,
- Scenario C shows the impact from the proposed investment. The trend shows marked reduction in both the risk position and the proportion of structural assets coming to the end of life within the 30 year forecast window.

3.4.3 Further details explaining how the base asset health dashboard works are included in Appendix B Base Asset Health Dashboard Risk Forecasting.

Figure 5 Scenario A – Asset health profile with no investment in rapid gravity filters; Scenario B – Forecasted asset health profile with AMP8 investment and Scenario C – Forecasted asset health profile with AMP8 investment and this business case

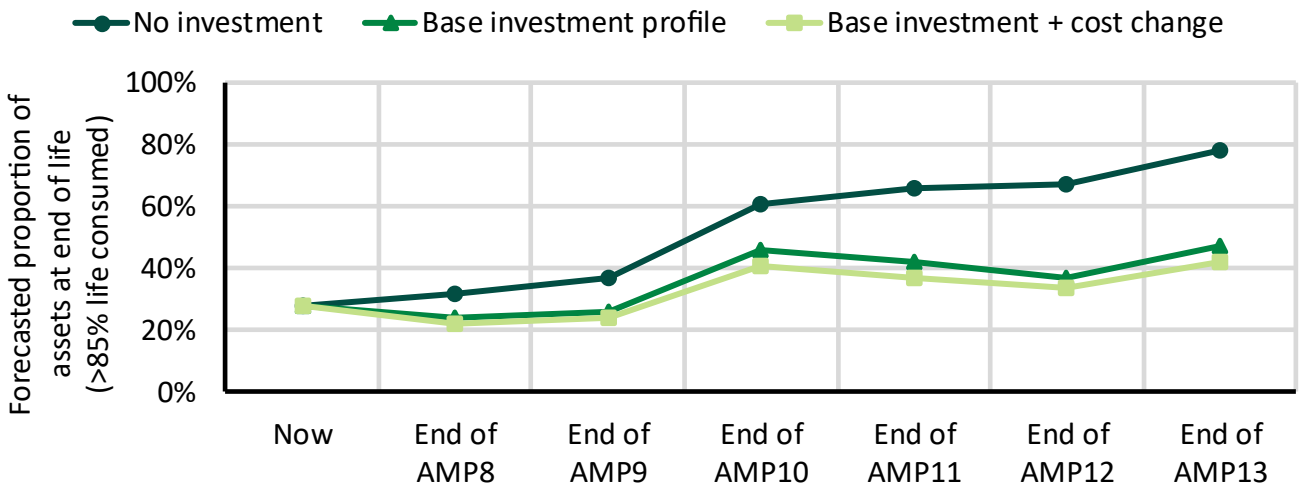
Source: UUW analysis (Base Asset Health profile dashboards)

3.4.4 Figure 6 below summarises the dashboard outputs shown above and displays how the proportion of rapid gravity filters at the end of their lives changes over time in each of the three scenarios. With no base investment, the impact of proportion of assets through the end of life will significantly increase, becoming a majority between 2035-2040, and continuing on an upward trend from there onwards.

3.4.5 With the base maintenance programme investment (Scenario B), this proportion is significantly reduced, not reaching a majority by 2055. The trend somewhat stabilises through 2040-2050, however sees another significant increase in the period 2050-2055. The impact of the AMP8 asset health investment shows a further 10% reduction in the assets that are at their end of life, maintaining a much greater stable position.

3.4.6 As this step change in investment continues into further AMPs, this gap will only continue to grow.

Figure 6: A line chart comparing the three scenarios highlighted in Figure 4 and Figure 5, highlighting the proportion of assets considered at the end of their life



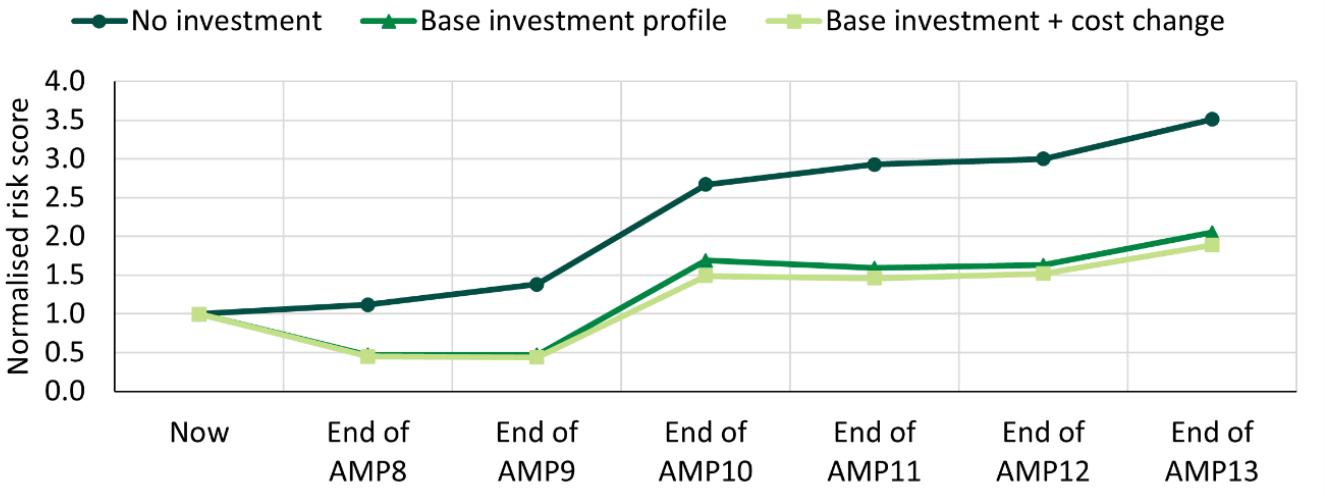
Source: UUW analysis

3.4.7 Figure 7 on the next page summarises the modelling effects of our investment proposal on RGF assets as a normalised risk profile to the current level of risk outputs into a single chart showing the proportion of assets at the end of life over time. This shows that base maintenance significantly reduces the risk to around half through to 2035. After this, the risk score increases to higher than we are currently, part way through AMP9.

3.4.8 Under our proposed asset health investment, the risk doesn't increase as much. However, this shows that we need to maintain the step change in investment to maintain the reduction in risk. A detailed build-up of the normalised risk trend scores is provided in Table 19 and Table 20.

3.4.9 There are also system benefits that are not accounted for by modelling on an individual asset basis. The impact on system capability, operational resources and maintenance capabilities grows exponentially as the proportion of assets at the end of life increases. This means that the investment proposed in this case has compound benefits enabling more effective and efficient maintenance in the long-term.

Figure 7: A line chart comparing how the risk score would change through future AMPs based on the three scenarios discussed, normalised to current risk



Source: UUW analysis

3.5 Our existing strategy and base programme

What Base Buys

3.5.1 The implicitly funded PR24 base expenditure for RGFs is £8.5m, as discussed in *Section 4*.

What we expect to spend in AMP8

3.5.2 In line with our approach to other asset classes, UUW operates both a proactive and reactive approach to asset health maintenance for filters. This is aligned with our asset class strategy which aims to:

- Maintain and refurbish assets through their designed life;
- Facilitate safe operation of the asset base;
- Facilitate proactive inspection and maintenance of the asset base (including media and backwashing);
- Improve operational resilience and efficiency of the assets;
- Investment to maintain a robust barrier from emerging water quality risks; and,
- Investment into supporting structures to improve efficiency and safety.

3.5.3 We initiated a programme of filter floor remedials in AMP6 as earlier multi-stage works were starting to develop individual filter cell failures. In AMP7 we undertook capital project on filters at 23 WTW sites. This included a mixture of planned and reactive projects. In addition, in AMP7 we undertook periodic GAC regeneration when necessary – across our 12 WTW sites with RGFs equipped with GAC filtration media. Finally, we pro-actively upgraded traditional filter media to GAC at an additional five WTW sites.

3.5.4 In the AMP8 base funded maintenance programme we have two schemes of works associate with RGFs, which focus on:

- Granular Activated Carbon (GAC) media replacement. We plan to regenerate GAC at WTW sites currently equipped with GAC, plus the pro-active installation of GAC at additional sites where required; and,
- End to end refurbishment at a collection of water treatment works built early post-privatisation. These sites were all built over a short period of time and have deteriorated together, and this investment is absorbing a significant proportion of the planned base maintenance programme for AMP8. The RGF funding is a proportion of this total cost (approximately 40%).

3.5.5 Regular operational inspections and inter-stage water quality sampling form the backbone of our asset health investigations. Where an asset health intervention is identified, further base funding is allocated to support this intervention. Base funded interventions are balanced against other business priorities and regulatory requirements. UUW has a number of prioritisation processes available to facilitate decisions around asset health interventions. These include:

- HAZREV – Process for pro-active prioritisation of base funded interventions where poor asset health poses a risk to drinking water quality.
- Corrective intervention – Reactive base funded maintenance where assets have failed or are clearly underperforming.

3.5.6 In our AMP8 programme we have allocated base funding to cover GAC media replacement and end to end refurbishment at a collection of water treatment works built early post-privatisation. Our existing expenditure on proactive interventions will be ringfenced through a base expenditure PCD in line with the aggregate what base buys figure across the relevant asset classes. Further details of our analysis of what base buys is contained within Section 4, and the detail of our proposed base expenditure PCD is set out in Section 7.

3.5.7 Our expenditure on RGF refurbishments and replacements over the 2014-15 to 2024-25 period was an average of £37m per AMP; therefore we have a strong track record of investing in our RGF assets and are confident that we will spend our implicit allowance for RGFs.

Risk Management

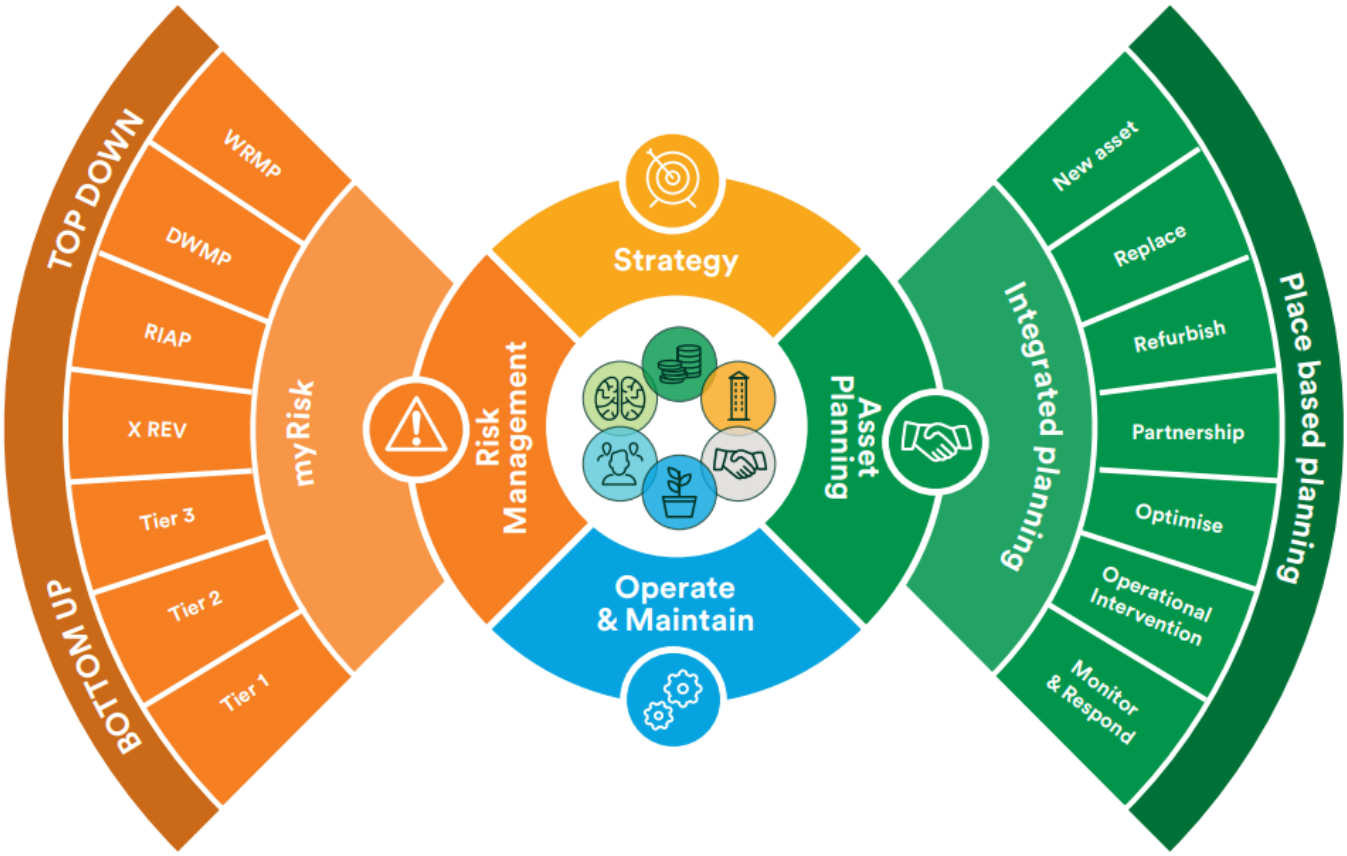
Risk identification, assessment and escalation

3.5.8 We manage operational and asset health risks through an enterprise-wide risk management framework that provides a clear golden thread from asset-level risk identification to Board-level oversight. This is delivered through our Risk and Asset Planning (RAP) process, as set out in our Strategic Asset Management Plan (SAMP), and was assessed by Ofwat through the PR24 Final Determination and AMMA processes.

3.5.9 Operational risks are identified at asset and site level through routine condition assessments, performance monitoring and operational experience. These risks are recorded in myRisk, United Utilities' corporate risk management system, which assesses likelihood and consequence across safety, environmental, service and financial dimensions. Risks are scored against defined criteria and supported by documented controls and mitigation actions. Where risks exceed tolerance thresholds, they are escalated through formal governance routes for prioritisation and intervention.

3.5.10 An illustration of this approach is in Figure 8 below.

Figure 8: Risk and Asset Planning bowtie diagram



Source: UUW analysis

Integration with corporate risk governance

3.5.11 The myRisk system operates as the bottom-up risk capture mechanism and is fully integrated with our wider corporate risk framework. Operational risks recorded in myRisk are aggregated and reviewed through regular six-monthly risk review cycles, informing the strategic risks managed through our corporate risk system. This ensures alignment between operational reality and corporate risk appetite, enabling informed decision-making on investment prioritisation and risk trade-offs at both executive and Board level.

3.5.12 This integrated approach ensures that asset health risks are not considered in isolation, but alongside other material business risks, including regulatory compliance, environmental performance, health and safety, and resilience to climate change. The framework enables the company to identify where reliance on reactive or temporary controls is increasing, signalling the point at which proactive capital intervention represents the most efficient and lowest-regret response.

Alignment with asset management standards and PR24 commitments

3.5.13 Our risk management approach is embedded within our ISO 55001:2024 certified Asset Management System and is set out in our SAMP. The SAMP defines how risks are identified, evaluated, escalated and mitigated across the asset lifecycle, linking long-term strategic objectives to short-term operational decision-making. This framework underpins the company's AMP8 asset health and resilience strategy and provides assurance that investment decisions are evidence-led, proportionate and targeted at the highest-risk assets.

3.5.14 As described in Chapter 7 of our PR24 submission[1], we use asset risk modelling, operational risk management processes and structured assurance to manage current and emerging asset health risks.

[1] *UU PR24 Submission, Chapter 7, Section 7.6: UUW07 Chapter 7 Resilience and asset health*

However, where deterioration becomes non-linear and constrains safe operation or maintainability, the effectiveness of operational controls reduces and reliance on reactive intervention increases. In these circumstances, proactive capital investment is required to restore risk to tolerable levels and maintain alignment with the company's stated risk appetite.

Proactive risk management

3.5.15 We work to avoid disruption that negatively impacts customers or the environment now and in the future. We do this by proactively managing risk associated with our assets, systems and processes, with control and mitigation focusing on preventing or limiting problems, while maintaining the capacity to respond effectively.

3.5.16 Many of our proactive risk management capabilities cut across multiple operational risks. More detail of our approach to risk management can be found in chapter 7 of our main PR24 submission, including details on asset risk modelling, managing operational risks, and our approach to asset health.

3.6 Our historical investment

3.6.1 Our RGF investment in recent AMPs has been focused around managing and improving resilience of our supply system understanding the condition and performance of our assets maintaining the reliability of our assets.

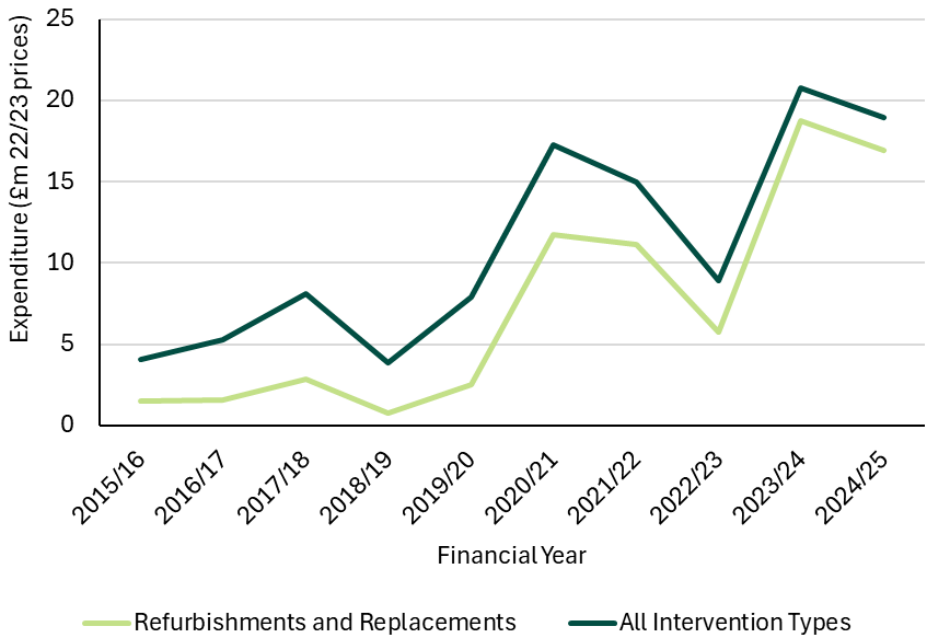
3.6.2 Our approach to maintenance of RGFs historically has been primarily focused on media replacement and prolonging asset life, with some instances of renewals at some of our older sites where required. The component of the RGF with the most operational stress is the media, requiring regular washing and eventual recharge/new media. This crucial programme of works requires regular base investment, prolonging whole asset life, and has often been prioritised over structural refurbishment, except in cases of failure. This step-change in investment will allow us to invest in structural refurbishment alongside the ongoing media replacement programmes.

3.6.3 Our historical investment activity has included:

- **Refurbishment** across 136 filters, including floor refurbishment, concrete remediation and valve replacement;
- **Replacement** of 20 filters across several sites; and,
- **26,221 repairs**, including at some of the sites putting forward in this business case, typically as reactive works affecting sufficiency of supply.

3.6.4 Figure 9 below presents the historic spend profile over the period from 2015-16 to 2024-25. We have spent around £105m across the asset base, with £73m being allocated specifically to refurbishments and replacements. These intervention types have increased over time, highlighting an ongoing trend towards proactive investment.

Figure 9: Rapid gravity filter legacy expenditure[2]



Source: UUW analysis

[2] Ofwat (2026). Sector workload and expenditure dataset v2 – for circulation.

4. Determining What base buys (WBB)

This section explains how much investment is already assumed to be funded through base allowances, and how the additional investment proposed ensures that customers are not paying twice.

4.1 Purpose of WBB

4.1.1 WBB represents the level of investment in asset maintenance and renewal that Ofwat assumes to be implicitly funded through PR24 base expenditure allowances. We calculate WBB to ensure that our investment proposals are not duplicative of those allowances and, therefore, represent genuine additional investment that has not been previously funded.

4.1.2 In developing asset health investment proposals, any additional health investment proposed through the cost change process should reflect the true incremental investment above and beyond WBB. This is informed by an assessment of the capital maintenance activity planned for each relevant asset class in AMP8, and an evaluation of the extent to which this activity can reasonably be delivered within existing base allowances.

4.1.3 The value of the cost change claim therefore comprises of the incremental investment proposed net of our implicit allowance (WBB) This supports transparency and ensures that customers are not paying twice for the same investment.

4.2 Limitations of WBB

4.2.1 It is important to note that at PR24 Ofwat set allowances across the entire asset base. Under the current totex-based regime, companies are given discretion to allocate base allowances across their asset base in line with efficient operational priorities, rather than to deliver predefined levels of investment in each specific asset classes.

4.2.2 As a consequence, there is no established approach to estimating WBB for specific asset classes. It is therefore important to recognise the limits of any mechanistic approach used to assess WBB for individual asset classes. Importantly, Ofwat has acknowledged that "there is no perfect way to determine what base buys"[3].

4.2.3 Assessing WBB *ex-post* after the Final Determination for specific asset classes requires making several key methodological assumptions and apply some judgement. It is difficult to robustly estimate WBB because:

- Base expenditure allowances are set in aggregate across the asset base;
- There is a lack of consistent cost definitions across the industry;
- There is a lack of comparative data that can be used to perform robust benchmarking;
- The funding needs for a specific asset class vary over time reflecting companies' specific asset cycles; and,
- The funding needs will depend on the asset strategy adopted by companies for each asset class.

4.2.4 In light of this, in assessing different approaches, we have set out the key risks and limitations associated with the data available for calculation of WBB in the supplementary document *UUW26-18 Asset Health – What base buys methodology.*

4.2.5 In applying any methodology, Ofwat should give significant consideration to the risk of an overstatement of WBB and the potential impacts this could have on restricting companies' base

[3] Ofwat (2025). Asset Health Investment Assessment Guidance. Available at: https://www.ofwat.gov.uk/wp-content/uploads/2025/12/Asset-Health-Assessment-Guidance.pdf, pg. 21.

expenditure decisions in a way that would be inconsistent with the PR24 approach to base expenditure allowances.

4.2.6 Our view is that the methodology presented in this document very much represents the upper end of the range that should be considered for WBB and that, in view of the risks associated with over-estimation, Ofwat should consider whether lower limits should be binding on companies. This may be particularly appropriate in the event that Ofwat applies the same methodology broadly across all companies.

4.2.7 Examples of potential mitigations that Ofwat could consider are set out in the supplementary document *UUW26-18 Asset Health – What base buys methodology.*

4.3 Calculating WBB

4.3.1 Despite these limitations, we have calculated our WBB in line with the principles set out by Ofwat and ensured that industry benchmarking is used alongside externally verifiable data. This is set out in Table 3 below and explained in further detail in our full methodology which is set out in the supplementary document *UUW26-18 Asset Health – What base buys methodology.* [4]

4.3.2 We present three potential approaches to calculating WBB in Table 4. Our assessment of each approach is also set out in the supplementary document *UUW26-18 Asset Health – What base buys methodology.* Following this assessment, we concluded that the bottom-up approach is most aligned to these principles. Therefore, all WBB numbers presented are calculated following this methodology.

4.3.3 Based on our approach to calculating the requirements as set out by Ofwat on WBB, the implicit funding allowance for rapid gravity filters is **£8.5m** over AMP8. As discussed in Section 4.2, this represents the upper end of a plausible range.

Table 3: Alignment with WBB principles

Principles of WBB	Approach's alignment with principle
Avoid the risk of customers paying twice for investment, once through existing base allowances and once through any additional adjustments	✓
Have a clear rationale, and where possible, is consistent with the way allowances are set during the price review	✓
Acknowledges that companies receive long-term base allowances, and that spend on an asset class across periods is likely to vary over time	✓
Is informed by good quality information, and where there are limits to this, is aware of data limitations	✓
Uses externally verifiable data	✓
Relies on an industry benchmark rather than a company specific view	✓

Source: UUW analysis of Ofwat's Asset Health Investment Assessment Guidance (2025)

[4] UUW26-18 Asset Health – What base buys methodology.

Table 4: Summary of different approaches assessed[5]

Approach	Description
Bottom-up approach	Adjusting sector average/median outturn AMP6 and AMP7 capital maintenance expenditure related to the priority asset class to the increase in base expenditure allowances provided at PR24.
Econometric based approach	Remove historic capital maintenance expenditure related to priority assets from PR24 base expenditure econometric benchmarking models to estimate implicit level of funding in modelled allowances associated with priority asset classes.
Historic company-specific expenditure approach	Scale company-specific historic capital maintenance expenditure on priority asset classes to PR24 base expenditure allowances and use each company's historic expenditure shares rather than industry-wide averages to estimate the implicit level of base funding associated with those assets.

Source: Ofwat (2025) Asset Health Investment Assessment Guidance.

4.3.4 The bottom-up approach estimates the RGF-specific WBB by identifying the industry-average share of modelled base historical expenditure allocated to RGF refurbishment and replacement. This share is applied to UUW's AMP8 wholesale water base allowance to derive an implicit RGF allowance. The mean and median estimates are triangulated to reduce sensitivity to outliers and provide a robust implicit allowance.

4.3.5 The approach involves the following steps:

- **Step One:** Sum historical asset expenditure:
  - Sum all refurbishment and replacement expenditure for RGFs across the full dataset period (2015/16–2024/25) - *Source: Workload and Expenditure Dataset (06/02/2026).*
- **Step Two:** Sum modelled historical base expenditure:
  - Sum a company's modelled base expenditure over the same period for Wholesale Water. - Source: Ofwat PR24 Base Cost Model 3 – 'Costs' sheet[6].
- **Step Three:** Calculate historical spend shares:
  - Divide the summed RGF historical expenditure (Step 1) by the summed modelled historical expenditure (Step 2); and,
  - This allows us to obtain a percentage share of modelled base historical expenditure on RGFs for each company.
- **Step Four:** Calculate the industry mean of this percentage share
- **Step Five:** Apply the mean share to AMP8 allowances:
  - Multiply each company's AMP8 base allowance by the mean percentage derived in Step 4.

[5] Ofwat (2025). Asset Health Investment Assessment Guidance. Available at: https://www.ofwat.gov.uk/wp-content/uploads/2025/12/Asset-Health-Assessment-Guidance.pdf

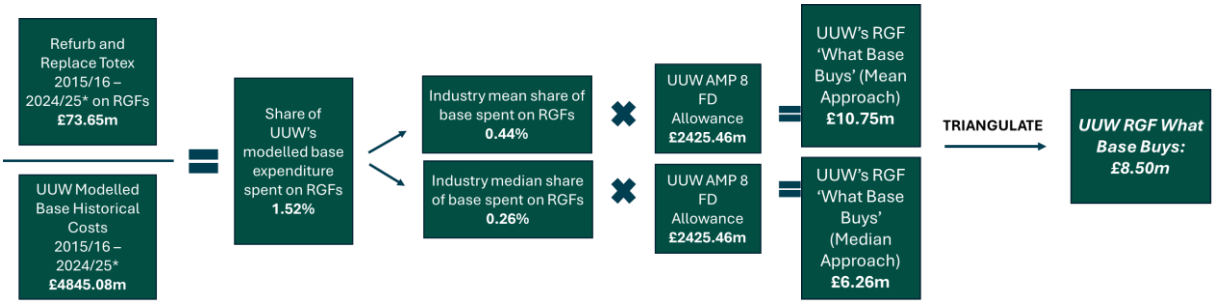
[6] Ofwat (2024). Cost assessment models: Base costs – water model 3, 'Costs'. Available at: https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-FD-CA05-Base-costs-water-model-3.xlsx.

  - AMP8 allowances are taken from *Base Costs Water Model 3 – 'final allowance'*[7], adjusted using the cumulative net price change for each year (from the *Base Costs Aggregator Model8*) to reflect post-frontier-shift and RPE-adjusted allowances.

- **Step Six:** Repeat step 4 for the industry median.
- **Step Seven:** Apply the median share to AMP8 allowances:
  - Multiply each company's AMP8 base allowance by the median percentage; and,
  - This follows the same process as Step Five.
- **Step Eight:** Triangulate results:
  - Average the mean-based and median-based estimates to form the final AMP8 implicit allowance for RGFs.

Figure 10 provides the calculation process for the RGF implicit allowance.

Figure 10: Calculation of the RGF AMP8 implicit allowance



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

4.4 Summary of our proposal

4.4.1 To demonstrate that our cost-change claim is incremental, we propose an expenditure-based Price Control Deliverable in Section 7 that would protect customers from non-delivery and claw back unspent allowances for WBB across the asset classes.

4.4.2 Given the limitations highlighted in Section 4.2 and the supplementary document *UUW26-18 Asset Health – What base buys methodology,* we consider that our assessment of WBB represents the upper end of a plausible range. In light of the risks associated with over-estimation, it is therefore important that Ofwat considers the potential implications for constraining companies' base expenditure decisions.

4.4.3 We plan to report in our Annual Performance Report the amount of expenditure for each relevant asset class as per Ofwat's latest proposals on companies' reporting requirements[9].

4.4.4 In Section 7 we propose that the base expenditure PCD covers all relevant asset classes of the investment proposal so that if the expenditure in one asset class is less that its implicit funding allowance, but it is offset by a higher expenditure in one of the other asset classes, there would be no net PCD clawback. This would provide sufficient flexibility to ensure that companies remain incentivised to target their maintenance interventions efficiently whilst providing appropriate customer protection.

4.4.5 Further examples of potential mitigations that Ofwat could consider, reflecting the risk of over-estimation and the upper-bound nature of these WBB estimates, are set out in the supplementary

[7] Ofwat (2024). Cost assessment models: Base costs – water model 3, 'Final Allowances'. Available at: https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-FD-CA05-Base-costs-water-model-3.xlsx.

[8] Ofwat (2024). Base Costs aggregator model. Available at: https://www.ofwat.gov.uk/wp-content/uploads/2024/12/PR24-FD-CA02-Base-costs-aggregator-model.xlsx.

[9] Ofwat, Consultation on regulatory reporting for the 2025-26 reporting year, December 2026 can be found here.

document *UUW26-18 Asset Health – What base buys methodology.* We would be happy to discuss the merits of any such approaches with Ofwat.

4.4.6 The cost-change claim is for activities above this implicit level of base expenditure, and for this we propose an output-based PCD as set out in Section 7. Overall, this approach provides transparency and accountability and ensures that customers are appropriately protected.

Table 5: WBB and Cost Change Claim: Rapid Gravity Filters

£m	WBB	Cost Change Claim*	Total Allocated Spend this AMP8
RGFs	8.5	17.9	26.4

Source: UUW analysis of What Base Buys using Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

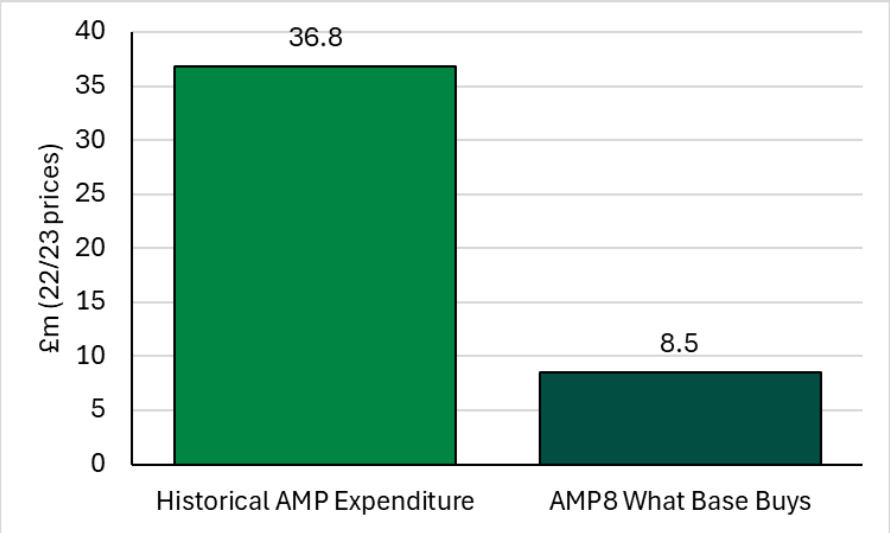
**net of repair savings*

4.5 Comparison with historical expenditure

4.5.1 UUW has historically spent a large proportion of its base expenditure on RGFs compared to the industry benchmark. As shown in Figure 11, our historical base expenditure exceeds our calculated AMP8 WBB allowance which represents the high end of a plausible range. This illustrates a strong track record of investing our base allowances, providing confidence that customers are not paying twice.

4.5.2 Further evidence of our actual AMP8 planned expenditure can be found in Section 3.5.

Figure 11: Comparison of average historical expenditure per AMP with AMP8 WBB, RGFs



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

5. Best option for customers

This section demonstrates how we have developed the preferred programme via a robust optioneering process, tested our programme for value, assessed its benefits and how it is been informed by customer research and stakeholder engagement.

5.1 Our proposals are based on robust optioneering

5.1.1 We have undertaken structured optioneering to identify the most appropriate way to deliver a reduction in risk associated with rapid gravity filters. The purpose of this process was to ensure that the proposed AMP8 cost change programme for asset health represents a proportionate, deliverable and efficient response to the need.

5.1.2 The proposed programme has been shaped by three primary considerations:

- Current levels of asset health risk: interventions have been prioritised where there is confirmed poor asset condition from both operational experience and recent visual inspections and in alignment with our Drinking Water Safety Plan risk assessments;
- Deliverability within AMP8: only interventions that can be designed and constructed within the AMP8 period have been included; and,
- Alignment with asset strategy: consideration of the long-term need for the assets.

5.1.3 The optioneering process was undertaken in two stages. Unconstrained optioneering was used to confirm the site-specific need and alignment to the requirements for inclusion within the asset health cost change process. Constrained optioneering was then applied to develop options that represent a credible, proportionate and deliverable solution within AMP8.

5.2 Unconstrained optioneering – sites considered

5.2.1 For RGFs we have used the following approach to unconstrained option development:

- Identify sites with investment needs on the corporate risk register associated with the RGF class;
- Confirm with operational teams that the potential investment need includes structural degradation;
- Arrange visual site survey to confirm current status and identify ancillary mechanical, electrical, instrumentation, control and automation needs associated with structure; and,
- Subject Matter Expert (SME) triage team review of survey evidence. Gaps in evidence identified and requested from field teams. Assets that not presenting near term service risk deprioritised for AMP8.

5.2.2 The outcome of this assessment process was a list of specific assets on sites identified to take forward as candidate options for constrained optioneering.

5.3 Constrained optioneering – interventions considered

5.3.1 To demonstrate that appropriate options have been considered and that the best value option has been selected for each investment need we have assessed all constrained RGF investment needs using our value assessment tool.

5.3.2 Each of the RGF investment needs that passed unconstrained optioneering has been assessed against the following options:

- **Minor Refurbishment of filter floor or tank:** This typically comprises maintenance of the external structure since it is generally accessible without media removal. Interventions can include localised or patch repairs on the structure.

- **Major Refurbishment of filter floor or tank**: This includes major repair or replacement of the component parts of the RGF system, for example: replacement of the plenum or filter floor, repair of filter floor, replacement of all the nozzles or widespread concrete remediation.

5.3.3 Options were scoped and estimated for each option at each selected site and then assessed for deliverability. Deliverability identified that there would be physical constraints to the number of filters that could be refurbished during the remainder of AMP8 at one of the selected sites.

5.3.4 Assets that passed the deliverability assessment were then taken forward for best value assessment.

5.4 Best Value Assessment

5.4.1 For this submission, we have used a valuation tool that evaluates the most cost-beneficial approach out of a 'refurbishment', a 'replacement' or a 'do nothing' approach. This analysis draws on our work to develop a broader "six capitals" based valuation approach to reflect changes in regulatory and government approaches to valuations of service, the environment and amenity values.

5.4.2 This assessment has been used to compare the constrained options identified through the optioneering process and to help to define a proportionate and deliverable preferred AMP8 cost assessment RGF programme. The outcome of the best value assessment supports a programme of refurbishment options. This helps to maximise the value from existing assets and to protect customers from unnecessary cost and risk.

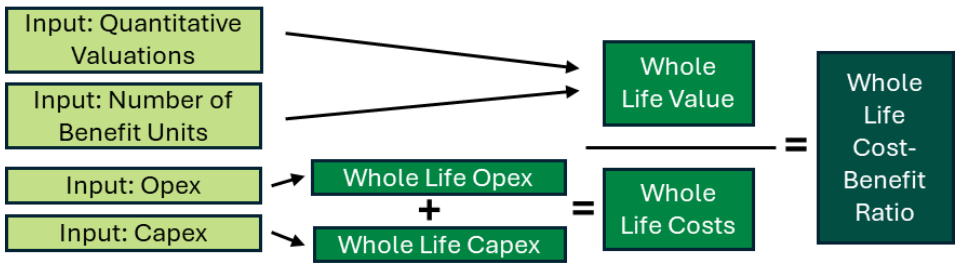
5.4.3 The purpose of the best value assessment is to determine which constrained option represents the best overall value for customers, taking account of cost, risk, flexibility, and wider system benefits.

Our approach

5.4.4 Our approach comprises three key steps as summarised in Figure 12:

- Calculating the whole life value;
- Calculating the whole life cost; and
- Comparing the whole life cost-benefit ratio across different solutions.

Figure 12: Cost benefit analysis flow diagram



Source: UUW analysis

Whole life value

5.4.5 We calculate whole life value of an investment solution as the present value of the total benefits accrued over a 30-year assessment period. This is derived by:

- Multiplying the number of projected benefit units from the investment solution by the annual quantitative valuation; and
- Calculating the compounded value over the investment horizon and discounting it using the Social Time Preference Rate, in line with the HM Treasury Green Book.

Whole life cost

5.4.6 We calculate the whole life cost of an investment solution by adding the whole life capital expenditure and the whole life ongoing operating costs. Capital expenditure includes capital overheads but excludes the effect of taxation. Whole life cost has been calculated on a consistent basis to the approach taken for PR24 investment appraisal.

5.4.7 The present value of capital expenditure has then been converted to a stream of annual costs over a 30-year appraisal period. To calculate the present value of these costs, and associated operating costs, the Social Time Preference Rate was used for discounting, consistent with the HM Treasury Green Book. Costs are in 2022/23 price base, using the CPIH financial year average.

Cost benefit ratio

5.4.8 The cost benefit ratio is calculated by dividing whole life value by whole life cost.

Quantification of benefits

5.4.9 The primary value associated with filter remedials is in retaining water production headroom. Whilst redundancy is built into the overall production of our supply system (i.e. provisions are made for allowing 1 filter out for repair and 1 out for backwashing), the strategic importance of these works from a water supply perspective provide sound basis for prioritisation of investment. As we enter AMP8 this works will be key in maintaining supply demand balance in the region especially during periods of peak week demand.

5.4.10 The increasing age of these assets creates a risk of possible failure of a filter which would in turn result in reduced efficiency and throughput of the remaining filters. We have allocated the proportion of peak week production capacity throughput associated with the filters under remediation as the asset health investment driven value from the work. The probability for the assessment is driven from the recent history of floor failures for of end of life filters at a site with a bank of 16 filters that are at end of life.

5.4.11 The cost benefit ratios in Table 6 below show that the preferred options deliver the highest overall positive value, even after accounting for embedded carbon as a disbenefit. The ratios indicate that the programme provides strong public and environmental benefits relative to its cost, particularly through improved resilience and protection of treatment capacity.

5.4.12 Even where benefits are more modest, the investment remains justified by the need to address accelerating asset health risks and avoid costly reactive failures. The non-preferred options have lower cost benefit ratios due to lower assumed asset lives for the minor refurbishments; this is in line with our recent experience of reactive repairs to filters. Overall, the figures confirm that this is a targeted, efficient, and low-regret approach to safeguarding long-term water supply resilience and customer value.

Table 6: Capex and cost benefit ratios for the 5 proposed sites for both assessed options

Site	Minor Refurb Capex (£k)	Major Refurb Capex (£k) (preferred)	Minor Refurb CBA	Major Refurb CBA (preferred)
[✂]	377	**1,351**	6.7	**7.8**
[✂]	172	**395**	2.4	**4.3**
[✂]	283	**682**	2.8	**4.8**
[✂]	3,829	**13,029**	1.0	**1.1**
[✂]	745	**2,471**	1.2	**1.5**

Source: UUW's analysis

5.5 Customer and stakeholder views

5.5.1 It is vital we engage with customers and stakeholders across the entire region about their water and wastewater services. We have undertaken an iterative research approach to understanding customers' views on Asset Health. For this submission, we therefore reviewed recent and relevant research from our established body of customer research, including key projects which informed the PR24 business plan. Building on this existing knowledge base, we then undertook targeted bespoke research using both qualitative and quantitative methods. We have taken steps to ensure our customer research approach is proportionate and comprehensive, with the quantitative survey elements using a robust sample allowing for sub group analysis, and qualitative research using members of our existing research community.

5.5.2 Further information on the methodology, Independent Challenge Group engagement and the application of our insights can be found in the appendix *UUW26-26 Customer Research Approach – Regional Growth and Asset Health.*

5.5.3 The research programme shows strong customer support for intergenerational equity and a clear expectation that UUW invests proactively to address major long-term challenges. Customers consistently prioritise safety, service reliability and regulatory compliance as core outcomes. In particular, the findings indicate that:

- Customers expect investment decisions to be fair, future-focused and environmentally responsible.
- There is strong support for approaches that avoid transferring costs and risks to future generations. Customers want UUW to take early, responsible action on long-term risks, ensuring that expenditure is targeted at what matters most and delivers value for money. The Asset Health proposals have been developed in direct response to these expectations.
- Customers support increased investment to protect drinking water quality. They want UUW to stay ahead of high-impact, long-term risks, while retaining the flexibility to respond quickly to emerging issues and emergencies. The proposed investment reflects this balance and acknowledges customer sensitivity to bill impacts.

5.5.4 We have proactively sought the views of key statutory and customer stakeholders, in line with our programme wide engagement plan. This has ensured that our proposals are grounded in customer expectations and aligned with regulatory priorities. Engagement to date includes:

- **Your Voice** – the Independent Challenge Group for the North West. We presented our findings from the recent customer research and welcomed input. The panel was broadly supportive of our plans.
- **The Drinking Water Inspectorate (DWI)** – we have held an initial discussion with the DWI to explain our intent to submit cases for additional asset health investment for the three water asset classes and agreed an approach to providing further information for these. On 31 March we submitted three approach documents setting out our proposals to improve asset health in boreholes, rapid gravity filters and treated water storage facilities. We received a Final Decision Letter – Commend for support on 30 April 2026 a copy of which can be found in *UUW26-25 Letters of support*.
- **The Environment Agency** – we held a meeting with the Environment Agency on 17 March to explain our intentions to submit asset health investment cases across a range of water and wastewater assets. We followed this up with a letter setting out our proposals and high-level indications around cost. We received a response on 25 March explaining that the Environment Agency will be working jointly with Ofwat to assess the proposals where those proposals are relevant to the Environment Agency. Due to the collaborative model of business case assessment, the Environment Agency will not provide additional supporting comments ahead of the submission deadline.

6. Robust and efficient costs

This section explains how we have developed our costs and the build-up of our estimates. It also provides evidence that our proposals are efficient, and summarises the results of the benchmarking against third party comparable costs.

6.1 How we developed our costs

6.1.1 This section explains how we developed our cost estimates for RGF interventions. We give a general overview of our methodology then we show a breakdown of costs at a project and programmatic level.

An overview of our methodology

6.1.2 This section sets out our methodology for calculating direct and indirect costs.

6.1.3 Direct costs are those that can be clearly and directly attributed to a specific asset, activity, or scheme. They arise solely because of the works being undertaken and would not be incurred otherwise. Direct costs are typically site-specific and measurable, and include construction labour, plant and equipment, materials, and disposal costs directly associated with delivering the works on site.

6.1.4 We assess direct costs using a bottom-up approach. This involves developing an engineering scope for each element of the work. We then develop a granular view of cost of each element of scope. To do this, we considered what we would need to do to deliver each element of scope. For example, if the engineering scope indicated we need to demolish existing infrastructure, we would need to use a bulldozer, remove the demolished material etc. In some cases, we had to make assumptions on what would be involved in each element of scope. We have detailed these in paragraph 6.4.2.

6.1.5 Each of these elements was then priced using a database containing costs from a range of different companies. This ensures that our estimates are in line with industry standards. Finally, we added an element of optimism bias to reflect best estimating practice, which varied depending upon whether we had a robust understanding of the asset. This produced our estimate of direct costs. We provide an example of this process in Section 6.4.

6.1.6 Indirect costs are those that enable, support, and govern the delivery of direct activities, but which cannot be practically or proportionately allocated to a single asset or activity. These costs are required to ensure that works are properly planned, managed, assured, and delivered safely and compliantly, and are typically incurred across multiple activities, projects, or sites rather than at an individual asset level.

6.1.7 Indirect costs include, for example:

- project and programme management;
- design management and technical assurance;
- health, safety and environmental management;
- planning, supervision and coordination activities;
- temporary works design and oversight; and,
- the corporate and operational support functions required to enable delivery.

6.1.8 Indirect costs are therefore not discretionary overheads, but a necessary and integral part of delivering capital works in a regulated, safety-critical environment. Excluding these costs would understate the efficient cost of delivery and would not reflect how capital programmes are practically delivered in the water sector.

6.1.9 Our calculation of indirect costs are aligned with best estimating practice. We include a risk allocation, which is informed by the extent to which historic schemes have been impacted by cost changes. We also

include for our cost to serve, which reflects the costs UUW incurs managing and integrating the project. Finally, we include our corporate overhead, which enables us to recover our functional support costs.

6.1.10 We then subjected our cost estimates to third party benchmarking, which is set out in Section 6.2.

Programme-level cost build

6.1.11 This section provides more detail on the breakdown of direct and indirect costs. We have allocated optimism bias to direct costs. This is because we would expect optimism bias to reduce and direct costs to increase as schemes mature and move into delivery. Where applicable, we allocate contractor indirect costs to indirect costs.

6.1.12 Table 7 shows the split between direct and indirect costs by project. This shows that our indirect cost allocation is low compared to what could typically be expected - that the ratio of direct to indirect costs to be roughly equal. This is because we have challenged ourselves with a lean indirect cost allocation for this programme of work. This reflects the fact we will aim to absorb a high proportion of the programme into our existing cost base.

Table 7: Split of direct and indirect capital expenditure by project (£m, 2022-23 CPIH prices)

Project	Direct	Indirect	Total
[✂]	1.043	0.308	1.351
[✂]	0.301	0.095	0.395
[✂]	0.527	0.155	0.682
[✂]	7.894	5.135	13.029
[✂]	1.497	0.974	2.471
Total	**11.262**	**6.667**	**17.929**

Source: UUW estimates

6.1.13 Table 8 shows the programme-level breakdown of costs across the different indirect cost categories as described in paragraph 6.1.9.

Table 8: Programme-level cost build (£m, 2022-23 CPIH prices)

[✂]

Source: UUW estimates

6.2 Our costs are efficient

6.2.1 This section presents evidence of cost efficiency. First we demonstrate that our costs are in line with those expected by independent third parties.

Our costs are considered efficient by Turner and Townsend

6.2.2 We engaged Turner and Townsend to provide third party benchmarking. This involved comparing our cost estimates against the costs similar organisations incur when carrying out the activity. We provide an excerpt from Turner and Townsend's report below, which sets out the methodology used as part of the benchmarking analysis.

"Our team have utilised our extensive industry data and Water Sector Benchmarking Club to undertake a comprehensive benchmarking exercise for UU across several programmes of work covering Boreholes, RGFs,

Service Reservoir, Filters, Settlement Tanks, Aeration Tanks and Growth projects for New Homes. Our Water Sector Benchmarking Club compiles external cost data through our platform, the Hive. This leverages anonymised data from six water sector organisations, creating the largest dataset of its kind within the sector. The Water Sector Benchmarking Club has been utilised in this benchmarking exercise, alongside our internal industry data.

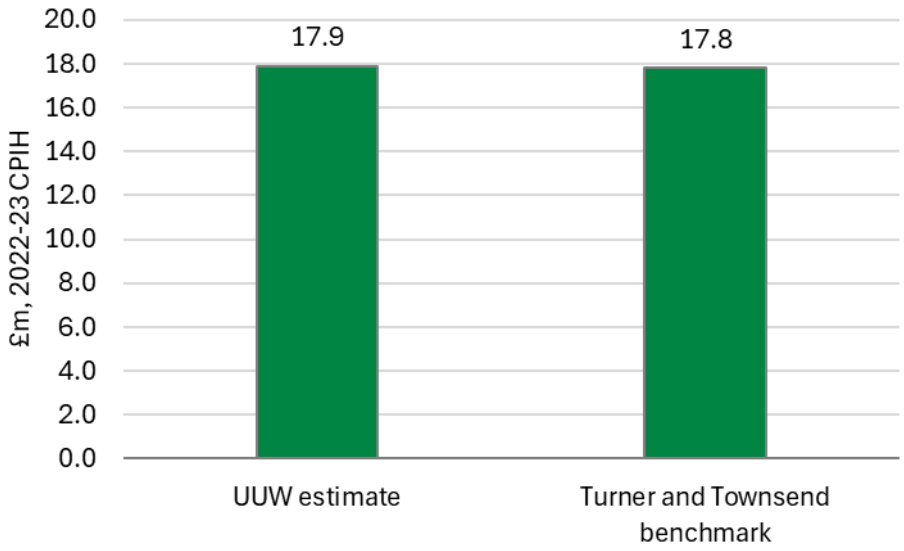
We carried out a comprehensive review of the cost build-up of the projects provided by UU.

We benchmarked the direct costs at component level, in accordance with UU's work breakdown structure, where possible. We have also benchmarked the uplifts for the following on-costs (Indirect costs, Project overheads, Risk and Estimating uncertainty) ***finding these were in line with industry expectations****.*

Our conclusion is that the methodology for developing the Capex estimate prepared by United Utilities is robust, and that the performance and cost profiles of UUs proposed interventions are consistent with the expected range observed across comparable projects delivered by industry peers*.*[10]"

6.2.3 Figure 13 shows the results of the benchmarking exercise for our RGF programme. This demonstrates that our cost estimates are efficient and well aligned with those expected by third parties.

Figure 13: Turner and Townsend found our costs are in line with industry expectations



Source: UUW estimates and Turner and Townsend

6.2.4 We provide a full overview of our benchmarking approach and associated reports in *UUW26-28 Benchmarking reports*.

6.3 We do not consider Ofwat's workload and expenditure data to be a robust source for cost benchmarking

6.3.1 We understand that Ofwat may wish to use its workload and expenditure data to compare companies' intervention costs to identify an efficient benchmark. However, we would caution against any reliance on this dataset as a source of company comparisons.

6.3.2 This section sets out evidence that demonstrates the data is not sufficiently granular to provide a meaningful indication of relative efficiency. In summary, this is because it reflects an average cost of multiple different intervention types carried out across the sector. A company that carries out a greater proportion of cheaper intervention types will appear artificially efficient – whereas – in reality - the lower observed unit cost is merely reflecting a simpler programme of work, often with shorter life

[10] Turner and Townsend. *Asset health and growth benchmarking report.*

interventions. If applied inappropriately, this dataset could distort incentives and discourage companies from selecting lowest whole-life-cost solutions aligned with good asset management practice.

6.3.3 We have set out the key issues in relation to the dataset and its unsuitability for robust cost efficiency assessments under the following headings:

- Lack of granularity;
- Inconsistent categorisation;
- Inherent variability in the data; and,
- Distortion of incentives.

Lack of granularity

6.3.4 The data is split into four categories, 'repair', 'refurbishment', 'replacement' and 'other' types of intervention. There is significant variation captured within each expenditure category, as refurbishment or replacement activities can differ materially in scope and complexity. As a result, higher unit costs may simply indicate that a company is undertaking more intrusive or costly interventions that can result in a longer asset life rather than implying a lower level of efficiency.

6.3.5 If unit costs are used at the refurbishment level, as captured by Ofwat, genuine differences in company intervention mix will be embedded as differences in efficiency.

6.3.6 This approach to unit costs would reward companies that engage in a high proportion of relatively lower cost refurbishment and replacement interventions. In contrast, companies will be disincentivised to invest in a high proportion of more expensive refurbishment interventions as the assessed efficient unit cost will be unachievable for these solutions. Furthermore, this incentive structure would contradict a key aim of the Asset Health Roadmap, that companies should use allowances to "maintain the long-term capability of assets"[11]. This would require proactive and long-lasting interventions.

6.3.7 For example, as seen in Table 9, Southern likely has relatively more small-scale refurbishments, which would reduce its unit costs for reasons not solely linked to differences in efficiency.

Table 9: Total refurbishment expenditure and number of interventions for each company on RGFs (2015/16-2024/25)[12]

Company	Expenditure (£m) (2015/16-2024/25)	Number of Interventions (2015/16-2024/25)	Average Unit Cost (Expenditure / Interventions)	Number of RGFs	Intervention Rate per RGF
[ ]	1.62	231	0.01	58	3.98
[ ]	49.39	207	0.24	293	0.71
[ ]	9.56	194	0.05	61	3.18
[ ]	14.24	136	0.10	535	0.25
[ ]	9.41	102	0.09	186	0.55
[ ]	17.81	42	0.42	206	0.20
[ ]	0.12	23	0.01	32	0.72
[ ]	1.53	16	0.10	73	0.22
[ ]	3.78	15	0.25	86	0.17

[11] Ofwat (2024). Roadmap for enhancing asset health understanding in the water sector. Available at: PR24-final-determinations-Roadmap-for-enhancing-asset-health-understanding-in-the-water-sector.pdf.

[12] Ofwat (2026). Sector workload and expenditure dataset v2 – for circulation.

Company	Expenditure (£m) (2015/16-2024/25)	Number of Interventions (2015/16-2024/25)	Average Unit Cost (Expenditure / Interventions)	Number of RGFs	Intervention Rate per RGF
[ ]	7.75	14	0.55	43	0.33
[ ]	1.91	6	0.32	148	0.04
[ ]	1.98	5	0.40	56	0.09
[ ]	0.07	2	0.03	53	0.04
[ ]	0.02	2	0.01	19	0.11
[ ]	0.04	1	0.04	29	0.03
[ ]	0.07	1	0.07	0	-
[ ]	0.00	0	-	10	-

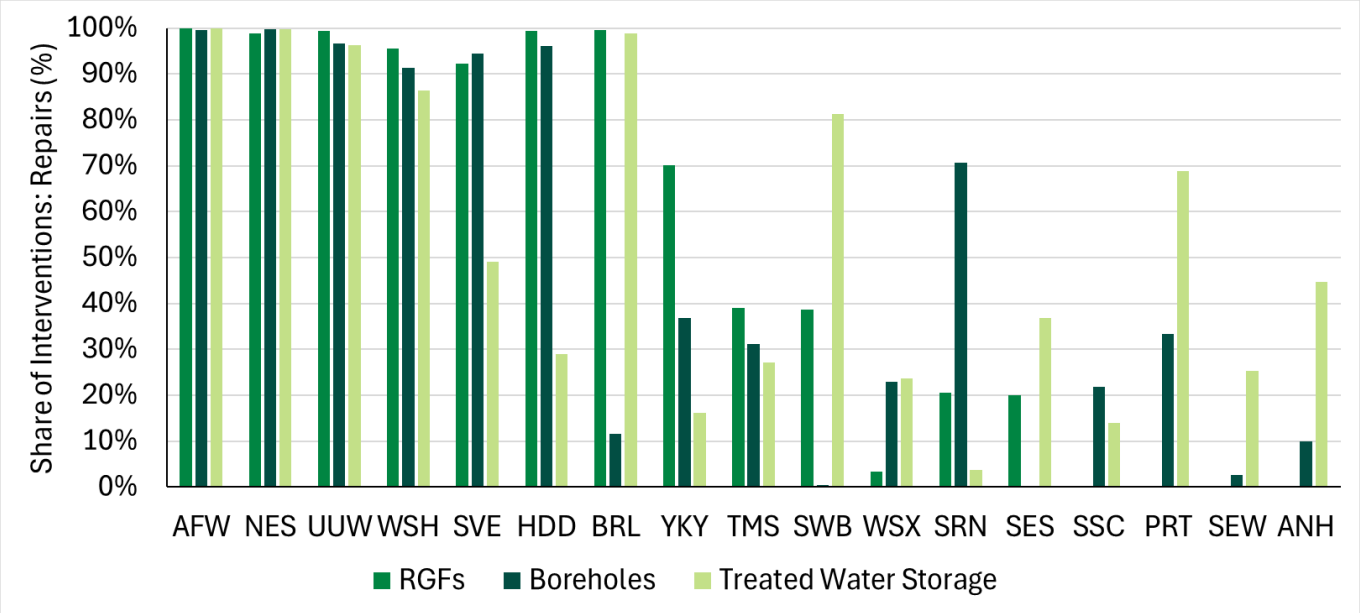
Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

6.3.8 Ofwat has not captured information linking asset size to intervention in its data collection to date.

Inconsistent Categorisation

6.3.9 There is not necessarily a clear distinction between repairs and refurbishments, which may lead to some companies having the same cheaper intervention categorised as a 'repair' where others categorise it as a 'refurbishment'. This will distort any unit cost comparisons. **Error! Reference source not found.** and **Error! Reference source not found.** show that companies with a higher proportion of repairs typically have a low proportion of refurbishments. Without a more granular breakdown of the data, it is not possible to ascertain whether this stems from a preference for proactive over reactive maintenance, or simply inconsistency in classification of repairs and refurbishments.

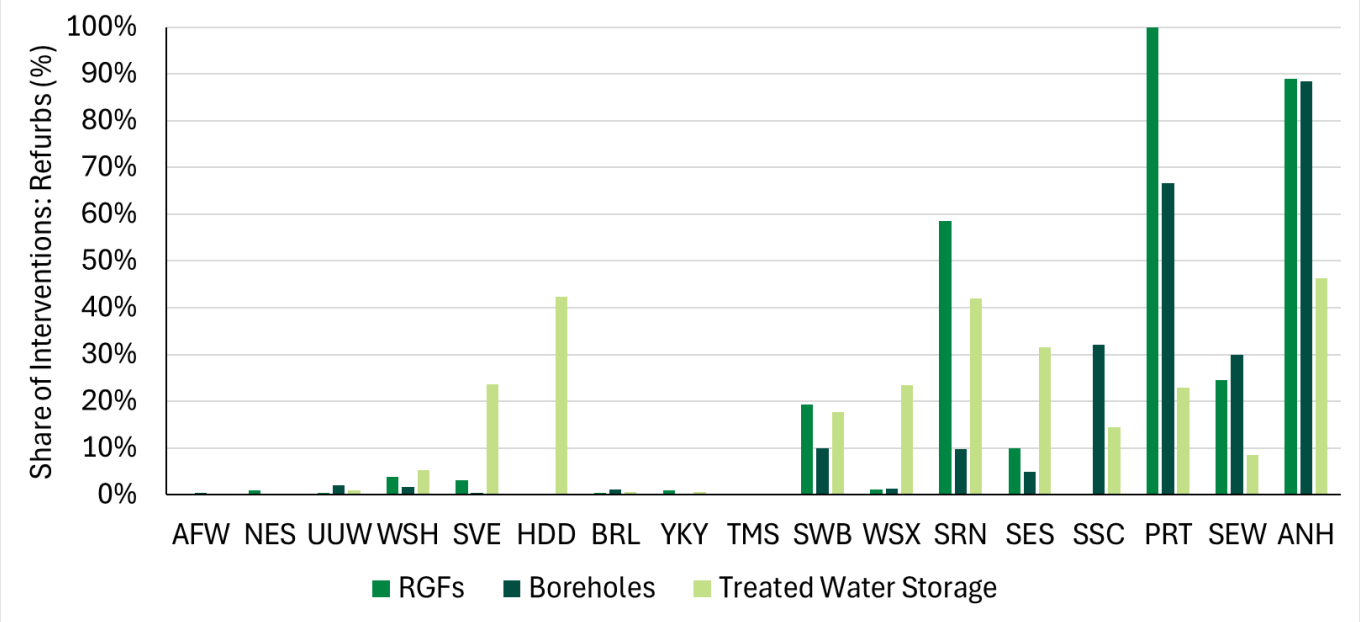
[✂][13]



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

[13] [✂]

[✂]

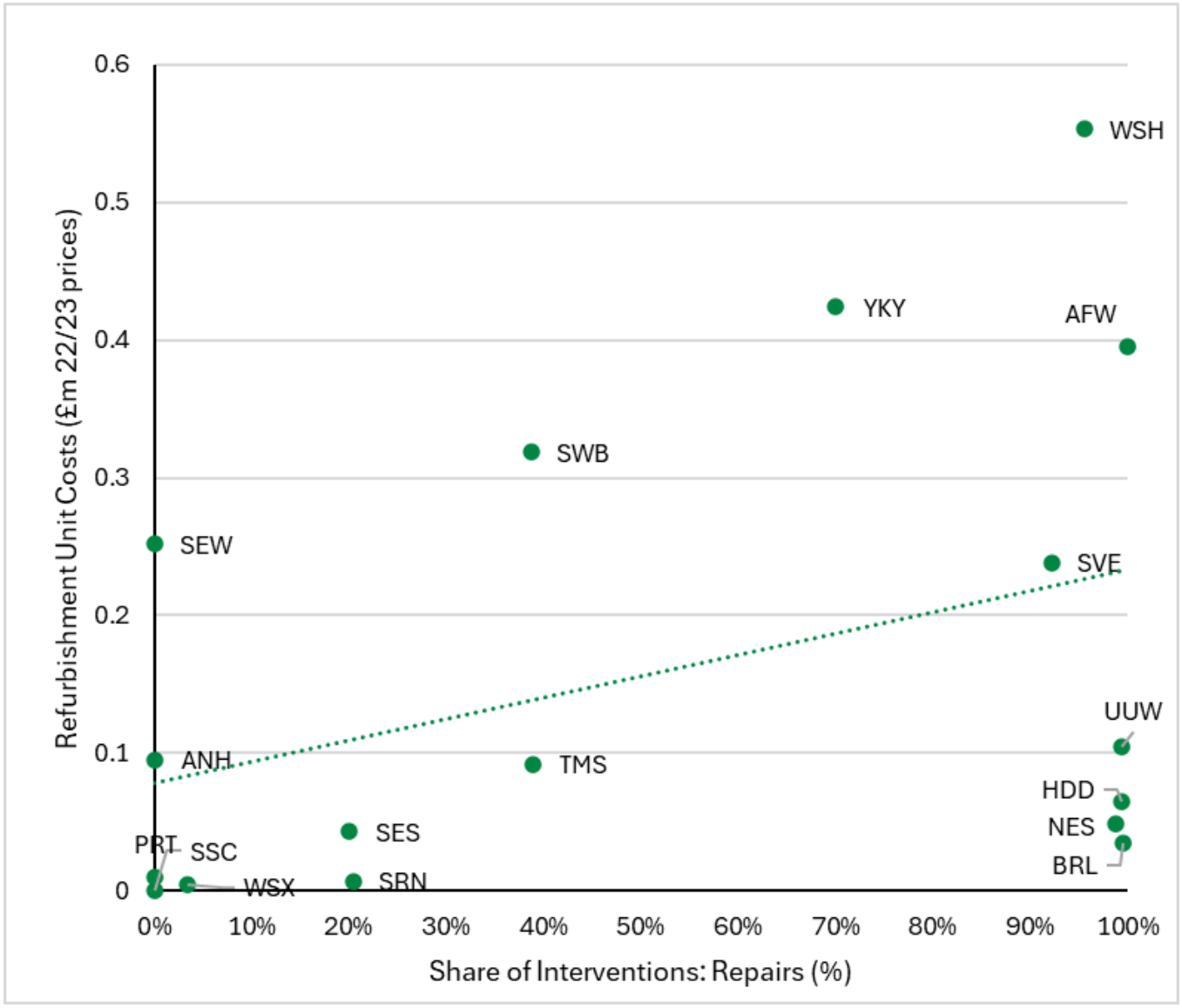


Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

6.3.10 Potential misclassification is also evidenced by the fact that companies with a low proportion of repairs are more likely to have a low refurbishment unit cost, which suggests that certain repairs could be miscategorised as refurbishments. This is illustrated by some companies, such as [✂], who have a low RGF refurbishment unit cost, a low proportion of repairs and a large number of refurbishment interventions per asset.

6.3.11 Figure 14 illustrates the positive correlation between refurbishment unit cost and share of repair interventions across the industry.

Figure 14: Diagram showing the positive correlation between proportion of repair interventions and refurbishment unit cost[14]



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

Inherent variability in the data

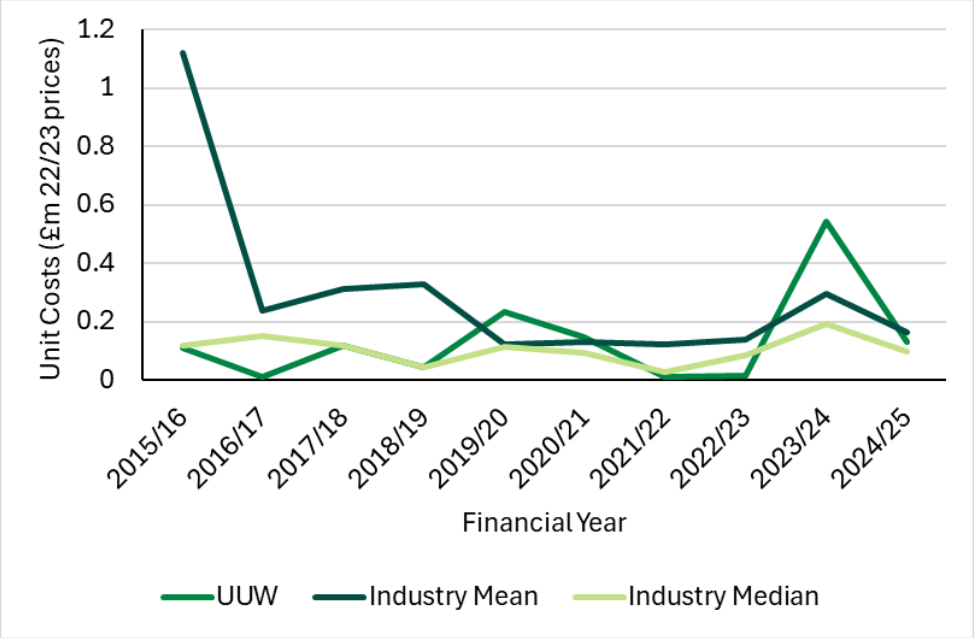
6.3.12 Figure 15 illustrates the refurbishment unit costs[15] over time for RGFs for UUW, and provides the industry mean and median for each year. . It highlights the variability inherent in the recorded data and the challenges this presents for interpreting unit cost differences. The volatility in unit cost over time is so large that it is unlikely to be solely as a result of (in)efficiency differences. For example, the mean and median show significant volatility throughout the period, which is not directly attributable to expected year-on-year variation.

6.3.13 We would expect that the mean and median real unit costs would remain relatively stable over time. Instead, it indicates that there are material differences in the scope of activities undertaken inherent in the historic data, not reflected by a simple unit cost assessment. This presents challenges for interpreting a forward-looking unit cost allowance opposite company plans. This further supports our position that there are a number of different types of refurbishment activity that cannot be assessed under a single broad category.

[14] Ofwat (2026). Sector workload and expenditure dataset v2 – for circulation.

[15] Calculated as the totex expenditure on replacements divided by the quantity of replacements.

Figure 15: Refurbishment Unit Costs over Time: Rapid Gravity Filters[16]



Source: UUW analysis of Ofwat (2026) Sector workload and expenditure dataset v2 – for circulation.

A simple unit cost approach would create distortive incentives

6.3.14 A simple unit-cost approach to assessing cost efficiency could materially distortive incentives for a company asset strategy. If companies are judged against a single refurbishment, or replacement-level unit cost, the regulatory framework would implicitly reward those who choose the lowest short-term capital expenditure option—regardless of whether it delivers the best whole-life outcome. Under such an approach, companies are likely to prioritise low-cost interventions to remain "efficient" in comparative assessments, even where a more substantial, longer-lasting intervention would provide better value for customers over the asset's life and deliver greater improvements in environmental and operational resilience.

6.3.15 This incentive structure runs counter to the aim of the Asset Health Roadmap. The Roadmap is explicitly designed to encourage proactive, higher-quality and long-lasting interventions, which "maintain the long-term capability of assets"[17]. Using simple unit costs to assess efficiency risks undermining this objective by effectively penalising companies that adopt more intrusive and sustainable interventions. Instead of promoting good asset management practice, a simple unit-cost benchmark would encourage behaviour towards short-term solutions that appear cheaper when assessed during a single period but lead to higher long-term costs for customers.

6.4 An example cost breakdown

6.4.1 We now provide a full worked example for the [✂] project. This gives a practical example to demonstrate the methodology we set out in Section 6.1.

Estimating assumptions

6.4.2 We used the following assumptions when estimating the costs for all RGF interventions.

- A competitively tendered quote for structural repairs at [✂] has been used as a basis for the construction cost for all wall interventions. This is assumed to be representative of the costs incurred;

[16] Ofwat (2026). Sector workload and expenditure dataset v2 – for circulation.

[17] Ofwat (2024). Roadmap for enhancing asset health understanding in the water sector. Available at: PR24-final-determinations-Roadmap-for-enhancing-asset-health-understanding-in-the-water-sector.pdf.

- The outturn project costs for a similar project at [✂] has been used as the basis for the construction cost for all floor interventions. This is assumed to be representative of the costs incurred; and,
- A contractor build only procurement route has been assumed.

How we developed our direct costs

6.4.3 We based our costs for all interventions on a similar activity for which we already have competitively tendered quotes from suppliers [✂]These quotes reflect a range of interventions from relatively light-touch to more complicated. We would expect to do one of these interventions, but the exact intervention would be determined during detailed design and delivery. As such, we take the average cost of all interventions into our estimate. We consider the average reflects a suitable balance of risk.

Table 10: How we use competitively tendered quotes for different intervention types at [✂] to calculate an average cost (£, 2022-23 CPIH prices)

[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	**[✂]**
[✂]	**[✂]**

Source: UUW estimates

6.4.4 We then multiply this unit rate by the wall area at [✂] to calculate a total cost for expected work. This is supplemented by an estimate of enabling works and media removal, storage and replacement as these were excluded in the contractor's quote. This is shown in Table 11. The direct cost total reconciles back to Table 7.

Table 11: How we used [✂] unit cost to derive a direct cost estimate for[✂]

	Unit rate	Units	Total cost
Media intervention	344.82	826	284,965
Median removal, storage and replacement	10,000	8	80,000
Enabling works	20%		72,993
Identified direct cost total			437,958
Optimism bias			89,006
Direct cost total			**526,964**

Source: UUW estimates

6.4.5 We then add on appropriate indirect costs to this to calculate a total project cost. This is shown in Table 12. The total cost reconciles back to Table 7.

Table 12: [✂]project cost build (£, 2022-23 CPIH)

[✂]	[✂]
[✂]	[✂]
[ ]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	**[✂]**

Source: UUW estimates

6.5 How we have accounted for repair costs associated with the proposal

6.5.1 Typically, civils assets are subject to relatively infrequent, but more substantial investment than mechanical, electrical and instrumentation assets. They are more often refurbished or replaced than they are repaired: this is reflected in the historic cost splits for repairs, with civils often accounting for less than 16% of repair expenditure.

6.5.2 We therefore expect to realise only modest savings in repair costs across the Rapid Gravity Filters asset class during AMP8 because of the asset health cost change expenditure. This is because:

- Our investment proposal covers only a small proportion of the installed asset base within the rapid gravity filters asset class i.e. around 8% of our stock (43 out of 535 filters);
- The delivery investment is profiled in the last few years of the AMP; and,
- It impacts predominantly civil assets which account for a relatively small proportion of repair costs. Repair work on rapid gravity filters has historically been approximately 84% on mechanical, electrical, instrumentation and control and automation (MEICA) assets, with around 16% associated with civil and structural elements.

6.5.3 Whilst the proposed investment on Rapid Gravity Filters will help to extend the life of these assets and reduce the risk of incidents and failures it will have a negligible impact upon in-AMP repair costs across the class.

Historical repair expenditure and implicit allowance

6.5.4 It is important to note that Ofwat has not set asset class specific allowances but rather an overall base expenditure allowance across the entirety of the asset base. Therefore, assessing ex-post WBB for a subset of asset classes requires applying key methodological assumptions and extensive judgement. While we have complied with Ofwat's guidance for the Cost Change process, we believe that adopting a mechanistic approach to estimating WBB has its limitations and that such an approach should not set a precedent for wider application at PR29.

6.5.5 We have used a similar WBB approach to assess an implied level of allowance for repairs for four of the five asset classes in our cost change submission (excluding gravity sewers). This assessment indicates that we have historically invested in a higher level of repair than is implicitly funded.

Table 13: Historical repair expenditure compared with implied WBB allowance for rapid gravity filters

	Rapid Gravity Filters (£m, 2022-23 CPIH prices)
WBB assessment - repair	£3.1m
UUW's average AMP repair expenditure AMP6-7	£16.5m

Source: UUW analysis

6.5.6 We have quantified an estimated range of implied savings associated with the proposed investment as **£10k to £64k** for AMP8. These potential savings would only be relevant to AMP8 as they would be associated with avoiding repair work on the assets in scope as they would instead be receiving capital investment during the AMP.

6.5.7 Our approach involved the following steps:

- **Step 1a -** Calculate a WBB allowance for repair by extending our existing WBB calculation to include repair expenditure alongside replacement and refurbishment costs (for detail please see *UUW26 – 18 Asset Health – What base buys methodology*;
- **Step 1b -** Subtract from the total WBB that include repair costs (as calculated in step 1) the WBB covering only refurbishment and replacement costs;
- **Step 2 -** Scale the repair only WBB allowance calculated in Step 1b based on the subset of assets in scope for the cost change investment;
- **Step 3 -** Adjust the potential savings based on the delivery profile of our investment (this assumes that each year's delivery programme on average delivers mid-year, so the year 3 programme has potential for savings across the last 2.5 years of the AMP); and,
- **Step 4 -** Assess the low end of the range by adjusting the potential savings by the proportion of civils only.

Table 14: Calculation of indicative repair cost savings associated with the AMP8 rapid gravity filter investment

Step	Description	Interim Calculation
1	**Calculate WBB repair**	
	WBB implied repair allowance per AMP	£3,070k
2	**Scale WBB for assets in scope**	
	Proportion of asset base included in cost change	8%
	WBB repair for assets in scope	£246k
3	**Calculate potential WBB savings based on investment profile (20%,40%,40%)**	
	20% x 2.5 years + 40% x 1.5 years + 40% x 0.5 years	26%
	Whole AMP implied saving (£572k x 26%)	£64k
4	**Calculate the proportion of potential civils repair savings**	
	Historic civils proportion of repair	16%
	Whole AMP implied civil saving (£149k x 10%)	£10k

Source: UUW analysis

6.5.8 We have therefore included £64k as potential operating expenditure savings associated with avoided repairs in AMP8. This represents the high end of the plausible range.

7. Customer Protection

This section sets out strong safeguards to ensure customers only fund efficiently delivered work. We propose output-based PCDs for our incremental investment and an expenditure-based PCD for our existing AMP8 programme. Our proposals ensure that customers are protected from double-funding through transparent separation of base and incremental investment.

7.1 Price Control Deliverables (PCDs)

RGF cost change PCD

7.1.1 We are proposing PCDs based upon efficient delivery of intervention types for this investment programme. For the cost change claim on the RGF priority class this involves an output-based PCD with two sets of rates, one for each deliverable. Any non-delivery of outputs would be subject to the PCD clawback mechanism as set out below in Table 15.

7.1.2 Table 15 presents the breakdown of intervention types used to set the output-based PCD deliverables and associated non-delivery rates. The rates are derived at programme level and reconcile directly to the total net cost allowance proposed as part of this investment proposal, reflecting the full value of the scheme rather than individual interventions in isolation.

7.1.3 PCD unit rates have been calculated by dividing the total capex forecast for each intervention type by the total number of interventions within that category. Table 15 sets out the intervention mix, volumes, and resulting unit rates, whilst demonstrating the reconciliation back to the total net cost proposed as part of this proposal.

Table 15: Price Control Deliverables

Intervention type	Number in AH Investment Proposal	Unit rate for PCD (2022/23 cost base) £	Total cost £
Concrete remediation	23	105,576	2,428,253
Floor refurbishment	21	738,093	15,499,950
			17,928,204

Source: UUW analysis

PCD reporting, assurance and other conditions

7.1.4 This section provides further details underpinning our approach to this proposed PCD. This includes parameters such as the measurement, reporting and assurance of the PCD, any timing incentives proposed and any additional conditions of the PCD mechanism on the proposed allowance.

7.1.5 This is an output-based PCD mechanism that applies to the business case expenditure. This would be above and beyond our base programme expenditure.

7.1.6 The base programme would be assured as part of the APR process to confirm base capex each year against each priority class.

7.1.7 The APR assurance for Asset Health would confirm there has been no overlap between the base programme and the additional Asset Health expenditure.

7.1.8 Any changes to the list of sites / interventions arising from new information as set out in the agreed Asset Health cost change would be presented alongside the APR PCD data. Commentary would provide a clear explanation for the change(s) and demonstrate how it would not increase risk to customers.

7.1.9 The overall programme value would not exceed the cost adjustment allowance although, the mix of interventions could be varied.

7.1.10 PCD outputs, progress and expenditure would be reported each year as part of our standard Delivery Plan reporting arrangements applied to all existing PCDs. Overall delivery against this PCD will be assessed at the end of year five AMP8 (i.e. 2029/30). If we have spent at least 60% of the allowed expenditure for this PCD due in AMP8, then there would be no claw back provided that the remaining delivery takes place by the end of AMP9 (i.e. 2034/35). This is in line with Ofwat's current PCD guidance[18] (February 2026).

7.1.11 The delivery of the interventions is not anticipated to have any impact on existing PR24 FD PCDs. We therefore do not propose any adjustment to the existing FD PCDs.

7.1.12 Ofwat's PR24 Final Determination sets out where timing incentives apply. These are restricted to water supply, supply and resilience interconnectors, metering, phosphorus removal, storm overflows and mains renewals. These incentives are designed to promote timely delivery of benefits. With the exception of mains renewals, these areas use scheme-level PCDs that allow greater flexibility in deliverables, therefore reducing the financial risk created by the application of timing incentives. In contrast, the PCDs proposed in this submission case have tightly defined, granular outputs, limiting the ability to substitute deliverables. For this reason, we do not propose applying timing incentives, except in the scenario of post-AMP8 delivery.

Examples

7.1.13 We provide worked clawback examples in each case submission document. However, the PCD proposed for RGF is comparatively straightforward and does not therefore require a worked example. For each line item which is not delivered by the end of AMP8 (2029/30) we propose that the specific unit rate for that item shown in Table 15 would be clawed back.

Base expenditure PCD

7.1.14 In addition to the output based PCD for this cost change submission, we also propose an expenditure-based base PCD to protect customers from non-delivery and claw back unspent allowances for WBB across four asset classes (see Table 16). We propose a single expenditure-based PCD that would operate across four of our asset classes. If the expenditure in one asset class is less that our implicit funding allowance, but it is offset by a higher expenditure in one of the other asset classes, there would be no PCD clawback. This would provide sufficient flexibility to ensure that companies remain incentivised to target their maintenance interventions efficiently whilst providing appropriate customer protection.

7.1.15 This type of expenditure-based PCD is similar to PCDs included in PR24 final determinations. These include Network Reinforcement and Climate Change Uplift PCDs, both of which have separate expenditure-based outputs for the Water and Wastewater services respectively. The additional granularity of reporting at Water and Wastewater price control levels provides additional customer protection. Overall we consider the approach would offer appropriate customer protection and claw back allowed costs in the event of non-delivery of the planned outputs.

Limitations of WBB

7.1.16 In our calculation of WBB, we have highlighted the limitations of any mechanistic approach used to assess WBB for individual asset classes and the data issues associated with the assessment. In applying any methodology, we believe that Ofwat should give significant consideration to the risk of an overstatement and the potential impacts this could have on restricting companies' base expenditure decisions in a way that would be inconsistent with the PR24 approach to base expenditure allowances.

7.1.17 We therefore believe that our WBB estimates very much represents the upper end of the range that should be considered for WBB and that, in view of the risks associated with over-estimation, Ofwat should consider whether lower limits should be binding on companies. We have therefore proposed potential mitigations that Ofwat could consider in the *UUW26-18 Asset Health – What Base Buys* document.

[18] Price-control-deliverables-guidance-Feb-4-republishing.pdf

Detail of PCD breakdown

7.1.18 In our AMP8 programme across the priority asset classes, we have allocated base funding to cover drain down, cleaning and inspection and remediation at a specified number of small, medium and large sites. The planned expenditure on proactive interventions will be ringfenced through a base expenditure PCD in line with the aggregate WBB figure of £77m across the asset classes.

7.1.19 Table 16 summarises the breakdown of WBB across the relevant asset classes in our submission (excluding gravity sewers because it is not an expenditure based PCD). We propose that our base expenditure PCD should be ringfenced at the aggregate level. This approach ensures delivery of the full £77m of base investment, whilst allowing us to optimise prioritisation of intervention across assets in response to emerging risks.

7.1.20 This ensures that the cost-change claim is incremental to our existing AMP8 capital maintenance plan. Our expenditure on refurbishments and replacements was £37m on average per AMP across 2015/16-2024/25, therefore we are confident that we will spend our implicit allowance of £8.5m for Rapid Gravity Filters.

Table 16: Breakdown of WBB PCD (£m, 2022-23 CPIH prices)

Asset class	WBB
Boreholes	6.4
Rapid Gravity Filters	8.5
Water Network storage assets	55.7
Trickling filters	6.5
Total	**77.1**

Source: UUW analysis

7.2 Impact on Performance Commitments

7.2.1 The delivery of the interventions is not anticipated to provide any in period performance improvement as the programme is targeting risk reduction not performance improvement. The delivery of the interventions is not anticipated to provide measurable in-period performance improvement, as the programme is targeting risk reduction, not short-term performance uplift. As such, we are not expecting to see any secondary benefit associated with this investment against the AMP8 performance commitments.

8. Investment Delivery Plan

The programme is deliverable within AMP8, supported by our established design and build capability and a supply chain with proven capacity. We have sequenced works to align with operational requirements, ensuring only one filter is taken out of service at any time to protect treatment capacity at key sites.

We are actively managing all key delivery risks, including outage availability, access constraints and interfaces with live assets, through early operational engagement, flexible outage planning and multi-partner delivery. Programme-level assurance confirms sufficient capacity to deliver the additional scope safely and efficiently, without compromising compliance or customer service.

8.1 Supply chain readiness

8.1.1 Our strategy is to deliver the projects in this case via the most appropriate delivery "runway" under our AMP8 runway-based delivery model. More detail of the runway-based delivery model has been set out in our PR24 business plan submission, and summarised in Section 7 of *UUW26-02: Growth Unlocked: Water for the New Economy.*

8.1.2 Assessment of supply chain capacity and supply chain deliverability risk should not be considered in the context of any one case in isolation. Instead we have considered the impact of all cases with our Growth and Asset Health submissions in aggregate on the baseline AMP8 programme. We have engaged with our supply chain partners and undertaken a thorough programmatic assessment of capacity in our new AMP8 supply chain, to assure ourselves that the overall investment proposal is deliverable, and that there is sufficient headroom in capacity and availability of resource within our design consultants and construction & wider supply chain, in addition to our internal programme management capacity, to accommodate the additional investment.

8.1.3 Please refer to Section 7 of *UUW26-02: Growth Unlocked: Water for the New Economy* for the programmatic assessment which considers all projects proposed for investment across all cases within our Growth and Asset Health submissions, with the supporting evidence that all such investments are deliverable.

8.2 Delivery risks: design & delivery risks tracked with mitigations

8.2.1 Key delivery risks have been identified, including access constraints at rural or remote sites. Mitigation measures are in place, such as early site access planning, use of specialist offroad equipment where required, and flexible scheduling to avoid seasonal access restrictions. Additional mitigations include multi-supplier frameworks to reduce dependency on single contractors and contingency allowances within the delivery plan.

8.2.2 Based on the evidence of need, the maturity of the delivery plan, and the confirmed capability and capacity of the supply chain, the programme is considered fully deliverable within AMP8.

8.2.3 A programme risk register has been developed for Asset Health (see *UUW26-27: Deliverability risk register*). Some of the key risks associated with RGF sites are shown below.

Table 17: Key delivery risks

Risk Description	Risk Type	Mitigation Details and Progress	Risk Impact Score Maimimx 25
RGFs There is a risk that taking filters out whilst the site is operational will impact production capacity.	Threat	The delivery programme is based on an operational impact assessment and therefore one filter at a time will be refurbished. Further opportunities to be understood if able to take more than one filter offline.	16
Water Programme There is a risk that dry weather impacts may reduce the window for outages or flow reductions	Threat	The programme has been developed to stage the filter replacements to limit this impact.	15
Interface with existing assets There is a risk that projects may require significant modifications to existing live assets - this could result in additional cost and programme impacts relating to temporary treatment or over pumping to enable any modifications or upgrades	Threat	Sites where the interface with existing assets has been identified as a high risk have additional allowances in place to cover temporary treatment and over pumping to mitigate. Initial discussions have commenced with operational teams to ascertain likely requirements and timescales	9
Availability of supply chain (Build) to deliver the additional scope in AMP8 Risk that there is insufficient capacity to deliver the additional scope causing delays to delivery and/or increased costs for accelerated delivery	Threat	Early visibility of the Growth & Asset Health programmes will be provided to our delivery partners - this work will help to bridge the ramp up to AMP9 Transitional Investment and AMP9 and avoid critical resources being redeployed to other water programmes or other growth industries. Where there is overlap between Growth and Asset Health with the AMP8 programme the works will be amalgamated to reduce rework	6

Source: UUW26-27 Deliverability risk register

8.3 Outline delivery schedule

8.3.1 To establish a robust and deliverable programme, each site has undergone a detailed assessment to confirm that production capacity can be maintained throughout the works and that adequate supply chain capability is available to support delivery. The programme has been developed in accordance with the outcomes of this assessment. Letters of support from key organisations within our supply chain can be found in *UUW26-25 Letters of support*.

8.3.2 Each site has been evaluated against defined deliverability and constructability criteria, setting out the delivery runway and the specific requirements expected of each contractor.

8.3.3 A comprehensive review has also been completed to identify any interfaces or overlaps with AMP8 projects, ensuring alignment and avoiding programme conflicts.

8.3.4 The works required for the RGF assets are classified as refurbishment, with no new assets being constructed. As a result, assets will need to be taken offline during the refurbishment period. An operational impact assessment has been undertaken, and it is anticipated that one filter can be taken offline at a time, enabling the refurbishment to be completed at each site while maintaining overall service continuity.

Figure 16: Typical RGF replacement (construction activities only)

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13
Isolate & drain down													
Underfloor washout													
Media removal													
Floor refurbishment													
Remove/replace nozzles													
Media Install													
Media washing													
Sampling													
Return to service													

Source: UUW analysis

8.4 AMP8 delivery evidence

8.4.1 UUW remains broadly on track to deliver against its PR24 Final Determination (FD) Performance Commitment Deliverables (PCDs). As explained in *UUW26-02 Growth Unlocked: Water for the New Economy* we are delivering against the requirements of the FD PCDs whilst spending in line with UUW's AMP8 enhancement allowances in the final determination.

8.4.2 The mains renewals base PCD in the PR24 Final Determination is of most relevance to this submission case as it helps monitor improvements in the asset health during AMP8. Our performance illustrates how we are successfully delivering against our current FD PCD commitments. In the FD, Ofwat expects the sector to move towards a sustainable mains replacement rate to maintain and improve asset health during the period. It therefore set a PCD on all companies to deliver the specified output of the PCD (a company specific length of mains). In the May 2026 Delivery Plan progress update we are reporting delivery against this PCD as Green, showing that we are on track with delivering the requirements of this base investment to Ofwat's FD requirements.

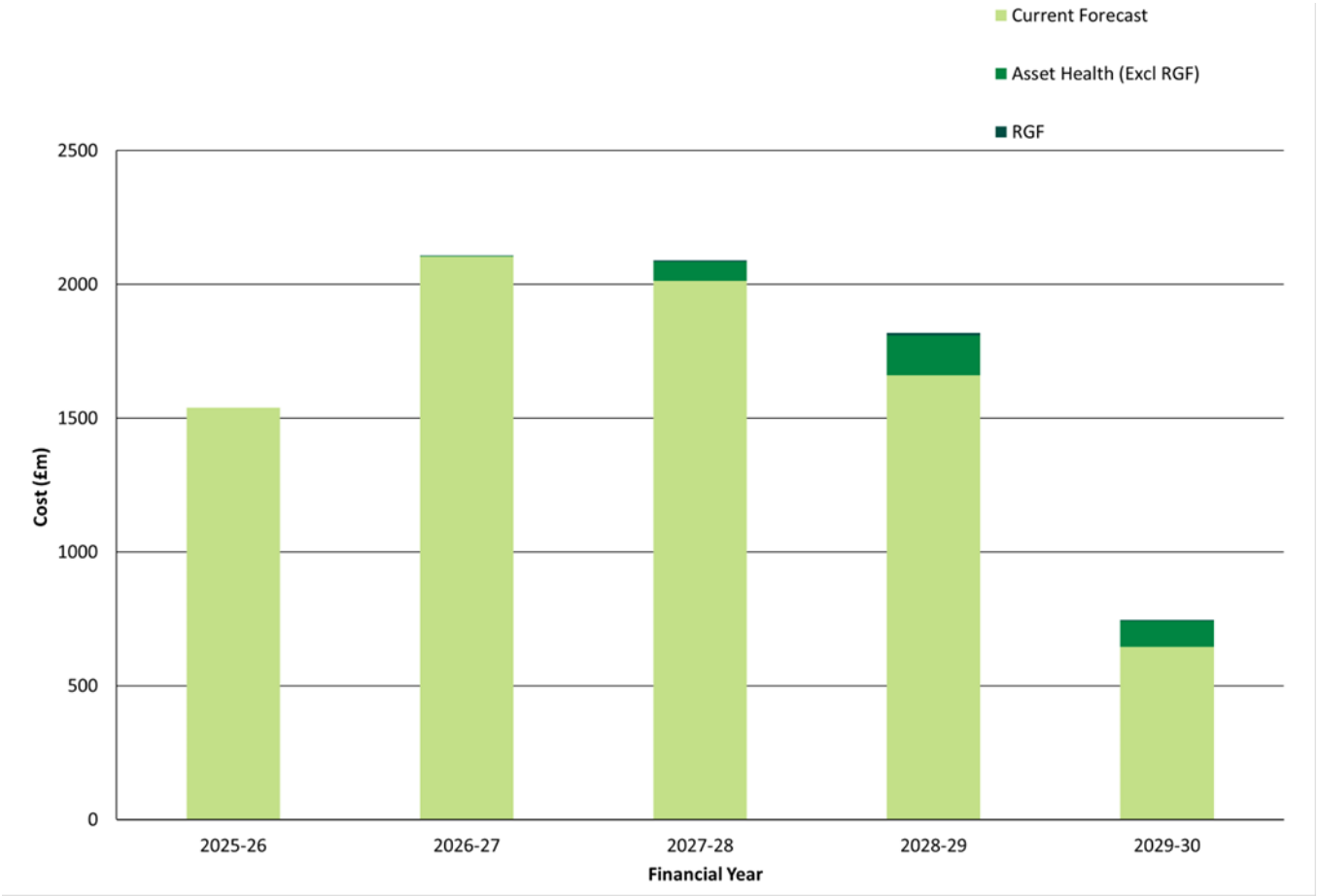
8.4.3 Table 18 and the following graph (Figure 17) illustrate the investment for asset health in the context of the Asset Health submission and the existing AMP8 programme. We are confident that the full programme is deliverable.

Table 18: AMP8 RGF Capital Expenditure Profile (£m, 22/23 Price Base)

Cost Change Category	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Asset Health	0	1.21	71.20	149.07	95.59	317.06
RGF	0	0.07	4.66	9.28	3.91	17.93

Source: UUW analysis

Figure 17: Investment profile for RGF against AMP8 (22/23 Price Base)



Source: UUW analysis

8.5 Stakeholder engagement and permissions

8.5.1 Each year, UUW delivers a wide-ranging programme of infrastructure investment, spending around £800 million annually across its asset base, based on average capital expenditure over the past three financial years. Most of this work, including the RGF activities set out in this proposal, takes place within our site boundaries and has minimal impact on customers or local stakeholders. Where communities may be affected, for example by increased traffic movements associated with deliveries, we proactively manage impacts by streamlining traffic routes, using screening to reduce visual and noise disruption, and offering community drop-in sessions for nearby residents. These measures ensure stakeholders are well informed, supported, and able to raise concerns at an early stage.

9. Assurance

The submission meets Ofwat's requirements for third-party assurance, with independent review of technical scope, cost robustness and customer protection mechanisms. This provides strong confidence that the programme is justified, efficient, deliverable, and aligned with PR24 asset health expectations.

9.1.1 This section summarises UUW's approach to assuring this submission and the outcomes of the third-party assurance. It is supported by *UUW26-19 Asset Health assurance report.*

9.1.2 Ofwat requires cost changes submissions to include a third-party assurance report in line with the requirements set out in "PR24 final determinations: Expenditure allowances - assurance requirements for delivery of enhancement schemes appendix"[19]. This includes technical and commercial assurance across the content of the submission.

9.1.3 The Technical Assurance confirms that the proposed investment meets the requirements set out in Ofwat's guidance for the following areas:

- Need for a step change in investment;
- Best option for customers; and,
- Investment delivery plan.

9.1.4 The Commercial Assurance provides a view on the robustness of the costs proposed by the company and whether they are efficient and represent industry best practice, this includes an assessment of cost estimation approach.

9.1.5 The Commercial assurance also confirms that the proposed investment meets the requirements set out in this document for the following areas:

- Robust and efficient costs; and,
- Customer protection.

[19] PR24-final-determinations-Expenditure-allowances-Assurance-requirements-for-delivery-of-enhancement-schemes-appendix.pdf

10. Site Specific Cases- Section Removed

Appendix A Site selection methodology

[✂]

Site	Is there an asset health risk?	Is the asset critical?	Is the asset still required?	Is there an alternative investment stream (growth or quality)	Is a short life intervention viable?	Is there a cost effective, long-life intervention?	Is an integrated solution with another driver viable?	Is the need for the asset expected to outlast the proposed asset life?	Can we deliver the work on at least one filter in AMP8?
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	Yes
[✂]	Yes	Yes	Yes	Yes					
[✂]	Yes	Yes	Yes	Yes					
[✂]	Yes	Yes	Yes	Yes					
[✂]	Yes	Yes	Yes	Yes					
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	Yes
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	Yes
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	Yes
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	Yes
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	No
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	No
[✂]	Yes	Yes	Yes	No	No	No	No	Yes	No

Source: UUW analysis

Appendix B Base Asset Health Dashboard Risk Forecasting

B.1 Base Asset Health Dashboard

B.1.1 The Base Asset Health dashboard is a tool developed by UUW to support asset investment decision making. It provides a picture of the current and future asset health, and risk position of our asset base resulting from a defined investment programme.

B.1.2 The dashboard presents a view across our whole above ground asset inventory. Each asset has:

- a modelled replacement cost, based upon historic UUW's project costs.
- a nominal expected asset life based upon historic UUW norms for asset replacement ages.
- an effective age based on physical age but influenced by the most recent condition assessment.
- a criticality band, based upon the potential service impact associated with asset failure.

B.1.3 The model includes forecasts of asset health and risk for various investment scenarios for each five-year investment period for the next thirty years to 2055.

B.1.4 The dashboard displays three scenarios with the profile of asset value by life for the selected assets in that investment period. Assets move upwards as they age. Assets which have exceeded 85% of their life are identified as 'end of life'.

B.1.5 The three scenarios are:

- No investment. In this scenario the assets age and are not replaced or renewed.
- Planned investment. In this scenario the current planned level of capital maintenance for AMP8 is continued each AMP for the next 30 years, ring fenced to the relevant part of the asset base, such as "all water treatment works".
- Planned investment with cost change. In this scenario the current planned level of capital maintenance for AMP8 is supplemented, just for AMP8 with the refurbishment of the targeted assets included within the AMP8 cost change business cases. Subsequently investment returns to PR24 levels for the next 30 years, ring fenced as before.

B.1.6 For all three scenarios for each forecast period, the effective age of the asset base is increased by five years, i.e. accounting for the initial condition state. Assets that are predicted to be fully life expired are then selected for renewal based upon a risk measure; the most critical life expired assets are selected first, until the available capital maintenance programme budget is exhausted. Upon renewal assets are assumed to have an effective age of zero as they enter the next timestep.

B.1.7 In the third scenario "Planned investment with cost change" additional specific assets included within the investment cases are refurbished i.e. a tank, including media, instruments, scrapers, distributors, valving and pipework, plus any local control.

Risk forecasts

B.1.8 Assets typically carry significantly more risk of failure as they enter the last 15% of their lives. The forecast change in risk position is driven by the number, value, and criticality of assets that are predicted to be life expired. This assessment enables us to track whether a well targeted investment programme is sufficient to stabilise or improve the overall risk position of the asset base, or if is predicted to lead to an overall degradation in asset health related risk.

B.1.9 The following worked example indicates the risk forecast assessment methodology on four assets over two investment periods, showing scenarios with and without investment.

Table 19: Risk forecast assessment methodology on four assets over two investment periods (without investment)

Without investment

End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
7	1	10	12	A	£1,000	83%	0	5	0
	2	60	60	B	£10,000	100%	1	4	40000
	3	30	35	C	£20,000	86%	1	3	60000
	4	25	23	D	£5,000	100%	1	2	10000
								End of AMP7 risk score	110000
								End of AMP7 normalised risk score	**1.00**
End of AMP	**Asset**	**Effective age**	**Asset Life**	**Criticality**	**Replacement cost**	**BAH**	**Last 15% End of life**	**Criticality weight**	**End of life risk score**
8	1	15	12	A	£1,000	100%	1	5	5000
	2	65	60	B	£10,000	100%	1	4	40000
	3	35	35	C	£20,000	100%	1	3	60000
	4	30	23	D	£5,000	100%	1	2	10000
								End of AMP8 risk score	115000
								End of AMP8 normalised risk score	**1.05**
End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
9	1	20	12	A	£1,000	100%	1	5	5000
	2	70	60	B	£10,000	100%	1	4	40000
	3	40	35	C	£20,000	100%	1	3	60000
	4	35	23	D	£5,000	100%	1	2	10000
								End of AMP9 risk score	115000
								End of AMP9 normalised risk score	**1.05**

Source: UUW analysis

Table 20: Risk forecast assessment methodology on four assets over two investment periods (with investment)

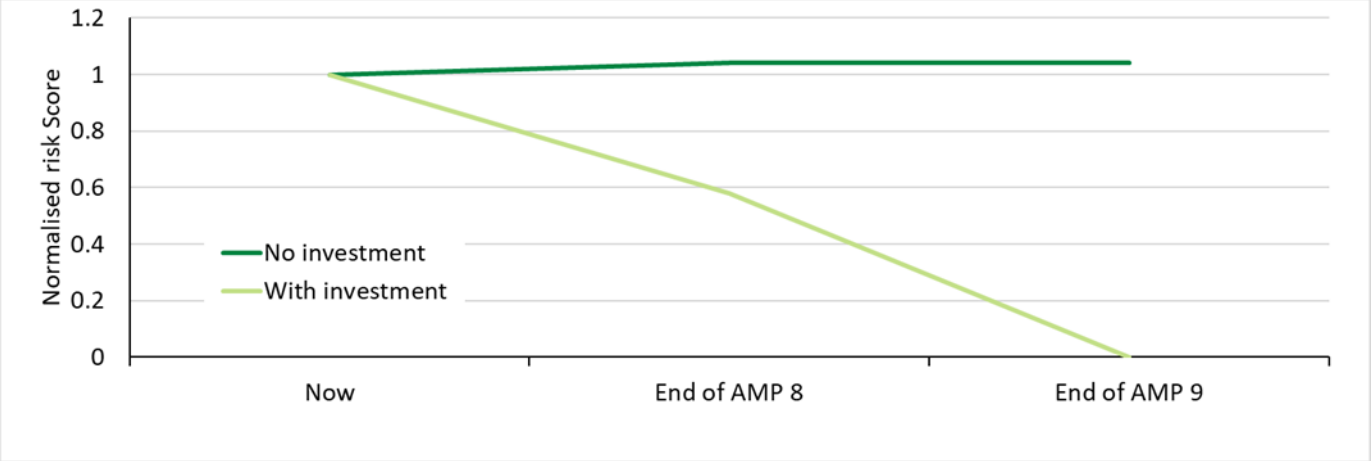
With investment (grey highlighting indicates investment)

End of AMP	Asset	Effective age	Asset Life	Criticality	Replacement cost	BAH	Last 15% End of life	Criticality weight	End of life risk score
8	1	15	12	A	£1,000	100%	1	5	5000
	2	0	60	B	£10,000	0%	0	4	0
	3	35	35	C	£20,000	100%	1	3	60000
	4	0	23	D	£5,000	0%	0	2	0
								End of AMP8 risk score	65000
								End of AMP8 normalised risk score	**0.59**
End of AMP	**Asset**	**Effective age**	**Asset Life**	**Criticality**	**Replacement cost**	**BAH**	**Last 15% End of life**	**Criticality weight**	**End of life risk score**
9	1	0	12	A	£1,000	0%	0	5	0
	2	5	60	B	£10,000	8%	0	4	0
	3	0	35	C	£20,000	0%	0	3	0
	4	5	23	D	£5,000	22%	0	2	0
								End of AMP9 risk score	0
								End of AMP9 normalised risk score	**0.00**

Source: UUW analysis

The above example (no investment) as described in Table 19, and the related example (with investment) as described in Table 20 would result in the following changes over time in underlying asset health risk across the portfolio of assets, as shown in the Figure 18.

Figure 18: Risk change over time



Source: UUW analysis

United Utilities

Water for the North West