Dŵr Cymru
Welsh Water

WSH50-IP00 –

Our Approach to Investment Planning

Contents

Executive Summary

Our approach to planning our investment has evolved significantly for AMP8. Shifting stakeholder demands over recent years have driven new innovative approaches in how we plan for our immediate and longer-term investment needs.

Our Long Term Delivery Strategy describes our plan to achieve our long-term ambitions, including an enhanced level of resilience, whilst being able to adapt to the shocks and stresses we are likely to experience over the years ahead. The sector is facing a lot of uncertainty, both in terms of the implications of the growing societal trends for ever higher environmental standards and in the impacts of long-term stresses like climate change and population growth. Our Long Term Delivery Strategy considers the key strategic themes of:

- Safe and high-quality drinking water.
- Reliable water supply.
- Protecting the environment and communities.

These key themes have also been used to develop our investment plan, as seen in Figure 1, evidencing that we have linked our Long Term Delivery Strategy to our investment plans.

In addition, and to complement our Long Term Delivery Strategy, we were one of the first water companies in the UK to develop a Resilience Framework and to undertake a comprehensive, comparative assessment of its resilience. In early 2017, we commissioned Arup to work with us to create the Welsh Water Resilience Framework to identify areas of strength and areas for improvement. This was used to underpin our WSH01 Long Term Delivery Strategy.

In 2022 we invited Arup to return to re-score our current level of resilience maturity following our work to address many of the actions identified in the previous assessment combined with the broader work to improve our asset management maturity. At the same time, we took the opportunity to adjust our Resilience Framework to reflect Ofwat's "Resilience in the Round", as it was published after our original assessment, and to enhance it with how our thinking and the wider resilience landscape has evolved over the last few years.

We are piloting the use of an innovative multi-criteria analysis software tool to enhance the Adaptive Systems Planning capability for Welsh Water to feed into the next iteration of our Long Term Delivery Strategy. Rapid, mass scenario analysis can both reflect a changing context for known investments and automatically generated investment options. Implementation will allow for the enhanced development and assurance of our core pathway and a more complete range of alternatives across a 25-year timeframe, clearly identifying the triggers which would lead to an alternative pathway, evaluating associated uncertainty, giving more confidence of what constitutes no and least regret pathways and avoiding stranded assets in the process.

We have developed our Drainage and Wastewater Management Plan (DWMP) as a collaborative long term strategic plan outlining how we intend to extend, improve, and maintain a robust and resilient drainage and wastewater system. It is an integral part of our overall company ambition, Welsh Water 2050, which aims to ensure that we become a truly world class, resilient and sustainable water service for the benefit of future generations. The plan will play a crucial role in highlighting where we anticipate risk from growth and climate change, the impact of customer behaviours, the need to meet new tighter environmental regulations, and the maintenance of our assets.

We have developed a new Water Resource Management Plan (WRMP) for PR24. This Plan is built on our previous WRMP19 in which the key drivers were the management of significant abstraction licence changes due to the implementation of the Water Framework and Habitats Directives, improvement to water resource resilience, and the mandating of demand management targets. We set a target to reduce our overall company level of leakage by 15% by 2024-25 and we are on target to achieve this having made a c10.5Ml/d reduction already. Of equal importance was the setting of a longer-term target to reduce the average per capita consumption (PCC) to 110 litres per person per day (l/p/d) and an 8% reduction in business demand by 2050.

We have improved our Multi-Capital Value Framework (also sometimes referred to as our Service Measure Framework or SMF) to introduce a broader range of criteria and metrics that better capture social and environmental externalities, including both direct financial and indirect non-financial impacts and dependencies. The Multi-Capital Value Framework has adopted the capitals definitions from the Integrated Reporting Framework (2021), aligning with best practice including Capitals Coalition's Natural Capital Protocol and Social and Human Capital Protocol.

Our Multi-Capital Value Framework has improved our decision-making, enabling us to more systematically and objectively consider the varied, and sometimes conflicting, priorities of our customers and wider stakeholders as well as practical constraints. We can therefore better demonstrate that our Plan provides the overall best value possible.

Our asset management approach and systems have also developed significantly. We have implemented asset management maturity objectives, all of which are underpinned by the Asset Management Maturity Assessment (AMMA) and our Strategic Asset Management Plan (SAMP). From the AMMA assessment, our ratings have improved from "Developing" to "Competent" and in some cases "Optimising". In addition to this, we are investing in the development of our people. We have identified key roles that require advanced asset management training and recognised professional qualifications (IAM Diploma, Certificate or Foundation) and we have started the roll-out of this training. These developments highlight that the development of our PR24 investment plan has been built with robust processes and by competent people.

Our approach to PR24 is to ensure that the link between cost and performance is well understood and to achieve this we need to be as data driven as possible. We started by improving our understanding of the current and future health of our asset base and how this would change based on a variety of investment plan options. To achieve this, Welsh Water has worked extensively ahead of PR24 to improve the maturity of our asset data analytics.

We have achieved this through:

- Developing a comprehensive system to collect and process asset health data to avoid the historical reliance on expert judgement, our "Asset Information requirements".
- Fully refreshing our service impact modelling, extending our failure dataset to 20 years to ensure we can be confident in our investment choices.
- Developing a systematic approach to Asset Risk through our realigned approach to base asset health and criticality using our new Multi-Capitals approach.

We have worked with the most appropriate strategic partners to ensure we have taken the best possible approach in each subject area.

For our service impact modelling, we partnered with Aecom and ICS consultants. This work has also received expert peer review by Cardiff University School of Mathematics and independent review by PricewaterhouseCoopers.

For our more specific analysis on the environmental factors affecting the current deterioration of our Asbestos Cement pipes, we partnered with Ovarro DA Limited given their previous extensive work in the area with UKWIR.

This activity has allowed us not only to plan effectively for our AMP8 period, but also plan for the longer term to feed our Long Term Delivery Strategy.

The Glas Board is committed to delivering a seamless and efficient service to our customers during the transition through AMP7 to AMP8. Significant resources have been deployed to develop a 2-year AMP8 rolling investment programme ensuring all Year 1 and 2 programme and project designs are complete for construction commencement in April 2025. In addition, the supply chain has been engaged early to ensure continuity and resilience of resource availability for Welsh Water's biggest investment programme in its history.

1. Introduction

This document describes the approach to asset management and investment planning used for PR24. It sets out the principles and practices that underpin all our planned investment and provides the methodology by which:

- risks and opportunities to the services we provide to our customers and to our interactions with wider stakeholders and the environment are identified.
- solution options and investment proposals are produced and assessed.
- the investment plan is developed and optimised to deliver the best possible outcomes.

1.1 Structure of this Document

This document is structured into five sections:

Table 1: Structure of this Document

Section	Summary
Our Customers, Legislation and Approaches	This covers our Asset Management good practices, our Asset Management System and ISO55001 certification, and the requirements and constraints we have considered during the development of our PR24 investment plan. This section also covers our approach to Direct Procurement for Customers (DPC).
Development of our AMP8 Investment Plan	This details the steps taken to develop our AMP8 investment plan, including planning, optioneering, costing and efficiencies. This section also details our AMP8 readiness plans.
Supporting Tools, Systems and Processes	This describes the tools, analysis, systems, and processes used to develop our AMP8 investment plan. It includes asset information, competency, our Multi-Capital Value Framework, and asset health.
Assurance and Challenge	How we have worked with independent agencies to provide assurances around our approach.
Continuous Improvement	Our approach to continual improvement to our asset management processes and maturity, outlining the benchmarking and our Asset Management Maturity Assessment development plans.

In addition, we are submitting:

- *WSH51-CW00 – Safe and High-Quality Tap Water*, *WSH56-RS00 - A Reliable Water Supply for the Short and Long Term* and *WSH63-PE00 - Protecting and Improving the Environment* that illustrate the application of our asset management approach and set out how we will deliver the right service for our customers and the environment in AMP8.
- 21 enhanced investment cases, which provide specific responses to Ofwat's enhancement assessment criteria set out in Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A1. These are technical documents written to evidence our approach for specific cases and why the investment proposed presents the best option for customers in the context of the overall plan.

Figure 1 shows the structure of our investment submission, including this overview document, the three overarching investment narratives, and the supporting enhanced investment cases.

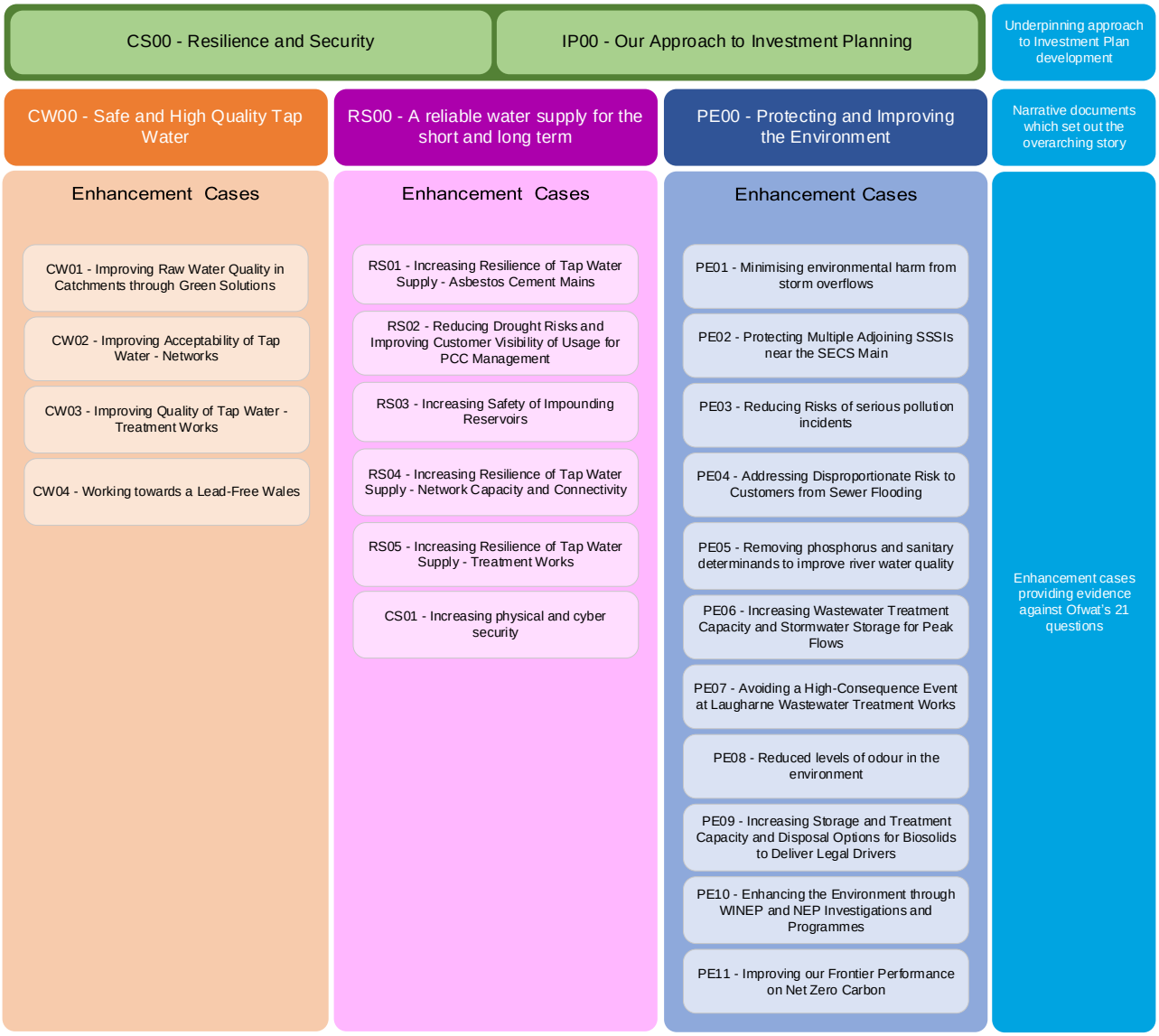


Figure 1: Established Hierarchy of Documents

1.2 Asset Management Maturity

In conformance to the requirements of ISO 55001: Asset Management and as part of good practice, we continually review and improve our approach (see Section 0). Since Ofwat's Asset Management Maturity Assessment (AMMA) in 2021, we have achieved a maturity level of at least "competent" in all areas – with some aspects of our approach now at a maturity level of "optimising performance". As described in Section 5.1, our asset management practices and maturity have been externally assured.

1.3 Legislation and Other Requirements or Constraints

We are mandated to deliver certain investments to satisfy the requirements of legislation or regulatory enforcement. Compliance ensures that we deliver the standards that our customers and society expect. We continually review our approach to make sure that we are managing risks in a suitable, adequate, efficient and effective way.

Changes in legislation or tightening regulatory standards are key drivers for enhanced investment, typically placing new requirements or constraints on the levels of service we provide or the ways we operate.

The Water Industry Act 1991 sets out the main powers and duties of water and sewerage companies. In line with our Asset Management Policy (see Appendix A), the PR24 Business Plan has been built in accordance with this, the regulatory drivers of the National Environment Programmes (WINEP in England and NEP in Wales), and other key legislative or regulatory requirements (see Section 2.3).

1.4 Engaging with Our Customers, Regulators and Other Stakeholders

Customer needs and priorities have been a core consideration in formulating our PR24 Business Plan. The results of our structured programme of customer engagement and research are presented in *WSH30 – Customer Engagement and Research*.

Furthermore, our regulators often take customer views and public sentiment into account when formulating policies and regulations. For example, as customers have become more environmentally conscious, regulatory authorities have responded by introducing measures that encourage or enforce actions to address environmental issues. Regulatory mandates for reducing pollution, implementing water conservation measures, or investing in renewable energy and sustainable practices reflect our customers' priorities.

1.5 Delivering Best Value

1.5.1 Robust Costing Processes

We have established and robust costing processes. Forming part of these processes is our Unit Cost Database (UCD). The UCD is our main business tool to estimate the cost of our maintenance and enhancement schemes. The UCD is the collective term for several systems used to carry out the costing function. One of the main systems, essential to the UCD, is the Engineering Estimation System (EES). It was introduced to help business-planning estimating and has been in place, and continually improved, since 2006. Within the PR24 Investment plan, we used three general approaches to costing. These are:

- Historic trend analysis and extrapolation
- Like-for-like costing (top-down)
- New areas (bottom-up)

We have used a top-down methodology drawing on our UCD to estimate around 80% of the plan.

Our enhanced investment cases reference the confidence in the cost. Most of our investment plan is a continuation of existing work types and as such is high confidence. We are continuing to progress schemes through their lifecycle towards detailed design and therefore cost confidence will continue to improve after submission.

1.5.2 Challenging Ourselves on Efficiency

The investment plan has been developed, reviewed, and adjusted with the Executive team. As a result, top-down adjustments and efficiencies have been applied on top of the efficiencies already identified by the business during plan development. These include:

- Specific stretch targets set by the Executives for individual investment lines
- Portfolio-level efficiencies set by the Executives for the business plan as a whole

See Section 3.11.

1.5.3 Optimising for Best Value

We are focused on delivering the right outcomes for our customers and stakeholders. We have evaluated our investment options through good practice whole life value analysis, considering multiple economic (including the private cost of failure and the cost of capital over the life of the investment), social and environmental criteria that reflect the wide range of, sometimes conflicting, priorities of our stakeholders. From the simple Cost-Benefit Analysis (CBA) models used for identifying work in PR19, we have built a CBA decision-support tool that reflects good practice, incorporates Multi-Capital Accounting (also sometimes referred to as our Service Measure Framework or SMF), and fully aligns with Ofwat requirements. We are now able to conduct more comprehensive scenario analysis (including portfolio-level goal-seeking optimisation) and quantify a wider range of benefits than were previously considered. We have developed consistent and systemised CBA models using our Multi-Capital Value Framework.

In addition to this and to ensure that we are selecting the best value option for our customers, we have considered a comprehensive set of options which reflect a range of spend and risk profiles and which offer viable solutions to the needs identified.

In producing our investment plans we have followed a clearly defined process to ensure the investment cases are founded on robust data and were developed in compliance with our ISO55001 certified asset management system (see Appendix A). This system includes processes set to deliver compliance with our legal and regulatory requirements as well as delivering value for customers.

Our approach follows a framework, shown in Figure 2, for each area of investment. The process flows from a clear articulation of customer and stakeholder needs through options development and analysis, to establishing solutions and performance commitments that meet the standards that customers expect. Finally, we ensure that investment is aligned to regulatory criteria and that appropriate customer protection is in place.

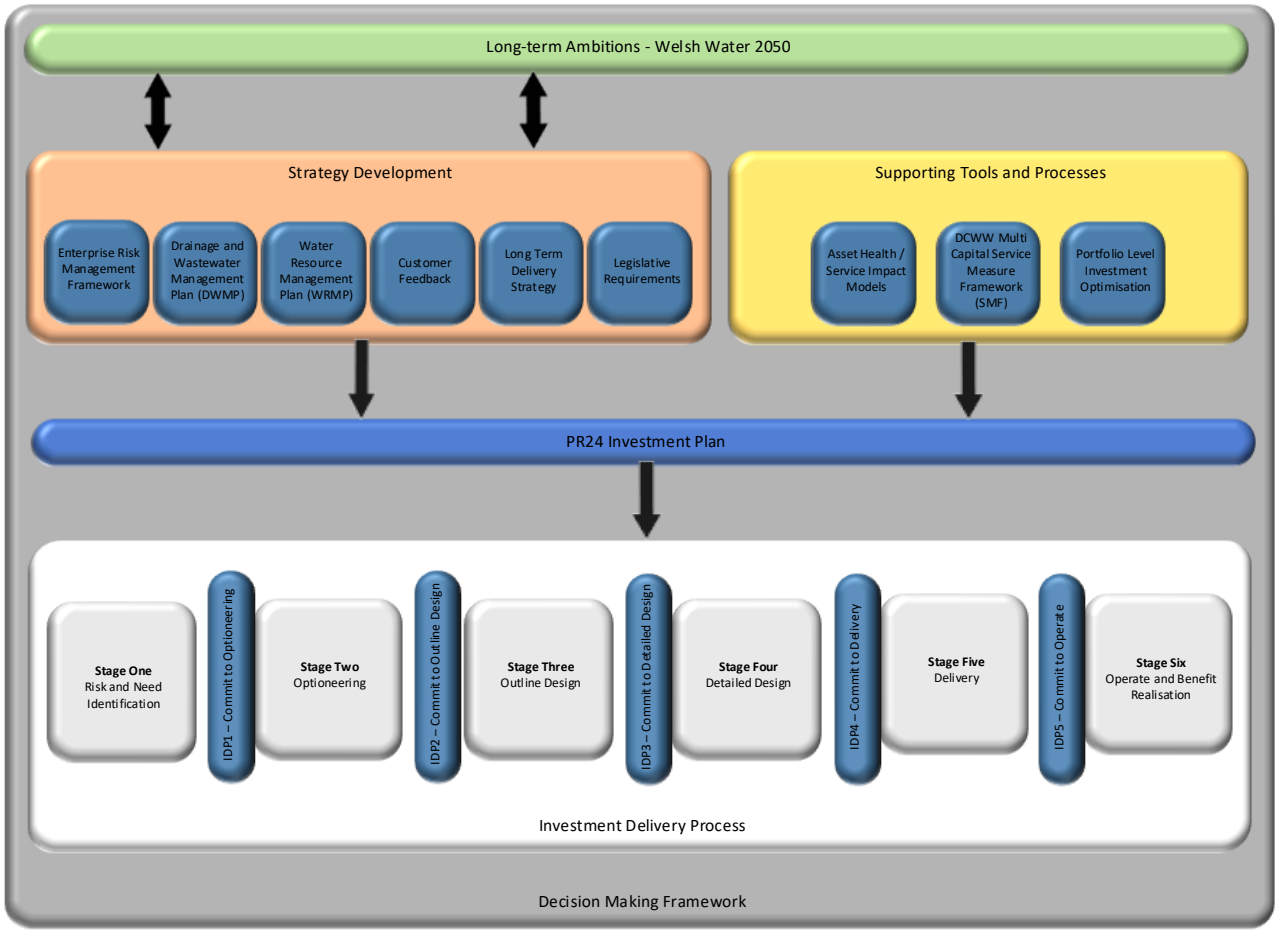


Figure 2: Investment Framework

1.5.4 Review and Governance of the Plan

We have also implemented a strict review and governance process to ensure that subject matter experts develop and challenge the plans, which have been separately and independently reviewed by our senior leadership team and Board, our Internal Audit department and by the Customer Challenge Groups (CCG).

We have also made use of targeted external assurance in the forms of:

- Focused engagement with our Board
- Ongoing engagement with Welsh Water's Senior Leadership Team
- Data provisions and assurance
- Internal Audit
- External Audit in areas of complexity

1.5.5 Delivering Best Value: In Summary

Our investment planning approach delivers against our Asset Management Policy, presented in Appendix B, and ensures that we meet the needs of our customers. We have confidence that the plan we have developed discharges our legislative duties, improves performance, reduces costs, and delivers positive outcomes for customers, stakeholders, and the environment.

2. Our Customers, Legislation and Approaches

2.1 Asset Management Good Practice at Welsh Water

Our approach to developing the PR24 submission builds on embedded good practice in asset management at Welsh Water. Our approach has achieved certification to the international asset management standard (ISO 55001), and our team are Institute of Asset Management (IAM) trained.

This section outlines our business-as-usual approach to asset management and how it has been applied in the development of our business plan.

Our asset planning processes and tools are used continually to plan and prioritise investment and act to address emerging issues. Using these capabilities, tools, and processes, we develop a detailed and costed investment plan to deliver the right customer outcomes and meet our performance targets.

Planned investment is based on evidence of the need to address a risk of failure (including against new legislative requirements) or improve customer service.

Our System: Service-asset issues and needs are captured on an ongoing basis in our Investment Manager (IM) database – this provides a single archive of needs and associated evidence which can be accessed around the business. Issues and needs (problem statements) may come from asset failure in the routine operation of our assets, ongoing deterioration identified through survey or modelling, process performance issues, or through a third-party trigger such as DWI or EA enforcement. We have workflow systems that allow issues to progress to solutions from identification to delivery and financial completion. This is standard good practice and provides a firm basis for investment planning.

Our Process: The workflow of issues is governed by our Investment Decision Point (IDP) process, the first three IDPs cover understanding of needs, development and evaluation of options and building an optimised investment programme. The process ensures that all needs and subsequent interventions within the business are managed in a consistent way. This process takes a business, operational or strategic issue recorded in IM and quantifies the impact in line with the company's Multi-Capital Value Framework (see Section 4.4).

Our Governance: We have two forms of governance processes within our decision-making framework, covering both the development of the PR24 Investment Plan and then the governance process to control programmes and projects though the IDP process.

2.2 Asset Management System (AMS) and ISO 55001 Certification

All functions of the organisation are involved in the AMS and we have developed the following scope for our ISO 55001:2014 certification:

'The Effective operations, maintenance and improvements of Welsh Water's Water, Waste and Bioresource infrastructure along with the associated support service and asset management processes to ensuring the provisions of safe drinking water and safe sanitation to its customers.'.

We are certified under the international standard for asset management ISO 55001. Adherence to the standard helps us to:

- Establish an asset management system to optimally manage assets
- Implement, maintain and improve our asset management system
- Develop and comply with an asset management policy and strategy.
- Continuously drive improvement

We undergo certification audits every three years via an accredited certification body, with annual surveillance audits for the years in between, to ensure we are maintaining our asset management systems appropriately.

2.3 Discharging our Legislative Requirements

We are mandated to deliver certain asset interventions to satisfy the requirements of legislation or regulatory enforcement. Compliance ensures that we deliver the standards which our customers and society expects. We continually review our approach to make sure that we are managing risk in a suitable, adequate, efficient and effective way.

Changes in legislation or tightening regulatory standards are key drivers for enhanced investment, typically placing new requirements or constraints on the levels of service we provide or the ways we operate.

This section sets out the underpinning legislative drivers behind our PR24 submission. Most notable are the increased environmental investments within the WINEP and NEP.

The Water Industry Act 1991 sets out the main powers and duties of water and sewage companies. The sections below provide an overview of some of the key legislation we are working to.

2.3.1 Water Quality

The Water Supply (Water Quality) Regulations (Wales) 2018 SI No 647 are primarily concerned with the quality of water supplied for domestic or food production purposes containing the requirements of the quality of water intended for human consumption.

Instruments	Main legislative drivers
Drinking Water Standards	The Water Resources Act 1991 sets out the functions of the national rivers authority (EA/NRW) which introduced water quality classification and objectives.

2.3.2 Water Quantity

Instruments	Main legislative drivers
Dam Safety	Welsh Water have a statutory duty to ensure bulk storage of water complies with legislation on health and safety under the Reservoir Act 1975, with a requirement to carry out detailed inspections (Section 10 reports) every 10-years supported by annual statement (Section 12 reports). Changing climatic conditions are raising the bar for compliance against these requirements.
Water Resources Management Plan	The duty to prepare and maintain a WRMP is set out in sections 37A to 37D of the Water Industry Act 1991. Within the guidance from the EA and NRW we need to work towards targets for leakage, resilience to drought and PCC.
Water Resources Security of Supply & Drought Plans	Solutions to resolve existing environmental problems caused by abstraction and to prevent deterioration in the condition of the environment should be put in place where required in line with the Water Resources Management Plan Regulations 2007. Water companies must ensure that agreed up-to-date plans are in place to manage drought and minimise environmental impacts. Water resources management plans should identify when drought management interventions are needed to manage plausible droughts.
Drinking Water	Drinking water protected areas are established under the Water Environment (Water Framework Directive) (England & Wales) Regulations 2017 (the WFD Regulations) for water bodies from which water for human consumption is abstracted. Water companies need to protect water resources and make sure their supplies are resilient. Companies need to consider how to

Instruments	Main legislative drivers
	mitigate climate change impacts, future demand, and deterioration caused by existing and emerging chemical substances.
Flood Resilience	The National Flood and Coastal Erosion Risk Management Strategy (the National FCERM Strategy) states that by 2030, water companies will plan for their infrastructure to be resilient to flooding and coastal change.

2.3.3 Environment

Environmental protection is a primary considerations for us, our customers and employees. We are also mandated to meet certain standards set out in legislation.

Our largest area of investment – the WINEP and NEP - is driven by environmental legislation and regulation. Environmental legislation is primarily enforced by the EA and NRW with whom we have met regularly during the development of our business plan.

Environmental investment generally follows risk-based inspection or monitoring which indicates that an asset is failing against the latest standards.

Instruments	Main legislative drivers
Section 101A	Section 101A of the Water Industry Act 1991 (as amended by the Environment Act 1995) places a duty on sewerage undertakers to provide first time sewerage (by connection to a foul sewer) in an area where non-mains sewerage arrangements are causing an environmental or amenity problem or are likely to do so if no preventative action is taken.
DWMPs	Drainage and Wastewater Management Plans (DWMPs) set out long-term aspirations and medium-term investment needs for drainage and wastewater. The Environment Act 2021 includes legal duties to tackle storm overflow discharges and their impact to help protect our waters. DWMPs should be used to quantify the current and future risks to, and from water company assets, and their interaction with other's drainage assets, seeking opportunities for co-planning and delivery and securing sustainable solutions
WINEP and NEP	WFD WWTW - P & San Dets CSO Harm Reduction and CSO monitoring WFD WWTW Permit parameters (WFD_PG_IMP) Phosphorous reduction / no deterioration in SAC rivers and WFD status (HR_P_NDIMP / HR_P_IMP1) Sludge storage, investigation and resilience (SUiAR) The flood and water management Act 2010 encourages the use of sustainable urban drainage systems (SUDs), and modernised the list of activities that can be restricted during a drought event
The following aspects are also covered under the WINEP and NEP:	
Bathing Water	The Bathing Waters regulations 2013 sets microbiological standards for designated waters protecting bathers health with the government aiming for all bathing waters to achieve at least sufficient class.

Instruments	Main legislative drivers
Chemicals	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 sets out environmental quality standards. This focuses on preventing deterioration of ground and surface waters and improving chemical status. Chemical Investigation Programme (CIP) and subsequent controls are expected to form part of the chemical management plan.
Eels	The EC Eel Regulation 1100/2007, transposed into UK law via the European Union (Withdrawal) Act 2018, aims to establish measures for the recovery of the stock of European eel. Water companies must comply with the requirements of the Eels (England and Wales) Regulations 2009. This will support the recovery of the European eel stock. All intakes (abstracting at least 20 cubic metres per day) and all outfalls must be screened to a required specification to prevent the ingress of eel unless the EA/NRW exempts the requirement.
Habitats & Ramsar	Habitats sites receive special protection under the Conservation of Habitats and Species Regulations 2017. Water companies must do a Habitats Regulations Assessment if their plans and projects may affect Habitats sites. They should make sure their plans and projects have no adverse effect, either alone or in-combination with other plans and projects, on the integrity of habitats sites.
Invasive non-native species	The UK has specific international and national obligations and laws to control the spread of invasive non-native species (INNS). Actions should be taken to: (i) mitigate the risk of introduction and spread of INNS across new and existing water company assets and activities and (ii) to control and manage INNS where their impacts pose a risk of deterioration in water body status or have an impact on achieving conservation objectives at Sites of Special Scientific Interest and Habitats sites.
Marine Conservation Zones	The Marine and Coastal Access Act 2009 provides the legal mechanism to ensure clean, healthy, safe, productive, and biologically diverse oceans and seas by improving the management and protection of the marine and coastal environment. Water companies are expected to contribute to maintaining or achieving the objectives within Highly Protected Marine Areas (HPMAs).
Fish (Salmon and Sea Trout)	In waters frequented by salmon and sea trout, the Salmon and Freshwater Fisheries Act 1975 (SFFA 1975) sets out specific circumstances for when fish passes, and the screening of intakes and outfalls, are required. Where water company assets or operations affect, or have the potential to affect, salmon and sea trout then these can be addressed through the NERC Act 2006.
Shellfish Waters	The microbial standard (measured as Escherichia coli) in shellfish flesh is retained for shellfish protected areas in the Shellfish Water Protected Areas Directions 2016 (the Shellfish Directions). Water companies should progress actions that reduce microbial pollution from wastewater discharges to, or near to, shellfish water protected areas.
Sites of Special Scientific Interest	The Wildlife and Countryside Act 1981 (as amended) requires public bodies to take reasonable steps, consistent with the proper exercise of their functions, to further the conservation and enhancement of the flora, fauna or geological or physiological features of Sites of Special Scientific Interest (SSSIs). Water companies are expected to contribute to maintaining or achieving SSSI favourable condition both on land they own, the catchment in which they operate, and other areas in which they exercise their functions.
Urban Wastewater	The environment is protected from the adverse effects of discharges of urban wastewater through the Urban Waste Water Treatment Regulations 1994 (UWWT Regulations). Water companies should see these in the context of the general duties to provide, improve and extend the sewerage system imposed by section 94 Water Industry Act 1991.

Instruments	Main legislative drivers
Sludge	The Urban Waste Water Treatment Regulations 1994 require reuse of sludge where practicable. Recycling to land of sewage sludge should not prevent water bodies achieving the WFD Regulations objectives. Water companies are expected to manage their sewage sludge treatment, supply, storage, and use, so as not to cause pollution to land, surface water or groundwater. They must follow the Sludge (Use in Agriculture) Regulations and Environmental Permitting Regulations and the Defra Code of Practice for Agriculture Use of Sewage Sludge.

2.3.4 Working with Regulators to Implement Legislation

In addition to our work with customers, we have worked closely with our regulators in the development of our AMP8 investment plan, particularly with regards to the WINEP and NEP.

This includes monthly working sessions with NRW and the PR24 Forum which involves Ofwat, NRW, Welsh Government representatives, CCWater and NGOs such as the River Trusts. We have worked effectively with these organisations to co-create a robust programme of work for AMP8. These meetings have allowed us to present and refine our thinking, and work towards a position of stakeholder support for our activities.

The process of developing the NEP, our largest single area of spend, has seen an evolution from a programme initially estimated at £1,600M to a final programme of £1,026M in TotEx.

This has been achieved by ensuring that drivers are clearly understood, and obligations tightly defined. Combined with phasing of work through time to deliver benefits when required – prioritising biggest benefits in the short term, giving opportunity (with further study and innovation/new approaches) to maximise benefits from future work.

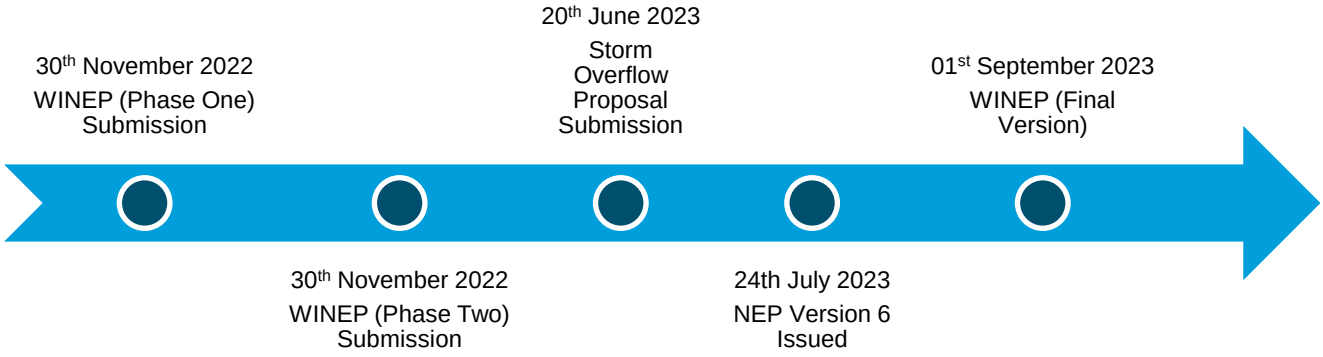


Figure 3: Timeline of WINEP and NEP Submissions

2.3.5 Other: SEMD, H&S, etc.

We also have other duties we need to satisfy in relation to being the owner of a large and varied asset portfolio. We demonstrate that we take reasonably practicable steps in ensuring we do not harm our staff, our customers or anyone else that could encounter our assets or services. These requirements include the following:

- Health & Safety at Work Act (1974)

- Control of Asbestos Regulations (2012)
- Occupiers Liability Act (1957, 1984, 1995)
- Construction, Design & Maintenance Regulations (2015)

Security issues also create a volume of mandated activity. To comply with national infrastructure security requirements issued by BEIS (Physical Security Upgrade Programme - PSUP), we must maintain security equipment across Welsh Water and in some instances upgrade security capabilities. In addition, we need to maintain cyber security defences to a government agreed standard.

2.3.6 Environment – GHG emissions

The Welsh Water approach to measuring and valuing carbon emissions follows DES&NZ (2021) best practice guidance and uses the most up-to-date carbon values per tonne of carbon dioxide equivalent (tCO_2e). Estimates of embodied and operational carbon sit alongside the private cost estimates for all assets in the UCD that are then brought forward into the Carbon & Cost Estimating Tool (C&CET).

This helps to ensure carbon is fully integrated into our strategic decision-making process.

2.3.7 Planning for Compliance with Legislative Requirements

It is important for us to establish a clear connection between legislation and appropriate investment, challenging the interpretation of obligations to ensure that we meet requirements whilst maintaining affordability.

Where appropriate, we have also been able to incorporate the views of customers and stakeholders into our legislative responses. Where there are genuine choices of the phasing of activity, or the way in which we comply, we have challenged ourselves to adapt our programme of work to incorporate these views. These actions have led us to reduce the overall scale of investment in AMP8.

We can evidence our actions to demonstrate that we are complying with our statutory obligations under various forms of legislation. We have tested our proposals with our regulators to ensure that we are delivering the standards they expect.

2.4 Fair Regulatory Treatment

Having identified potential interventions an examination of regulatory treatment is then made.

We examine the split between base and enhanced investment and consider the viability as a Direct Procurement for Customers (DPC) programme or scheme.

2.4.1 Direct Procurement for Customers (DPC)

We have assessed our investment plans for AMP8 in accordance with Ofwat's guidance. The guideline threshold for DPC has increased from £100 million at PR19 to £200 million. Above that level there should be an assumption that DPC is used as a default, unless companies can demonstrate it is not appropriate or would not deliver value to customers. There is also a technical discreteness and value for money assessment, and we need to take into account the Welsh Government's position on the introduction of competition as set out in its SPS.

On the above basis we asked Aqua consultants to review our investment plan. Following this review, it has been concluded that there are no schemes for which a DPC approach is likely to be suitable and would bring benefits for customers. Welsh Water have reviewed and endorse this approach and as a result we have accordingly not included any new DPC projects in our plans for AMP8. Full details can be found in WSH34-IP01 - Assessing our Plan for Direct Procurement for Customers (DPC) Opportunities.

2.4.2 Identifying Enhancement

Building on the published Ofwat methodology, we have developed a standardised set of tests to establish whether any element of an investment area will constitute enhancement, and if so what amount is covered under base and what amount is enhancement.

We have developed the process flow shown below to assess all potential projects and determine viable enhancement cases. All projects have been taken through the process flow and challenged at each stage. Where the output of the process flow indicates a project is meeting the enhancement criteria, further work has been undertaken to ensure the evidential thresholds can also be met. This has included assessing each scheme with respect to Ofwat's enhancement criteria and the twenty-one specific questions in the areas of need, best options for customers, cost efficiency and customer protection.

We have also tested any potential overlap between enhancement and base. This is particularly relevant where we are replacing an asset because of an enhancement driver which might have been replaced on a maintenance basis. In general, we have found that the enhancement work is happening well in advance of any planned maintenance and as such there is no overlap. Where overlaps have been identified the proposed enhancement investment has been reduced (e.g. customer supply metering, or service reservoirs) or removed, as appropriate. This is described in more detail in our enhanced investment cases.

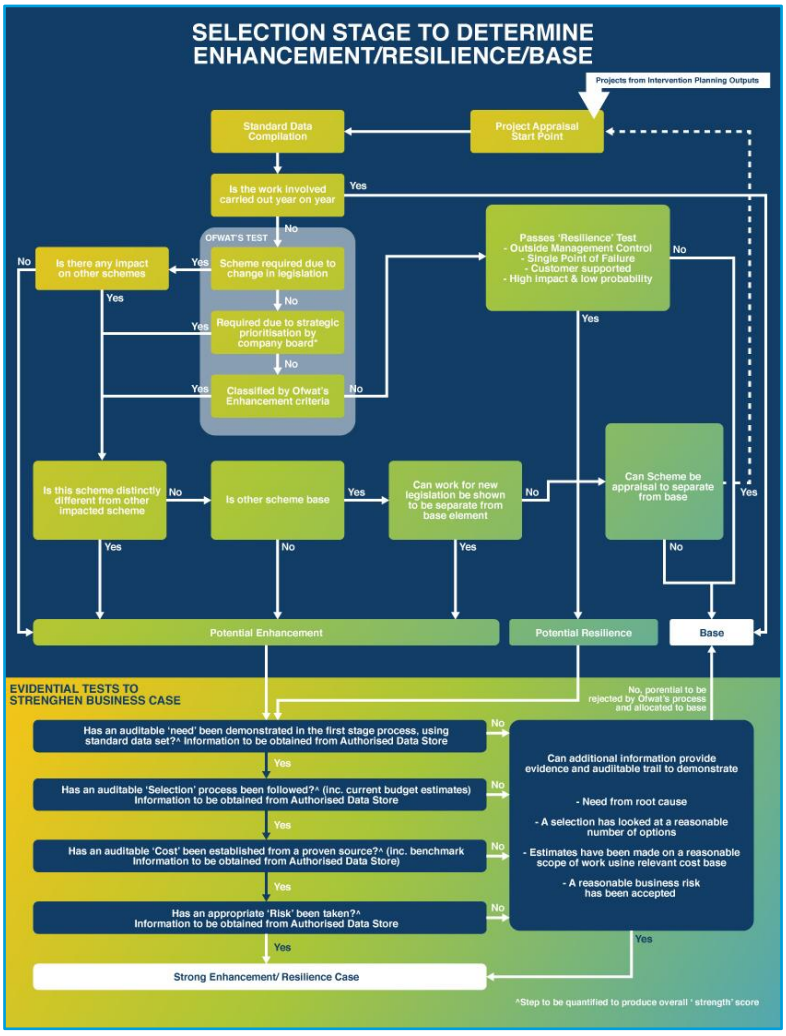


Figure 4: Base vs Enhancement flowchart

2.4.3 Price Control Deliverables (PCDs)

Within our enhancement cases we have developed price control deliverables (PCDs), aligned with guidance set out by Ofwat IN 23/05 (July '23), where appropriate. These mechanisms ensure that customers and stakeholders know what to expect from the funding provided. Where the outcomes or outputs are not delivered ,these mechanisms will allow funding to be returned to customers.

We are proposing 9 PCDs, summarised below:

PCD	Measure	REF	Enhancement Case
PCD 1	Number of Reservoir schemes delivered	WSH59-RS03	Increasing Safety of Impounding Reservoirs
PCD 2	Number of meters installed	WSH58-RS02	Reducing Drought Risks and Improving Customer Visibility of Usage for PCC Management
PCD 3	Length of mains replaced by diameter	WSH62-RS01	Increasing Resilience of Tap Water Supply - Asbestos Cement Mains
PCD 4	Number of safeguard zone Action Plans completed	WSH53-CW01	Improving Raw Water Quality in Drinking Water Catchments through Green Solutions
PCD 5	Number of risks to tanks addressed	WSH61-RS05	Increasing Resilience of Tap Water Supply - Treatment Works
PCD 6	Scheme delivered - km of pipe laid	WSH60-RS04	Increasing Resilience of Tap Water Supply - Network Capacity and Connectivity
PCD 7	Lead pipes replaced	WSH52-CW04	Working towards a Lead-Free Wales
PCD 8	Delivery of odour reduction work	WSH73-PE08	Reducing Levels of Odour in the Environment
PCD 9	Confirmation of route risks	WSH64-PE02	Protecting Multiple Adjoining SSSIs near the SECS Main

2.1 Compliance with Ofwat Guidance

The approach outlined above aligns to the guidance that Ofwat has issued through the business planning process. These requirements are clearly embedded in our business-as-usual practices. Our plan has been developed to maximise benefit for customers and the environment.

2.1.1 Long-Term Focus

We have developed our WSH01 Long Term Delivery Strategy which outlines our key priorities over the next 25 years in line with Ofwat guidance. Our Long Term Delivery Strategy shows the key outputs we are looking to deliver and the milestones and key areas we are looking to invest in to achieve these outputs. Our Long Term Delivery Strategy considers a number of key scenarios in line with Ofwat guidance. In addition, we have developed company specific scenarios. Our Long Term Delivery Strategy has been assessed against these scenarios to identify a number of alternative and adaptive pathways to delivering our 2050 outputs. Our scenarios have considered societal and environmental expectations from our customers and how these may evolve in time and the impacts this could have on our Long Term Delivery Strategy.

Through recognising the wider impacts of our decision-making on society and the environment using our multi-capitals approach, we have ensured that our decisions have a long-term focus. Our cost models forecast cost throughout the life of assets, and we have used a minimum of a 30-year horizon for our CBA. We recognise that significant investment is required to both improve service and protect the wider environment whilst at the same time managing the impact on customer bills. We have set our ambitions in WSH01 Long Term Delivery and have used adaptive planning to ensure the course of least regret for our customers whilst achieving the service and environmental standards required.

2.1.2 Delivering Greater Societal and Environmental Value

Our plan considers the impact of our investment across multiple capitals which ensures that economic, social and environmental impacts are central in our decision-making – reflecting the wide range of, sometimes conflicting, priorities of our stakeholders. Our investment planning approach is tailored to our customers and allows objective comparison of investment decisions, enabling us to achieve the optimal mix of outcomes across our portfolio of investment.

2.1.3 Driving Improvements through Efficiency and Innovation

To achieve the stretching targets, we are using innovative approaches including:

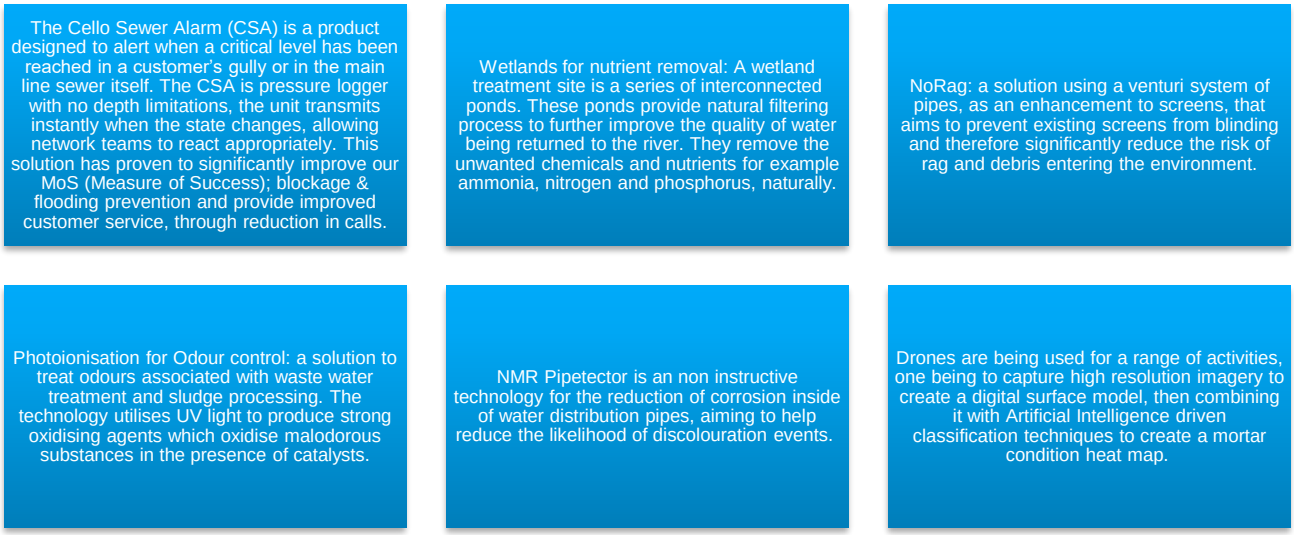


Figure 5: Details on Innovative Approaches across Welsh Water

Our costs have been rigorously assessed and assured to ensure they are accurate. Our proposed programme of investment has been tested through our investment decision and cost benefit processes to ensure solutions are cost effective whilst delivering operational, social and environmental requirements.

2.2 Our Customers, Legislation and Approaches: In Summary

We deploy a range of tools and techniques to analyse information and to facilitate strategic decision making. We engage everybody with asset management responsibilities so that we have a complete understanding of issues and ensure everyone is committed to the same action, not only for proposed solutions but also to manage risk that we may not be able to address through investment. We want to draw on and combine the insights of our teams, analysis of past trends and our CBA models to produce a single plan. We are committed to continuous improvement of our approach, building on both positive and negative feedback from customers and regulators to enhance the quality of our decision-making.

3. Development of our AMP8 Investment Plan

3.1 Overview of Our Investment Delivery Process

The Investment Delivery Process is a six-stage project lifecycle process with five key investment decision-making approval points. It covers the capture of risks, their scoring and prioritisation, through to confirmation of business needs, development of appropriate risk reduction solutions, detailed design, construction/installation, and handover to operations.

The Investment Delivery Process aligns with elements of good project management practice and data collected gives visibility that the Investment Delivery Process is supporting the achievement of our 2050 outcomes. Details of the process can be seen in Figure 6.

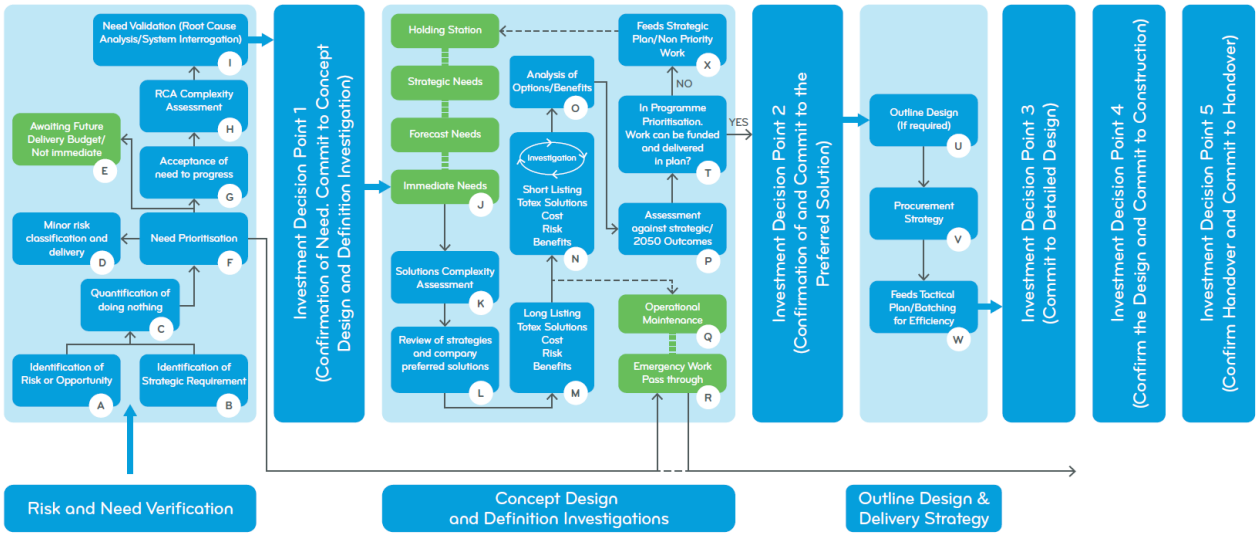


Figure 6: Investment Delivery Process

Below is a brief overview of the key steps in the process:

Stage(s)	Overview
A/B	Identification of business risk.
C	Scoring of risk to assess impact to the business.
I	Root cause assessment and defining the business need.
M/N	Long and short listing to identify a wide range of innovative and viable interventions.
O/P	Assessment of options using multi-capitals and contributions to long term business objectives to identify a preferred option.

An 'issue' (or need) is defined as a system shortfall or opportunity, either actual or predicted, requiring a resolution through:

- Change in operational practice
- Operational maintenance
- Capital investment

A new issue is reviewed in detail and in the context of others in the system to get a complete understanding. Several issues may arise from a common cause; several operators may have raised the same issue; or future issues may affect the area (such as predicted growth). Therefore, grouping and reviewing the issues is essential to understanding the root cause and identifying areas in which a single solution can resolve multiple issues.

Not all issues require immediate investment; for some, monitoring and mitigation are sufficient for the short term.

A map of our investment planning process is included in Appendix C. A simplified overview is provided here.

When developing our PR24 Investment plan, we followed the 5 steps in Figure 7:

Figure 7: Key Steps in Developing the PR24 Investment Plan

Establish Need:

- Clearly articulate any legislative requirements relating to the issue.
- Identify changes in the external environment including demand, attitudes to risk, and service expectations.
- Understand the condition of our assets and identify issues, risks or opportunities around performance and compliance (this includes root cause analysis).
- Quantify and analyse these items to best understand drivers for change and customer or stakeholder expectations.

Develop Options:

- Understand current operational practices and costs.
- Work with an expert team to develop options, including no action, operational interventions, capital expenditure, and opportunities for innovation or new ways of working (including partnership solutions). Our standard TotEx hierarchy provides a useful and systematic framework for options identification.
- Bring in new ideas from outside our organisation, external expertise, new technologies and different ways of thinking.

Analyse Options:

- Develop cost estimates using our UCD with adjustments for efficiency and innovation.
- Appraise options using a range of techniques including CBA based on our Multi-Capital Value Framework to identify the best solution under different future scenarios.
- Review with internal stakeholders, including those accountable for delivery. For an option to be viable it must be deliverable, and the duration of delivery must be mapped against the time taken to realise benefits.
- Implement independent audit and assurance of our approach to highlight any risks in our methodology.

Set Standards Customers Expect:

- Having built separate investment cases, review overlaps and synergies to refine the scope of plans that can work better together or produce a greater effect for less work. We also undertake optimisation to assess how the different elements of performance and cost sit together in terms of an overall customer offer.
- Carry out acceptability testing of our proposed overall plan with our customers to ensure we have appropriately responded to their needs.
- Engagement with customers will continue beyond the submission of our business plan: throughout the AMP8 period we will continue to track customer expectations of service and engage with local stakeholders regarding how we deliver work in their communities.

Ensure Fair Regulatory Treatment:

- Having established the right solution, we consider how it should be funded and measured fairly and transparently within the regulatory framework.
- This would include assessment of Direct Procurement for Customers (DPC), development of enhancement cases where required and consideration of the need for Price Control Deliverables (PCDs) or adjustments to Performance Commitments.

3.2 Planning and Need Identification

We have set clear long-term ambitions for the company as reflected in Stepping up to the Challenge: Business Plan 2025-30. The key outputs and milestones in achieving these ambitions form part of our long-term delivery strategy. Our AMP8 business plan is a step that forms a part of our overall strategy to achieve our 2050 targets and outlines our short-term investment needs. By assessing and testing our AMP8 plan we have ensured that our investments are no/low regrets and would be required under all adverse and benign scenarios. Our AMP8 investments have been considered in terms of adaptive planning and modular interventions. Further details on how our AMP8 plan fits into our long-term ambitions are outlined in WSH01 - Long Term Delivery Strategy.

Deciding when and how to intervene is essential. We aim to time expenditure so that it is made neither too early nor too late.

The need for investment is identified via various mechanisms ranging from operational feedback to analysis of changes in legislation and deterioration modelling.

Forecasting the future performances of our assets: To increase our understanding of deterioration we have developed risk models across our asset base. These areas (asset types) are water mains, sewers, water and wastewater treatment works, and pumping stations. The models forecast deterioration over the long term, typically 25 years. These models have been developed with

support from external specialist but are now fully owned and operated by Welsh Water. Extensive testing and validation have been completed as part of the review and acceptance process. Building on the agreed reporting foundation, we have tuned our models to our asset performance and expanded the way in which the models can be used.

Some models are statistical models of life distribution (such as, at their simplest, a 'bathtub curve') that are built using records of maintenance data from our corporate work planning database, SAP. Life-distribution models indicate failure numbers; statistical simulations use the life-distribution data to calculate the number of failures for a type of equipment over time.

For example, the 'pipes' models use asset data from our geographical information system (GIS), ESRI, and records of modes of failure such as mains repair, interruptions, and leakage to forecast deterioration by diameter and material. The model represents a failure mode effect analysis (FMEA) considering the likelihood and consequence of different failure mechanisms. We are therefore modelling a 'web of risk' rather than a simple – single – failure probability and consequence.

The asset data is refreshed regularly to reflect changes from ongoing activity on our assets.

The models are used to simulate the impact of deterioration on service performance (for example bursts), and these are aggregated and quantified as a total monetised risk. They are also used to understand the levels of deterioration that could occur and would need to be addressed to meet customers' preferences in service levels.

This approach allows us to identify long-term trends in performance (and underlying asset health), that may not be picked up during day-to-day operation, and agree the approach to progressing the issue.

In addition to modelled data, we are also using innovation to provide an informed view on the condition of our assets. We are trialling non-intrusive testing of our potable water network as part of our zonal studies programme. This will refine our understanding of current asset condition and inform our deterioration modelling. From this we will be better placed to make informed decisions around the optimum timing of implementing different interventions.

Operational Feedback: Through our Investment Manager process anyone in the organisation can raise a need (issue). We also have regular, formal asset health meetings, which brings together all parties with an interest in an issue on a specific asset or process to collectively discuss and agree the need and possible options. This includes operations, maintenance, technical strategy, and asset management.

Interpreting Regulatory and Legislative Change: We work closely with our regulators including the DWI, EA and HSE to understand the evolving legislative environment within which we operate. We seek to understand the specific requirements of change and agree a shared understanding of need.

3.3 Optioneering and CBA

We have developed robust economic principles to inform our decision-making. This section describes how we have evaluated our investment options through good practice CBA, considering the impact of societal savings, environmental savings, human intellectual and the private cost of failure and the cost of capital over the life of the investment. Top-level CBA results are included in Appendix D.

From the simple CBA models used for identifying work in PR19, we have built a CBA decision-support tool that reflects good practice and fully aligns with Ofwat requirements. We are now able to conduct more comprehensive scenario analysis (including portfolio-level goal-seeking optimisation) and quantify a wider range of benefits than were previously considered. We have developed consistent and systemised CBA models using the benefit values developed in our Multi-Capital Value Framework. This analysis underpins around 69% of the net investment in our plan. Our approach not only discharges the requirements set out in Ofwat guidance but goes further in its assessment of benefits and optimisation across different asset classes.

Our existing SMF already provides a good quantification of 'benefits' such as reduced carbon, service impacts and repair costs.

Our approach provides the following features:

- Consistency with the HM Treasury Green Book
- Application of the Spackman approach to discounting
- Considerations of a comprehensive set of options designed to provide the best value scheme to customers.
- Inclusion of both Opex and Capex spending and savings
- Costs and benefits at 2022/23 prices, excluding real price effects (RPEs) and net of expected productivity improvements.

3.4 Identification of Options

Our approach to options identification and options assessment has been consistently applied across our PR24 plan and includes five steps as detailed below:

1. Apply our standard solutions hierarchy to develop a longlist of options. The solutions hierarchy acts as a checklist and supports us in exploring a range of suitable intervention types, including demand-side and/or behavioural interventions, instead of automatically jumping to an asset replacement/upgrade solution.

2. Dismiss obviously non-viable options from the longlist to identify the shortlist of options. At this stage, options are typically dismissed based on feasibility and/or suitability to address the need for change. For example, customer behaviour interventions would not close the gap in storm overflow performance.

3. Assess the shortlist of options based on:
   - initial and whole life costs,
   - initial and whole life benefits (or the extent to which the need for change is addressed), quantified using our Multi-Capital Value Framework,
   - uncertainty,
   - delivery risks,
   - buildability constraints, and
   - opportunities and constraints from other work required across the asset portfolio.

4. If appropriate, eliminate unacceptable options from further consideration. While preference for an option may be indicated at this stage, all acceptable and viable options proceed to the next stage, which is portfolio optimisation.

5. The goal at portfolio optimisation is to maximise the whole life value added to customers and the environment (quantified using our Multi-Capital Value Framework) as a result of the entire long-term plan at PR24 (covering AMP8 and beyond) within all applicable constraints, including overall affordability, mandated (such as legal and regulatory) minimum requirements and risk appetite. We have made a deliberate decision not to eliminate all but the first-choice options in Step 4 to ensure that the best overall plan for our customers and the environment can be developed and investment choices are not removed from consideration too early.

   This is illustrated in Figure 8. If only options preferred at scheme level progressed to portfolio-level optimisation, the plan would not make best use of the financial constraints and opportunities to deliver the overall best value for customers - in this case, 3 units of whole life value added with 2 units of available upfront financing not used to deliver benefits. Since the whole life value added measure includes consideration of whole life costs not just whole life benefits, this is an inefficient choice. If, on the other hand, all viable options progressed to portfolio-level optimisation, the plan would make full use of the upfront financing available and maximise the whole life value added possible.

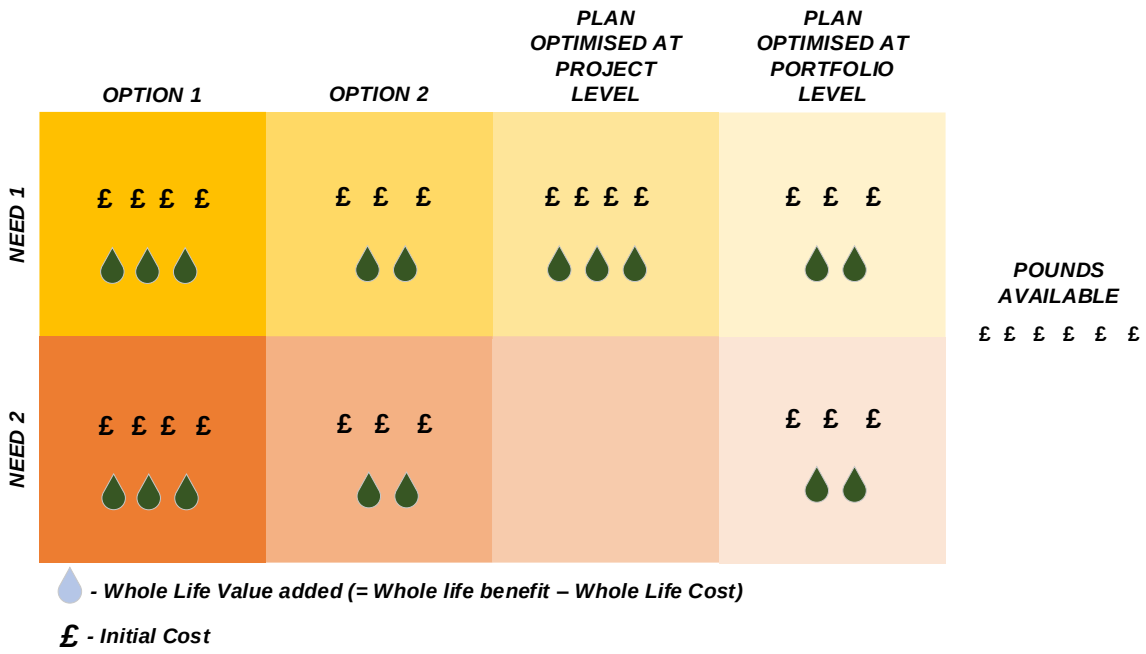


Figure 8: Optimisation Chart Illustration

Addressing greenhouse gas emissions is integrated into our PR24 planning process. As part of Welsh Water's Net Zero Carbon strategy, our longlist of investment opportunities being considered for PR24 includes schemes with the main objective to decarbonise our electricity or reduce our reliance on fossil fuels (such as a gas to grid scheme). Additionally, as part of our Multi-Capital Value Framework, the initial and whole life impact on greenhouse gas emissions (embodied and operational) forms part of our assessment of the whole life value added to customers and the environment as a result of different investment choices - thus influencing the recommendations for our PR24 plan.

The impact of climate change on current and future risks to our water and wastewater services are used to identify needs for change and investment, assess solution options and build adaptive plans in line with Ofwat's and other regulatory guidance.

Optioneering is fundamental to the planning process. Using the expertise of the stakeholders, a wide range of potential solutions are generated, discussed, and documented as viable or non-viable – using a TotEx hierarchy approach. Benefits are quantified using the SMF to compliment qualitative assessment of viable options.

3.4.1 The TotEx Hierarchy.

Through optioneering, a wide range of unconstrained interventions are identified which looks to incorporate innovation and emerging solutions. By utilising the Totex hierarchy Welsh Water ensures that opportunities across the range of viable interventions are considered systematically thereby avoiding siloed or personal bias thinking based on historical experiences. Assessment using the Totex hierarchy often involves a range of people from across the company to draw on a variety of experiences and insights to ensure all options are considered.

Solution Category	Example	Certainty of Success
Eliminate, reduce or delay the need for change	Manage demand, influence future legislation	Low/Medium
Maintain the effective risk controls already in place	Maintain, replace the existing asset like-for-like, or mothball/dispose of the existing asset or service	Medium/High
Enhance existing resources or add new resources	Upgrade an existing asset, create/acquire a new asset or service	High

Figure 9: The Totex Hierarchy

The process which we undertook to ensure that the best value option was selected is explained in the following sections.

3.5 Identification and Quantification of Costs and Benefits

For each option included in the CBA, costs and benefits have been identified in relation to the baseline case costs and benefits. Benefits have been taken from the approved Multi-Capital Value Framework. Costings have followed the Ofwat-preferred Spackman approach over 30 years, and benefits include the monetised value of public (non-market) impacts.

In addition to the Contingent Valuation customer preference valuations outlined in section 6, a full estimation of non-use values have been estimated, across environmental and societal categories, from water and land use to water and air pollution on the environmental side to staff, community, recreation, vulnerable customers, security and transport on the societal side.

3.6 Period for Discounting Costs and Benefits

We have followed Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A1 when considering timeframes for modelling and set a 30-year period for consideration. We have sought to best understand whole-life costs and benefits in the long term while also running shorter scenarios to understand plan sensitivities. Where appropriate we have also undertaken analysis on a longer time frame for those options which have significant social costs or benefits over the 30-year time horizon.

To discount the benefits and costs over time we have used the social time preference as set out in the Treasury Green Book at a rate of 3.5% in real terms.

We have used a P50 estimate of the benefits and costs associated with each option to account for the uncertainties and risks associated with each scheme over the appraisal period and have adjusted both to 2022/23 prices using the CPIH index.

3.7 Decision Rules

CBA is a tool to support decision making. It has been applied at the project level, and most of the investment plan is made up of projects which have non-negative Net Present Value.

Our investment plans have been informed by a detailed assessment of the costs and benefits of delivering different levels of risk and service. From this assessment we have selected the right option

for our customers using the best value principles described by Ofwat's PR24 Final Methodology, Appendix 9 (Setting Expenditure Allowances), Section A1.

In principle we would wish to invest to the point where the marginal project has a non-negative NPV. This is the most cost beneficial level of investment. However, in some cases, we will not deliver all NPV-positive work, where it would produce changes in levels of cost that are not supported by customers. Similarly, we may choose to deliver negative NPV projects where these are supported by customers or mandated by external drivers (such as duties within environmental legislation). For legislatively driven work, a CBA may be attempted to help us understand benefits or to select options, but a positive CBA is not required for inclusion.

Therefore, in selecting and evaluating the options we have used the following criteria:

- Net present value (NPV) & Spend/NPV Ratio – in absolute terms, and also expressed as NPV per £ expenditure. NPV measures value for money and therefore options with the highest NPV are the most cost beneficial; but options with the highest NPV ratio provide the greatest value for money per £ spent.
- Level of PR24 spend – our customers and stakeholders are concerned about affordability so it is important to consider the level of spend, and question whether some or all of this can be deferred or delayed to PR29 and beyond.

Finally, we also recognise that non-monetised factors and engineering judgement also have a key role in assessing whether an option should be selected.

We have not applied a formulaic approach to assessing options. We recognise that CBA supports decision making – it is not the decision itself. We therefore consider the criteria above in a balanced way.

3.8 Link to completion of benefits sections in data tables

The Enhancement Benefit Tables contain the annual benefit (both the number of units and the monetised benefit of changes to service measure levels) associated with the proposed enhancement programmes. This benefit has been calculated by analysing the impact that a project/investment will have in comparison to the pre investment position of relevant service measures. The value of a service measure change is calculated using the Welsh Water multi-capital value framework which applies a monetised value dependant on the particular service measure, considering Intellectual, Human, Social and Natural Capitals alongside the private cost of failure.

3.9 Informing detailed optioneering through Zonal Studies

In order to identify the optimum interventions within discrete sections of the network, Welsh Water undertakes zonal studies. Zonal studies identify the root cause of issues and risks specific to individual parts of the network. By assessing the root cause in individual locations, this ensures we can identify location specific interventions which address location specific needs. This approach ensures efficient expenditure as the mix of interventions is optimised to realise maximum benefits across all relevant performance commitments for individual locations.

To understand the needs of individual locations we assess all zones based on performance against a range of Performance Commitments, such as customer contacts, supply interruptions, bursts etc. This identifies the zones with the worst performance across the different measures and as such where interventions can provide the greatest benefit.

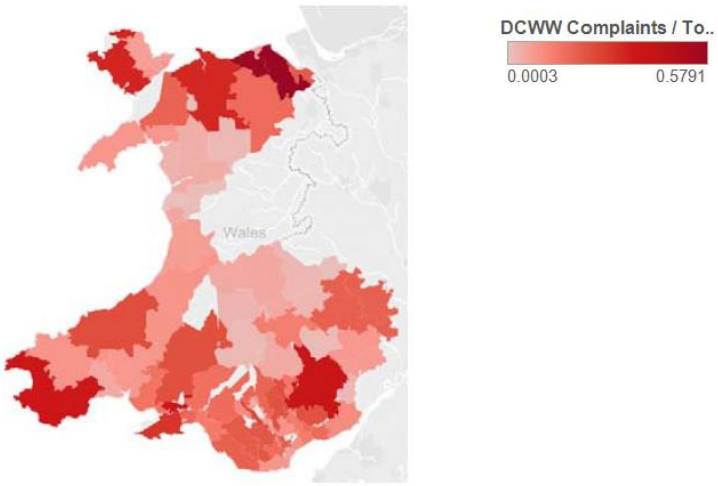


Figure nine – Heatmap of Welsh Water complaints by zone

To identify appropriate interventions to improve specific measures such as discolouration of water, further assessment is undertaken focusing on specific needs in this area. This includes referencing hydraulic modelling and pipeline specific pipeline condition assessment findings, as well as historical performance in the area.

A range of interventions are then assessed against the specific needs and risks in each area. Workshops are held with stakeholders to evaluate a range of options. Interventions are considered in line with our Totex hierarchy (see Section 3.4.1) in order to identify and assess all viable options, including but not limited to:

- implementing an advanced flushing programme,
- ice pigging,
- valve management and re-configuration,
- abandoning unused pipeline sections,
- installing new cross connections to optimise water flow,
- reconfiguring the network based on hydraulic assessments,
- pipe replacement, such as replacing unlined cast iron mains, and
- automated flushing/conditioning using actuated valves.

The use of unit costs for the variety of interventions, as recorded in Welsh Water's Unit Cost Database (UCD), allows all options to be compared using a cost benefit curve. This identifies the most efficient and effective solutions are selected.

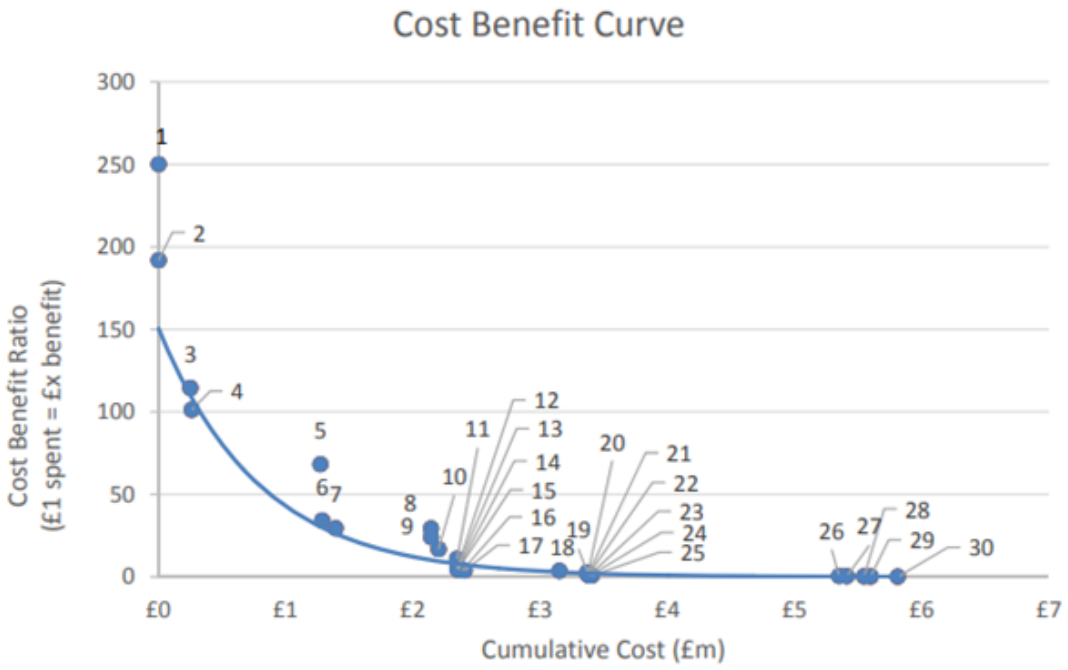


Figure 11: Cost Benefit Curve showing the Zonal studies solutions.

In addition to assessing conventional solutions, we continuously assess - and drive the market to develop - innovative solutions to add to our catalogue of available intervention options. For example, we have oversized pipes (see section 3.3) for which conventional flushing is not a viable intervention - it is not possible to generate an artificial flow rate high enough to flush these pipes to remove manganese. Welsh Water has therefore engaged an Australian company, which utilises a non-conventional flushing method. We have identified a range of research studies and pilot implementations to evaluate emerging technology. Once assessed, if viable, these technologies will form part of the toolkit to address the root cause issues for each zonal area.

3.10 Costing

This section looks at our methods of constructing a cost for elements of work. It describes the costing mechanisms used to ensure our costs are as robust as they can be, demonstrating that they are realistic, take account of relevant cost drivers (including that they challenge efficiencies) and recognise appropriate regional variations.

We have used three general approaches to costing:

- **Historic trend analysis and extrapolation:** Some work in the future is unknown in terms of the specific interventions and volume required but has well-established patterns of spending in the past. For example, we will invest money each year to replace high volumes of failed low cost electrical and instrumentation equipment, but the specific need is unknown. In these cases, costs have been based on historical trends from previous years, along with input from subject matter experts who can tell us if we are likely to see more or fewer incidences. These cost patterns are well established and high confidence.

- **Like-for-like costing (top down):** Where we have identified specific asset interventions for the future and have regularly delivered similar work, we have good historical costings that we can apply, if they are validated by relevant subject matter experts. For example, all things being equal, the cost of remediating a railway crossing of a certain length or rebuilding a pumping station of a certain size will be comparable in PR24 to PR19 (pre-efficiency and with adjustment for inflation). This approach takes account of cost drivers such as location or size to tune forecast costs to proposed work activity. These costs are high confidence.

- **New areas (bottom up):** New areas require costing where we have little experience of previous investment. For these, we have sought the services of our supply chain, to input their expertise and experience, or used external specialist consultancy to help provide costs. Where possible we have used competition to help reveal the true cost of the service. Examples of this include nature-based solutions, or particular projects such as the dams and impounding reservoirs, increased security and enhanced net zero projects. For example, interventions to address process emissions have been costed using a bottom-up approach due to the unique nature of the works meaning Welsh Water have limited historical outturn costs within UCD which can be used to provide an accurate cost curve. Even in these areas we can still draw on related experience. As we progress further through costing activities for new work areas, we achieve high confidence in the costs.

3.10.1 Our Costing Process

Our approach, which reflects best practice as defined by the Infrastructure and Projects Authority, follows a six-step model shown below and is described in the next section.

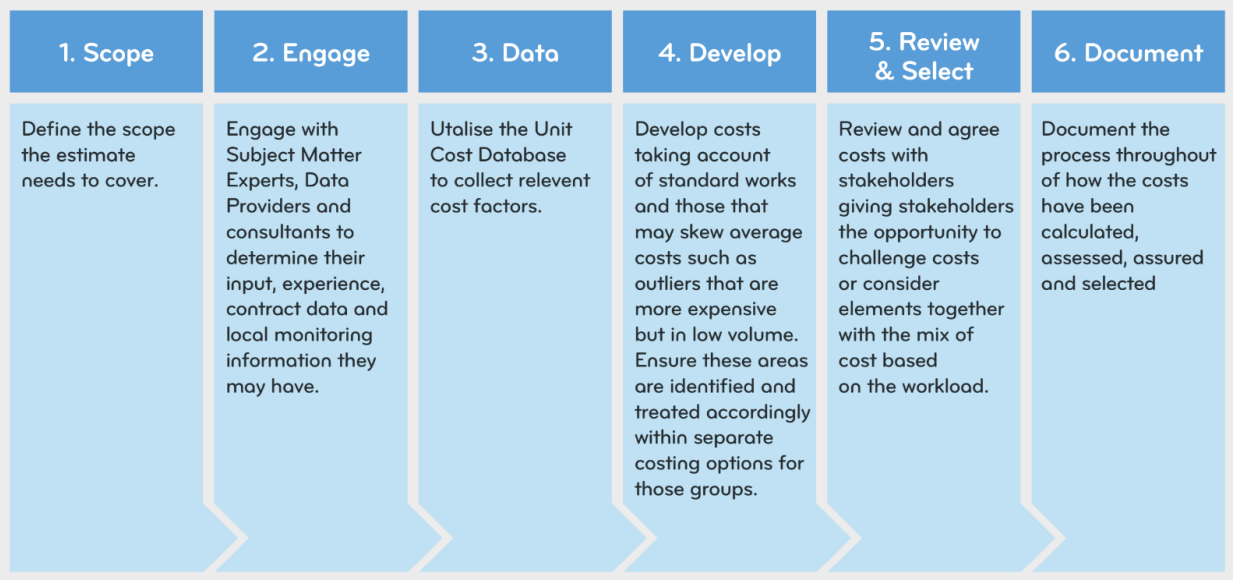


Figure 12: Costing six-step model.

1. **Define the Scope:**
   We determine the scope of each solution, the required level of detail and overall depth and confidence of the estimate. This assessment is based on a simple process which is led by our experience, or otherwise, of delivering similar projects/assets, the size and scale of the solution and the complexity of the assets used. We also determine which stakeholders would input to, review, and agree the finalised estimate.

2. **Engage:**
   Stakeholder teams for the development of the cost estimates were established together with a schedule that included the potential estimating approaches based on the data and knowledge available. This included understanding any interdependencies and influences that may affect the work for each area, or the influences it may have on other areas. All the teams and individuals costing solutions are of a suitable level of experience for the type of costing they are engaged with. We also have defined governance processes in place, described below, which ensure that the costs put forward in our plan are robust, deliverable and efficient.

3. **Data:**
In PR24 we have made significant steps to increase the use of our Unit Cost Database (UCD) in costing the Business Plan, driving improvements in its costing ability and range to allow this. For example, we have increased the cost data capture to include greater operational base maintenance activities. This allowed us to undertake a more detailed approach to costing and give us much more cost certainty through the uniform method of costing. Where this method is not appropriate, for instance if it is a novel technology that we have not delivered before, we have utilised other sources of information such as supply chain information or consultancy advice.

4. **Develop:**
Costings were developed, estimating, where possible, each Work Breakdown Structure element, using the best methodology from the data collected. All estimating assumptions were included and expressed in constant-year pricing (our plan is presented in 2022/23 prices). This includes defining any site-specific additional elements that have been added. The models were updated as more data became available or as changes occurred. Where possible, the impact of sensitivity on cost elements was considered by identifying and exploring the effects on the overall estimate of changing the schedule, quantities or external factors and determining which assumptions are key cost drivers and which cost elements are affected most by change. Estimates were updated to reflect changes in technical or program assumptions to keep them current as each program passes through new phases or milestones. This included adjusting for overlap reduction with other investment lines.

5. **Review and Select:**
As our estimates were developed, we undertook a detailed assurance programme to ensure that the costs that were put forward were robust and efficient. The assurance took the form of scoping challenge undertaken by our in-house engineering team as well as third party assurance on costs themselves undertaken by Jacobs and Aqua Consultants who provided both top down and bottom-up comparisons to ensure that we were providing costs that were affordable and demonstrably efficient. We have also provided internal challenge, with over £400m of efficiency on our original £2.5bn plan issued at board level. The programme itself, and the outcomes, is shown in Table two below.

Table 2: Enhancement Table

Enhancement Case	Approach	Findings	Outcome / Action
WSH55-CW03 Improved water quality by reducing risks on water treatment works	Like-for-like benchmark of the project scope of each manganese removal scheme.	Pre-efficiency costing was in line with the industry, being within the benchmark range and 7.6% above the average.	We have applied an efficiency challenge to our costings to improve our overall cost efficiency.
WSH70-PE01 Minimising environmental harm during storm events	Carried out a like-for-like benchmark on the project scope for a sample of schemes.	The benchmark report identified that our pre-efficiency costing was better than the industry average but not upper quartile.	We have applied an efficiency challenge to our costings to improve our overall cost efficiency.
WSH64-PE02 Addressing serious pollution risks (SECS main)	Like-for-like benchmark of the project scope for option 1 and 2.	Our pre-efficiency was lower than 2nd quartile, but not upper quartile.	We have applied an efficiency challenge to our costings to move us towards upper quartile.

Enhancement Case	Approach	Findings	Outcome / Action
WSH68-PE05 Improving phosphorus removal at sewage works	Like-for-like benchmark of the project scope for a sample of NRW and EA P removal schemes.	Our Pre-efficiency costing for both the NRW and EA samples where within the benchmark range. The NRW sites were upper quartile. The Opex costing was significantly below the benchmark range.	We have applied an efficiency challenge to our costings to move us towards upper quartile in all areas.
WSH69-PE06 Increasing flow passed forward flow and storm tank capacity at Wastewater Treatment Works (WwTW)	Like-for-like benchmark of the project scope.	Pre-efficiency costing demonstrating our efficiency and was less than 2% above the upper quartile.	We have applied an efficiency challenge to our costings to move us towards upper quartile.
WSH72-PE07 Reduced customer risks from low probability high consequence events on the wastewater network	Like-for-like benchmark of the project scope for the preferred solution for Laugharne WwTW.	Pre-efficiency costing is already in an efficient position and achieving below the upper quartile.	We have further improved our cost efficiency with an efficiency challenge applied.
WSH73-PE08 Reduced levels of odour in the environment	Like-for-like benchmark of the project scope for the preferred solution for Swansea odour compliance.	Pre-efficiency costing is already in an efficient position and achieving below the upper quartile.	We have further improved our cost efficiency with an efficiency challenge applied.
WSH65-PE09 Protecting the environment – "Enhancing the environment through WINEP/NEP driven activities" Bioresources	Like-for-like benchmark of the project scope for the preferred solution for Five Fords sludge strategy.	Pre-efficiency costing is already in an efficient position and achieving below the upper quartile.	We have further improved our cost efficiency with an efficiency challenge applied.
WSH58-RS02 Improvement to supply demand balance reducing drought risks and Improved customer visibility of usage and PCC management	Benchmark carried out on the rates used.	Our combined rate for installation and procurement is within the benchmark range and 10% below the average.	We have applied an efficiency challenge to our costings to move us towards upper quartile.

Once we were content that the solution was the right one and that the costs were robust and efficient, we began to gather information into the relevant data tables. This stage sought sign off from the owner of each investment line to confirm that they were content with the methodology and the outcomes in terms of the workload and costs.

An independent second line assurances step was also delivered by the Cost Intelligence team.

6. **Document:**
Throughout the process, we ensured that we documented all the steps used to develop the estimate, so that any individual unfamiliar with the investment line could recreate it quickly and produce the same result. This included all the detail in relation to the purpose of the estimate, the team that prepared it. This forms the basis of our methodology documents,

discussed in the appendix. This documentation also enables independent audit of the process to be conducted.

3.10.2 Our Costing System: The Unit Cost Database (UCD)

We have used a top-down methodology drawing on our Unit Cost Database (UCD) to estimate around 80% of the plan.

Our Unit Cost Database (UCD) is the main estimation and costing tool to estimate the cost for our capital and maintenance schemes. UCD is the collective term for several systems used to carry out the costing function. One of the main systems, essential to the UCD, is the Engineering Estimation System (EES). It was introduced to help business-planning estimating and has been in place since 2006. Since then it has been continually refined and developed through the various price reviews. The system was subject to a detailed external audit as part of PR14 (see audit report). Currently there are over 1,600 projects within the model.

EES is a widely used estimating system within the water industry, which is familiar to Ofwat who have audited the system in the past. The system itself, to ensure accuracy, relies on the quality of the data input. This requires the water company to impose its own governance on the data collection and uploading.

EES is a storage database for project costs held in a predetermined Work Breakdown Structure (WBS). A data-capture template is used to capture the actual costs from a scheme. This is an Excel spreadsheet that mirrors the WBS in the EES. The user selects entries via a series of drop-down boxes and can enter values for a series of yardstick costs. The data in the spreadsheet is then automatically imported into the EES database.

The EES system takes a parametric or statistical approach using regression analysis between cost and one or more characteristic to an asset which influences the construction cost the most. Models have been development for the most common assets which tend to be constructed on our non-Infrastructure sites and networks. The system can be used to search and bring forward costs for any selected work item in the WBS. These costs can be adjusted for year, using recognised cost-based indices (CPIH), and can be plotted against an x-value yardstick to find a line of best fit. This line of best fit gives a formula that can be used to estimate future projects costs.

The cost models that have been generated are incorporated into the estimating template, Cost & Carbon Estimating Tool (C&CET).

All Capex cost models are reviewed and updated on an annual basis to include the latest completed projects and inflation. The C&CET is updated and issued to coincide with the new financial year, as part of a business-as-usual process. The C&CET is widely used within Welsh Water, during IDP 1-2 for estimating by the Asset Team, IDP 3 for costing by the Alliance partners, and for price review costing of projects.

The C&CET used CPIH, as the method for updating costs using indices as defined by Ofwat, but this can be easily altered to RPI or CPI, which can be obtained from the Office of National Statistics.

The C&CET is a locked Excel based workbook, which the user can enter the scope details of a project and it will generate an estimate based on the latest cost models. When selecting various work items from the work breakdown structure it provides details on the inclusions and exclusions from the model and the range of the model.

Where cost models are not available to price up items of works, the C&CET allows for manual values to be in included. These will be costed up based on bottom-up costing, supplier quotations or consultants' industry cost data.

All estimates using the C&CET a subject to our quality and assurance process, to ensure that the cost models are used correctly, and all manual costs are verified. The approval of the estimates is included with in the estimate documentation.

Welsh Water's approach to the data capture has the Alliance partners carrying out the data capture, as they are closest to the final outturn costs and are best placed to assign costs to the WBS. The UCD Team then audits the data capture to ensure that it has been carried out correctly before uploading.

The UCD C&CET Version 17

C&CET Version 17 was used for all project costings which are either investment cases, or all projects that form a programme of works. This allows for uniformity of approach and means that we can control, and change, estimates centrally and with a tried and tested approach.

UCD Models to Cost Programmes of work.

In some investment cases the maturity of the programme is such that schemes have not been developed and the programme is still in the optimisation phase. Whilst works can, in areas of networks for example, be identified, the batching of these works has not been completed. In these instances, the C&CET cannot be used, however where possible the version 17 UCD cost models have been used, in pricing the programme. The cost model formulas are either applied to the work activities in separated costing documents, or they are integrated into the model optimisation tool.

3.10.3 Articulating Cost Robustness

The material set out below feeds into the articulation of cost robustness in each of our investment methodologies. External best practice reference material has been used to help us systematically quantify cost uncertainty (Figure 12). In the early stages of any project lifecycle there can be a high level of uncertainty relating to cost, due to the number of unknown issues that could lead to cost variance.

	Primary Characteristic	Secondary Characteristic			
Estimate Class	LEVEL OF PROJECT DEFINITION Expressed as % of complete definition	METHODOLOGY Typical estimating method	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges	PREPARATION EFFORT Typical degree of effort relative to least index of 1
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +20% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/Tender	Detailed Unit Cost with Forced Detail Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Figure 13: Project Lifecycle Cost Confidence Accuracy AACE

This is particularly true for new areas of spend, but less acute for projects, which although being newly developed, are very similar to projects which we have delivered many times before. As the project progresses and more data is gathered to understand cost drivers or if there is a high amount of data from similar historic works, the estimates become more certain meaning cost confidence increases. We also test the market where appropriate utilising competition to reveal the efficient cost of the work.

For example, we have not developed detailed designs for booster pump replacements in PR24, as the specific units which will fail are unknown. We have however delivered hundreds of replacements of this nature during AMP7. For asset groups like this, which are low-cost high volume, cost certainty is high despite the lack of detailed design.

We have ensured cost robustness in each of the areas within our estimates by undertaking the following activities.

Direct Cost

A large proportion, circa 80%, of our direct costs come from our bespoke costing tool, UCD, which houses asset data for completed projects conforming to our own Work Breakdown Structure. The database undergoes a refresh on an annual basis utilising collected data from internal sources and our supply chain to ensure that the costs that are representative of the prices we are experiencing and the work that has been completed.

This annual refresh also comprises an inflation uplift to the relevant base date for all data as well as a benchmarking exercise to help us understand if there are any anomalies in our data when compared to the rest of the industry. Internal assurance as well as checks by statisticians ensures that the costs are robust and reflective of our latest contractual and work practices.

The UCD Cost Models are also used for Target Price Setting within the Alliance in the business-as-usual process. While these are used to set the prices, the Alliance Partners are required to provide a Latest Best Estimate (LBE). The LBE is compared to the Target Price from the UCD, so provides a regular cost check throughout the AMP.

Indirect Costs

Ensuring that we allow enough cost within our estimates for contractor and client overheads is of paramount importance to increase our cost confidence and ensure that the costs that we put forward within our plan are robust and deliverable.

For the area of indirect cost, we have analysed 1600 previous projects to determine how different types of projects attract varying ranges of indirect cost and what is influencing this. The outputs of this allowed us to understand what level of cost we have historically performed at, understand the drivers of this and which of those areas we can influence, and finally how we can begin to influence and eventually apply realistic efficiency targets to arrive at a bespoke PR24 indirect cost.

This is split by the four quadrants across the whole of the programme: Water Infrastructure, Water Non-Infrastructure, Waste Infrastructure and Waste Non-Infrastructure.

Risk and Contingency

As a business we have made the decision, at Asset Investment Group to exclude Optimism Bias from the estimates put forward within our Stepping up to the Challenge: Business Plan 2025-30. We came to this decision as we were at the top end of the scale when it came to cost comparisons and so believed that we could deliver our own efficiency challenge by doing sufficient work to be confident in our solutions and our costs to a point where we could provide a robust plan with the approach, risk based, level of contingency.

We have managed to deliver a robust and efficient plan without this inclusion by undertaking a piece of work to understand where the unknowns are in our estimates, challenge these, and where

appropriate cost them into our estimates. This process involves the vetting of assumptions made within estimates through stakeholder review to determine where generic costing assumptions may not deliver robust estimates. For instance, there were some assumptions made at early stages of design with respect to the reapplication of redundant assets which were underestimated and so rectified by review. Undertaking this work has enabled us to gain confidence in our costs and apply risk-based contingency.

The confidence we have in this approach is further evidenced by the work undertaken by our Solutions Development Team who investigated the variance from estimates at IDP2 to final outturn cost. The variance was in the magnitude of +/-30% which is within AACE guidelines as shown above in figure 13. At a project level the team looked at what was causing this variance and where it was identified costed this in with support from stakeholder review sessions to bolster cost confidence and robustness of estimates.

Whilst we have worked hard to determine the risks at project level, we have also made allowance for opportunities which may occur and identified these in internal and external challenges which have allowed us to have a degree of confidence in the costs put forward well within the industry benchmarks provided by AACE. We are sufficiently confident in the level of +/-30% across our portfolio that by determining the risks and opportunities at a project level, and costing these in, we have arrived at a business plan cost that is robust.

3.10.4 Cost Confidence

Each of our investment cases will reference the confidence in the cost estimate based on the above model. We are continuing to progress projects through their life cycle towards detailed design and, as such, cost confidence on several lines will continue to improve after submission. In line with the processes and procedures outlined above this may mean a reduction in risk and contingency as we move forward through the project lifecycle and gather more information about the schemes enabling us to mature our design and introduce more granular scoping and pricing as a result.

Most of our investment plan is continuation of existing work types and as such is high confidence at the time of submission.

We consider this to provide a high level of certainty around our estimates and evidence that we have developed a plan which is robust and deliverable by the supply chain.

We have further developed our confidence in the costs put forward by following the process outlined above regarding the elimination of Optimism Bias and contingency at a project level. Whilst we understand that this means that at the lowest level there is a chance that costs may be insufficient for individual projects, we are confident that through our risk and opportunity costings this will be rectified across the portfolio and work vice versa as well.

3.11 Application of Efficiency

Welsh Water have a systematic approach to identifying and applying efficiency. This approach includes consideration of the following efficiency levers.

Table 3: Efficiency levers

Historic performance	How does our historic performance influence our ability to achieve efficiency by asset type.
Technological Advancement	Have we captured technological advancement within Technical Standards and are those standards minimum viable product.
Engineering Methodology	Have we exhausted standardisation, off the shelf design and our standard products catalogue in our option selection.

Procurement Strategy	Have we understood how best to procure, resource and respond to efficiency opportunities that exist by tailoring our supply chain to the programme for AMP8. Have we secured latest thinking, best practice and innovation from recent and up and coming procurement events supporting the programme.
Stretch Performance	Have we challenged ourselves to continue to secure further efficiency in areas where we have been performing well.

This approach is underpinned by management control, line one and line two controls and Board engagement sessions.

Line One and Two Controls

During AMP7 the investment planning process was reviewed and redesigned to provide consistency of approach for promoting, developing and prioritising business risks and issues. That standard approach was applied to risks that have been included within the plan.

The approach was to achieve a gated process which provides governance, assurance and challenge whilst driving efficiency opportunities further up the value chain. This gated process adopted multi-criteria analysis, option selection, CBA and option comparison upfront and was underpinned by Technical Standards driving minimum viable solutions and standardisation.

This approach also secured stakeholder input to solution development, option selection and preferred option through standardised meetings which fostered a culture of challenge, to further drive efficiency.

Historic and Stretch Performance

- Welsh Water have areas of good historic performance in delivering efficiency, one example of this is catchment management where a combination of techniques; Smart catchments, research, partnerships and engagement enabled us to deliver an efficiency of 33.4% against budget at 2018 prices.
- Stretch targets based on historic and current performance have been agreed by the Executives for individual investment lines for their part of the business. One example is 2.9% efficiency (£5M) on base maintenance for sewage pumping stations, building on the success of the Maintenance and Reliability Support (MaRS) programme thus far.

Technological Advancement and Engineering Approach

- A review undertaken of the Technical Standards identified £46M in 2021/22 prices from the Technical Standards workstream. This piece of work looked to challenge and reconsider Technical Standards from a minimum technical position and incorporate the use of standard off-the-shelf concept designs and the catalogue of standard products developed during AMP7.

- The Executive supported the efficiency as the programme were on target to achieve £22M of AMP7 savings by December 2022 from this workstream. These savings would not have been captured into the cost curves of UCD version 17. The decision was taken to assume a similar run-rate of savings from the Technical Standards workstream in the AMP8 programme.

Board Engagement and Procurement Strategy

The Executive were engaged through the process of developing the CapEx plan. The above details those areas of targeted efficiency which were individually endorsed through the process. The Executive also held targeted sessions at key milestones in the plan development, at a greater level of detail than previous planning cycles. The work completed by the wider business between September 2022 and November 2022, allowed the Executive to review, discuss and adjust efficiencies at a

portfolio level. Those adjustments included a 5% efficiency of the Capex Plan as a result of the following:

- Based on their consideration of the company's historic and current TotEx performance and ability to respond to efficiency challenges in the past, likely opportunities from improvements to our resourcing strategy (such as strategic insourcing and outsourcing; providing a 2-year look-ahead of our detailed project pipeline to the supply chain; smarter, more efficient packaging of works), successes from recent and upcoming procurement activities, as well as adopting innovation and good practices.

- Considering the supply chain's previous performance and the breakdown of contractors' indirect costs and overheads an efficiency is expected to be achieved.

- A more specific allocation of the stretch-target-in-the-round was not discussed at the time and is likely to be part of preparations for AMP8 delivery once up and coming procurement events have been finalised. Details of our AMP8 readiness Approach can be found in section 3.13.

3.11.1 Cost estimation and efficiency

Our cost estimates and confidence intervals around cost estimates are developed prior to the application of challenging cost efficiencies. As such although we present cost confidence as symmetrical the post efficiency position will be asymmetrical with a reduced range of potential underspend and an increased range of potential overspend. This is illustrated in the image below which shows the application of a 10% efficiency. A cost estimate that was ±15% would, after the application of a 10% efficiency become -5% to + 25%.

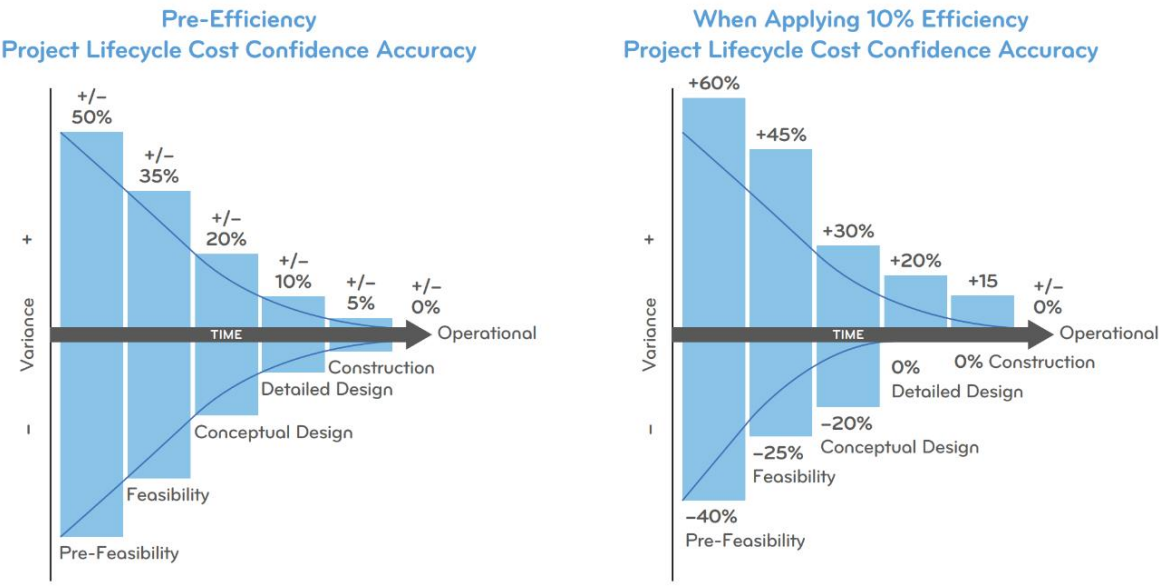


Figure 14: Cost Efficiency - Applying 10% Accuracy

3.11.2 Benchmarking

Our determination to demonstrate that our costs are efficient has been showcased in the benchmarking work that we have undertaken. Aqua consultants have looked at the top down and bottom-up approaches that Ofwat may take to cost assessment to ensure that we are confident that costs that have been put forward are in line with the industry as well as stretching and deliverable.

We have taken a targeted approach to benchmarking by making sure that the most material elements of our plan are reviewed which has led to the following areas being studied.

- WSH55-CW03 Improved water quality by reducing risks on water treatment works - manganese removal.
- WSH70-PE01 Minimising environmental harm during storm events.
- WSH64-PE02 Addressing serious pollution risks (SECS main).
- WSH68-PE05 Improving phosphorus removal at sewage works – EA and NRW sites.
- WSH69-PE06 Increasing flow passed forward flow and storm tank capacity at wastewater treatment works (WwTW).
- WSH72-PE07 Reduced customer risks from low probability high consequence events on the wastewater network Laugharne WwTW.
- WSH73-PE08 Reduced levels of odour in the environment – Swansea odour compliance.
- WSH65-PE09 Protecting the environment – "Enhancing the environment through WINEP/NEP driven activities" Bioresources – Five Fords Sludge Strategy.
- WSH58-RS02 Improving to supply demand balance reducing drought risks and Improved customer visibility of usage and PCC management.

This has allowed us to determine where we sit in relation to our peers and either confirm that we are providing efficient costs as part of our plan or highlight areas where we need to investigate to make sure that we are putting forward efficient and deliverable costs.

The individual elements of the benchmarking work will be discussed in more detail in the enhancement business cases.

3.12 Cost Assurance

Underpinning our confidence in the costs that we have put forward is a detailed assurance plan giving first- and second-line checks and balances to ensure that we deliver a robust plan.

As previously mentioned, we have undertaken an annual refresh of our cost curves within the UCD. This is accompanied by an internal review as well as assurance by an external independent statistician to ensure that the costs are robust and significant against several statistical tests. We also provide internal assurance to understand how costs have changed, as well as why. Any unexplained or unacceptable changes will be removed from the update before issuing to users.

We have also undertaken reviews from independent consultants in the past including Mott MacDonald in 2019 as well as undertaking periodic reviews into large schemes by external consultants as well as using industry bodies such as TR61 and the WRc to ensure that the costs we include within the business plan are robust and efficient.

Benchmarking carried out by external consultants suggests that Welsh Water's UCD is in line with the industry and in some areas outperforms other water companies.

The UCD is embedded in the commercial models used in AMP6 and AMP7 and is continually challenged and benchmarked against current market prices and external benchmarks as part of the commercial challenge process.

We also employ a rigorous governance process to ensure that costs are signed off by the appropriate people within the business and that they have been developed by suitably qualified professionals. The overall process is defined in the Welsh Water Management Handbook.

The process is detailed below.

Table 4: Welsh Water Approval thresholds

	>£2m	>£1m	<£1m	>£100k	<£100k
IDP1				Head of Water/Waste Assets	Client Manager
IDP2		Managing Director	Head of Water/Waste Assets		
IDP3	AIG / Board	Managing Director	Head of Water/Waste Assets		

As part of developing our PR24 submission we have also undertaken additional independent assurance via Jacobs, this is described in Section 5.

3.13 AMP8 Readiness

The Glas Board is committed to delivering a seamless and efficient service to our customers during the transition through AMP7 to AMP8. Significant resources have been deployed to develop a 2-year AMP8 rolling investment programme, ensuring all year 1 and 2 programmes and projects of work are identified, prioritised and planned for in a timely manner. The approach currently being progressed will ensure we have a controlled, well governed set of activities that help us arrive at the right point to commence AMP8 at a pace to support the effective use of funding, and the confidence to proceed knowing the considerations given to the options, approach and designs to get us ready.

Part of any successful readiness activity depends on managing supply chain, and as part of our set of AMP8 readiness programmes we are working closely to on-board new suppliers and off-board any suppliers from AMP7 to ensure we don't lose pace in our progress and ultimately let down our customers. The Supply chain has been engaged early to ensure continuity and resilience of resource availability for Welsh Water's biggest investment programme in its history.

To further support this we are analysing work being done across the transition from AMP7 to AMP8 to better understand and prepare for capacity in our supply chain to deliver a great close out to AMP7 and deliver against the promise of a strong start to a demanding AMP8 schedule of work.

The principles of our readiness ambition are to be sure we are doing the right work, for the right costs, with the best solutions and to be 'spade ready' to commence construction from April 2025, and apply a rolling steady feed of work as we travel through the AMP8 period.

We will have challenges along the way, but with a great team of people organised and working to a rhythm of consistent delivery we're confident we can tackle the significant challenges AMP8 presents with resilience, control, and vigour.

4. Supporting Tools, Systems and Processes

4.1 Asset Information

Asset Information is considered an asset and critical to Welsh Water's investment decision and business planning processes.

To fully understand what data we require relating to our assets, the Asset Planning team has compiled the Asset information requirement (AIR) for all our assets. This allows us to determine, at a project level, the Employer Information Requirement (EIR) to ensure that as we deliver any new or improved infrastructure, we capture the required data into our corporate systems.

The Data Governance Team are a critical component of the wider Data Team, and largely focus on progressing the data governance strategy across the organisation. The initiative focuses on the technical identification and implementation of data management practices that support good data governance, as well as embedding an organisational culture, through an engaged network of Data Owners and Data Stewards, that enables the business to consider data "as an asset". Progress is largely measured based on data maturity scores calculated by each data domain.

4.2 Organisation & People

Welsh Water broadly consists of Water and Wastewater divisions, each with its own Managing Director, whose role is to be accountable for right sizing to deliver outcomes and customer service. The Energy section of Welsh Water business falls within the Wastewater division.

Within each division, various heads of service lead local asset management efforts to understand the assets, the risks and to maintain and enhance the assets via suitable business plans.

Within the development of the business plan, there has been continuous 'cross team' working to ensure that the investment needs and solution are those that provide the best benefit to our customers and the environment.

To develop Asset Management competence within the organisation, we have identified key roles that require advanced asset management training (IAM Diploma, Certificate or Foundation) and we have started the roll out of this training.

4.3 Risk & Review

The long-term success of the organisation depends on identifying, assessing, and managing risk effectively. All colleagues play a part in risk management.

The Board has overall responsibility for the operation and effectiveness of the organisations system of internal controls and risk management. They consider in detail, every 6-months, risk appetite and progress to target for identified strategic risks, with interim updates at every Board meeting. All areas of the business that are associated with the identifying, assessing, and managing of risk are involved in the processes to understand and control accordingly.

Our framework of internal control is designed to identify, evaluate, and manage risks affecting the business. This is supported by a "Three Lines of Defence" model, which manages and assesses key controls and adherence to a suite of processes, policies, and management systems.

- **First line** owns and manages risks. This is fulfilled by operational teams and managers. A wide range of potential events including legal, regulatory, core operations, customer service and hazard risks are reviewed.
- **Second line** is risk management and risk control. This is fulfilled by our Compliance team and internal committees. Opportunities are also identified and actioned by the business through this process.

- **Third line** is independent review and oversight. This is fulfilled by Internal and External Auditors, including our technical advisor on regulatory reporting issues (Jacobs Engineering Group – our Reporter).

Risks are documented in our risk systems to ensure a systematic and auditable approach is undertaken and decisions are appropriately evidenced. A simple view of our risk systems can be seen below:

Figure 15: Risk Management System

Each business area feeds into a "bottom up" risk management system by maintaining a Risk Register. Risks are discussed during a "top down" discussion each month at a meeting of the Welsh Water Executive team (DCE) which also works on reporting strategic risks and progress towards mitigating these risks, to the main Glas and Dŵr Cymru Board of Directors. This combined bottom up and top-down approach to risk management provides assurance that risks are being effectively managed by the business and identifies those areas where further mitigation steps are needed.

Within asset management our aim is to embed risk thinking within investment decisions across the organisation. The strategy to achieve this is outlined in AP_(02)_08 (Asset Management Risk Strategy) which supports delivery of our company policies on Asset Management and Risk. This approach aligns with the Institute of Risk Management Standard ISO 31000:2009 and as processes are developed, we will continue to review them to ensure compliance and continual improvement.

4.4 Multi-Capital Value Framework

The aim of a multi-capitals approach is to introduce a broader range of valuation criteria & metrics that better capture human, societal & environmental externalities. This improves decision making and assists Welsh Water to achieve not only it's goals but also improving the wider environment and society.

The six capitals includes both direct financial and indirect non-financial impacts and dependencies. The SMF has adopted the capitals definitions form the Integrated Reporting Framework (2021), aligning with best practice including Capitals Coalition's Natural Capital Protocol and Social and Human Capital Protocol.

Capital	Description	Impact Metrics
Financial	Cashflow. The pool of funds available to an organisation obtained through financing or generated through operations or investments.	Private costs, private benefits.

Manufactured	Physical assets owned or controlled by an organisation that contribute to service provision.	The value of assets is captured within the asset costs and can be accounted for at the level of the whole asset portfolio.
Natural	The elements of nature, such as biodiversity, that either directly or indirectly provide value to people.	Water quality, water resources, greenhouse gases (including carbon dioxide), air quality, food provision, renewable energy, water regulation, noise mitigation, recreation, aesthetics, non-use value.
Social	The relationships and networks within or between communities with shared norms, values and understanding facilitating co-operation.	Trust, stakeholder relationship, quality of place, local economy.
Human	The competencies, skills and attributes embodied in individuals that facilitate improved performance and wellbeing, alongside external factors that impact affect individuals.	Skills and knowledge, health and wellbeing, safety and security.
Intellectual	Organisation, knowledge-based intangibles (such as intellectual property) and organisational capital (such as knowledge, systems, procedures).	Routine and practices, structural resources.

This translates into a set of valuations across Welsh Water's activities, spanning the following:

Valuation Type	Definition	Approach
Private Costs	'Private costs' which the business incurs in responding to failures of services	Developed through analysis and by consultation with members of staff from across Welsh Water various functions
Customers' valuations	Customers' Stated Preference values for changes in service	Derived from Willingness to Pay evidence from Customer Valuation Research
Social, human, Intellectual and environmental capital valuations	Social: Relationships between an organisation and communities, local government etc.	Consideration of social, human, environmental and intellectual values across the industry and broader literature/research at regional to global levels following best practice guidance in the HM Treasury Green Book and supplementary guidance.
	Human: Includes trust, skills, well-being and safety of personnel.	
	Environmental: Ecosystem services that are relevant to Welsh Water's activities.	
	Intellectual: Includes routines, practices and structural resources	

Robust private costs as well as appropriate challenge have been used as described above, and contingent valuation is covered in Stepping up to the Challenge: Business Plan 2025-30 (Section 5). Where direct non-use environmental and social values are not valued using the Willingness to Pay research, reference values from the literature have been used. A conservative approach has been taken in line with best practice to avoid double-counting of benefits.

Our Service Measure Framework links failure modes, to their potential monetised consequences. Each potential consequence has been expressed as monetary values. The valuations we have used to monetise societal impacts are outlined below.

Within our CBA we have applied out multi capital approach to score our options.

4.5 Asset Health and Service Impact Modelling

Welsh determines Base Asset Health and combines this with Asset Criticality to obtain an overall Asset Health Risk Score. This Asset Health Risk Score is used to inform operational practices, maintenance interventions and capital investment requirements.

The total Asset Health Risk Score will be reported to the Board as a corporate risk on a periodic basis to provide information on long term trends of Asset Health and Risk across the asset base.

4.5.1 Base Asset Health

Base Asset health has been defined as the probability of an asset failing. This probability is derived from our deterioration and service impact models that consider parameters such as previous failure rates of an asset / asset group, condition, age, material, location, soil types etc, resulting in an asset specific probability of failure.

These figures form the “Base Asset Health” for an asset, with higher scores indicating a higher probability of failure. Base Asset health is calculated as a “failures per year” figure.

As well as creating a current assessment of asset health per pipe/piece of equipment, our asset deterioration models also allow us to create deterioration curves to predict base asset health into the future, for example for our water infrastructure assets where we have assessed deterioration by pipe material -

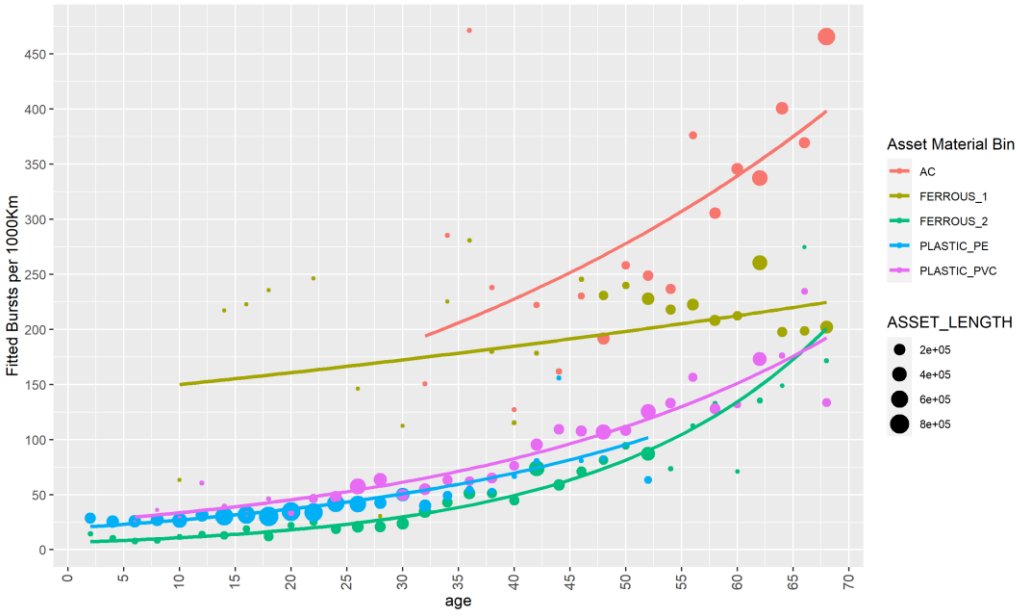


Figure 16: Deterioration curves for Water Infrastructure materials

4.5.2 Asset Criticality in Welsh Water

As Asset Health decisions cannot be solely driven by a probability of failure, the consequence of failure also needs to be fully understood and quantified.

This is done by undertaking service impact modelling which allows us to look at the consequences of failures through historical assessment of consequences and then predicting the impact of failures at individual locations using information about the characteristics of the assets and location.

This is achieved using 'Risk Maps' to link cause and effect. Risk Maps are graphical representations of all service impact relationships (such as linking asset to service failure), interventions costs and impacts, and private/company costs and social value.

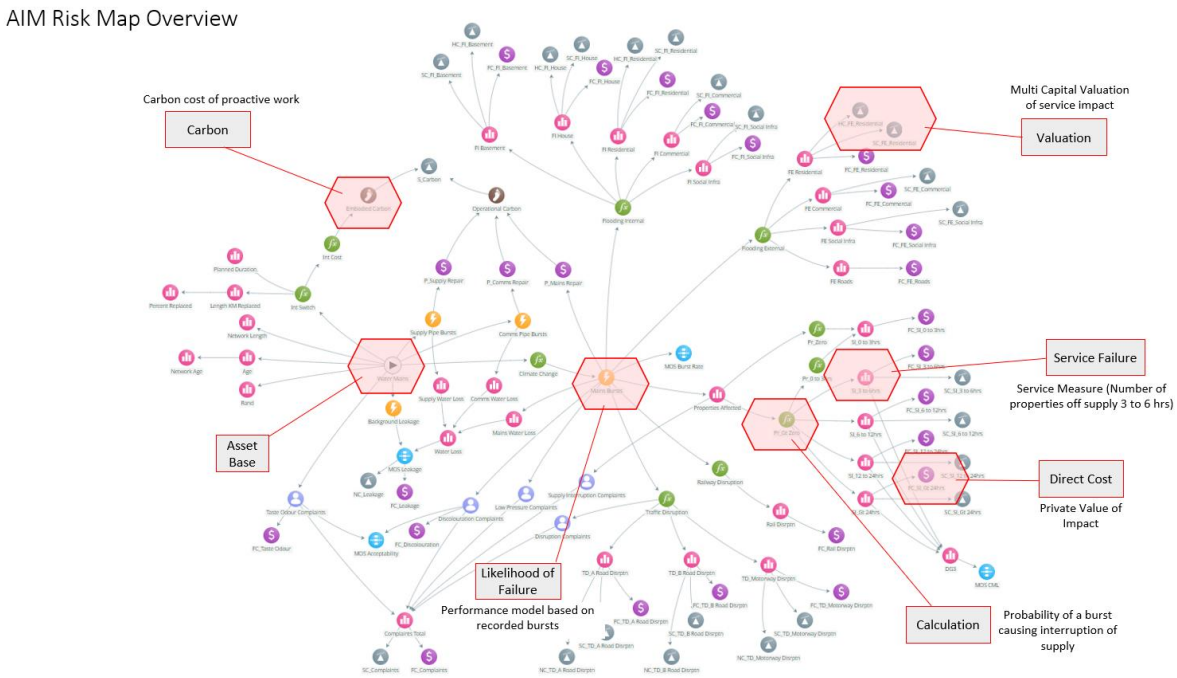


Figure 17: AIM Risk Map Overview

The resulting criticality value is calculated in a pounds and pence figure that will be incurred by Welsh Water in the event of a specific asset failing. These figures are quantified by our Service Measures Framework (SMF).

Each asset will be allocated a criticality value in £ with higher scores indicating a higher financial consequence of failure.

4.5.3 Managing investment using Asset Health Risk

As part of our investment management approach, Welsh Water take the two components listed above, Base Asset Health and Asset Criticality to calculate "Asset Health risk".

We use Asset Health Risk in a number of ways in order to ensure that our future investments are appropriate.

1. It is used to compare cohorts of assets to understand the risk profile across the portfolio, shown for water mains by pipe material in figure 18 below.
2. It is used to compare investment scenarios alongside performance aspirations.
3. It is used as a target for particular asset health investment scenarios.

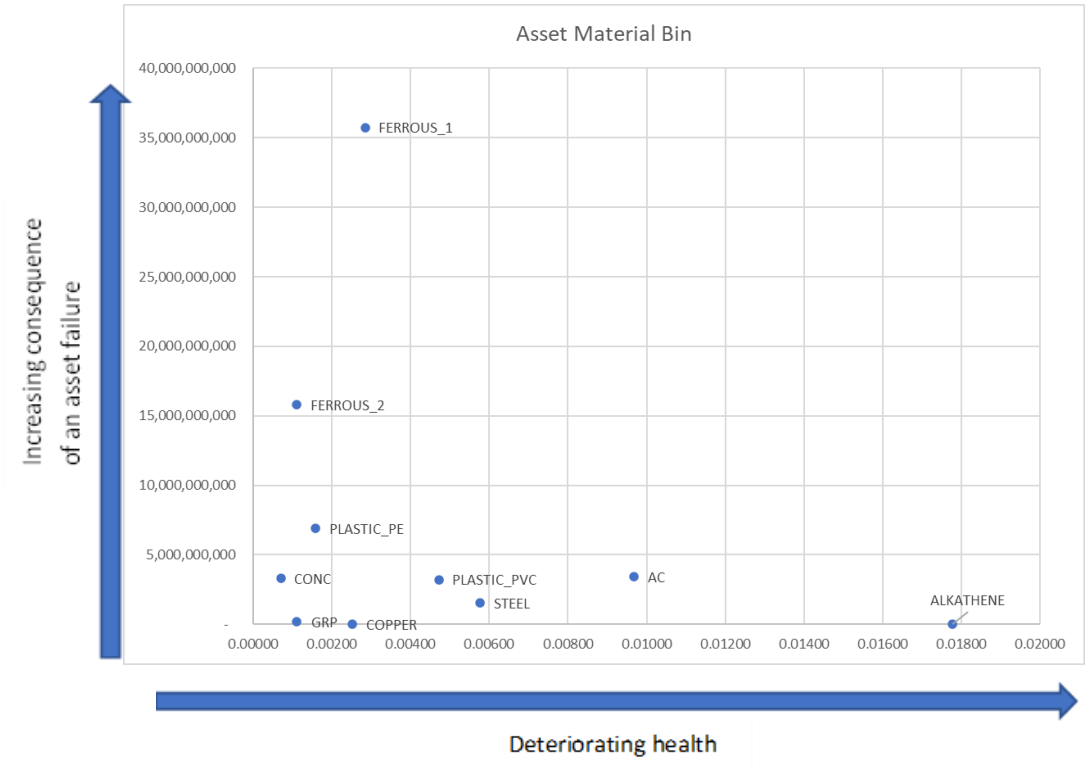


Figure 18: Asset Health risk scoring for all Water Infra pipe materials.

5. Assurance and Challenge

Welsh Water has delivered a robust process to provide assurance to our senior leadership and Board teams. This approach is set out in more detail in Our Assurance Framework Chapter.

Within this section we have focussed on expanding the key assurance activities specifically related to the development of our base maintenance and enhancement cases.

In producing our investment plans we have followed a clearly defined process to ensure the investment cases are founded on robust data and were developed in compliance with our ISO55001 accredited asset management process.

Our asset management process also delivers compliance with our legal and regulatory requirements as well as delivering value for customers.

We have also implemented a strict review and governance process to ensure that subject matter experts develop and challenge the plans, which have been separately and independently reviewed by our senior leadership team and Board and challenged and supported by the Customer Challenge Groups (CCG). We have also made use of targeted external assurance:

Data provision and assurance: We have worked closely with data owners and SMEs from across the business to provide data and engineering expertise to inform our business plan.

Comprehensive methodology documents: We have documented our overall process for developing our Totex plans, within the context of our ISO 55000 accredited business as usual approach, which have been reviewed by our external assurance providers, Jacobs. We have also produced comprehensive internal methodology documents to record the development of our plans which has been reviewed and approved by key SMEs within the business and have been subject to external assurance by Jacobs.

Ongoing engagement with Welsh Water senior leadership: We have utilised water and wastewater working groups and our Asset Investment Group (AIG), attended by our senior leadership team and directors, to consider investment proposal outputs for compliance with strategy and that they were fit for purpose. These included a review and sign-off phase.

Internal Audit: Our business-as-usual processes include second line controls and independent internal audit. For example, the costs produced for the plan have been reviewed by our Cost Intelligence Team (CIT). High level governance review conducted by internal audit in 2022/23.

Focussed engagement with our Board: Our Board have been intimately involved in the development of our plan with regular working sessions on plan development. The outputs from work at the CCG and water and wastewater working groups fed into sessions with both our Executive Team and Board, that allowed extensive challenge and review.

In accordance with our assurance process, in areas of complexity we have employed specialist external third-party suppliers to assure the work we've undertaken. External assurance has been completed in the following areas:

Table 5: Details of Assurance

Area of Assurance	Provider of assurance	Approach
Asset management approach: ISO 55000	SGS	Assessment of our approach to asset management as a BAU process.
Asset management approach: PR24	Jacobs	Assessment of our methodology; deep dives into specific investment line. Compliance with Ofwat guidance around Enhancement.

Costing Methodology & Carbon Accounting	Jacobs	BAU assurances. Review of overall approach and detailed review on specific investment lines. This covers Capex, Opex and Opex from Capex.
Asset deterioration modelling	Cardiff University	Expert review of our statistical methodology used for our Asset Deterioration Models
Service impact modelling	PWC	Independent review of Asset Investment planning process and underlying Asset deterioration and service impact model.
BPDT production and methodology	Jacobs	Jacobs provided a review of specific inputs files that feed data to BPDTs covering the structure of the files, linearity, hard coded inputs in these files, and a detailed review of unique formulae where required.
DWMP/WRMP	Jacobs	Assessment of plan development and compliance with regulatory guidelines.
LTDS	PA	Providing independent 'critical friend' review and assurance.
LTDS	Jacobs	Assessment of plan development and compliance with regulatory guidelines.
Whole life cost calculations	Economic Insight	Compliance with Ofwat guidance on CBA.
WINEP	Jacobs	Approach and compliance with EA requirements, including review of data table completion.
Multi capital accounting	ICS	Review focussed on the structure and measures contained within the service measure framework.

We designed our assurance programme to ensure that Jacobs undertook complimentary, and in some cases overlapping assurance activities with other providers to fully cover our approach. Due to the identified overlaps, we are confident that we have had a comprehensive set of external audits completed on our methodology to deriving our investment program and the supporting approach to costs.

5.1 Results from Audit

The following table summarises the Assurance Provider's actual findings as stated in their final reports or supporting commentary.

Table 6: Summary from Audits

Assurance Provider	Summary of Findings
SGS	*ISO50000* *The content of the SAMP is clear and concise giving good context and following through covering the majority of the requirements of the standard (areas not covered are covered in other documentation). The processes employed to manage the assets are clearly described or signposted.* *Improvement in both asset management and asset planning is happening within the company very quickly. A large change in a positive direction can be seen since the audit in August 2022 and an even larger positive change in the last 18 months.* *The greater understanding and visibility are now driving the decisions related to how the assets are managed.*
Jacobs	*In summary, we found the Welsh Water approach to costings and its use in investment cases to be robust and, at second review, many of the material issues identified were addressed satisfactorily and closed out. On the treatment of optionality, the cases reviewed demonstrated consideration of multiple options in line with the DCWW totex hierarchy approach.*
Cardiff University	*Upon reviewing the methodology sections of the reports, I find that the statistical techniques and procedures outlined appear to be sound and appropriate for the research objectives at hand. The methodology adheres to accepted statistical principles, and I have not identified any issues or concerns during my review. The methodology employed in the reports appears to be robust, transparent, and in accordance with commonly applied techniques in the field.*
PWC	The model has been developed using external and internal experts and considers similar variables and predictors as other regulated companies. The model has been developed using established statistical techniques and is data driven, utilising past data and taking uncertainty into consideration where possible.
ICS	Overall, the framework is comprehensive and covers the range of impacts and valuations to assess/value the benefits of investment in the asset base across the whole range of investment drivers. The framework has a suite of measures that are at the more complex end of those that we have seen across the water and other industries.
PA	Overall, there were good levels of evidence of awareness of, and compliance with, the Ofwat guidance and a clear link to Welsh Water's strategy and vision. The SME's demonstrated a good understanding of the Final Guidance requirements and there is evidence of compliance with those requirements across the work that has been completed to date

Economic Insight	the R&V tool and AIM optimiser developed by Welsh Water is compliant with the relevant Ofwat guidance. Specifically, we have been able to assure that the R&V tool directly complies with a number of areas of guidance (such as the treatment of financing costs, the discount rate used to calculate the net present values of costs and benefits, and the time horizon included). We have also been able to assure that the tool is consistent the remaining areas of guidance – meaning that, while the guidance is not followed within directly within the tool, steps taken before or after use of the tool can be taken to ensure compliance with the guidance. We have found no areas of concern.

6. Continuous improvement:

6.1 Benchmarking and Good Practice

To improve industry wide benchmarking and best practice, Welsh Water has established an Asset Management Working Group. The group meets on a bi-monthly basis and has representatives from across the industry. In addition, we frequently meet with investment planners from other regulated businesses to review and compare good practice in asset management. Our asset management team have also successfully completed certification and diploma courses with the Institute of Asset Management (IAM). These courses draw on the latest thinking across multiple sectors.

We are therefore confident that our approach to asset management meets the requirements of good practice appropriate to our asset base.

In September 2021 Ofwat's AMMA showed Welsh Water as developing to competent, with one area which was optimising. Ofwat also highlighted good practice in communication and strategic asset management planning (see box below from Ofwat's published report).

> **Good practice example**
>
> Dŵr Cymru showed us strong ownership at the top and **communicated the asset management policy across the business** with all staff obliged to read and sign that they have read and understood it. Dŵr Cymru provided useful visual representations of their asset management system alongside a clear strategic asset management plan (or SAMP).

We have built the feedback from the AMMA into our continuous improvement process within our ISO 55001 framework. Since the AMMA in 2021 our asset management capabilities have improved considerably. In our December '22 ISO 55001 audit by SGS they noted:

'Improvement in both asset management and asset planning is happening within the company very quickly. A large change in a positive direction can be seen since the audit in August 2022 and an even larger positive change in the last 18 months.'

We have reached a competent standard across all measures, with some areas now rating above the end of AMP7 target for maturity. The image below shows our maturity tracker.

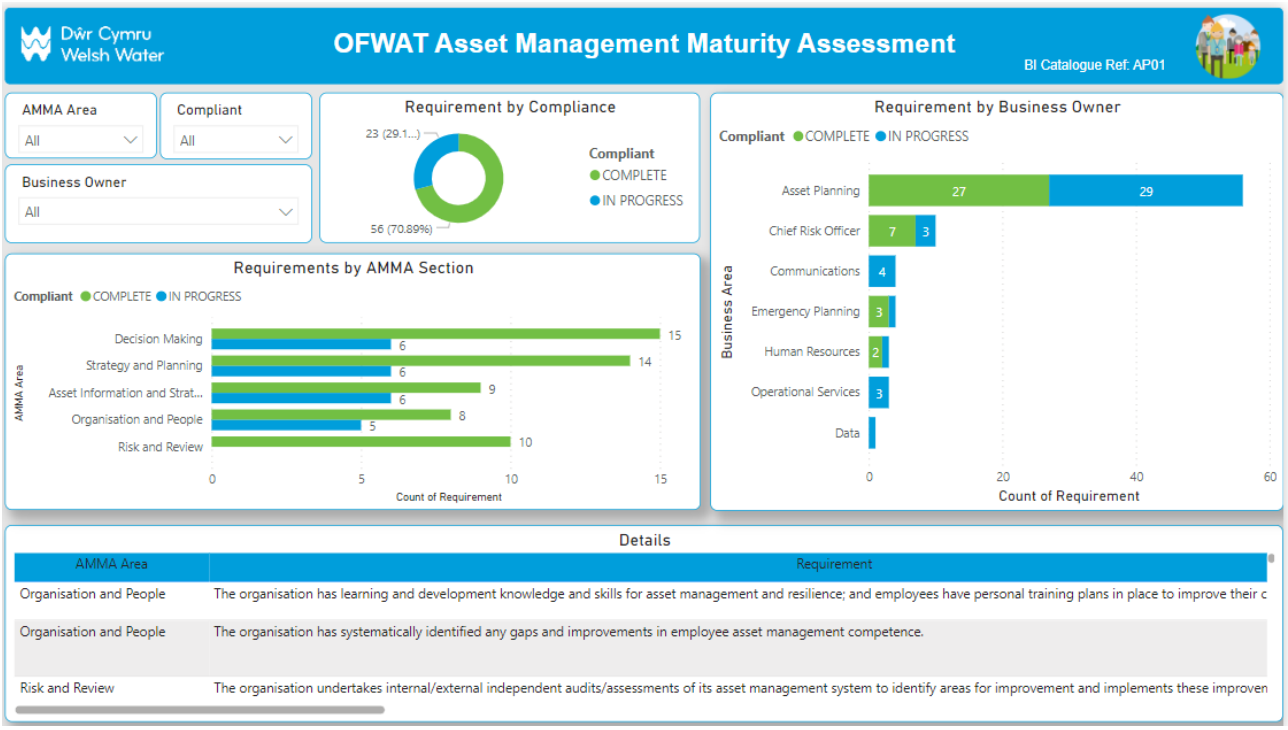


Figure 19: Asset Management Maturity Assessment Dashboard

Improvement highlights include:

- We undertake risk-based prioritisation, based on investment pounds (£) to consequence to service ratios, with statistical models forecasting future risk and deterioration over the long term.
- Utilizing our Multi Capital Accounting methodologies (the SMF), all risks are now scored with these wider factors considered.
- We have developed an Asset Management Training Matrix to ensure proficiency against the Competency Framework of the Institute of Asset Management (IAM) and are proactive contributors to the water industry asset management networks.
- We have invested to improve the quality of our asset data, creating an asset information in Welsh Water strategy to ensure that an Asset Information Management system is in place to effectively manage, and improve our critical data set and systems.
- We have also used advanced data mining and processing techniques to search for and fill gaps in our asset data. These improvements allow us to make better investment choices for our customers.

Delivery of our continuous improvement plan is assessed each year as part of our ISO 55000 accreditation audits.

7. Investment Conclusions

Having researched customer preferences and understood legislative requirements, we have applied good asset management and economic appraisal techniques to build a robust plan. This plan has been presented to our CEG and Board and is being tested with customers.

We have a clear understanding of Ofwat's CBA requirements. CBA will remain one input into our wider decision-making process, which will remain focused on delivering the right outcomes for our customers and stakeholders.

We are confident that the plan we have developed discharges our legislative duties, improves performance, reduces costs and delivers positive outcomes for customers, stakeholders and the environment.

8. Appendices

Appendix A – Welsh Water's ISO 55001 Certificate

Certificate GB17/872629

The management system of

Dŵr Cymru Welsh Water

Ty Awen Office, Spooner Close, Coedkernew, Newport, Nelson, NP10 8FZ United Kingdom

has been assessed and certified as meeting the requirements of

ISO 55001:2014

For the following activities

The Effective operations, maintenance and improvements of Welsh Water's Water, Waste and Bioresource infrastructure along with the associated support service and asset management processes to ensuring the provisions of safe drinking water and safe sanitation to its customers.

This certificate is valid from 07 April 2023 until 10 February 2026 and remains valid subject to satisfactory surveillance audits.

Issue 3. Certified since 11 February 2017

Last certificate expiry date 10 February 2023
Recertification audit date 28 December 2022

Authorised by
Jonathan Hall
Global Head - Certification Services

SGS United Kingdom Ltd
Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN, UK
t +44 (0)151 350-6666 - www.sgs.com

Appendix B – Welsh Water's Asset Management Policy

Dŵr Cymru
Welsh Water

Asset Management Policy Statement

This Policy seeks to outline the guidelines and practices that govern decisions on asset management to ensure we accomplish our Welsh Water 2050 vision 'to earn the trust of our customers every day.' We deliver this by providing high quality, essential services that protect our customers' health, our communities, and the environment around us. This Policy has a significant influence on our regulatory planning processes and applies to all lifecycle activities across Welsh Water's assets. The Policy is applicable to all employees, contractors, and consultants.

Intent
Welsh Water commits to ensuring customers receive a safe, reliable, and resilient service which meets all their needs and expectations at a price which is affordable. The intent of this Policy is to ensure all employees and functions are aligned with these goals and to ensure assets are managed in a manner to maximise benefit, reduce risk, and provide satisfactory levels of service to customers in a safe and sustainable manner.

We will achieve this by:

- Committing to comply with current and relevant statutory and regulatory requirements as well as other requirements deemed necessary by the business.
- Consulting our customers and interested parties on their needs and expectations now and for the future.
- Continuously improving our Asset Management system, which is customer service led, forward looking, and outcome based, whilst providing focus on delivering the best whole life cost for our assets.
- Continuously improving our approach to risk identification and management, strategy and planning, decision making, asset information, and capital delivery.
- Operating and enhancing our Asset Management system as a framework for setting and delivering our strategic responses, Asset Management Maturity Objectives, strategies, and plans, all of which are underpinned by innovative approaches.
- Committing to ensuring that there are adequate competent resources in place to develop, implement and continually improve the Asset Management system.
- Aligning our Asset Management system with other Welsh Water policies including those for Health and Safety, Sustainability, Environment, Quality Management, and Human Resources to ensure consistency.

Welsh Water has established Strategic Responses, Asset Management Maturity Objectives, and Inter AMP targets which are aligned, documented, and reviewed through Welsh Water 2050, the Business Plans, and Annual Performance Reports. The performance of the Asset Management system is also reviewed through frequent independent reviews in line with ISO 55001:2014 Asset Management Certification.

The Chief Executive Officer is responsible for approving this Policy and the Director of Asset Planning responsible for leading the implementation of this Policy across the organisation. The Policy will be communicated to interested parties, all Welsh Water colleagues and to those working on behalf of Welsh Water, including suppliers and contractors.

This Policy will be reviewed annually, and when significant and/or material changes are identified.

Peter Perry
Chief Executive
Welsh Water
April 2023

Dŵr Cymru
Welsh Water

Datganiad Polisi ar Reoli Asedau

Bwriad y Polisi hwn yw amlinellu'r canllawiau a'r arferion sy'n ymwneud â phenderfyniadau ym maes rheoli asedau er mwyn sicrhau ein bod yn cyflawni gweledigaeth Dŵr Cymru 2050, sef 'ennill ffydd ein cwsmeriaid bob dydd'. Fe wnawn hyn trwy ddarparu gwasanaethau hanfodol o safon uchel sy'n diogelu iechyd ein cwsmeriaid, ein cymunedau a'r amgylchedd o'n cwmpas. Mae'r Polisi hwn yn dylanwadu'n drwm ar ein prosesau cynllunio rheoliadol ac mae'n berthnasol i'r holl weithgareddau cylch oes ar draws asedau Dŵr Cymru. Mae'r Polisi'n berthnasol i bob gweithiwr, contractwr, ac ymgynghorydd.

Y Bwriad
Mae Dŵr Cymru'n ymrwymo i sicrhau bod ei gwsmeriaid yn derbyn gwasanaeth diogel, dibynadwy a gwydn sy'n bodloni eu holl anghenion a disgwyliadau, a hynny am bris fforddiadwy. Bwriad y Polisi yw sicrhau bod yr holl weithwyr a swyddogaethau'n gyson â'r nodau hyn, a sicrhau bod yr asedau'n cael eu rheoli mewn ffordd sy'n darparu'r manteision mwyaf, yn lleihau risgiau, ac yn darparu gwasanaethau o lefel foddhaol i'r cwsmeriaid mewn ffordd ddiogel a chynaliadwy.

Fe gyflawnwn ni hyn trwy:

- Ymrwymo i gydymffurfio â'r gofynion statudol a rheoleiddiol cyfredol perthnasol ynghyd â'r gofynion eraill y mae'r busnes o'r farn eu bod yn angenrheidiol.
- Ymgynghori â'n cwsmeriaid ac eraill sydd â buddiant ynghylch eu hanghenion a'u disgwyliadau nawr ac at y dyfodol.
- Gwneud gwelliannau parhaus i'n System Rheoli Asedau sy'n cael ei lywio gan wasanaethu cwsmeriaid, sy'n flaengar ac sy'n seiliedig ar ddeilliannau wrth gadw pwyslais ar sicrhau'r gost gydol oes orau ar gyfer ein hasedau.
- Gwella'n dulliau o glustnodi a rheoli risgiau, pennu strategaeth a chynllunio, gwneud penderfyniadau, gwybodaeth am asedau a chyflawni cyfalaf yn barhaus.
- Gweithredu a gwella ein system Rheoli Asedau fel fframwaith ar gyfer pennu a chyflawni ein hymatebion strategol, ein Hamcanion Rheoli Aeddfedrwydd Asedau, ein strategaethau a'n cynlluniau sydd i gyd yn seiliedig ar ddulliau arloesol o weithio.
- Ymrwymo i sicrhau bod digon o adnoddau cymwys yn bodloni i ddatblygu, gweithredu a gwella'r System Rheoli Asedau yn barhaus.
- Sicrhau bod ein System Rheoli Asedau'n gyson â pholisïau eraill Dŵr Cymru, gan gynnwys y polisïau lechyd a Diogelwch, Cynaliadwyedd, Amgylcheddol, Rheoli Ansawdd ac Adnoddau Dynol er mwyn sicrhau cysondeb.

Mae Dŵr Cymru wedi sefydlu ymatebion strategol, Amcanion Rheoli Aeddfedrwydd Asedau a thargedau Rhyng AMP sy'n cael eu cysoni, eu dogfennu a'u hadolygu trwy Dŵr Cymru 2050, y Cynlluniau Busnes, a'r Adroddiadau Blynyddol ar Berfformiad. Caiff perfformiad y System Rheoli Asedau ei adolygu hefyd trwy adolygiadau annibynnol aml yn unol ag ISO55001:2014 Ardystio Rheoli Asedau.

Y Prif Weithredwr sy'n gyfrifol am gymeradwyo'r Polisi hwn, a'r Cyfarwyddwr Cynllunio Asedau sy'n gyfrifol am arwain y gwaith o weithredu'r Polisi ar draws y sefydliad. Caiff y Polisi ei gyfleu i'r Rhai sydd â Buddiant, i holl gydweithwyr Dŵr Cymru ac i bawb sy'n gweithio ar ran Dŵr Cymru, gan gynnwys cyflenwyr a chontractwyr.

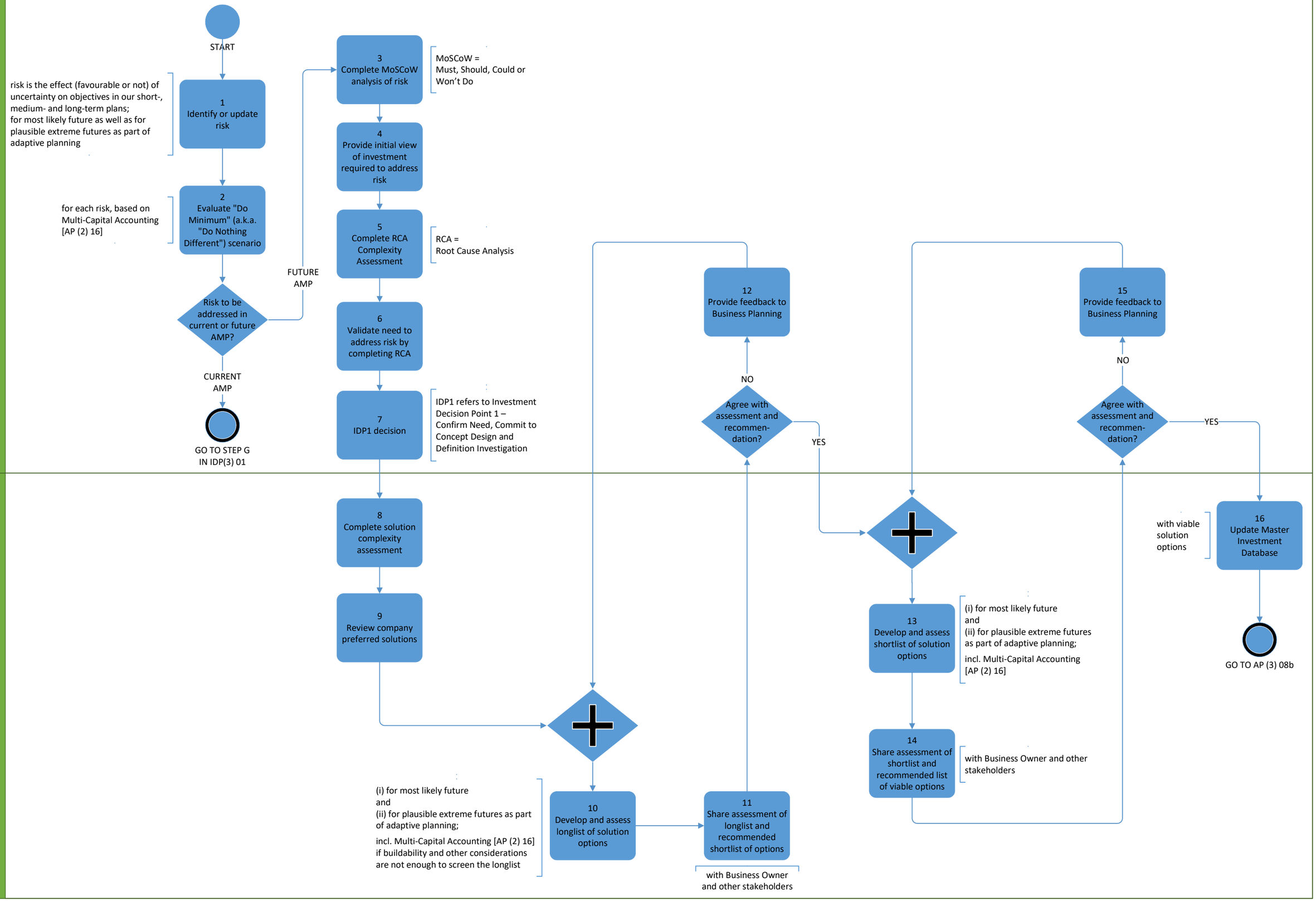
Caiff y Polisi hwn ei adolygu'n flynyddol a phan fo newidiadau arwyddocaol a/neu berthnasol yn codi.

Peter Perry
Prif Weithredwr
Dŵr Cymru
Ebrill 2023

Appendix C – Welsh Water's Investment Planning Process

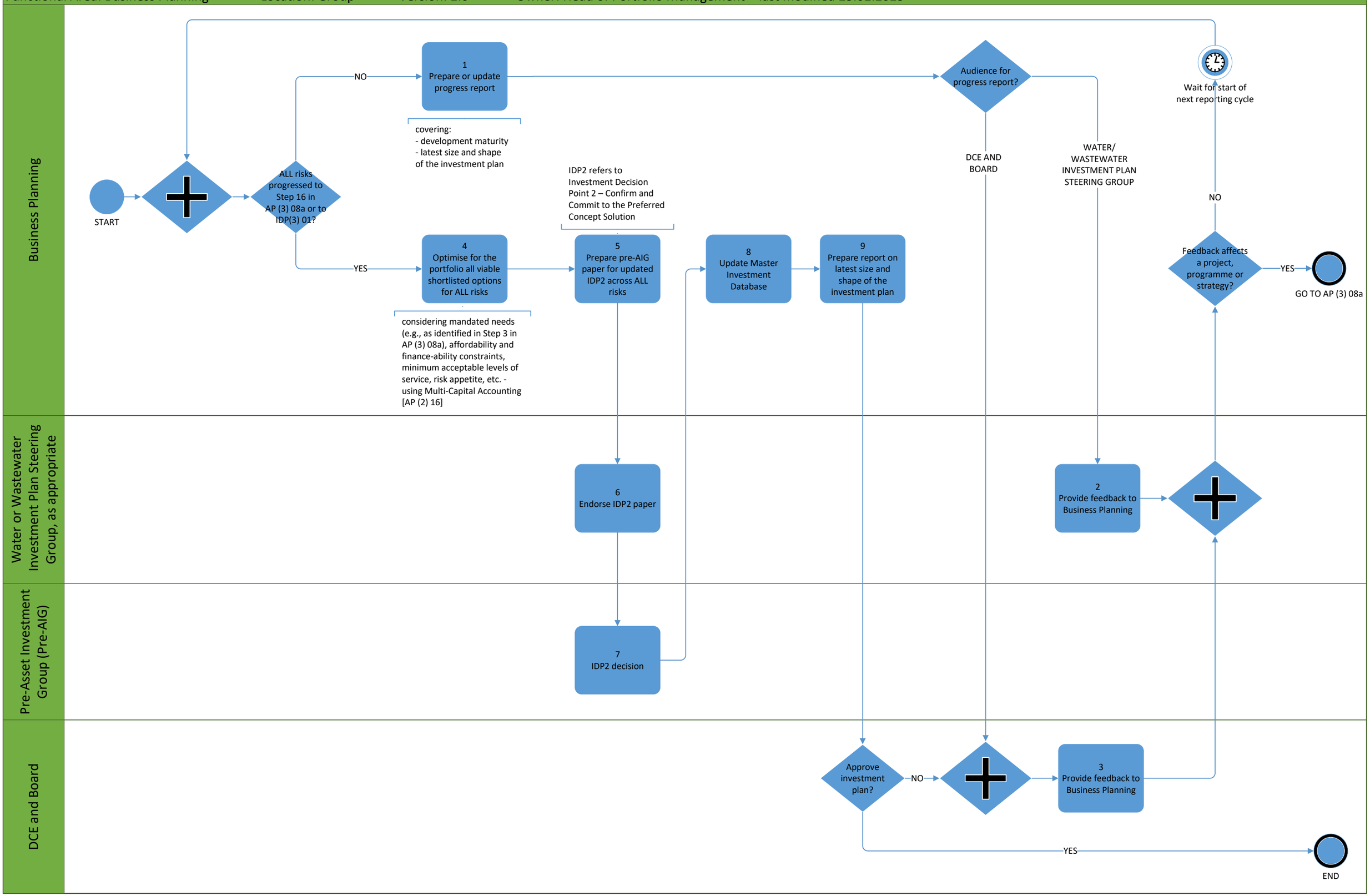
AP (3) 08a – Investment Planning Process: Project/Programme/Strategy Level Planning

Functional Area: Business Planning | Location: Group | Version: 2.0 | Owner: Head of Portfolio Management – last modified 23.02.2023



AP (3) 08b – Investment Planning Process: Portfolio Level Planning

Functional Area: Business Planning | Location: Group | Version: 2.0 | Owner: Head of Portfolio Management – last modified 23.02.2023



Appendix D – CBA Results and Sensitivity Testing

Our approach to undertaking CBA is in line with the Ofwat guidance and best practice. We have employed Economic Insight consultants to review and assure our CBA processes.

The assurance process has shown that we have followed the Ofwat's guidance in principle and in practice.

Top line results

The NPV for each of the areas where CBA has been completed, illustrates at least £7166m of benefits of the periods analysed. This is broken down, across the portfolio as seen below:

Table 7: Total NPV across the portfolio

Investment Case	Total Benefit (£m)
CW15 (Water)	4998.6
CWW15 (Wastewater)	2167.4
Total	7166