Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

26 FEBRUARY 2026

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BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Water Quality

February 2026

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1 Executive Summary

This Water Quality Technical Appendix covers all proposed investment required to maintain or improve service outcomes relating to the quality of drinking water supplied to customers in the SR27 period. The proposed investment will deliver our regulatory commitments in line with legislation and Scottish Water strategies and policies, including the requirements of Draft Ministerial Objectives 2027-33 to:

- Make progress towards the realisation of the long-term vision of the water industry.
- Promote sufficient asset maintenance to deliver required levels of service.
- Understand the condition of our assets, in particular those of a critical nature for maintaining service delivery and develop an evidence-based strategy to inform the long-term asset maintenance needs of the industry.
- Comply with our drinking water quality duties and prepare plans to address failures and the risk of failures to comply with those duties.
- Undertake risk assessments of our drinking water supply systems, from source to the point of supply, that identify where there are risks of supplying unwholesome water.
- Prepare investment plans to remove the contact of potable water with lead pipes in our networks and work with stakeholders to take steps towards a lead-free Scotland.
- Continue to implement and evolve plans for adaption measures necessary to protect services from climate change.

Total water quality compliance with regulatory standards has increased from 99.27% in 2002 to 99.93% in 2024. This has been achieved against a backdrop of regulatory and environment challenges and reflects the significant improvements delivered for customers since the formation of Scottish Water. However, increasing investment is required to not only maintain this performance but to deliver the Draft Ministerial Objectives 2027-33 and ongoing improvements to compliance, whilst reducing risks to the water service to meet regulatory requirements.

In SR21, the Public Water Supplies (Scotland) Amendment Regulations 2022 were enacted which amended the 2014 Regulations to reflect the requirements of the recast European Drinking Water Directive. This included new standards for a number of parameters including haloacetic acids (HAA) and chlorate, whilst retaining requirements for disinfection and understanding and controlling significant risks. Future changes are also expected through the reduction of the standard for lead from 10ug/l to 5ug/l by 2035. In addition, the challenges posed by climate change, through the deterioration in source water quality, along with the base maintenance demands from a more complex and ageing or deteriorating asset base, have the potential to compromise our ability to not only improve but maintain service levels in SR27 without appropriate levels of investment.

To identify the optimum blend of interventions to meet the above challenges, we have undertaken a strategic assessment process to review a number of potential investment scenarios. The investment scenarios have been developed from risks to water quality identified and validated through our Water Supply Risk Management (WSRM) processes, with the highest risks prioritised for delivery to maintain and improve water quality performance. The scenarios have been tested against Draft Ministerial Objectives 2027-33, customers' and stakeholders' expectations, the Water Sector Vision and the Climate Change Adaptation Plan. The proposals also align with Scottish Water Board expectations on meeting our regulatory requirements and making progress towards our Long-Term Strategy outcomes.

Part of this development process was the creation of a Draft Business Plan submission against which stakeholders provided feedback against their expectations and refinements were subsequently made.

Based on the refinement of the Draft Business Plan and the testing of outcomes, Reference Scenario (CPI +3.3%) is recommended as it offers the best balance in meeting the above factors through customer charges which are sustainable for both current and future generations. The £1,720m of investment proposed through the Reference Scenario will address needs which have been validated through our Water Risk Assessment Platform (WRAP), in line with priorities agreed with the Drinking Water Quality Regulator (DWQR) and wider industry stakeholders, to deliver the following:

Meet Regulatory Requirements:

We will **deliver** improvements required under

Enforcement Notices and to address Significant Risks (covered by Letters of Commitment) to maintain wholesome water supplies:

- **Enforcement Notices** (*Cryptosporidium*): Turriff WTW & Mannofield WTW.
- **Enforcement Notice (Treated Water Storage**):
    - Complete enabling works to allow the inspection and maintenance of Treated Water Storage Points (TWSP).
    - Complete permanent remedial actions to rectify ingress issues across all TWSP.
- **Letter of Commitment (Haloacetic Acids)**: Londornoch WTW, Glenlatterach WTW, Penwhirn WTW.
- **Letter of Commitment (Raw Water Supplies)**: Improvements to up to 54 supplies where they fail to meet regulatory requirements (to be confirmed through risk assessment).

We will also **prioritise delivery** of improvements, in agreement with the DWQR, for sites at risk from HAA and other Significant Risks, currently:

- **Letters of Commitment (Bradan / Haloacetic Acids)**: Enhancements to improve disinfection and reduce disinfection by-products at Bradan WTW.
- **Letter of Commitment (Haloacetic Acids)** and other **Significant Risks**: Stornoway WTW, Glendevon WTW and Camphill WTW.

We will also **develop** the long-term solutions for other sites with Significant Risks relating to HAA or other parameters and continue to review the phasing of scope and priority for investment through ongoing risk assessment against other needs and within available funding:

- **Letter of Commitment (Haloacetic Acids)**: Castle Moffat WTW; Inverary WTW; Killylour WTW; Camps WTW; Lochinvar WTW; Greenock WTW.
- **Letters of Commitment (Daer / Haloacetic Acids)**: Development of strategic replacement options for Daer WTW to deliver long-term solution for manganese, disinfection by-products, and other needs (potential delivery SR33), with the potential for interim investment being required in SR27 to mitigate increasing HAA risk.
- **Other Significant Risks**: Rawburn WTW; Lomond Hills WTW; Boardhouse WTW; Hopes WTW; Roberton WTW.

To support the above, we will:

Maintain or improve current levels of service over the long-term for water quality:

- **Ensuring microbiological quality of drinking water whilst minimising the taste of chlorine:** We will enhance disinfection processes at our water treatment works in line with our disinfection policy, prioritising improvements (e.g. increased treatment, control, monitoring and automatic shutdown) using our Water Risk Assessment Platform to ensure they meet regulatory requirements to adequately disinfect water at all times and minimise microbiological risks. This will also include provision for the installation of ultra-violet (UV) disinfection systems to reduce significant risks in relation to *Cryptosporidium* (e.g. Forehill WTW). We shall also continue to inspect and maintain our Treated Water Storage assets to reduce the risk of bacteria ingress and subsequent failures at customers' taps.
- **Reducing organics and disinfection by-products (DBP):** To help deliver our regulatory commitments relating to DBPs, we will continue to take a catchment-based approach to managing organics in our source waters and to develop partnerships with landowners and other stakeholders to assess and implement opportunities for nature-based or catchment solutions. Where these are not effective or suitable, we will utilise enhanced treatment technologies such as ion-exchange or ozone with granular activated carbon (GAC) to reduce organics. We will also continue to monitor the levels of organics in our source waters and optimise treatment processes through operational solutions to reduce the risk of DBP formation.
- **Improving aesthetics performance:** To reduce the risk of customers being supplied with discoloured water from our distribution network, we will continue to take a risk-based approach to cleaning and conditioning water supply pipes or replacing them where required. Our activities to improve catchment management and treatment processes will also reduce the increasing risk of discolouration and taste and odour originating from our source waters (as a result of climate change) and WTW. This will include the delivery of further investment at Carron Valley WTW to minimise the risk of customers being affected by repeat taste and odour events.
- **Continue to make progress to deliver a lead-free Scotland by:** removing ~3,000 lead communication pipes per year in response to sample results, when requested by customers or when identified through our mains replacement work to support the removal of all lead from Scottish Water's network by 2045. We will also continue to develop plans with stakeholders to deliver a lead-free Scotland in the future, considering options to encourage the removal of customer-side lead supply pipes.
- **Maintain (or improving where possible) water quality service levels at our SR21 exit position by**: maintaining our assets in line with the prioritisation criteria set out by our management approaches and within the proposed funding scenario**.** This will reduce the risk of the condition and performance of our existing asset base compromising drinking water compliance, whilst reducing the number of DWQR declared incidents and risks deemed to be significant or above long-term tolerable thresholds.
- **Managing risks to water quality**: delivering a net reduction in the number of risks above the long-term tolerable threshold (as determined by the WRAP process) from 5,625 in 2024/25 to 4,568 in 2032/33. We will also reduce the number of Significant Risks over the long-term (as per the ongoing process with DWQR due to be developed by March 2026).
- **Seek opportunities** for lower-cost operational-based interventions where appropriate or feasible to deliver interim or partial risk mitigation in line with established risk governance processes.

The investment proposed for SR27 (summarised in Table 1) represents an increase from SR21 to ensure that we not only deliver appropriate levels of maintenance to sustain the performance of the existing asset base, but also target the highest risks to water quality by enhancing our

assets to meet the challenges of climate change, in line with regulatory requirements, Draft Ministerial Objectives 2027-33 and our Long-Term Strategy, to deliver continuous improvement for customers. However, risks to water quality will remain and ongoing review of investment priorities will therefore be required during SR27 to ensure significant risks are controlled effectively.

Table 1: SR27 Water Quality Investment Summary by Investment Area

Investment Hierarchy	Investment Category	Investment Area	Proposed Investment (£m 24/25)
Cat 1	**AR3**	Water Distribution: • Network Dosing • Managing Discolouration	34
		Water Storage: • Service Reservoir Maintenance • Sample Points	300
		Water Treatment: • WTW Maintenance • Contact Tanks • WQ Instrumentation	530
		Raw Water & Catchment Management	1
Cat 2a - Regulatory	**WQ Enforcement (Non-Compliance)**	Water Storage: • Enforcement Notice - Treated water storage	18
		Water Treatment: • SR21 Core Programme Completion & WQ Enforcements • Letter of Commitment	610
	WQ - Lead	Lead Management	36
Cat 2b - Regulatory	**WQ Enforcement**	Water Treatment	19
	WQ Expectations (Other Commitments and Non-Compliance)	Raw Water & Catchment Management: • Peatland Restoration	8
		Water Treatment: • HAA at risk • Developing schemes – improved disinfection • Run to Waste	136
Cat 3a – Improve Service	**WQ - Expectations**	Water Distribution: • Developing plans to manage discolouration	29
Total			**1,720**

The Investment Planning Technical Appendix provides detailed information on the investment scenarios considered and the optioneering process.

The £1,720m SR27 investment into Water Quality makes up 21% of the total SR27 Investment of £8.1bn, as shown below.

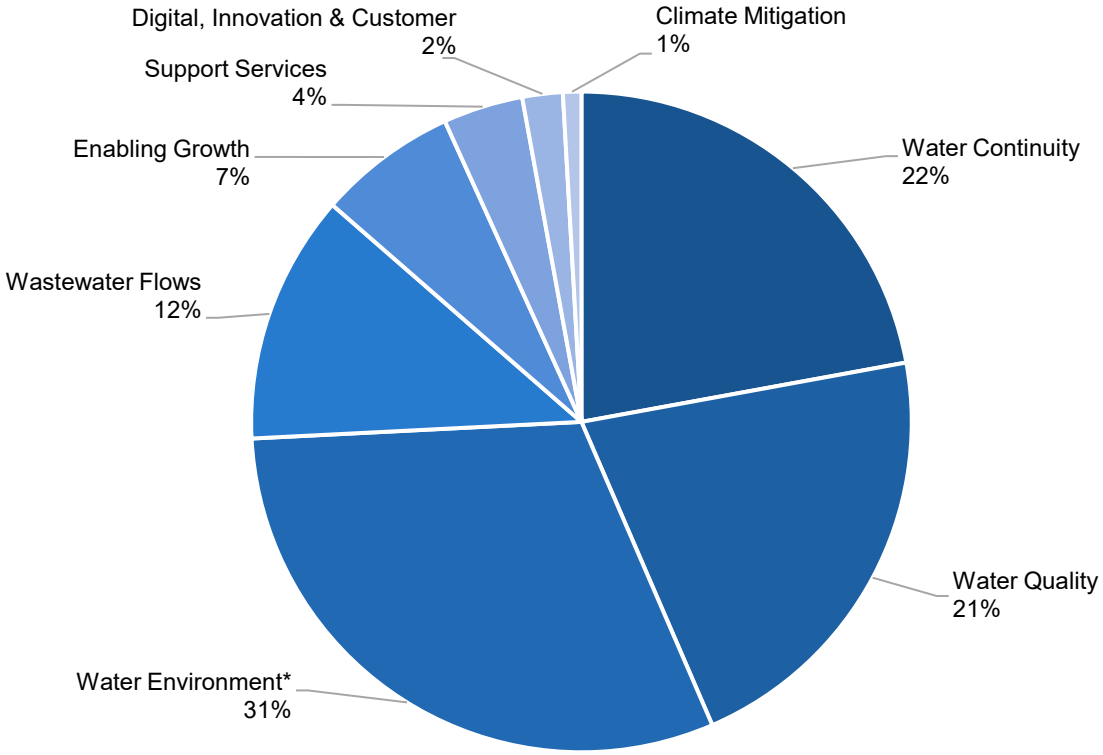

Figure 1: Water Quality investment as a proportion of the total SR27 investment

** Includes West Central Bioresource investment*

2 Background

2.1 Scope of Technical Appendix

The Water Quality investment area covers all investment required to maintain or improve service outcomes relating to the quality of public drinking water supplies across Scotland. The investment requirements for Water Quality have been identified from risks associated with the ability of our assets to supply customers with safe, clear and great tasting water which meets regulatory requirements, customer expectations, Draft Ministerial Objectives 2027-33 and our Long-Term Strategy to ensure that Scotland's tap water remains a source of national pride.

The investment proposed under Water Quality will target the highest priorities from an increasing risk profile, to maintain the performance and service provided by the existing asset base. Enhancements will also be required to reduce significant risks and further improve performance to meet existing and changing legislation against the challenges of climate change. The activities delivered by this investment will include managing the quality of our raw water sources and improving supplies fed directly from our raw water network, whilst maintaining and improving key water treatment works processes, treated water storage assets, trunk and distribution mains (in relation to discolouration), and lead management. As a part of our catchment restoration plans, nature-based solutions such as peat restoration and working closely with farmers to manage risks in each catchment will continue to reduce risks to water quality. This will be achieved whilst delivering Net Zero benefits, as proposed under the flourishing Scotland investment area.

This Technical Appendix details the drivers behind the proposed investments, identifies the needs that will be addressed during the regulatory period (2027-2033), and outlines the benefits for the Scottish population. It provides an overview of the allocation strategy for the investment, the methodology used for selecting options, and a balanced delivery plan for Water Quality investments across SR27. However, risks to water quality will remain and ongoing review of investment priorities will therefore be required during SR27 to ensure significant risks (both existing and emerging) are controlled effectively.

2.2 Context

The proposed investment needs presented in this document are required to meet Scottish Water's legislative obligations, including the Draft Ministerial Objectives 2027-33, and align with Scottish Water's Long-Term Strategy and policies to address existing areas of unsatisfactory service performance and risk, including non-compliance with prescribed standards, whilst addressing significant risks to service associated with the key long-term challenges posed by an extensive and complex asset base, changing regulatory requirements and environmental changes.

Legislative Requirements

Scottish Water has a duty to supply wholesome water under the **Water (Scotland) Act 1980**, with wholesomeness being defined by **The Public Water Supplies (Scotland) Regulations 2014** (as amended in 2017 and 2022) (referred to as the Regulations). These set out the regulatory standards and requirements governing the quality of water supplied by Scottish Water with the primary objective of protecting public health and are enforced by the Drinking Water Quality Regulator (DWQR) for Scotland.

In addition to setting the regulatory standards for water quality parameters and associated sampling requirements, the Regulations also set out the legal requirements for disinfecting water, and the duties on Scottish Water to risk assess its drinking water systems and take necessary steps where significant risk of supplying unwholesome water are identified.

The Regulations were updated in 2022 to transpose the requirements of EU Directive 2020/2184 for the Quality of Water Intended for Human Consumption (Recast), commonly referred to as the Recast Drinking Water Directive (rDWD). This introduced new and revised regulatory standards for a number of parameters, including haloacetic acids, chlorate, bisphenol-A and per- and polyfluoroalkyl substances (PFAS). Although compliance with the new standard for haloacetic acids (HAA) represents a key challenge for Scottish Water in SR27, other parameters will require ongoing monitoring to further understand the level of risk for the longer term. Although not yet reflected in the Regulations, it is expected that the regulatory standard for lead will also reduce from 10µg/l to 5µg/l by 2035 in line with the rDWD.

Recognising the challenges posed by a changing climate, policy relating to the water industry in Scotland is currently under review by the Scottish Government in collaboration with Scottish Water and other stakeholders. As this work has yet to be concluded through the parliamentary process, any associated investment requirements have not been included. However, as set out through Scottish Water's Long-Term Strategy (below), it is predicted that climate change will impact the ability of our assets to maintain current levels of service for water quality and to meet regulatory requirements, particularly due to deteriorating raw water quality. Initial progress on addressing these challenges is therefore required in SR27.

Draft Ministerial Objectives 2027-33

Our investment plans for Water Quality in SR27 are required to meet the following Draft Ministerial Objectives 2027-33:

- Make progress towards the realisation of the long-term vision of the water industry.
- Promote sufficient asset maintenance to deliver required levels of service and demonstrate how investment, or lack thereof, is contributing to a change in the condition of assets and thus levels of risk and service.
- Understand the condition of assets, in particular those of a critical nature for maintaining service delivery and develop an evidence-based strategy to inform the long-term asset maintenance needs of the industry.
- Comply with our drinking water quality duties and prepare plans to address failures and the risk of failures to comply with those duties.
- Undertake risk assessments of our drinking water supply systems, from source to the point of supply, that identify where there are risks of supplying unwholesome water.
- Prepare investment plans to remove the contact of potable water with lead pipes in our networks and work with stakeholders to take steps towards a lead-free Scotland.
- Continue to implement and evolve plans for adaption measures necessary to protect services from climate change.

Long-Term Strategy

A key outcome of Scottish Water's Long-Term Strategy to 2050, is to ensure that Scotland's tap water remains a source of pride, by:

- Maintaining the excellent quality of tap water, by continually improving how we treat and distribute water to ensure it is always safe, clear and tastes great to drink.
- Working across our drinking water catchments to improve the resilience of the water environment, to help tackle the changes in raw water quality caused by climate change that can lead to unpleasant tastes and smells in drinking water.
- Playing our part in creating a lead-free Scotland, removing all lead from the public water supply network, and working with the Scottish Government and other stakeholders to support customers to remove lead from their properties.

Key Challenges

- **Climate and wider environmental change** - impacting particularly on raw water quality through increasing levels of organics, particulate matter, microbiological loading, and nutrient loading (leading to algal growth). This will compromise our ability to meet both established regulatory standards and requirements and those more recently introduced through the increased potential for microbiological failures (including detections of *Cryptosporidium*), the formation of disinfection by-products and the generation of taste and odour compounds.
- **An extensive and ageing or deteriorating asset base** - the need for asset repair, refurbishment and replacement will be ongoing for the more complex treatment processes installed over the past 25 years, as well as for older assets requiring end-of-life replacement.

During SR21 we have seen a significant increase in investment demand as we expand our understanding of the risks across the asset base (through asset inspection and monitoring and increasing risk assessment capability) and observe changes in our raw water sources. This trend is expected to continue in SR27 to further add to the current volume of needs, which will be addressed by cyclical reprioritisation through SR27 to ensure risks are mitigated. Therefore, appropriate levels of investment are required to ensure that the key needs (including Significant Risks) can be addressed at a rate which maintains the overall risk position at an acceptable and sustainable level. Failure to do this will compromise our ability to maintain current levels of service and meet regulatory requirements, with lower levels of stakeholder and customer satisfaction and trust.

2.3 Past Performance

This section sets out our past performance across key performance metrics from 2002 to the present (aligning to the WICS SRC27 Final Methodology), key performance improvements that have been delivered in this period and trends emerging from historical analysis.

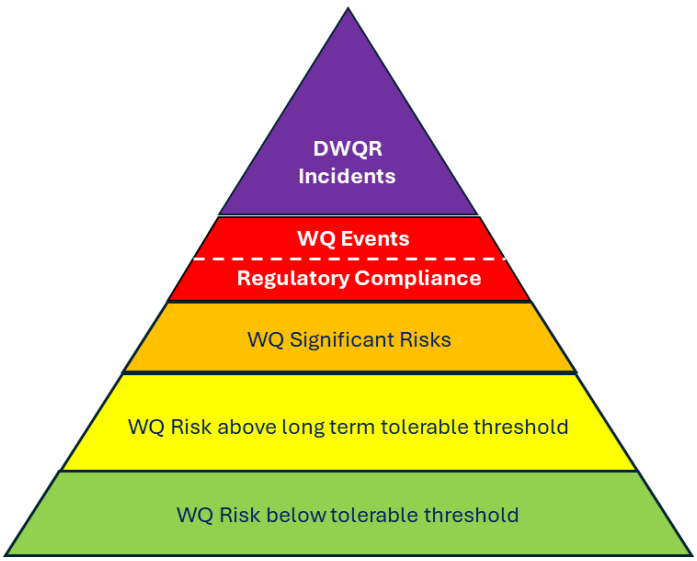

Figure 2: Water Quality Risk Triangle

For context when discussing performance, Figure 2 shows how water quality is regulated by the DWQR in line with the Regulations, with the risk triangle setting out the areas on which water quality is reported:

- **Incidents** – Water Quality exceedances, disinfection failures, significant customer contacts (DWQR Criteria).
- **Events** – exceedances (from all samples), critical process failures (e.g. disinfection or coagulation) and elevated contacts.
- **Regulatory exceedances** – samples from the statistical regulatory programme only.
- **Significant risks** – to be reported to DWQR once identified (process to developed by March 2026) along with an interim control plan.
- **Risks** – to be reduced over the long-term in line with the investment strategy.

Related outcome measures include Total Drinking Water Quality Compliance, the Number of WQ Risks Above Long-Term Tolerable Level and the Number of DWQR Incidents.

Total water quality compliance with regulatory standards has increased from 99.27% in 2002 to 99.93% in 2024 (Figure 3: Total Water Quality Compliance 2010 - 2024). This has been achieved against a backdrop of regulatory and environment challenges and reflects the significant improvements delivered for customers since the formation of Scottish Water.

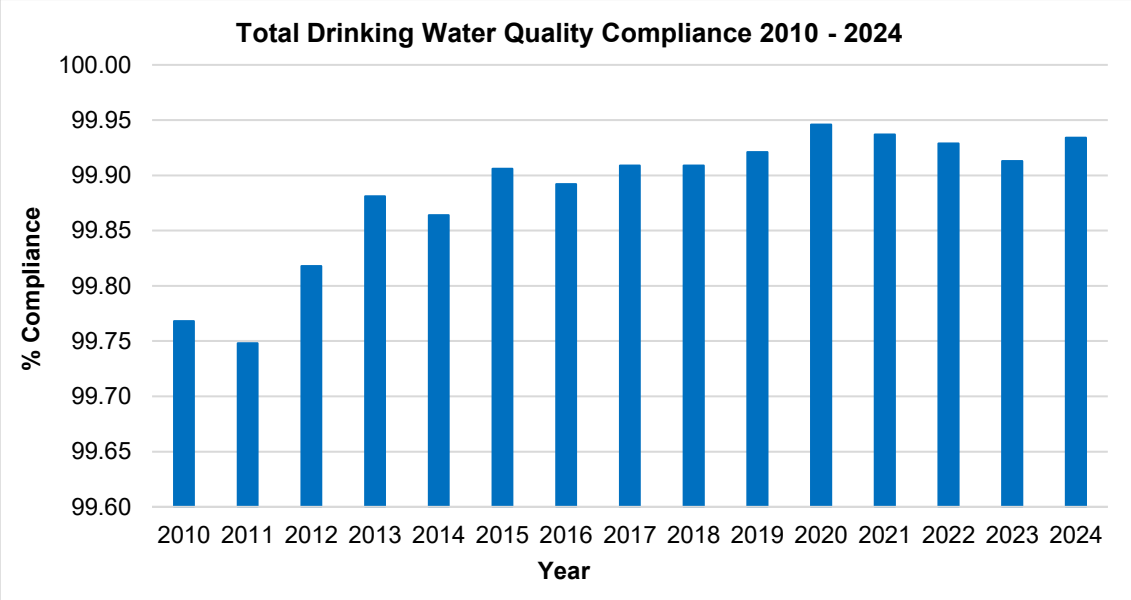

Figure 3: Total Water Quality Compliance 2010 - 2024

Although water quality performance has improved since 2002, compliance in 2023 reduced from 99.93% to 99.91% due to an increase in sample failures, partly associated with the introduction of new regulatory standards for chlorate and haloacetic acids (HAA), along with increased bacteriological failures at treated water storage assets. This has since improved back to 99.93% in 2024.

Despite the performance improvements delivered to date, key challenges, such as changing regulatory standards, climate change (with increasing temperatures and variable rainfall patterns leading to the deterioration in source water quality) and ageing / deteriorating assets, have the potential to compromise our ability to maintain or improve service in line with our Long-Term Strategy outcomes, Draft Ministerial Objectives 2027-33 and current regulatory requirements.

Our current risk profile for water quality hazards is shown in Figure 4. In October 2025, there were 5,625 risks above the Long Term Tolerable (LTT) threshold, including those considered significant, based on a current risk score threshold of 42 as determined by Scottish Water's WRAP process. Within these, Bacteria and Viruses represent a key area of focus where over 80% of

water supply zones (WSZ) have risks which exceed the long-term tolerable threshold, highlighting the requirement for improvements to disinfection processes and the integrity of treated water storage assets. Without appropriate levels of investment, the overall risk profile is expected to increase further as a result of the challenges highlighted above.

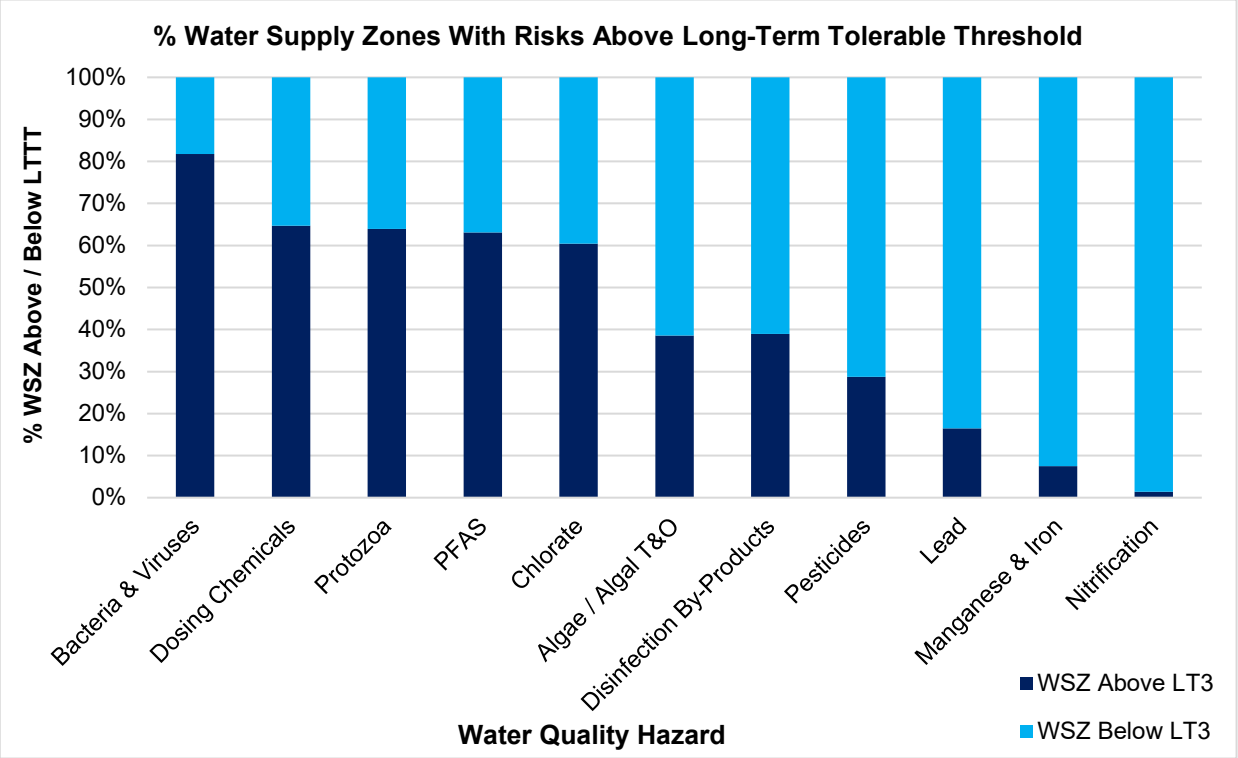

Figure 4: % of Water Supply Zones with Risks Above Long-Term Tolerable Threshold

Since 2014 the number of reportable water quality events has remained steady at ~800 per year, and the number of these declared as incidents by the DWQR has reduced from 43 to remain at ~30 per year (Figure 5). Asset capability and maintenance accounted for nearly 60% of the declared incidents from 2020 to 2024, with people or procedural factors being the lead cause for 33%.

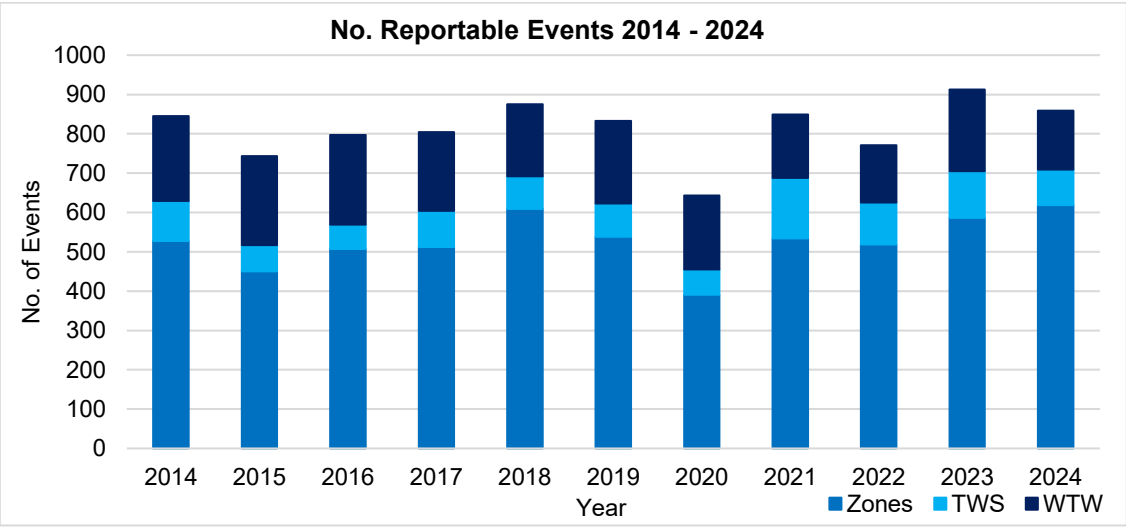

Figure 5: Reportable WQ Events 2014 - 2024

During SR21, a number of supplies have failed to meet the regulatory requirements for microbiological quality, including ~8 detections of *Cryptosporidium* per year leading to enforcement action by DWQR relating to Turriff WTW and Mannofield WTW. Several systems

are also impacted by increasing levels of naturally occurring organic matter in source waters, linked to increased temperatures due to climate change, and elevated levels of disinfection by-products at customers' taps (e.g. Glenlatterach). This has resulted in commitments from Scottish Water to DWQR to identify and deliver preferred options to manage these risks.

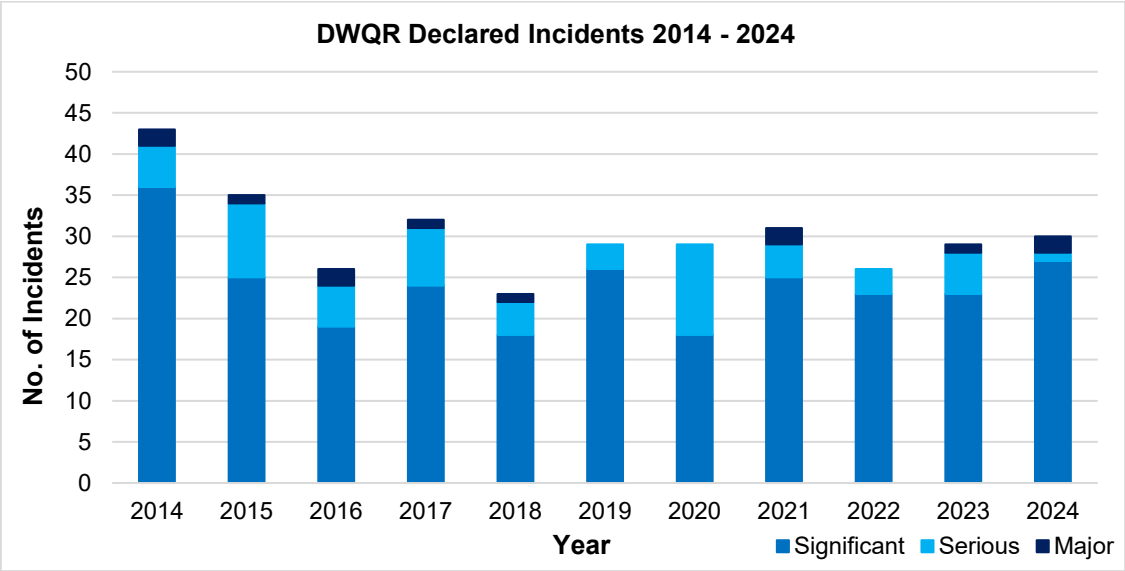

Figure 6: DWQR Declared Incidents 2014 – 2024

After a drop in customer contacts from 2014 to 2017, the number of WQ related contacts has increased to an average of 17,000 since 2022 (Figure 7), with the majority associated with discoloured water. The peak of contacts recorded in 2021 was due to discolouration relating to high manganese levels at Daer WTW in South Lanarkshire as a result of low reservoir levels. In addition, during the SR21 period, customers supplied by Carron Valley WTW have been directly impacted by taste and odour issues caused by geosmin, and taste and odour forming compounds have also been detected at Turriff WTW and Glenfarg WTW.

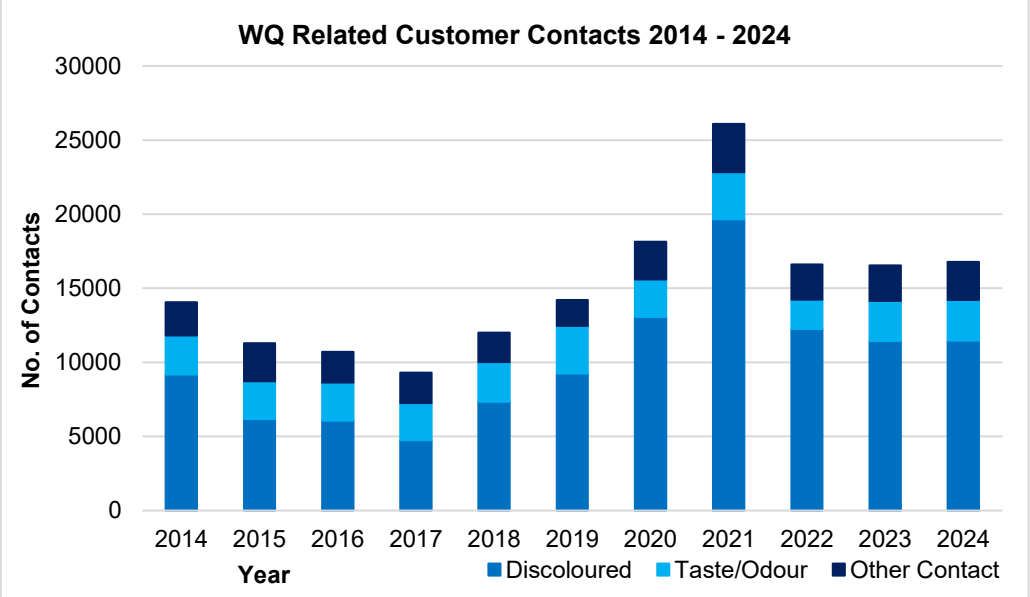

Figure 7: Water Quality Related Customer Contacts 2014 - 2024[1]

In 2024, over two-thirds of customer contacts relating to water quality were associated with discolouration with a further 16% associated with taste and odour. Customers have also been

[1] Elevated contacts and events with significant numbers of contacts are included in the risk triangle, total contacts are used as a secondary diagnostic measure

impacted by discoloured water resulting from sediment deposition and biofilm development in the distribution system, which can be disturbed following events in the network such as bursts. Our investment in water quality aims to reduce discolouration in the network, enhancing customer experience and improving our performance. For taste and odour, our Long-Term Investment Strategy estimates that capability improvements will be required at ~60 WTW over the next 25 years to mitigate the impacts of climate change on service levels.

The issues seen at Daer WTW and Carron Valley WTW demonstrate the increasing influence of climate change on water quality and the requirement to improve asset capability. In 2025, low rainfall in the Backwater-Lintrathen reservoir system (supplying Dundee, Angus, and parts of Perthshire) resulted in the lowest reservoir levels seen there since 2003-4. In addition to the subsequent challenges to maintain supplies, the low reservoir levels and other environmental factors resulted in water quality being put at risk due to elevated manganese levels from Backwater reservoir and significant algal blooms at the Loch of Lintrathen (Figure 8), which could not be treated by the receiving water treatment works. Investment is therefore likely to be required at these and other sites in the future to mitigate the water quality risks associated with a forecast increase in the periods of low rainfall during the summer months.

Figure 8: Water Quality - Algal bloom at Loch of Lintrathen October 2025

The investment in water quality described in this technical appendix will enable us to sustain our performance by addressing risks relating to the quality of our raw water sources, the maintenance of our existing asset base, and the capability of our treatment facilities. Together with ongoing improvements to our processes and procedures, this will support a reduction in the number of reportable water quality events and declared incidents.

2.4 SR21 Delivery: Investment in Water Quality in SR21

This section accounts for our delivery of SR21 water quality investments and how Scottish Water has met the SR21 Ministerial Objectives by undertaking a number of key interventions.

This includes operational steps in SR21 which have mitigated chlorate formation in water supplies, following the introduction of a new regulatory standard of 250µg/l in 2023. Chlorate forms through the breakdown of sodium hypochlorite, used as the primary disinfectant at most water treatment works and supplementary dosing sites. Higher strengths of sodium hypochlorite, long storage times and higher storage temperatures increase chlorate formation risk. Focus has been on lower-cost operational and procurement changes to reduce these factors and minimise failures by 2027. However, some bulk storage sites may require additional investment for cooling facilities or replacement with chlorine gas installations, where operational measures do not sufficiently reduce the risk.

Investment in SR21 has seen the completion of a new Bonnycraig WTW to minimise the risk from *Cryptosporidium* for 9,000 customers in the Peebles area. The innovative new works, based on

ceramic membrane filtration technology, was initially constructed off site as modules, saving on costs and time and reducing the impact on the operation of the original treatment process.

As part of our transformation programmes this new approach has learning and benefits which are now being used for other sites adopting ceramic membranes with construction commencing in SR21. These include Eela Water WTW, where a new treatment works will address microbiology and asset condition needs to improve supplies to 5,000 customers in the north of mainland Shetland. At Black Esk WTW, serving 40,000 customers in the Dumfries, Lockerbie and Annan areas, a new water treatment works (to be completed by 2028) will improve supplies by addressing needs relating to microbiology, disinfection by-products, and discolouration.

Improvements will also be delivered for 6,000 customers in the Keith area where a new Herricks WTW, based on dissolved air flotation and rapid gravity filters, will reduce the risk from *Cryptosporidium*. At Carron Valley WTW, process enhancements are being made to address microbiology, taste, and odour and other needs to improve supplies for 220,000 customers in the Stirling and Falkirk areas. Additionally, 180,000 customers in Fife will benefit from disinfection and resilience improvements being delivered at Glenfarg WTW.

To address water quality needs, support development and improve resilience on Islay, a new water treatment works based on nano-filtration membrane technology will be constructed at Torra. A transportable treatment unit (TTU) currently being used at Torra may then be used to address a supply risk at Crathie WTW, which supplies ~35 customers in Royal Deeside.

Project investment appraisal and design work continues in preparation for investment to be delivered in SR27, which includes a new water treatment works at Turriff and a new process stream at Mannofield WTW, both based on ceramic membrane technology, to meet the DWQR Enforcement Notice requirements to minimise the risks from *Cryptosporidium*. Other SR27 investment to be developed during the remainder of SR21 includes measures to meet the requirements of Letters of Commitment to the DWQR relating to haloacetic acids (including Londornoch, Penwhirn, Glenlatterach, Stornoway and Glendevon) and raw water supplies, as well as other significant risks.

In addition to base maintenance activities at water treatment works, key asset repair, refurbishment and replacement (AR3) activities in SR21 include the strategic replacement of Craighead WTW, similar to the plant being delivered at Herricks, to improve the reliability of supplies to 5,000 customers in the Huntly area. Remedial works are also being undertaken at ~200 treated water storage assets to reduce the risk of water and bacteria ingress from external sources.

During SR21 we have continued to make progress to Scottish Water's network being lead free by 2045 through the expected replacement of ~17,000 lead communication pipes by 2027 (aligning to the Ministerial Objective). We have also undertaken pilot studies to understand the practicalities, costs, and customer impact of undertaking customer-side lead pipe replacement to the first point of use in a property. This work will inform updates to Scottish Water's Lead Strategy with respect to the risks associated with phosphate disengagement, ongoing maintenance requirements for phosphate dosing in the meantime, and the potential replacement of customer-side lead pipes by Scottish Water where economic to do so.

Learning has also been taken from operational events and incidents, such as the discolouration event in 2021 which affected customers supplied from Daer WTW in South Lanarkshire because of low reservoir levels leading to high manganese concentrations. This has led to improved awareness of this type of risk and the risk control measures required at Daer and other sites to reduce the potential for a similar event occurring in the future.

SR21 has also seen the implementation of a new Water Supply Risk Management (WSRM) system which provides an overarching risk governance structure and supporting processes and procedures to drive a consistent approach to the management of the water service by Scottish Water. The risk governance structure provides visibility of key risks to the water service to allow appropriate operational and / or investment-based measures to be taken, whilst supporting continuous improvement in line with industry best practice.

To inform our risk position, we have also increased our inspection capacity and capability to support our ongoing asset maintenance activities. Our inspection programme to date across non-infrastructure and infrastructure assets has delivered ~4,000 site visits and ~20,000 inspections at a rate of ~800 inspections/month. The programme involves more than 25 contractors and 200 staff and will see us invest ~£120m in inspection related activities over the SR21 period. This investment has led to an increased understanding of asset condition to inform decision making in relation to managing Water Quality risk in line with our strategies and policies (including Management Approaches).

2.5 SR27: Drivers of Investment

In addition to ensuring compliance with established regulatory requirements, there are a number of key challenges to maintaining or improving service relating to water quality including:

- **Changes to legislation** – new and revised drinking water standards through the implementation of the Public Water Supplies (Scotland) Amendment Regulations 2022 to reflect the requirements of the recast European Drinking Water Directive including haloacetic acids and chlorate. Future expected changes include the reduction of the lead standard from 10ug/l to 5ug/l by 2035.
- **Climate and wider environmental change** - impacting particularly on raw water quality through increasing levels of organics, particulate matter, microbiological loading, and nutrient loading (leading to algal growth). This will compromise our ability to meet both established regulatory requirements and those more recently introduced through the increased potential for microbiological failures (including detections of *Cryptosporidium*), the formation of disinfection by-products and the generation of taste and odour compounds.
- **An extensive and ageing or deteriorating asset base** - the need for asset repair, refurbishment and replacement will be ongoing for the more complex treatment processes installed over the past 25 years, as well as for older assets requiring end-of-life replacement.

The **Long-Term Strategy** recognises these challenges and risks and sets out the expected level of investment demand required over the next 25 years to mitigate them to deliver the outcome of ensuring that Scotland's water supply remains a source of pride.

The DWQR also support and recognise these drivers for investment in their Annual Report 2023:

- DWQR recognises that despite good progress being made on improving water quality it cannot be taken for granted and have identified "*deteriorating condition and age of many*" water quality assets as a concern, with "*good performance [in some cases] is only achieved by the ongoing effort and diligence of Scottish Water's operational staff*".
- DWQR also outline its concerns regarding the effects of climate change combined with "*the current scale and pace of investment in the maintenance and replacement of water assets which may not be sufficient to safeguard the consistently high quality of our drinking water for future generations."*

Based on the above context and challenges, and to meet Draft Ministerial Objectives 2027-33, the main drivers for investment in SR27 are:

Meeting Stakeholder Expectations and Regulatory Requirements – ensuring compliance with regulatory requirements for meeting prescribed quality standards or reducing areas of significant risk to public health, including delivering or developing improvements required under DWQR Enforcement Notices and Letters of Commitment to maintain wholesome water supplies:

- **Enforcement Notices (*Cryptosporidium*):** Turriff WTW & Mannofield WTW.
- **Enforcement Notice (Treated Water Storage):**
    - Complete enabling works to allow the inspection and maintenance of Treated Water Storage Points (TWSP).
    - Complete permanent remedial actions to rectify ingress issues across all TWSP.
- **Letter of Commitment (Haloacetic Acids):** (Failing) Londornoch WTW, Glenlatterach WTW, Penwhirn WTW; (High Risk) Inverary WTW, Killylour WTW, Camps WTW, Lochinvar WTW, Greenock WTW.
- **Letter of Commitment (Haloacetic Acids) and Other Significant Risks:** Stornoway WTW, Glendevon WTW, Camphill WTW and Castle Moffat WTW
- **Letter of Commitment (Raw Water Supplies):** Improvements to up to 54 supplies (to be confirmed through risk assessment).
- **Letters of Commitment (Bradan / Haloacetic Acids):** Enhancements to improve disinfection and reduce disinfection by-products at Bradan WTW.
- **Letters of Commitment (Daer / Haloacetic Acids):** Development of strategic replacement options for Daer WTW to deliver long-term solution for manganese, disinfection by-products, and other needs (potential delivery SR33), with the potential for interim measures being required in SR27 to address the HAA risk.
- **Other Significant Risks:** Rawburn WTW; Lomond Hills WTW; Boardhouse WTW; Hopes WTW; Roberton WTW.

Maintaining Service and Reducing Risk – in addition to areas of enforcement / commitment, address areas of unsatisfactory performance either directly impacting customers or at high risk of doing so e.g. repeat discolouration events. This includes mitigating significant risks to ensuring wholesome water supplies or meeting Scottish Water policy requirements (e.g. disinfection, auto-shutdown, organics, lead) and asset maintenance requirements through:

- **Ensuring microbiological quality** (including *Cryptosporidium*) of drinking water across our source-to-tap systems, whilst minimising the taste of chlorine, including the disinfection and auto-shutdown capability of our treatment works.
- **Reducing organics** and disinfection by-products (DBP) to meet regulatory requirements and to improve overall water quality.
- **Improving aesthetics** performance to reduce the risk of customers being supplied with discoloured water from our treatment works or distribution network, whilst managing the risk of customers being affected by taste and odour issues.
- Continuing to make progress in removing all lead pipes from Scottish Water's network by 2045 whilst working with stakeholders to deliver a **lead-free Scotland** in the future.
- **Maintain** (or improving where possible) water quality service levels at our SR21 exit position by maintaining our assets in line with our management approaches.

Understanding and Managing Risk – continuous development and improvement to our Water Supply Risk Management (WSRM) processes and undertake activities in line with our functional risk register and approved Board risk positions. This will involve the delivery of interventions requiring capital investment, whilst seeking further opportunities for lower-cost operational solutions to deliver interim or partial risk mitigation to support:

- A reduction in the number of risks above long-term tolerable thresholds and those classified as Significant.
- A reduction in the number of DWQR declared incidents.

3 Customers and Stakeholders

3.1 Our Customers and Stakeholders

Delivering consistently excellent water quality is our highest priority, with our customers viewing the quality of the public water supply in Scotland as a source of national pride. Supplying clear, great tasting water to customers which is free from pathogens and chemical contaminants is of primary importance for maintaining public health and confidence. Without appropriate investment, a lack of key treatment capability could directly impact the health of our customers and compromise Scottish Water's ability to support a flourishing Scotland.

3.1.1 Customers

From 2017 to 2020, customer contacts relating to water quality increased from ~9,000 to ~18,000 before stabilising at ~17,000 from 2022 to 2025. The net increase seen during this time was primarily due to incidents originating from raw water sources, lack of treatment capability and disturbances in the distribution system following events like pipe bursts, leading to customers being particularly affected by issues such as discolouration and poor taste and odour. The perception of our customers of the quality of the water they receive through their taps is initially influenced by its aesthetic quality.

Although less apparent, other water quality incidents can impact customers, for example when supplies fail to meet the regulatory requirements for microbiological quality, which may lead to boil water notices, or when increasing levels of naturally occurring organic matter in source waters results in elevated levels of disinfection by-products at customers' taps.

Such events affect the confidence of customers and stakeholders, potentially compromising their trust in Scottish Water and the public water supply, and reflect the challenges our assets are now facing due to changing environmental conditions. This highlights the ongoing need to both maintain and, in many cases, improve the capability of our assets to deliver reliable high levels of service expected by customers. Progress is being made during SR21 to deliver water quality improvements across several systems, with further investment required during SR27 and beyond.

The process for customer engagement, along with the methodology for evaluating customer support for the proposed investment, is detailed in the Customer Research Technical Appendix.

3.1.2 Stakeholders

Scottish Water operates within a framework of diligent oversight and collaboration, engaging with multiple stakeholders who ensure that the public water supply meets the highest standards. These stakeholders include the Scottish Government (SG), the Water Industry Commission for Scotland (WICS), the Drinking Water Quality Regulator for Scotland (DWQR), and the Scottish Environment Protection Agency (SEPA), with the wider stakeholder group also including Consumer Scotland (CS) and the Independent Customer Group (ICG):

- **Scottish Government** sets national policies and objectives for water supply standards, and its role is pivotal in shaping the regulatory backdrop and ensuring that public health and environmental sustainability are at the forefront of water management practices.
- **DWQR** acts as quality regulator on behalf of customers to ensure that the water supply in Scotland meets regulatory standards and remains wholesome to drink. Activities include regular auditing of our assets, reviewing our performance against regulatory requirements, investigating water quality events and incidents, enforcing, or seeking commitment to address areas of non-compliance with prescribed standards or the control of significant risks, and identifying investment requirements.

- **WICS** is responsible for economic regulation, ensuring Scottish Water operates efficiently. The economic regulator scrutinises financial and operational plans to guarantee that investments deliver value for money while maintaining and improving service quality.
- **SEPA** focuses on environmental protection, ensuring compliance with environmental regulations and sustainability goals. This oversight ensures that water treatment processes minimise environmental impact, safeguarding ecosystems, and biodiversity.
- **Consumer Scotland** represents the interests of water customers, ensuring that their needs and concerns are prioritised. Consumer Scotland works in partnership with businesses, consumer bodies, the public and third sectors to promote the interests of consumers, understand consumer vulnerabilities and promote good business practice.
- **ICG** works closely with Scottish Water to provide independent insights and perspectives on customers priorities, ensuring customers interests are central to decision making.

The interaction between these stakeholders and Scottish Water is collaborative and crucial to building the investment requirements for SR27. For instance, DWQR has enforced actions to address the presence of *Cryptosporidium* in supplies from Turriff WTW and Mannofield WTW, ensuring immediate and long-term improvements in water quality. Scottish Water has also issued or updated Letters of Commitment in relation to Glenfarg WTW, Black Esk WTW and Carron Valley WTW, where investment will be delivered or commence in SR21. In addition, Letters of Commitment relating to Bradan WTW and Haloacetic Acids will require investment in SR27.

3.1.3 Engagement

Customers are at the heart of our business, and their opinions are a key factor in our decision-making process, as set out in our Customer Research Technical Appendix. Building these views into our plans is part of our ongoing customer research approach that allows us to ensure our customers' needs are at the centre of our service delivery. The SR27 customer research programme aimed to understand customer expectations for Scottish Water over the course of SR27. However, we also have a deep understanding of views on service issues from existing and ongoing research. Scottish Water's synthesis database contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers. These insights have been assessed and mapped into topics, and the highest quality insights have been gathered together into Key Insights which have been used to support the development of the Final Business Plan and Technical Appendices. The Research Synthesis Supporting Document sets out supporting evidence, scoring, and referencing for these Key Insights. The Key Insights on Drinking Water Quality can be seen in Table 2.

Table 2: Key Insights on Drinking Water Quality

Research Question	Key Insight
What are customers **perceptions of drinking water quality** in Scotland?	Customers consistently express high satisfaction with the quality of drinking water in Scotland, often making connections to national pride and Scotland's identity. When customers are asked about drinking water quality, they tend to respond in terms of taste, odour, and discolouration rather than regulatory drinking water quality. Many customers believe the water in Scotland is "the best in the world," leads in taste and quality and are keen for these standards to be preserved. For many customers, the quality of the drinking water that Scottish Water provides is the most tangible and visible aspect of service and perceive this as the core of what they are paying for.

Research Question	Key Insight
What is the **perceived impact** of drinking water quality issues on customers?	When customers experience issues with drinking water quality, it can result in a loss of trust in the tap water supply and in Scottish Water as a whole. The impact of water quality issues varies depending on the individual circumstances of the customer, and the nature of the water quality issue. Customers are concerned by potential health impacts in the event of quality issues. Households with children are concerned about children drinking water when out of sight, and businesses are concerned about their ability to operate, as well as risks to health and safety for staff and customers. Customers expect Scottish Water to communicate quickly around the safety of water in the event of issues.
What are customer **expectations** of Scottish Water regarding **drinking water quality?**	Customers do not have a strong understanding of the work required to maintain drinking water quality and might not understand why investment in this area is required. Customers who perceive drinking water quality to already be very high, might be less likely to prioritise investment in this area. However, the national pride associated with Scotland's drinking water quality also means that customers have high expectations, expecting Scottish Water to maintain what they perceive as the current high standards. Once customers are informed of water treatment processes, and the need for investment to address Scottish Water's three Long-Term challenges, they generally support investment to maintain the quality of water in the future. Some customers are aware of the role of other industries and organisations in the safeguarding of drinking water quality e.g. agriculture and expect Scottish Water to work together with these sectors.
What are customer **expectations** for dealing with **lead in the network**?	Customers generally have little knowledge of the potential presence of lead in drinking water. When discussed, most customers are concerned by the health risks of lead pipes. A significant proportion of customers are unsure whether they have lead pipework in their own properties. Many customers are unsure about their responsibility regarding internal and external pipework at their properties, which hampers proactive action currently, as does the cost and upheaval of replacement. Knowledge of Scottish Water's pipe replacement policy, free water testing and information on the health risks is likely to motivate many customers. Most customers believe that there are no/very few lead pipes still present in Scottish Water's network, assuming that they have already been eradicated. Customers can be shocked and concerned to learn that lead is still present in the network. Overall, customers expect that Scottish Water will replace any lead still found to be present in the water mains and in the communication pipe.

Also of relevance to the Water Quality investment area are the Key Insights relating to Asset Repair, Refurbish and Replacement (as summarised below in Table 3) which is seen as important by both household and non-household customers. Whilst customers understand the requirement for asset maintenance and the challenges posed by ageing infrastructure, there is less awareness of the scale of infrastructure in the network.

Table 3: Key Insights on Asset Repair, Refurbish and Replacement

Research Question	Key Insight
What is customer **understanding & acceptance** of aging assets as a challenge?	Customers are generally surprised to hear about the scale of Scottish Water's infrastructure, and to learn its age. Customers understand and acknowledge that ageing assets are a challenge for Scottish Water. They recognise the need for investment to maintain these older assets.
What are customer **expectations** of Scottish Water in maintaining assets?	Asset maintenance is a concept that people intuitively understand. It is felt to be highly important, and core to Scottish Water's purpose as an organisation, as it is an area that is clearly Scottish Water's sole responsibility. Customers recognise the need for investment and want to see lasting solutions put in place. Making things last is seen as an important area for Scottish Water's focus, appealing to all customers and older customers. They are keen to reduce the risk of service failures, as well as avoid unnecessary costs. Customers expect this to be an ongoing area of investment with a focus on preventing future problems. They generally expect Scottish Water to maintain or replace infrastructure before it fails to avoid service issues. Fixing assets on failure is perceived by some to cost more money over time than proactive intervention. Customers may also seek some reassurance that investment is necessary. They may wish to be satisfied that investment is directed at parts of the system at risk of failing, and that interventions are future-proof, high quality and lasting.
What are customer **expectations** around climate adaptation of assets?	On hearing about the scale of challenges from climate change, and the consequent impact on the provision of Scottish Water's water and waste water services, customers believe it is important to protect infrastructure against the impacts of climate change. There is an expectation that Scottish Water will invest in innovative approaches and long-term solutions.

3.1.4 Demonstrating Customer and Stakeholder Support

Our customers are highly satisfied with drinking water quality levels in Scotland and perceive water in Scotland as a source of pride, with water quality being the most valuable aspect of the services provided by Scottish Water. However, customers are concerned about their health in the event of a water quality issue, but most do not understand what is required to maintain a good standard of drinking water quality. Customers that perceive drinking water quality to already be very high might be less likely to prioritise investment in this area. In SR27, we will comply with our drinking water quality duties and prepare plans to address failures and the risk of failures to comply with drinking water quality standards. We are committed to making adequate investments to maintain these high standards, driven by the demands of our customers who prioritise the purity and safety of their drinking water.

Our customers understand the concept of asset maintenance but generally do not understand the level of asset maintenance required and the current ages of our assets. In SR27, by prioritising investment in asset maintenance (£865m) and improvements in infrastructure and treatment facilities (£856m) we can reassure customers and stakeholders that their water continues to meet high regulatory standards.

Although customers are concerned about the health risks associated with lead contamination many do not believe or are aware that there are many lead pipes left in the supply network. In SR27, we plan to invest £36m to reduce lead in our network, driven by concerns among customers and stakeholders about possible health issues arising from drinking water that comes into contact with lead pipes (this also aligns with the Draft Ministerial Objectives 2027-33). Addressing these concerns through the replacement of lead pipes, along with providing clear information about health risks and offering free water testing, will reassure customers and

encourage support of such initiatives. Investment in this area not only protects public health but also reinforces our commitment to maintaining the highest standards of water quality.

4 Our Investments

4.1 Approach

To meet the outcomes of the Long-Term Strategy, investment to improve the capability of our assets is required as a minimum to maintain current service levels at acceptable levels of risk to counter the impacts of climate change. This investment is covered through asset maintenance, which includes Asset Repair, Refurbishment and Replacement (AR3). To achieve further service improvements and make progress towards our Long-Term Strategy and the Water Sector Vision, additional investment will be required (Enhancement). In SR27, initial progress on the long-term outcomes will focus on addressing areas of non-compliance with regulatory standards and issues directly impacting customers, whilst reducing the highest risks to service or compliance.

The investment needs outlined in Section 2 reflect the increasing demands on the asset base through a changing environment and regulatory requirements, highlighting the areas where improvements to asset capability are required to meet these new challenges to safeguard public health and improve customer service for the long term. The priority investments will deliver regulatory commitments and address other service issues primarily relating to microbiology (including *Cryptosporidium*), disinfection by-products, and discolouration. Our SR27 Plan also includes enhancements to reduce significant risks of non-compliance against these and other parameters including taste and odour, as well as making continued progress to reduce the risk of exposure to lead.

Needs which are subject to regulatory enforcement and regulatory commitment relating to non-compliance will be prioritised, followed by regulatory commitments relating to high risk of non-compliance, and other areas of non-compliance and high risk not yet subject to regulatory commitment or enforcement.

4.1.1 Long-term Outcomes and Performance Requirements

The Water Quality investment area aligns with Scottish Water's Long-Term Strategy to 2050 and the delivery of the outcomes to ensure that Scotland's tap water remains a source of pride. The long-term outcomes aimed at ensuring excellent water quality are:

- Maintain the excellent quality of tap water through continuous improvement of treatment and distribution processes to guarantee that water is safe, clear and tastes great to drink.
- Enhancing the resilience of the water environment through a catchment management approach, to address changes in raw water quality caused by climate change, thereby preventing unpleasant tastes and smells in drinking water.
- Play our part in creating a lead-free Scotland by removing all lead from the public water supply network and working with the Scottish Government and other stakeholders to support customers to remove lead from their properties.

The delivery of the Long-Term Strategy outcomes relating to water quality will be based on the following principles:

- Ensuring current levels of service are sustained through ongoing asset maintenance, with necessary improvements to asset capability to mitigate the impacts of climate change.
- Delivering required improvements to levels of service to meet changing regulatory requirements, Scottish Water policy positions or economic considerations.
- Understanding source-to-tap risks through Scottish Water's water supply risk management processes and identify controls to manage these risks, leveraging opportunities to address multiple hazards simultaneously to deliver the sub-outcome strategies outlined in Table 4.

Table 4: How We Will Measure Delivery Against Our Long-Term Strategy Sub-Outcomes

Long-Term Strategy Sub-Outcome	AR3 / Enhancement	Description	Progress Measures: SR27 Outcomes and Internal Measures
Asset Maintenance	AR3	Our management approaches cover various asset groupings and have been economically appraised to determine the most effective approach to maintain our assets, including an assessment of costs, benefits, risks, and carbon. Significant areas of investment to maintain water quality relate to Water Treatment Works (WTW) instrumentation, chemical storage and dosing, operational technology, treated water storage, and network discolouration management.	- Total DWQ % compliance - Number of DWQR declared incidents - WQ Hazards above long-term tolerable risk level - Number of Significant Risks

Organics & Disinfection By-Products	Enhancement	Minimising the formation of disinfection byproducts and protect public health, by managing our catchments to improve source water quality, limiting the levels of naturally occurring organic matter in raw water sources, and increase the capability of our treatment processes to remove natural organic material.	- Total DWQ % compliance including:
			  - Trihalomethanes (THM)
			  - Haloacetic acids (HAA)
			  - Chlorate

Microbiology	Enhancement	Reducing microbiological risk to our water supplies by improving the capability of our water treatment processes, including effective clarification, filtration, and disinfection, securing our distribution systems, protecting public health, and preserving the reputation of Scotland's drinking water. Minimise the potential development of biofilms in distribution systems by managing organics levels.	- *Cryptosporidium* - Number of DWQR declared incidents
Discolouration	Enhancement	Enhancing treatment processes to remove iron, manganese, and organic material ensuring regulatory compliance and reducing the deposition of material in our network. Improving networks management practices to reduce the likelihood of customers experiencing discoloured tap water. Effectively manage organics levels to reduce the potential for discolouration events as a result of biofilm development in distribution systems.	- Discolouration to customer contacts target (nr/1,000 pop)

Long-Term Strategy Sub-Outcome	AR3 / Enhancement	Description	Progress Measures: SR27 Outcomes and Internal Measures
Taste and Odour	Enhancement	Preventing the formation of compounds causing poor taste and odour in our source waters, including those relating to algae. Ensuring our water treatment processes reduce the presence of organic matter and chlorine disinfection responsible for the generation of taste and odour compounds to undetectable levels, while minimising the levels of chlorine in water, always ensuring water is safe to drink.	- Taste & Odour Customer contacts (nr/1,000 pop) target. - WQ Hazards above long-term tolerable risk level
Chemicals and Compounds	Enhancement	Improving treatment works capabilities to comply with regulated chemical contaminants and developing understanding of emerging chemicals and compounds to identify suitable technologies to control them.	- Total DWQ % compliance
Lead	Enhancement	Removing all lead pipes from the public water supply network by 2045 and supporting customers to remove their lead pipes through enhanced stakeholders' collaboration, whilst enabling the withdrawal of plumbosolvency control.	- Lead pipes in public network (Nr) - Indicator of lead in customer supply pipes.
Other improvement areas:			
Raw Water Supplies	Enhancement	Improve supplies to properties or communities which currently do not meet the water quality standards under the Regulations, meeting commitments to the DWQR.	- Total DWQ % compliance. - Number of DWQR declared incidents
Risk	Enhancement	Develop strategies to reduce the risk of contamination to supply where not reflected above, as assessed through the Water Risk Assessment Platform (WRAP)	- Total DWQ % compliance. - Number of DWQR declared incidents - WQ Hazards above long-term tolerable risk level - Number of Significant Risks

This strategy supports the delivery of Draft Ministerial Objectives 2027-33 relating to Service Standards, Asset Maintenance, Drinking Water and Climate Change Adaptation and Mitigation. Key considerations in identifying the SR27 investment needs relating to each of the sub-outcome areas above are set out later in this document. Progress towards the long-term outcomes in SR27 will focus primarily on maintaining current levels of service and addressing areas of non-

compliance against regulatory standards subject to regulatory commitment, whilst reducing unacceptable levels of risk to supplies.

4.1.2 Building our Approach for AR3

In SR21, Scottish Water introduced Management Approaches for key asset groups and service areas which set out the policy of how and when we will intervene to manage assets. Our approach is directed by our long-term outcomes, Draft Ministerial Objectives 2027-33, current legislative requirements, and Board risk appetite statements which set the performance levels for critical and non-critical assets.

Management Approaches for each asset type have been maturing since 2023 to become economic appraisals. Impacts of climate change have also been considered, considering a range of climate hazards as identified through the Scottish Water Climate Change Risk Assessment.

Our management approaches include two primary considerations:

- **When to intervene** – this considers the point in an asset's life when an intervention should occur. This includes whether to intervene after failure (responsively) or on a planned basis before failure and, if planned, at what stage to intervene to maximise the useful life of the asset while minimising the chance of failure. A definition of each intervention approach is provided in
- Table *5*.
- **How to intervene** – this considers what intervention is used to restore asset condition / performance. This includes options for investigations and repairs, decisions on whether to refurbish or replace. Decisions on whether to enhance or improve the resilience of an asset when it is being refurbished or replaced are considered as part of a sub-outcome approach and made on a case-by-case basis as part of systems planning. A definition of each intervention type is provided in Table 6.

Table 5: Scottish Water Definitions for Intervention Approaches

Intervention Approach	Definition
Responsive	The intervention is responsive when an asset has failed and is impacting service provision and/or we identify that an immediate, no-choice intervention is required.
Planned	The intervention is planned when an asset has a historic service failure, or we identify that an intervention is required, at our choice, to reduce the risk of asset failure.

Table 6: Scottish Water Definitions for Intervention Types

Intervention Type	Description
Investigation	Activities focused on gathering asset information which is required in the decision-making process prior to one of the other asset intervention types. This includes inspection programmes to identify the condition of our assets.
Operational and Maintenance Activities	Responsive or planned processes and practices that support an asset to continue to operate and achieve its expected operational life that do not modify the asset itself.

Intervention Type	Description
Repair	Fixing an asset to ensure it can continue to operate and achieve its expected operational asset life (this includes replacement of component parts)
Refurbish	Renovation / overhaul of older or damaged equipment or replacement of parts of the asset to bring the asset back to a workable condition to extend the expected life of the asset
Replace	Replacement of an asset (equipment, unit, or process) when it is at the end of its serviceable life, or the asset has failed and cannot be repaired or refurbished (or it is not economic to do so), or when a change in performance or capacity is required.

Key Management Approaches informing the asset maintenance requirements for Water Quality include Water Treatment Works (chemical storage and dosing, filtration, sludge, process civils, mechanical and electrical, water instrumentation), Operational Technology, Treated Water Storage and Distribution Infrastructure Discolouration.

The investment needs for asset maintenance have been developed primarily from a combination of analytical models (used to predict the overall level of investment required for a particular asset type) together with Management Approaches (used to identify the site / asset specific needs in line with policy criteria). In addition, some investment requirements are associated with routine inspection and maintenance programmes, with others developed from historical run-rates of ongoing activities.

Analytical models which consider previous maintenance requirements to predict future requirements are utilised to inform investment requirements and plans at an asset type level. The process for the analytical models is described in Investment Planning Technical Appendix.

Both original Management Approaches and those developed to economic appraisals have been used inform the criteria on which specific assets shall be identified for intervention, with appropriate adjustments to further improve performance or ensure affordability. The criticality of assets and impact to service is also considered in the policy option selection.

Several assets have resilience included to allow for maintenance and equipment breakdowns e.g. duty and standby chemical dosing equipment, multiple filtration units to allow for one unit to be offline or storage to allow for system outages. These assets may have responsive management approaches where the assets are fixed on failure. Some key assets also have critical spares to minimise the risk of impact to service.

We also have planned intervention programmes to replace membranes, sand media, and granular activated carbon to maintain required performance of filtration units and sustain water quality. Understanding the condition of assets is important and monitoring water quality performance can indicate potential issues for further investigation or programme acceleration. Our filter processes performance monitoring can lead to earlier asset intervention such as membrane, sand media, or granular activated carbon replacement to maintain water quality. We proactively inspect several civil assets e.g. clarifier units and treated water storage tanks to monitor condition and ensure maintenance is arranged to maintain service.

4.1.3 Building our Approach for Enhancement

The requirements for Water Quality enhancement investment during SR27 originate from a range of confirmed needs relating to non-compliance, or represent a high risk to compliance, with

regulatory standards, several of which have been escalated through regulatory enforcement or commitment to be addressed within an agreed timeframe. In addition, some investment requirements are associated with Scottish Water policy positions to reduce risk or improve service where the current status is considered unacceptable from a customer service perspective or where progress is required to achieve Long-Term Strategy outcomes.

All investment requirements are aligned with the needs on the Development List, (established through the Investment Planning and Prioritisation Framework (IPPF) approach introduced for SR21) as agreed by stakeholders. The more defined needs set out in this Technical Approach have been validated against the Water Risk Assessment Platform (WRAP) and agreed with the DWQR, with supporting evidence provided through a range of sources including needs statements and regulatory commitments.

A range of information sources have been used to identify the needs initially and provide the supporting evidence for these and the subsequent investment requirements to address them. The typical information sources are summarised by project development stage as outlined in Table 7 below:

Table 7: Stage / Gate Information Sources

Stage	Information Sources
Pre-Gate 30	To include one or more of the following: • Asset / system risk and performance data; • SR21 Development List; • Scottish Water / DWQR Needs Statements; • Letters of Commitment to the DWQR; • DWQR Enforcement Notices; • Stakeholder / customer correspondence / engagement. • Needs originating from Scottish Water strategies and policies (including Management Approaches).

Gate 30 – 90	As above plus:
	• Project Investment Appraisal stage documentation, confirming needs, considered options, costs and benefits appraisal:
	  • Gate 30 – Stage 1
	  • Gate 40 – Stage 2
	  • Gate 50 – Stage 3a
	  • Gate 70 – Stage 3b
	  • Gate 80/90 – Stage 4
	• Target costs based on detailed design (Gate 80).

Post Gate 90	As above plus: • Project spend profiles to confirm remaining expenditure into SR27.

Although several needs, particularly for DWQR enforcement or commitment, relate to specific parameters for a water supply system or site, many systems or sites have multiple investment needs. Although these may be of varying priority, a holistic approach to their resolution is required to identify the most cost-beneficial approach, particularly for treatment assets where multiple factors can impact performance in relation to a range of parameters. These sites are being progressed through a Core Programme for improving water treatment capability which commenced in SR21 and will continue in SR27. The investment needs for this programme are captured through a combination of needs statements and Stage 1 of the project investment appraisal (PIA) process, with supporting evidence relating to the option selection and cost-benefits captured though subsequent PIA stages.

4.2 Optioneering

As set out in our Investment Planning Technical Appendix we have developed our options through a series of steps: building investment scenarios on our key principles, using our investment hierarchy to inform options, developing a full list of unconstrained and constrained options at draft business plan, and finally rebalancing and refining our investments following feedback from our stakeholders. We have set out these steps in detail below.

4.2.1 Optioneering Process

The investment scenario options are built based on three key principles:

- Support new connections: providing adequate standards of service to our new customers. Whilst the Water Continuity Technical Appendix contains the growth funding to support house building in Scotland, Water Quality investment is required to ensure these new properties can sustainably receive excellent quality drinking water.
- Deliver for our existing customers: this includes carrying out essential works to maintain existing asset performance, customer experience, and health and safety, meeting legislative, regulatory and community standards and progress towards Net Zero by 2040. It also involves investing in asset enhancement to improve resilience, reliability, and sustainability of service.
- Consider future customers: replacing ageing assets now to ensure resilience of supply to future customers, preventing unsustainable costs being passed on to them in future.

We use our investment hierarchy approach to develop a balanced investment portfolio across all investment areas, including water quality, to prioritise projects and programmes based on our objectives, customer expectations, stakeholder needs, and available funding. This approach is outlined in Table 8.

- **Category 1** covers ‘must do’ investments, which are required as a minimum to meet customers’ expectations on level of service. This category accounts for the majority of the investment.
- **Category 2**, which accounts for the next biggest share, includes ‘should do’ investments aimed at delivering regulatory compliance and meet the expectations of DWQR.
- **Category 3** covers investment choices to improve service for existing customers, enabling growth, replacing ageing assets to protect service levels for future customers.

Table 8: Our SR27 Investment Hierarchy Approach

	Customer & performance centric investment needs	Examples	Investment allocation approach		
Deliver for existing customers	1 Maintain core service performance for existing customers	Essential works to maintain existing asset performance, customer experience and health & safety	Minimum needed to maintain service. Already prioritised significantly so budget reduced as a last resort, after all other non-discretionary expenditure reduced to minimum levels	AR3 – asset category 1,2&3	Core expenditure
	2a Meet current regulatory & community commitments	Meet undertakings, legislative (RBMP3), regulatory (water quality), Improving Urban Water (IUW), community (e.g., Seafield odour.)	Named sites agreed with regulators	Enhancement	
	2b Meet current regulatory & community expectations	Water Treatment: HAA at risk Developing schemes – improved disinfections, Run to Waste.	Allocated portion of Enhancement funding	Enhancement	Remaining allocation prioritised within these areas
	3a Improve service for existing customers	Investing in asset enhancement to strengthen resilience, reliability and sustainability of service	Allocated portion of Enhancement to support Customer service issues (internal flooding and low pressure, rainwater management partnerships)	Enhancement	
Support new connections	3b Provide a service for new customers	New development and connections, including temporary works	Adress know systems that has confirmed development.	Enhancement / matched funding*	
Consider future customers	3c Replace long-life assets for future customers	Proactively replacing aging assets to tackle back log and underlying issues; water mains (Asbestos cement pipes), civil infrastructure with remaining lifetime of 40-60 years). Aim to prevent unsustainable costs being passed on to future customers	Consequential allocation as there is high demand from existing assets that impact current service. FD & investment scenarios do specify investing in long-life asset replacement. Future customer needs re-prioritised	AR3 – category 2 Civils and water mains, pressurised sewers	Additional core expenditure

*Cat 3b Match funding Income received that is allocated for Part 3 infrastructure improvements to support new connections. In addition, service relocation allocation is required to move our assets when required by a 3rd party (part funded from external sources)

An initial unconstrained investment scenario has been developed to fulfil all the principles outlined in Table 9 ensuring the delivery of all essential requirements to maintain the current level of services, as well as enhancing performance while minimising risk. From this unconstrained investment scenario, additional investment scenarios have been derived by strategically reducing or eliminating investments in certain areas. These “constrained” scenarios aim to meet Draft Ministerial Objectives 2027-33 at a lower cost, but come with associated risks, as the limitation on investment may impact performance improvements and ultimately affecting customer service enhancements.

4.2.2 Unconstrained Options

The development of investment planning scenarios is a crucial step in ensuring that strategic and financial objectives are aligned with the Water Sector Vision and our Long-Term Strategy. The initial step involved generating a comprehensive suite of options to encapsulate potential outcomes and investment needs. The unconstrained options include all the necessary investment demands to meet the current Draft Ministerial Objectives 2027-33, covering legislative requirements, commitments to stakeholders, and customer priorities.

The formulation of investment planning scenarios is essential for aligning strategic and financial objectives with the vision for the water sector and our Long-Term Strategy. The initial phase involved creating a comprehensive range of options to encompass potential outcomes and investment requirements. The unconstrained options incorporate all potential investment options, with a focus primarily on maintaining all assets involved in ensuring water quality performance.

To identify the best suite of interventions we have undertaken an extensive optioneering process, applying testing across various performance metrics and compliance requirements to form a series of constrained options, the investment scenarios.

4.2.3 Constrained Options: Draft Business Plan

The constrained investment scenarios were generated from the unconstrained investment options by eliminating, reducing, or removing some of the investments. The three constrained investment scenarios considered were:

- **High Scenario**: The investment meets Draft Ministerial Objectives 2027-33 with a CPI + 6.5% per annum, maintaining the service levels achieved at the exit of SR21.
- **Working Reference Scenario**: The investment meets Draft Ministerial Objectives 2027-33, with a CPI + 4% per annum, the investment allows maintenance of the service levels achieved at the exit of SR21, albeit accepting more risk of burst frequency
- **Flat Charge Scenario**: the reduction in investment under this "Flat Charge" scenario, with a CPI + 0% per annum, triggers reduced service levels compared to exit of SR21, with notable overall service impacts as measured by OPA and CEM.

The High Scenario includes the continuation of the inspection programme for critical assets and enhancement measures to address risks and failures at 18 WTW serving c1.45m customers. In addition, the risk of failures at 4 WTW serving 275k customers is reduced, auto shut down capability is provided where none exists, reliability of disinfection processes is ensured at priority sites and development of other WQ failure risk sites.

The Working Reference Scenario is £37m lower than the High Scenario due to a reduction in investment toward addressing the risk of failure at WTW, as one out of four is not included. Additionally, in the Working Reference Scenario our commitment to regulatory compliance is maintained.

The Flat Charges Scenario aims at reducing failures at 14 WTW serving c1.45m customers (rather than 18 WTW in the High Scenario and the Working Reference Scenario), HAA compliance risk is not addressed at any of the WTW at risk, £30m is allocated to address highest DWQR priority risks only and there are no plans on development work on HAA and other WQ failure risk sites. Under the Flat Charges Scenario, the reduced investment in regulatory compliance poses a significant risk of failing to meet the expectations relating to water quality established by our stakeholders and regulator.

Table 9: Summary of investment under constrained scenarios

High (CPI+6.5%)	Working Reference (CPI+4%)	Flat Charges (CPI+0%)
Non-trivial water quality failures addressed. Risks to water quality and water supply reduced.	Non-trivial water quality failures addressed. Risks to water quality and water supply maintained.	Non-trivial water quality failures addressed. Risks to water quality and water supply increase.

Water Quality Enforcement / Commitment

Needs have been categorised under WQ Enforcement due to the level of risk they pose in terms of public health and require appropriate asset improvements to be delivered within timescales set out or agreed with the DWQR, either through a DWQR Enforcement Notice or a Letter of Commitment from Scottish Water to DWQR. In addition, certain activities may be required in response to DWQR Information Letters, which typically clarify the requirements of the Public Water Supplies (Scotland) Regulations 2014 (amended), or to address imminent risks to service.

4.2.4 Chosen Option at Draft Business Plan

The investment scenarios were tested against various performance metrics and compliance requirements to validate the scenarios' robustness and ensuring they aligned with Draft Ministerial Objectives 2027-33, customers and stakeholders' expectations, the Water Sector Vision, the Climate Change Adaptation Plan and meeting Scottish Water's Board expectations on progress towards our Long-Term Strategy and risk appetite. Based on the testing outcomes, we progressed

with the Working Reference Scenario (CPI+4%) as the basis for our Draft Business Plan submission.

4.2.5 Further refinement: Final Business Plan

Following further engagement and feedback from a broad range of our stakeholders on our Draft Business Plan, we have further refined our SR27 investment to reflect feedback, with two key themes:

- **Affordability**: ensuring that we are not putting a disproportionate burden on the bills of current customers – and that we are doing everything we can to limit impacts on bills; and
- **Ambition:** responding to feedback on our investment focus and ensuring it is adequately ambitious in the areas that matter to our customers.

Responding to this feedback has meant that we need to make further trade-offs across our SR27 investment portfolio. We have done this by refining our reference scenario, through careful rebalancing of investment across AR3, Regulatory Commitments and Service Choices. We have described, in further detail, the steps we took as part of this refinement, and the impacts on our Final Business Plan in TA008 Investment Planning.

Our final chosen option is a further refined version of the Reference Scenario presented in the Draft Business Plan submission.

We did this across all investment areas by:

- Refining the available budget associated with a CPI +3.3% pa customer charge profile, re-running the Financial Model using the latest modelling assumptions and the application of the most up to date top-down global efficiency factors to be applied.
- We incorporated feedback from sector stakeholders, clarification of Regulator requirements, customer research feedback and further considering the requirements of the Draft Ministerial Objectives 2027-33. Decisions were required to navigate these limitations while ensuring a balanced investment plan.
- Several strategic options were considered to manage budgetary constraints and investment reallocation. These included potential further removal of demand in the asset repair, refurbishment, and replacement (AR3) programme areas or reduce outcomes where there is service choice. As a result, there were upwards adjustments in some areas, and downwards adjustments in others.

The refined **Reference Scenario** will deliver:

- Our Enforcement Notice Requirements – Turriff WTW; Mannofield WTW; Treated Water Storage.
- On our Letters of Commitment (LoC) - Haloacetic Acids (HAA) Sites (Londornoch, Penwhirn, Glenlatterach, Stornoway, Glendevon and Camphill); HAA/Other LoC Sites (Bradan); Raw Water Supplies.
- Reduced organics and disinfection by-products for the sites above.
- Improved microbiological quality of drinking water whilst minimising the taste of chlorine through improvements to disinfection and auto-shutdown capability at our treatment works.
- Improving discolouration performance, through improved treatment processes and trunk mains conditioning, and maintaining the number of Taste & Odour contacts, including additional treatment at Carron Valley to minimise the risk of repeat taste and odour events.
- Continued progress to deliver a lead-free Scotland by replacing ~18,000 lead communication pipes, and additional customer supply pipes where economic to do so.

- Stable (or improved) service levels at our SR21 exit performance level through the maintenance of our assets in line with Management Approaches.
- A reduced risk profile delivered through the Water Supply Risk Management system by achieving a net reduction in the number of significant risks and those above long-term tolerable thresholds over the long-term, along with a reduction in the number of DWQR declared incidents.
- Opportunities for lower-cost operational-based interventions where appropriate or feasible to deliver interim or partial risk mitigation in line with risk governance processes.

Although the Reference Scenario also includes the development of other projects to address other significant risks, the scenario does not include provision for the subsequent delivery of those interventions for the following:

- Letter of Commitment (Haloacetic Acids): Castle Moffat WTW; Inverary WTW; Killylour WTW; Camps WTW; Lochinvar WTW; Greenock WTW.
- Letters of Commitment (Daer / Haloacetic Acids): Development of strategic replacement options for Daer WTW to deliver long-term solution for manganese, disinfection by-products, and other needs (potential delivery SR33), with the potential for interim investment being required to mitigate increasing HAA risk.
- Other Significant Risks: Rawburn WTW; Lomond Hills WTW; Boardhouse WTW; Hopes WTW; Roberton WTW.

These shall be subject to ongoing risk review and investment prioritisation through internal governance processes and discussions through the DWQR Joint Development Group. The total additional investment liability to deliver these projects (excluding the strategic solution for Daer but allowing for interim measures) is expected to be in the order of £400 - £500m, subject to full completion of strategic optioneering and costing.

This information was discussed with stakeholders to identify areas of development, concern and provide an opportunity of challenge. This allowed demand profiles to be reassessed, and adjustments made to the investment allocations across portfolios.

4.3 Overall Strategic Option Chosen for SR27

4.3.1 SR27 Investment Plan

A summary of our proposed investment on water quality for SR27 is outlined in Table 10 below.

Table 10: Summary of investment for water quality for SR27

Investment Type (Primary)	Investment Hierarchy	Reference Scenario Total (£m, 24/25)
AR3	Cat 1	865
Enhancement	Cat 2a - Regulatory	664
Enhancement	Cat 2b - Regulatory	162
Enhancement	Cat 3a – Improve Service	29
Total		**1,720**

4.3.2 Customer Benefits

4.3.2.1 Performance Outcomes

The outcome measures marked with an asterisk are those that we consider there is scope to align with the measures in England and Wales.

Table 11: The outcomes we are seeking to achieve in SR27.

Level of Service - metric	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Customer Taste & Odour contacts / 1000 customers	Number	0.51	0.51	0.51	0.51	0.51	0.51
Customer Discolouration and aeration contacts / 1000 customers	Number	2.11	2.11	2.09	2.02	1.99	1.90
Estimated number of lead pipes remaining in public network	Number	40154	37154	34154	31154	28154	25154
% of customers with no indication of lead in supply <3ug/l	%	98.04	98.06	98.08	98.11	98.13	98.15
Total drinking water compliance	%	99.937%	99.942%	99.944%	99.947%	99.949%	99.950%
WQ Hazards above long-term tolerable level.	Number	5116	5125	5064	4933	4801	4568
Number of DWQR declared incidents	Number	30	29	28	27	26	25

4.3.3 Risk and Opportunities

As mentioned throughout this document, the key challenges to maintaining or improving service relating to water quality include:

- **Climate and wider environmental change** - impacting particularly on raw water quality through increasing levels of organics, particulate matter, microbiological loading, and nutrient loading (leading to algal growth). This will compromise our ability to meet both well-established regulatory standards and those more recently introduced through the increased potential for microbiological failures (including detections of *Cryptosporidium*), the formation of disinfection by-products and the generation of taste and odour compounds.
- **An ageing asset base** - the need for asset repair, refurbishment and replacement will be ongoing for the more complex treatment processes installed over the past 25 years, as well as for older assets requiring end-of-life replacement.
- Our **Long-Term Strategy** recognises these challenges and risks and sets out the expected level of investment demand required to mitigate them.

To meet these challenges, Scottish Water will continue to collaborate with the wider water industry to explore opportunities for new technologies and approaches relating to knowledge development

and alternative treatment processes, building on the progress made during SR21 as set out below. Opportunities to develop our operational practices will include optimising site operation, including developing the skills of our site operators, enhanced monitoring, targeted maintenance, the use of remote operation where appropriate to do so, and the effective use of data and analytics to support these activities We are also investing in a number of innovative approaches which have the potential to improve performance and de-risk delivery (please see Section 5: Innovation)

Regulation 33 in Scotland (Regulation 31 in England and Wales) requires approval for all water supply system products. The process faces challenges due to limited DWI approved laboratories, which assess new or existing products. This issue risks a) disruption of current water treatment processes or b) delays in adopting new treatments used in other countries. We will work with UK water industry groups and Regulators to address this problem.

4.4 Investment Programmes

4.4.1 Water Treatment

The investment demand allocated to water treatment is £1,294m, £765m of which will enhance our assets to deliver our regulatory requirements and expectations of the DWQR including Enforcement Orders and Letters of Commitment. £530m is for asset maintenance (AR3) investment, to maintain the capability of our water treatment works, including filtration and disinfection systems, M&E equipment, instrumentation and chemical storage facilities and processes.

Table 12: Water Treatment Investments

Investment Hierarchy	Investment Category	Deliver / Develop	Investment Area	Reference Scenario Total (£m, 24/25)
Cat 1	**AR3**	Deliver	WTW Process Stage Civils	38
		Deliver	WTW Process Stages M&E	59
		Deliver	WTW Chemical Storage & Dosing	140
		Deliver	WTW Filtration	92
		Deliver	Chlorine Contact Tank Maintenance and increasing capacity to comply with standards	134
		Deliver	Water Assets Loss of water supply due to obsolete membrane filtration technology	10
		Deliver	WTW Water Quality Instrumentation	57
Cat 2a - Regulatory	**WQ Enforcement**	Develop / Deliver	SR21 Core Programme Completion & WQ Enforcements	359
		Develop / Deliver	WQ Sites with Letters of Commitment (Daer, Bradan & Winterhope)	220

Investment Hierarchy	Investment Category	Deliver / Develop	Investment Area	Reference Scenario Total (£m, 24/25)
		Deliver	Improve water quality supplied from raw water infrastructure to ensure compliance with water quality regulations where not supplied under a commercial raw water agreement	28
		Deliver	Completion of SR21 schemes (Disinfection, THM, Invercannie)	2
Cat 2b - Regulatory	**WQ Enforcement**	Deliver	Carron Valley WTW – Taste and Odour Improvements	19
	WQ Expectations	Develop / Deliver	HAA at risk, *Cryptosporidium* UV (6 sites) and development of non-trivial fails sites	69
		Deliver	Deliver Disinfection improvements)	38
		Deliver	Auto-Shutdown / Run to waste	29

4.4.2 Water Storage

The investment demand allocated to water storage is £318m. This includes AR3 investment for maintaining our treated water storage and secondary disinfection processes in SR27 of £300m, ensuring that we provide high quality water for our customers. This also includes enhancement expenditure to improve our ability to inspect and maintain treated water storage tanks through enhancement investment of £18m.

Table 13: Water Storage Investment

Investment Hierarchy	Investment Category	Deliver / Develop	Investment Area	Reference Scenario Total (£m, 24/25)
Cat 1	**AR3**	**Deliver**	Treated water storage (including Clear Water Tanks & Service Reservoirs)	290
		Deliver	Sample Points	10
Cat 2a - Regulatory	**WQ Enforcement**	**Deliver**	Enforcement Notice - Treated water storage	18

4.4.3 Water Distribution

The AR3 investment demand for SR27 for water distribution water quality is £64m. This includes investment to manage discolouration through maintenance activities and minimising impact on customers thereby improving customer satisfaction.

Trunk main conditioning is currently performed manually and automating this in six areas is planned in SR27 to reduce risk of discolouration to customers.

Table 14: Water Distribution Reference Scenario investments

Investment Hierarchy	Investment Category	Deliver / Develop	Investment Area	Reference Scenario Total (£m, 24/25)
Cat 1	**AR3**	**Deliver**	Distribution Infrastructure – Discolouration (Maintenance)	31
		Deliver	Network Chemical Dosing	3
Cat 3a – Improve Service	**WQ Expectations**	**Develop**	Distribution Infrastructure – Discolouration (Developing plans)	29

4.4.4 Lead Management

We are investing £36m toward our commitment to reducing lead in our network, through replacing lead communication pipes, maintaining and optimising our phosphate equipment and undertaking additional sampling to identify presence of lead.

Table 15: Lead Management Reference Scenario investments

Investment Hierarchy	Investment Category	Deliver / Develop	Investment Area	Reference Scenario Total (£m, 24/25)
Cat 2b - Regulatory	**WQ - Lead**	**Deliver**	Lead Communications Pipe Replacement	35
		Deliver	Lead Sampling and Risk Assessment	1

4.4.5 Raw Water and Catchment Management

We plan to invest £9m towards catchment management to support our Net Zero activities whilst improving the quality of our raw water sources.

Table 16: Other Programmes Scenario C investments

Investment Hierarchy	Investment Category	Deliver / Develop	Investment Area	Reference Scenario Total (£m, 24/25)
Cat 1	**AR3**	**Deliver**	Catchment Management & Liaison	1
Cat 2b - Regulatory	**WQ Expectations**	**Deliver**	Assess peatland restoration options at all 20 catchments.	8

4.4.6 Future Investment Requirements

Planning for the next 25 years is inherently uncertain. As part of our Long-Term Strategy, we undertook a broad-ranging and comprehensive review of the risks and opportunities across the next 25 years. The investment we have identified will secure our essential services by maintaining our existing asset base, allow us to adapt to climate change and meet our legislative requirements. Without major changes to how we currently operate the water and waste water system and given the projected impact of climate change, we are currently forecasting that the funding needed to deliver sustainable services will need to increase over the next 25 years by

almost double. Planning for this period is inherently uncertain and there are both opportunities and risks ahead.

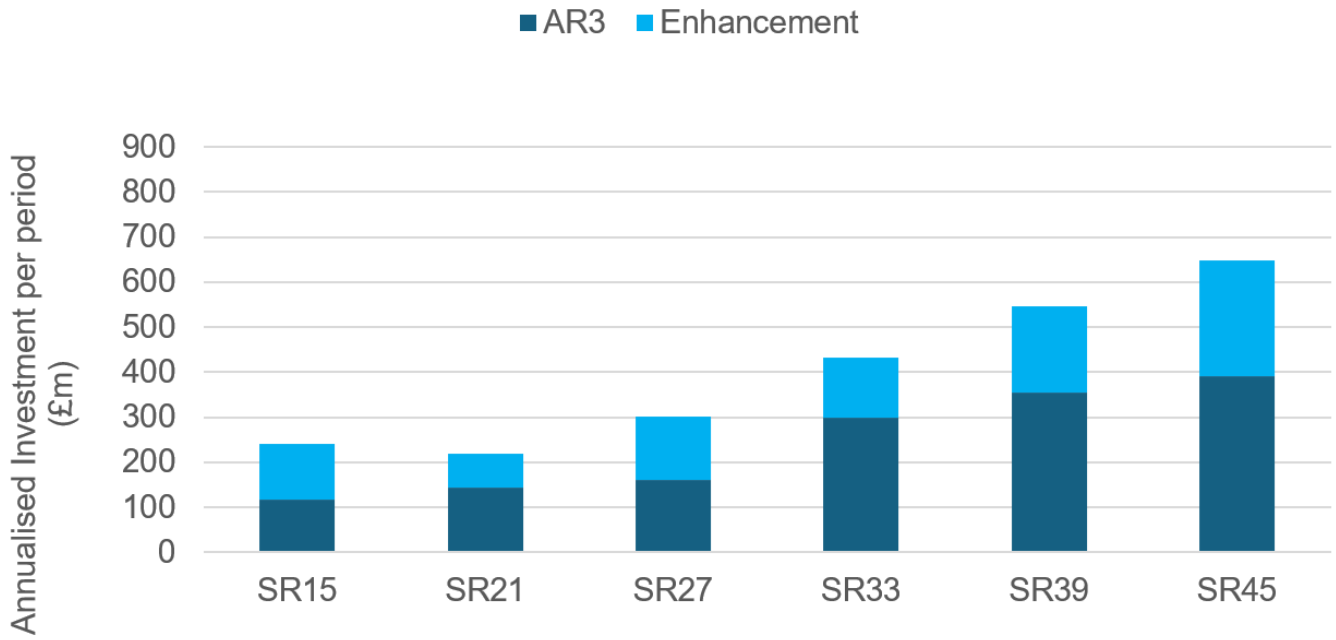

Figure 9: Historic and projected investment - Water Quality (2015 to 2051)

For Water Quality, the projection will double in expenditure from ~£300m in SR27 to ~£650m per annum in SR45 (see Figure 9). This is partly driven by an increase in AR3 expenditure largely associated with more MEICA replacements being required between SR27 and SR45 (a 75% increase in AR3 spend in this period). However, the majority of the additional projected expenditure to 2051 is due to enhancement requirements, including:

- Address the impacts of climate change including raw water quality deterioration and increase in microbiological risk presented by a warmer climate.
- Reduce discolouration and taste and odour issues which will be exacerbated by climate change through raw water quality deterioration.
- Removal of chemicals to more stringent water quality legislation and regulatory requirements
- Lead pipe removal from Scottish Water network.

A detailed breakdown is shown in Figure 10 below.

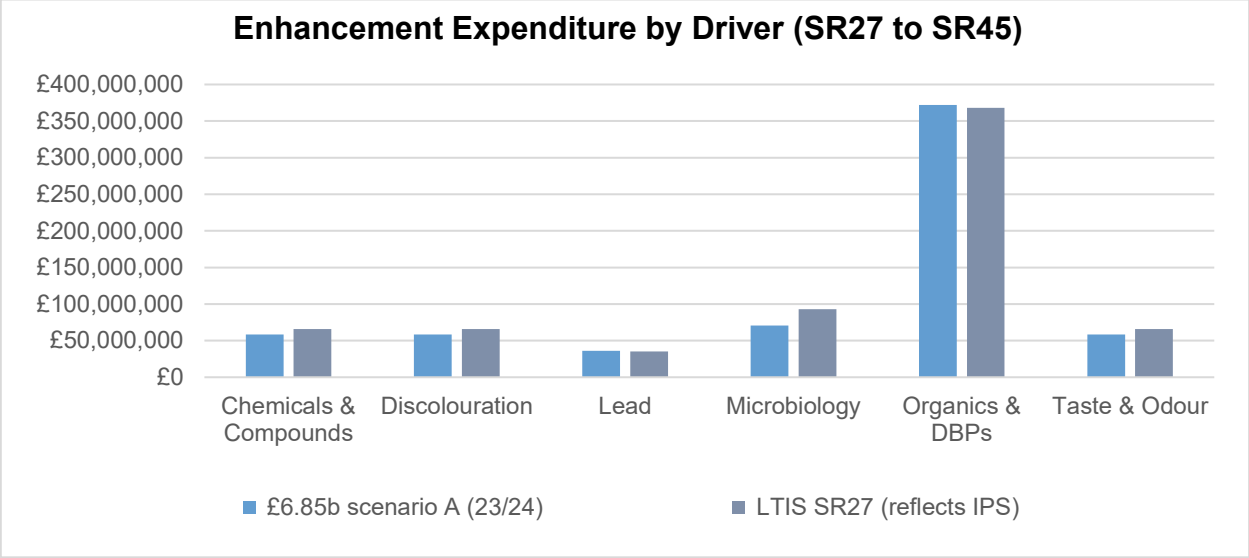

Figure 10: Long-Term Enhancement Expenditure Projection for Water Quality (2027 to 2051)

The above demonstrates that our SR27 plans is a proportionate and incremental step to achieving the ambitions of our Long-Term Strategy. This will be influenced by a number of factors and is dependent on finding innovative ways to deliver more cost-effective solutions and driving down demand by working with customers and partners. However, it could also be influenced by new legislation and climate impacts that differ from our current projections. We will do as much as we can to reduce demand, transform, drive efficiency and in work in partnership before we seek support for future investment.

5 Innovation

We are committed to employing innovative strategies to enhance water quality and ensure sustainable management of resources. In the upcoming SR27 investment period, the focus will be on pioneering technologies and advanced methodologies to address emerging challenges and optimise treatment processes. By integrating cutting-edge technologies, novel methodologies, and research initiatives, we aim to address both current and future challenges within the water treatment processes. This will include:

- In line with our commitment to achieving a lead-free Scotland, we will collaborate with our stakeholders to support customers to remove lead supply pipes. This will include undertaking pilot studies to develop our knowledge on the removal of customer-side lead and progressing opportunities for the removal of lead supply pipes where economic to do so. Until lead pipes can be removed from the network we will continue to maintain and optimise orthophosphate dosing, whilst developing plans to support dosing reductions in the future as the lead risk is gradually reduced.
- Further innovation in construction techniques to see greater use of modular designs, particularly in relation to ceramic membranes and alternative treatment technologies, providing opportunities for off-site construction.
- The changes in regulatory standards have also led to research into new analytical techniques for new parameters (e.g. PFAS, somatic coliphages) increasing the sensitivity of analysis methods to help detect the early presence or prevalence of the contaminants. Progress will also be made in SR27 on the use of new techniques to optimise the operation of our treatment works (e.g. zetasizers) and understand the performance of our assets (e.g. particle counters).
- During SR27 we shall continue to develop our understanding of the impact of climate change on the quality of our raw water sources, particularly in relation to variations in rainfall patterns, extreme weather events and increasing temperatures. This shall include research and development in the following areas:
    - Understand the risks to source water treatability associated with climate change impacts, including algal blooms, taste and odour and increasing levels of organics and pathogens;
    - Evaluation of alternative treatment technologies such as nanofiltration ceramic membranes and ozone nanobubble, and the development of low chemical, low cost, and low carbon treatment;
    - Assess the efficacy and environmental impacts of nature-based, in-reservoir and catchment solutions;
    - Development of monitoring and modelling techniques to predict and manage variations in raw water quality, including organics and pathogens.
    - Assessing techniques to improve our ability to prevent and control discolouration events in distribution.
- In relation to asset maintenance, through the review of our Management Approaches, we will continue to develop our knowledge in relation to several key themes including asset age, condition, criticality, deterioration, consequence, and likelihood of failure along with operational and capital intervention costs.
- We will continue to develop our sustainable land management approach and seek further catchment management opportunities to reduce risks to water supplies and improve raw water quality. Working with industry will help to improve byelaws compliance and reduce the risk of cross-contamination of water supplies.

6 Interdependencies

This document should be read in conjunction with other Technical Appendices that have key interdependencies including:

- Climate Change Adaptation
- Water Environment
- Investment Planning
- Water Continuity

The document should also be read in conjunction with Scottish Water's Long-Term Strategy.

7 Conclusion

Our Reference Scenario aligns with Draft Ministerial Objectives 2027-33, customers' and stakeholders' expectations, Water Sector Vision, Scottish Water's Climate Change Adaptation Plan, meeting Scottish Water's Board expectations on progress towards our Long-Term Strategy and risk appetite.

The Reference Scenario will deliver require £1,720m of investment to deliver the following:

- **Enforcement Notices** (*Cryptosporidium*): Turriff WTW & Mannofield WTW.
- ***Enforcement Notice (Treated Water Storage)***:
    - Complete enabling works to allow the inspection and maintenance of Treated Water Storage Points (TWSP).
    - Complete permanent remedial actions to rectify ingress issues across all TWSP.
- **Letter of Commitment (Haloacetic Acids)**: Londornoch WTW, Glenlatterach WTW, Penwhirn WTW.
- **Letter of Commitment (Raw Water Supplies)**: Improvements to up to 54 supplies where they fail to meet regulatory requirements (to be confirmed through risk assessment).

We will also **prioritise delivery** of improvements, in agreement with the DWQR, for sites at risk from HAA and other significant risks:

- **Letters of Commitment (Bradan / Haloacetic Acids)**: Enhancements to improve disinfection and reduce disinfection by-products at Bradan WTW.
- **Letter of Commitment (Haloacetic Acids)** and **Other Significant Risks**: Stornoway WTW, Glendevon WTW and Camphill WTW.

We will also **develop** the long-term solutions for other sites with Significant Risks relating to HAA or other parameters and continue to review the phasing of scope and priority for investment through ongoing risk assessment against other needs and within available funding:

- **Letter of Commitment (Haloacetic Acids)**: Castle Moffat WTW; Inverary WTW; Killylour WTW; Camps WTW; Lochinvar WTW; Greenock WTW.
- **Letters of Commitment (Daer / Haloacetic Acids)**: Development of strategic replacement options for Daer WTW to deliver long-term solution for manganese, disinfection by-products, and other needs (potential delivery SR33), with the potential for interim investment being required in SR27 to mitigate increasing HAA risk.
- **Other Significant Risks**: Rawburn WTW; Lomond Hills WTW; Boardhouse WTW; Hopes WTW; Roberton WTW.

To support the above, we will:

Maintain or improve current levels of service over the long-term for water quality:

- **Ensuring microbiological quality of drinking water whilst minimising the taste of chlorine:** We will enhance disinfection processes at our water treatment works in line with our disinfection policy, prioritising improvements (e.g. automatic shutdown) using our Water Risk Assessment Platform to ensure they meet regulatory requirements to adequately disinfect water at all times and minimise microbiological risks. This will also include provision for the installation of ultra-violet (UV) disinfection systems to reduce risks in relation to *Cryptosporidium*. We shall also continue to inspect and maintain our Treated Water Storage assets to reduce the risk of bacteria ingress and subsequent failures at customers' taps.

- **Reducing organics and disinfection by-products (DBP):** To help deliver our regulatory commitments relating to DBPs, we will take a catchment-based approach to managing organics in our source waters and continue to develop partnerships with landowners and other stakeholders to assess and implement opportunities for nature-based or catchment solutions. Where these are not effective or suitable, we will utilise enhanced treatment technologies such as ion-exchange or ozone-granular activated carbon (GAC) to reduce organics. We will also continue to monitor the levels of organics in our source waters and optimise treatment processes to reduce the risk of DBP formation.
- **Improving aesthetics performance:** To reduce the risk of customers being supplied with discoloured water from our distribution network, we will continue to take a risk-based approach to cleaning and conditioning water supply pipes or replacing them where required. Our activities to improve catchment management and treatment processes will also reduce the increasing risk of discolouration and taste and odour originating from our source waters (as a result of climate change) and WTW.
- **Continue to make progress to deliver a lead-free Scotland by:** removing ~3,000 lead communication pipes per year in response to sample results, when requested by customers or when identified through our mains replacement work to support the removal of all lead from Scottish Water's network by 2045. We will also continue to develop plans with stakeholders to deliver a lead-free Scotland in the future, including supporting customers to remove their lead supply pipes.
- **Maintain (or improving where possible) water quality service levels at our SR21 exit position by**: maintaining our assets in line with the prioritisation criteria set out by our management approaches and within the proposed funding scenario**.** This will reduce the risk of the condition and performance of our existing asset base compromising drinking water compliance, increasing the number of DWQR declared incidents or increasing the number of Significant Risks or those above long-term tolerable thresholds.
- **Managing risks to water quality**: delivering a net reduction in the number of risks above the long-term tolerable threshold (as determined by the WRAP process) from 5,625 in 2024/25 to 4,568 in 2032/33. We will also reduce the number Significant Risks over the long-term (as per the ongoing process with DWQR due to be developed by March 2026).
- Seek opportunities for lower-cost operational-based interventions where appropriate or feasible to deliver interim or partial risk mitigation in line with risk governance processes.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Water Continuity

February 2026

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1 Executive Summary

The Water Continuity investment area covers all proposed investment required in the SR27 period to maintain or improve service outcomes relating to the provision of a continuous supply of drinking water to customers which is both reliable and resilient for the long term. The reliability and resilience of Scotland's water supplies delivered in a sustainable way are key components of the shared Water Sector Vision to support a flourishing Scotland. This frames Scottish Water's Long-Term Strategy to 2050 and the outcome to ensure that **Scotland's tap water remains a source of pride**. The proposed investment will deliver our regulatory commitments in line with legislation and Scottish Water strategies and policies, including the requirements of the Draft Ministerial Objectives 2027-33 to:

- Make progress towards the realisation of the long-term vision of the water industry.
- Understand the condition of assets, in particular those of a critical nature for maintaining service delivery and develop an evidence-based strategy to inform the long-term asset maintenance needs of the industry.
- Review and update existing plans to address the resilience of supplies (inc. raw water) and take steps to secure further improvements to resilience to ensure continuity of service.
- Promote sufficient asset maintenance to deliver required levels of service and demonstrate how investment, or lack thereof, is contributing to a change in the condition of assets and thus levels of risk and service.
- Identify the impacts of climate change on our assets and services and continue to implement and evolve plans for measures necessary to adapt to these changes.
- Work with customers to encourage, and subsequently monitor and evaluate, behaviour changes that promote water efficiency.
- Prepare and implement plans to improve the cyber, physical and personnel security of our network and systems to protect them from malicious attack.
- Help to deliver the Scottish National Adaptation Plan, including the objective (PS3) on managing Scotland's water resources.
- Identify and provide new strategic capacity that will meet the demand of all new housing development and the domestic requirements of commercial and industrial development.

In SR27 and beyond, there are a number of key challenges, such as climate change, changes in population and ageing / deteriorating assets, which have the potential to increase our risk profile and compromise our ability to meet regulatory requirements and maintain service without appropriate levels of investment.

As a result of these challenges, over the next 25 years the amount of water available from sources currently used for public water supplies is expected to fall short of demand requirements by ~280 megalitres per day (ML/d) during drought conditions, with supply systems across 13 of our water resource zones forecast to be not resilient to drought by 2033. This is exacerbated by Scotland being one of the highest per-capita water users in Europe at 178 litres per person per day (l/p/d), compared to ~140 l/p/d in some metered areas of England. Peak demand for water during warm, dry spells can also exceed the capacity of some of our water treatment works or parts of our distribution network requiring response measures such as tankering to maintain supplies.

Conversely, our assets and ability to maintain supplies face increasing threat from more extreme weather conditions such as storm events, leading to power interruptions or localised flooding, or

varying wet / dry conditions resulting in ground movement causing pipes to burst. In addition, our critical, large infrastructure assets, such as dams and trunk mains, require ongoing inspection and maintenance to ensure that they not only maintain supplies for the long-term but do not pose a risk to others from catastrophic failure.

It is also critical that our wider asset base, including distribution mains and pumping stations, continues to be maintained at a rate to deliver the required levels service. This includes addressing significant areas of risk such as interruptions to supply associated with asbestos cement (AC) mains, and ensuring that our control, automation and security systems are maintained in line with industry standards and continue to protect our assets from external threats.

To identify the best suite of interventions to meet the above challenges, Scottish Water have undertaken an optioneering process, with the investment scenarios being tested against various performance metrics and compliance requirements to validate their robustness. The scenarios align with Ministerial Objectives, customers' and stakeholders' expectations, the long-term strategy for the Water Sector Vision and the climate change adaptation plan, whilst also meeting regulatory requirements and Scottish Water's Board expectations on progress towards our Long-Term Strategy and risk appetite.

Part of this development process was the creation of a Draft Business Plan submission against which stakeholders provided feedback against their expectations and refinements were subsequently made.

Based on the refinement of the Draft Business Plan and the testing of outcomes, Reference Scenario (CPI +3.3%) is recommended as it offers the best balance between progress towards our Long-Term Strategy, contribution to the Water Sector Vision, meeting the Draft Ministerial Objectives 2027-33 and customer charges, both now and for future generations.

The £1,770m of investment proposed through the Reference Scenario will deliver the following outcomes aligned to the Draft Ministerial Objectives 2027-33 and our Long-Term Strategy to 2050:

Adapting to Climate Change and Increasing Resilience

- **Continue to develop our understanding of the impact of climate change** on our water resources and assets and develop plans to mitigate these risks. This will include updating our Water Resource Plan and exploring wider catchment planning opportunities and other activities to support the development of water industry policy and implementation of the National Adaptation Plan 2025 - 2029.
- **Improving drought resilience in key areas, including:**
    - Addressing the supply-demand balance deficit (to 2033) in Dundee, Angus and parts of Perthshire.
    - Developing options to reduce the deficit gap in other areas not resilient to drought including Edinburgh & Lothians, Fife, Lanarkshire and Aberdeenshire / Morayshire, reviewing their priority for investment through ongoing risk assessment against other needs and within available funding.
    - Continuing to improve our drought management capability and implement our updated Strategic Drought Plan.

- **Ensure that Scottish Water have water treatment production and network capacity** in key locations at risk of supply interruptions during peak demands (including Tiree, Balmichael, Turriff and Fife), prioritising the highest risk areas.
- **Improve our understanding of and reduce the demand for water:**
    - Reduce leakage by 9.9% (3-year average from 456 to 411 ML/d) equivalent to a reduction of 1.3% per annum.
    - Drive change in domestic customer demand by increasing awareness and supporting industry initiatives such as water efficiency labelling of domestic appliances**.**
    - Roll out smart metering for 130,000 Non-Household Customers[1]: expected to deliver demand reduction of 55ML/d in SR27 (with 25 ML/d contributing to network leakage reduction and a further 15ML/d realised in SR33).
- **Improve our resilience:** by improving power resilience to regional power outages and increasing connectivity of our water supply systems. In addition, Scottish Water will update plans to address resilience of supplies to wider hazards (e.g. flooding) and make progress to secure improvements. Scottish Water will also improve our response and recovery plans and capability.

Maintaining Service and Reducing Risk for Customers

- **Maintain current service levels:** Scottish Water will maintain and operate our assets in line with our water risk management processes, including inspections of key critical assets (e.g. dams and trunk mains) to identify and mitigate emerging risks, undertaking repairs, refurbishment and replacement across the asset base to maintain performance. Scottish Water will also ensure that our key control, automation and security systems (e.g. Supervisory Control and Data Acquisition (SCADA), telemetry) remain fit-for-purpose in line with industry standards and regulatory requirements.
- **Maintain interruptions performance:** maintaining both the number of interruptions our customers experience which are greater than 6 hours, and the number of customers experiencing 6 or more interruptions in a year or 10 or more in 3 years. To achieve this, mains rehabilitation rates will need to increase, with a programme focused on Asbestos Cement (AC) pipes, which represent the highest proportion of failures, and the maintenance of water pumping stations.
- **Maintaining (or improving) low pressure performance:** Continuing to address issues resulting in persistent low-pressure.

Understanding and Managing Risk

- Continuous development and improvement of our Water Supply Risk Management (WSRM) processes in relation to Water Continuity and undertake activities in line with our functional risk register and approved Board risk positions to reduce the number of risks above long-term tolerable thresholds prioritising those classed as Significant.

The above interventions and investment will allow us to improve our resilience to climate change and other threats to reduce the risk of long-term interruptions to supply, whilst maintaining the existing asset base to maintain or improve levels of service. However, risks to water continuity

[1] Representing approximately 95% of the total programme during SR27, this assumption will continue to be updated as the project progresses through governance stages

will remain and ongoing review of investment priorities will therefore be required during SR27 to ensure significant risks are controlled effectively. Investments are summarised in Table 1 below.

The Investment Planning Technical Appendix provides detailed information on the investment scenarios considered and the optioneering process.

Table 1: Investment Summary by Programme (2024/25 price base, post-efficiency)

Investment Hierarchy	Investment Summary	Proposed Investment (£m 24/25)
AR3 Cat 1	Abstraction, Sources and Raw Water Transfers	427
	Water Treatment	5
	Water Transmission	99
	Water Pumping Stations	48
	Water Distribution & Demand management	655
	Other programmes	310
Enhancement Cat 2a – Regulatory	Water Treatment	3
	Other programmes	60
Enhancement Cat 3a – Improve Service	Water Distribution & Demand management	31
	Resilience	126
Enhancement Cat 3b – New Customers	Other programmes	7
Total		**1,770**

The £1,770m SR27 investment into Water Continuity makes up 22% of the total SR27 Investment of £8.1bn, as shown below.

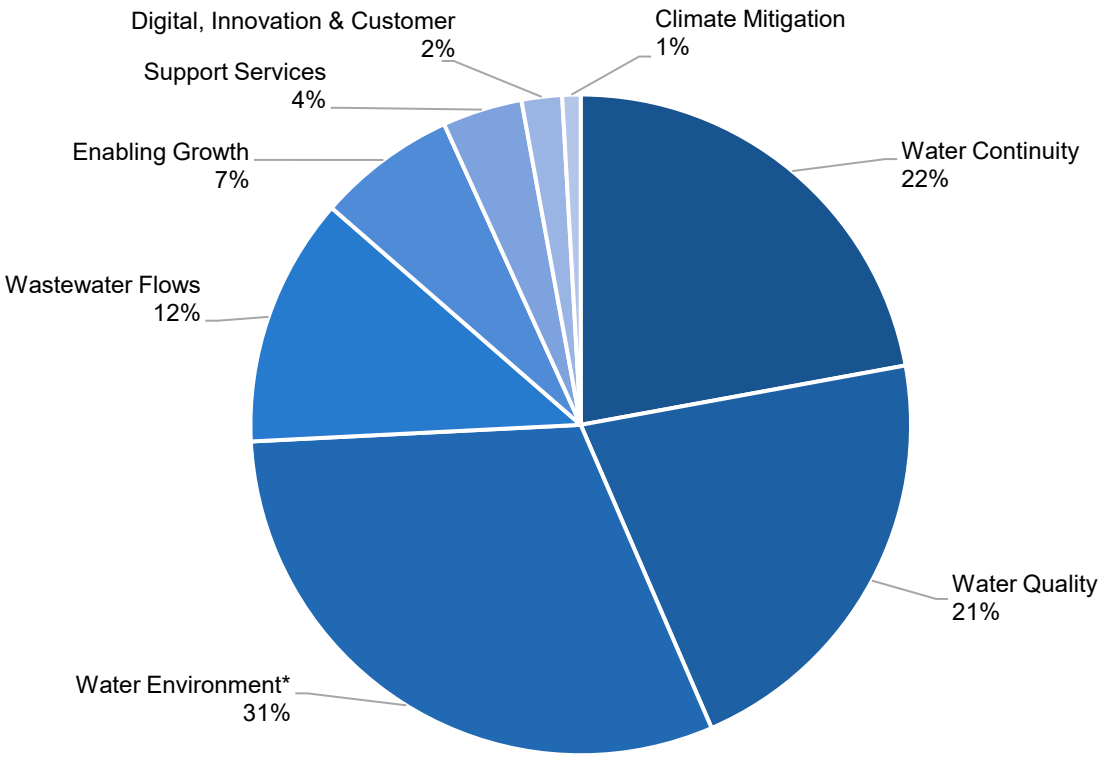

Figure 1: Water Continuity investment as a proportion of the total SR27 investment

** Includes West Central Bioresource investment*

2 Background

2.1 Scope of Technical Appendix

Scottish Water supplies ~1.8 billion litres[2] of water to 2.64 million households and 161,000 businesses across Scotland every day. The Water Continuity investment area covers all investment required during the SR27 period (2027-33) to maintain or improve service outcomes relating to the provision of a continuous supply of drinking water to customers which is both reliable and resilient for the long term, meeting regulatory requirements, customer expectations, Daft Ministerial Objectives 2027-33 and our Long-Term Strategy to ensure that Scotland's tap water remains a source of national pride.

The investment proposed under Water Continuity will target the highest risks associated with maintaining the performance and service provided by the existing asset base, whilst making progress in delivering the enhancements required to mitigate the challenges from climate change and other threats. This will include reducing the supply-demand deficit gap, improving the resilience of our assets and continuing to maintain assets across our source-to-tap systems which are key to maintaining supplies to customers. This includes structural assets such as intakes, dams, raw, trunk and distribution mains, pumping stations and buildings, along with ancillary assets and supporting systems such as valves, metering, SCADA, telemetry, security and power supplies, and improving our response and recovery capability.

This technical appendix details the drivers behind the investments, identifies the needs that will be addressed during the SR27 period and outlines the benefits for the Scottish population. It provides an overview of the allocation strategy for the investment, the methodology used for selecting options, and the most efficient delivery plan for Water Continuity investments in SR27.

2.2 Context

The investment needs presented in this document are required to meet Scottish Water's legislative obligations, including the Draft Ministerial Objectives 2027-33, and align with Scottish Water's Long-Term Strategy and policies to address existing areas of unsatisfactory service performance and risk, whilst mitigating risks associated with the key long-term challenges as set out below:

Legislative Requirements

Key legislation relating to the Water Continuity investment area includes:

- **The Water (Scotland) Act 1980** - sets out Scottish Water's duty to provide a supply of wholesome water to every part of its limits of supply. The 'Act' gives Scottish Water powers to protect the supply network and resources through corrective action (repairs), preventing misuse, contamination and wastage of water, restricting hose pipe use and also to supply water during a drought.
- **The Water Resources (Scotland) Act 2013** makes it a statutory duty for Scottish Ministers to take such reasonable steps as considered appropriate for the purpose of ensuring the development of Scotland's water resources. It gives Scottish Water powers to monitor and manage the quality of water in the water environment that is likely to be used for human consumption and sets out a legal framework for Water Shortage Orders to enable actions to conserve water and access additional sources.

[2] Total distribution input including leakage.

- **The Reservoirs (Scotland) Act 2011**, enforced by SEPA, sets out the regulatory requirements on Scottish Water, as a registered reservoir manager, for the safe construction and operation of reservoirs above 25,000m^3. The Act requires the appointment of supervising and inspecting engineers to oversee the ongoing inspection and maintenance of reservoir structures, including measures to be taken in the interests of safety (MIOS) within a specified timescale.
- **The Security and Emergency Measures (Scottish Water) Directions (SEMD) 2002**, set by Scottish Ministers, require Scottish Water to have plans in place to ensure the provision of essential water supply in a civil emergency or any event threatening national security.
- **The Security of Network and Information Systems (NIS) Regulations 2018** provide legal measures to boost the level of security (both cyber & physical resilience) of network and information systems for the provision of essential and digital services. As a designated 'supplier of an essential service', Scottish Water is required to comply with the regulations, which are regulated by the DWQR, primarily in relation to its SCADA, Human-Machine-Interface (HMI) and other control equipment used on operational sites.
- **The Public Water Supplies (Scotland) Regulations 2014 (as amended),** the primary purpose of which is to define and ensure the provision of wholesome water, is also applicable to the Water Continuity investment area in terms of the quality of new or alternative sources which may be required to address long-term supply-demand balance deficits or support short-term drought response activities.

  The Regulations also place a duty on Scottish Water to assess, report and control water quality risks across all water supply systems. To achieve this, a Water Supply Risk Management (WSRM) system, covering both quality and continuity risks, has been developed and implemented in line with the requirements of British Standard EN15975-2. The key investments proposed under this Technical Appendix have been validated by the new risk system where applicable.
- **The Landfill (Scotland) Regulations 2001**, enforced by SEPA, require all long-term waste storage facilities to meet minimum criteria, with any storage facility where material is stored on site for more than one year should meet the requirements of the regulations.

Other relevant legislation to note but primarily covered by the Water Environment investment area:

- The European **Water Framework Directive (WFD)** which became law in Scotland as the **Water Environment and Water Services (Scotland) Act 2003** (WEWS Act). The WEWS Act aims to protect and improve the ecological status of the water environment while safeguarding the social and economic interests of those who depend on it. This is achieved through River Basin Management Plans (RBMP), first established in 2009.
- **The Water Environment (Controlled Activities) (Scotland) Regulations 2011** (as amended 2013, 2017, and 2021) brought into effect the requirement of Section 20 of the WEWS Act, more commonly known as the Controlled Activities Regulations (CAR). Under CAR, Scottish Water required authorisation for abstraction of its water sources and had a duty to take all reasonable steps to secure efficient and sustainable water use. As of 1st November 2025, the requirements of CAR were replaced by The Environmental Authorisations (Scotland) Regulations 2018 (amended 2025).
- **The Environmental Authorisations (Scotland) Regulations 2018** (amended 2025) (EASR) came into force in 2018 with the framework being extended to water, waste water.

- management and industrial emissions activities in 2025. The Regulations sets out a common framework that integrates the authorisation, procedural and enforcement arrangements and standardises the process for complying with environmental legislation in Scotland. Best Available Techniques (BAT) principles have been introduced for preventing or reducing environmental impact to include the efficient use of energy and water and continual improvement based on technological progress.

Recognising the challenges posed by a changing climate, the Scottish Government, in collaboration with Scottish Water and other industry stakeholders, is developing policy for the future of the Scottish water industry and how it can respond to the impacts of the climate emergency. As this work has yet to be concluded, any associated investment requirements have not been explicitly included as part of the proposals for the Water Continuity investment area. However, as set out through Scottish Water's Long-Term Strategy and Climate Change Adaptation Plan, and aligned with the Scottish Government's National Adaptation Plan 2024 – 2029[3], climate change could impact the ability of our assets to maintain current levels of service relating to water continuity and the environment, and progress on addressing these challenges will be required in SR27. The policy changes or requirements under consideration include:

- The collective and sustainable management of Scotland's water resources by all users, including increased focus on the efficient use of water.
- Proposals for Scottish Water to undertake water resource and strategic drought planning.
- Proposals to increase action on leakage as required by the recast Drinking Water Directive.

Draft Ministerial Objectives 2027-33

Our investment plans for Water Continuity in SR27 are required to meet the following Draft Ministerial Objectives 2027-33:

- Make progress towards the realisation of the long-term vision of the water industry.
- Understand the condition of assets, in particular those of a critical nature for maintaining service delivery and develop an evidence-based strategy to inform the long-term asset maintenance needs of the industry.
- Review and update existing plans to address the resilience of supplies (inc. raw water) and take steps to secure further improvements to resilience to ensure continuity of service.
- Promote sufficient asset maintenance to deliver required levels of service and demonstrate how investment, or lack thereof, is contributing to a change in the condition of assets and thus levels of risk and service.
- Identify the impacts of climate change on our assets and services and continue to implement and evolve plans for measures necessary to adapt to these changes.
- Work with customers to encourage, and subsequently monitor and evaluate, behaviour changes that promote water efficiency.
- Prepare and implement plans to improve the cyber, physical and personnel security of our network and systems to protect them from malicious attack.
- Help to deliver the Scottish National Adaptation Plan, including the objective (PS3) on managing Scotland's water resources.

[3] Scottish National Adaptation Plan (2024-2029)

- Identify and provide new strategic capacity that will meet the demand of all new housing development and the domestic requirements of commercial and industrial development.

Long-Term Strategy

The key objectives of Scottish Water's Long-Term Strategy to 2050, relevant to Water Continuity, to deliver the outcome of ensuring that Scotland's tap water remains a source of pride are:

- Continue to ensure no one has persistent low water pressure and fewer people experience recurring low pressure.
- Reduce the amount of water lost through leakage by 20% to 380 million litres per day, focusing on the areas where it benefits people and the environment the most.
- Improve the resilience of our treatment works and pipes and improve our planned maintenance and operational response to reduce the amount of water which is lost and the impact on the environment in the event of a burst.
- Accelerate the replacement of our water mains pipes that Scottish Water know are more likely to burst due to their material.
- Reduce the amount of water abstracted and treated every day, helping to make us more resilient to the worst drought Scotland has experienced.
- Consider localised solutions to reduce demand and maximise the water available from our existing sources in areas at risk of water scarcity, before developing new sources.
- Improve connectivity of our existing systems to increase flexibility to move water around and improve resilience in times of drought.

Key Challenges

- **Climate and Demographic Change** – with a prediction of warmer, drier summers, population increase and migration from the west to the east of Scotland over the next 25 years, the amount of water available from sources currently used for public water supplies is expected to fall short of demand requirements by 280 megalitres per day (ML/d) during drought conditions[4], from a current deficit of 130 ML/d. This is exacerbated by Scotland being one of the highest domestic water users in Europe at 178 litres per person per day (l/p/d). Conversely, our assets and ability to maintain supplies also face increasing threat from more extreme weather conditions such as storm events leading to power outages or localised flooding and varying wet / dry conditions resulting in ground movement causing pipes to burst and leakage to increase.

- **An extensive and ageing or deteriorating asset base** – our source-to-tap system includes 173 operational impounding reservoirs, 747 water pumping stations, over 49,000km of pipes and other supporting assets and systems which need to be operated and maintained to provide a continuous supply to over 5 million domestic customers, along with commercial and industrial users, across Scotland. Our critical, large infrastructure assets, such as dams and trunk mains, require ongoing inspection and maintenance to ensure that they not only maintain supplies for the long-term but do not pose a risk to others from catastrophic failure. Progress is also required to mitigate other high risks to service, including the risk of short-term interruptions to supply associated with asbestos cement

[4] Update to figures presented in the Scottish Water Climate Change Adaptation Plan based on UKCP18 climate change projections.

pipes. It is also critical that our control, automation and security systems are maintained in line with industry standards and continue to protect our assets from external threats.

2.3 Past Performance and Challenges

2.3.1 Resilience and Long-Term Interruptions

Although the majority of supply interruptions are classified as short-term (less than 3 hours), our assets are facing increasing risks from a wide range of hazards with the potential to have greater impact on customers through long-term interruptions to supply which exceed our corporate risk appetite. These risks include environmental and demographic change which will impact the availability of water to sustain supplies, particularly under worst-historic drought conditions. Events may also be caused by failure of strategic assets serving large populations and / or which present significant challenges to the quick restoration of supplies.

Although such events are rare, those seen during SR21 have had the potential to have a significant impact on customers, such as the flooding of the Inchgarth raw water storage and pumping station complex in 2022, potentially compromising supplies from Mannofield Water Treatment Works (WTW) serving customers in Aberdeen.

During Storm Arwen in 2021, supplies to 1.5 million customers were maintained through the use of standby power generation at 43 water treatment works and 15 other sites. However, supplies to 18,000 customers were disrupted due to the loss of mains power caused by storm damage to the power network, with some small rural communities experiencing long-term interruptions. In 2025 during Storm Amy, although previous investment to improve resilience protected water supplies in many areas, widespread issues with power supplies, including the Fort William and Aviemore areas, highlighted the need for additional investment to further reduce the risk to customers and the impact on operational teams.

In 2023, draft Water Shortage Orders (WSO) were developed for some supplies in response to low rainfall and warm weather in the spring and early summer, and emergency measures were deployed to maintain water supplies on parts of Skye. In 2025, a draft WSO was also prepared for supplies serving the Dundee and Angus areas, along with the deployment of drought measures, in response to reservoirs reaching their lowest levels in over 20 years (Figure 2).

Figure 2 – Backwater Reservoir

These events highlight the ongoing requirement to ensure that Scottish Water's resilience capability is sufficient to meet current and future challenges, and is consistent with the 4 Rs of resilience for the water industry[5]:

- **Reliability** – reducing the likelihood of an asset failing and impacting on customers, through its original design and construction, through to its ongoing inspection and maintenance.
- **Resistance** – providing additional capability by hardening assets to specific threats to mitigate the risk of damage or disruption.
- **Redundancy** – providing additional capability to the asset base, such as installing back-up or ensuring spare capacity, so if one part fails, another can take over.

[5] UKWIR: Resilience-performance-measures-costs-and-stakeholder-communication (2017)

- **Response and Recovery** – where things do go wrong, Scottish Water have the right technology in place to give us early warning of potential incidents and the right plans and equipment ready to use to implement an effective and quick recovery, avoiding or limiting direct customer impact.

2.3.1.1 Water Availability

Since the formation of Scottish Water, significant improvements have been delivered to ensure that our raw water sources and water treatment works can maintain supplies during prolonged dry weather and periods of high demand. Although original service levels for raw water yield were to maintain supplies during droughts with a 1:40 (2.5%) probability of occurring in any given year, Scottish Water are now planning for more severe droughts with a 1:150 (0.67%) probability (broadly aligned with the worst historic droughts on record) reflecting a greater understanding of the impact of climate change. Other areas of the UK are required to plan to maintain supplies during more extreme plausible droughts of 1:500 (0.2%) probability but more work is required to understand the impact of these in Scotland, which will be developed further in SR27.

Ongoing changes to climate and population represent an increasing risk to our ability to maintain water supplies during periods of peak demand or prolonged dry weather. Our water resources and storage capacity have historically been managed and designed on the basis that Scotland enjoys frequent rainfall, particularly in winter, which can regularly recharge our sources. However, with reduced rainfall during periods when customer demand is likely to be higher, our limited storage volumes are expected to deplete at a faster rate, putting both supplies and water quality at risk[6]. Scotland's water resources are also expected to see increasing demand from irrigation to support agriculture, changes in land use and potential new industries.

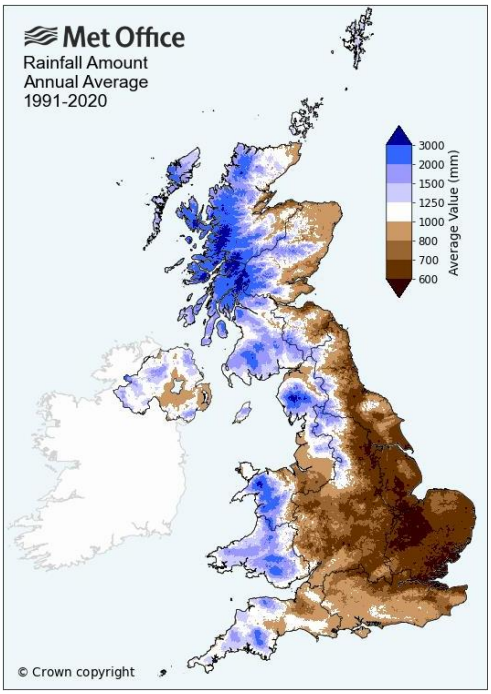

Figure 3: Annual Average Rainfall 1991-2020 (source: Met Office)

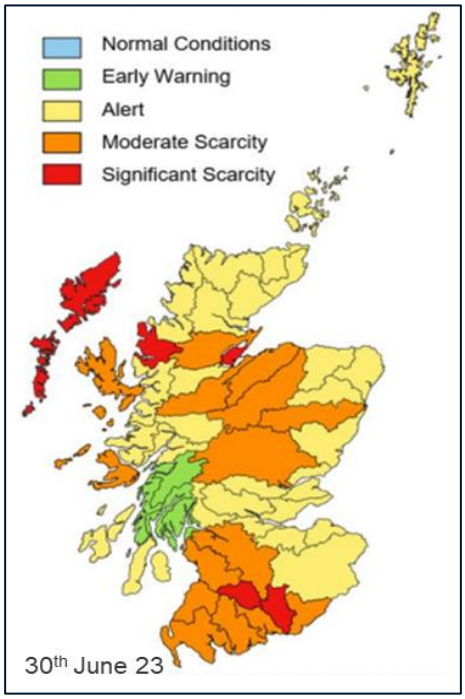

Figure 4: Water Scarcity Map - June 2023 (source: SEPA)

There is substantial variation in rainfall between the east and west of the country (Figure 3: Annual Average Rainfall 1991 – 2020), with levels in the west being well above the UK average, and the east being significantly drier. However, water scarcity can develop across any part of the country

[6] Scottish Water Climate Change Adaptation Plan

in any given year, such as in 2023 when low rainfall during the spring resulted in much of the country experiencing scarcity by early summer, with many areas at moderate or significant (Figure 4: SEPA Water Scarcity Map – June 2023).

In 2025, prolonged dry periods in the east of the country resulted in a peak of 21 areas monitored through SEPA's Drought Risk Assessment Tool (DRAT) reaching Significant Scarcity and licence suspensions being imposed on some water abstractors. Figure 5 shows that Significant Scarcity has been reported in 8 out of the past 10 years (2016 – 2025).

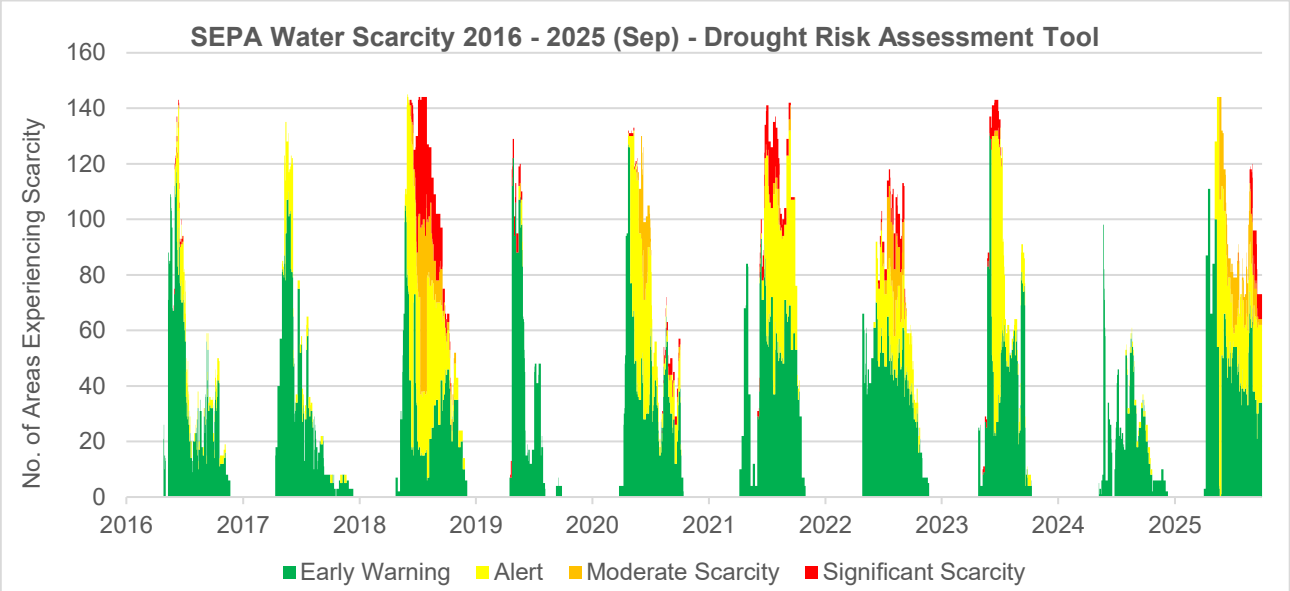

Figure 5: SEPA Water Scarcity Levels (2016 to 2025) (source: SEPA)

For Scottish Water's existing sources, it is forecast that the availability of raw water supplies during a 1:150 drought event will fall short of customer demand by 280 ML/d by 2050. This compares to a current deficit of 130 ML/d (reflecting climate change) increasing to 215 ML/d by the end of SR27 without any intervention (Figure 6). The impact of climate change, both now and in the future, increases the risk of long-term supply interruptions or restrictions in water use.

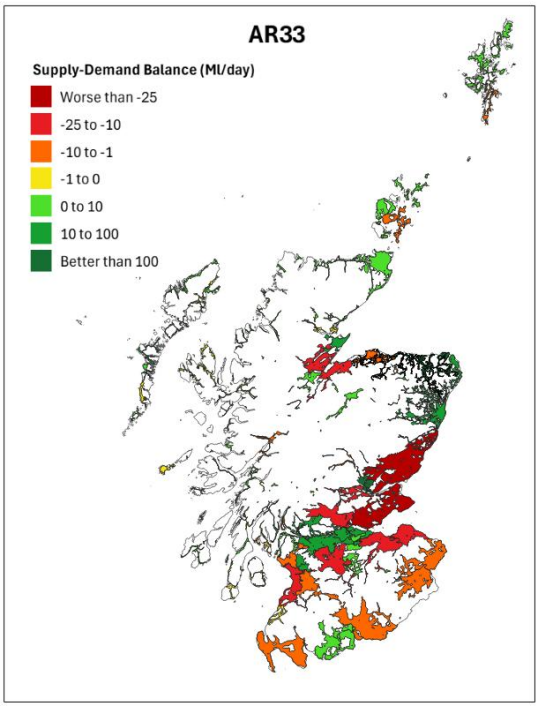

Figure 6: Supply-Demand Balance Forecast 2033

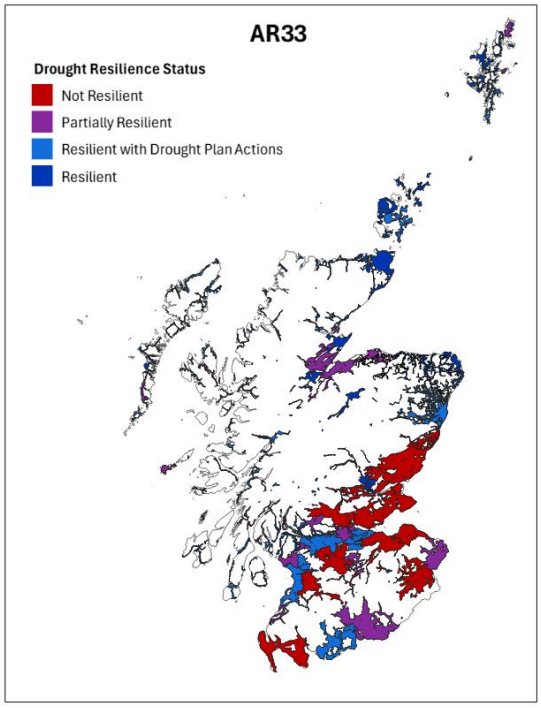

Figure 7: Forecast Drought Plan Resilience 2033

Scottish Water routinely monitors the levels of its water sources and, as drought conditions develop, appropriate response measures are prepared and deployed in line with its system and regional based drought plans. These plans aim to provide full or partial resilience for events equivalent to the worst-historic drought on record, particularly for systems in supply-demand deficit. However, 6 systems are currently considered to be not resilient to a worst-historic drought even with documented drought plan measures (Figure 7).

Drought conditions across 77 reservoir systems are monitored through a series of drought triggers (Figure 8) - Close Monitoring (green), Drought Watch (yellow), Drought Warning (amber) and Drought Impacts (red). Since 2016, an average of 30 systems has entered drought trigger per year, with Drought Impacts being recorded in 6 of the 10 years. This results in high levels of activity being required by water resources, operational and delivery teams to mitigate the drought risk and maintain supplies, particularly when dry periods extend over a number of months, as seen in 2018, 2021 and 2025. It is therefore critical that our drought response options are tested to ensure they deliver the level of mitigation expected, and that our drought plans and supporting hydrological models are reviewed and updated to ensure they remain fit-for-purpose.

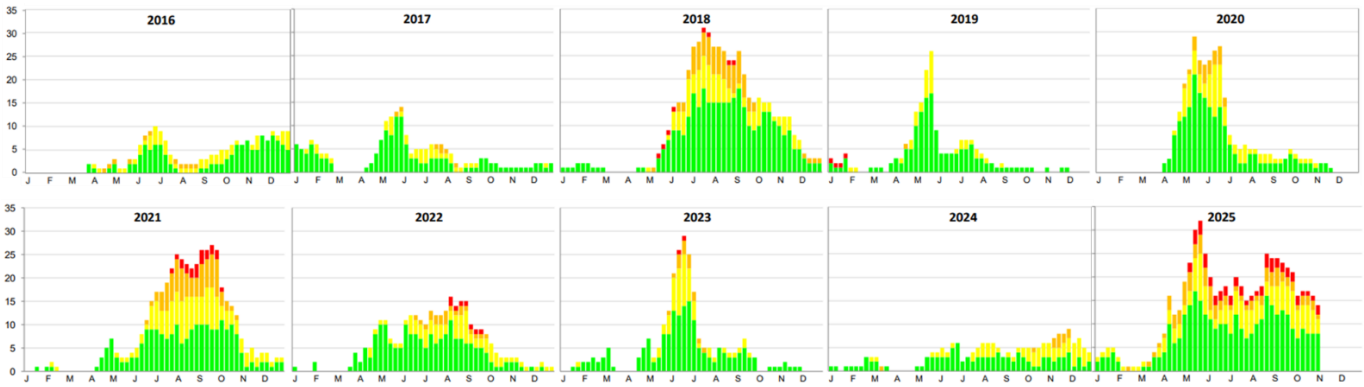

Figure 8: Drought Triggers 2016 - 2025

Although drought plans will continue to play a key role in mitigating these risks, where sufficient drought resilience cannot be achieved in a way which is sustainable for customers, operators and the environment, either now or in the future, other measures such as alternative sources, increased connectivity and demand management will be required to deliver resilience to a 1:150 drought event. Without intervention, the number of supply systems forecast to be not resilient to a repeat of the worst historic drought on record will increase from 6 to 13 by 2033.

Although our response activities typically avoid the requirement for customers to be directly impacted by water use restrictions (e.g. hose pipe bans) during drought events, customers are encouraged to use water wisely through national and local media campaigns (Figure 9) to reduce the demand on supplies and to protect the environment. However, increasing risk to water availability may result in Water Shortage Orders being required in future.

Particular consideration is required regarding the environmental impact of water consumption and drought response measures in areas which coincide with those designated by SEPA as being in Significant Scarcity.

Figure 9 – Water Efficiency Campaign

In addition to the risks associated with raw water availability, a number of supplies across the country are also constrained by the capacity of the water treatment works and networks serving the area, particularly during peak demand periods (e.g. Fife, Tiree, Balmichael). This can cause both temporary and longer-term challenges, with response measures such as tankering being required to maintain supplies for short periods, through to potentially constraining development by not meeting the needs of the local populations. Similar to drought resilience measures, this may also drive the need for new sources and additional connectivity with neighbouring systems, along with new water treatment works or additional process streams to provide addition capacity.

However, with levels of domestic demand for water in Scotland being amongst the highest in Europe, a significant change in how water is viewed and used in Scotland will also be required as part of the range of measures to meet the challenges relating to water availability and to safeguard public water supplies and the environment. This work will form part of Scottish Water's wider activities relating to water resource management, including updating our Water Resource and Strategic Drought Plans, and supporting the Scottish Government water industry policy development work and implementation of the National Adaptation Plan 2025 – 2029.

2.3.1.2 Water Demand

The total demand for water for the public supply is reported as the volume of treated water leaving our water treatment works and passing into the distribution system, referred to as distribution input (DI), the breakdown of which is shown in Figure 10. Approximately 21% of total DI is supplied to non-domestic (industrial and commercial) customers, 51% supplied to 5.4 million domestic customers, and 25% attributed to total leakage.

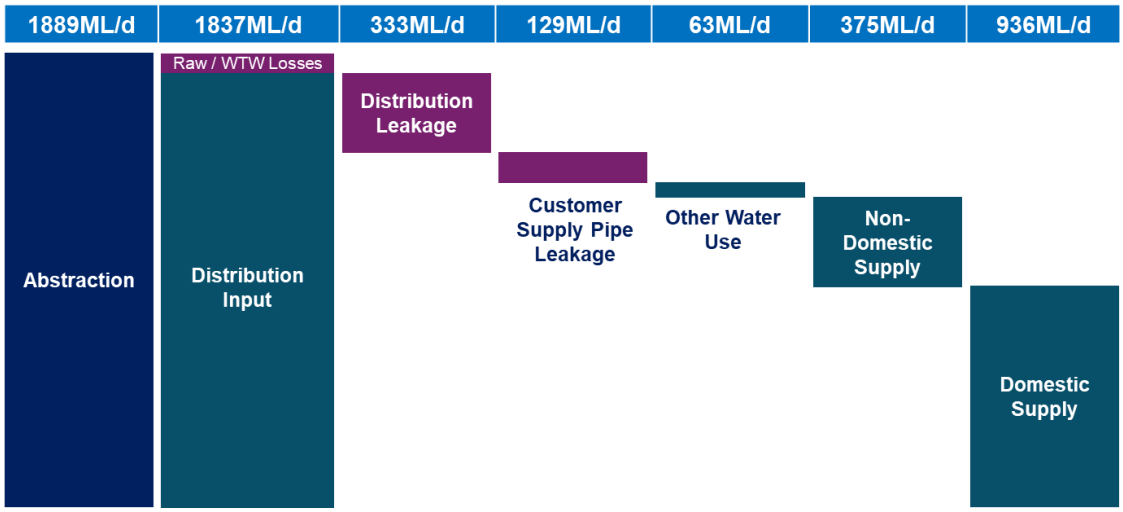

Figure 10: Distribution Input Waterfall Diagram

Domestic and Non-Domestic Demand

Average per-capita consumption (PCC) in Scotland is equivalent to 178 l/p/d, although this varies significantly across 189 Water Resource Zones (WRZ) due to the varied socio-demographic distributions across the country. This represents an increase from pre-Covid levels of 167 l/p/d, attributed to hybrid working, and puts the Scottish population amongst the highest users in the UK and Europe (Figure 11).

With an increasing population, the prediction of higher temperatures and greater frequency of drought conditions, reducing water consumption has the potential to play a significant role in closing supply-demand deficits and further improve the sustainability of water abstraction. This will help to protect our water sources, relieve pressure on the distribution network during periods of peak demand and protect the environment by only abstracting what is required.

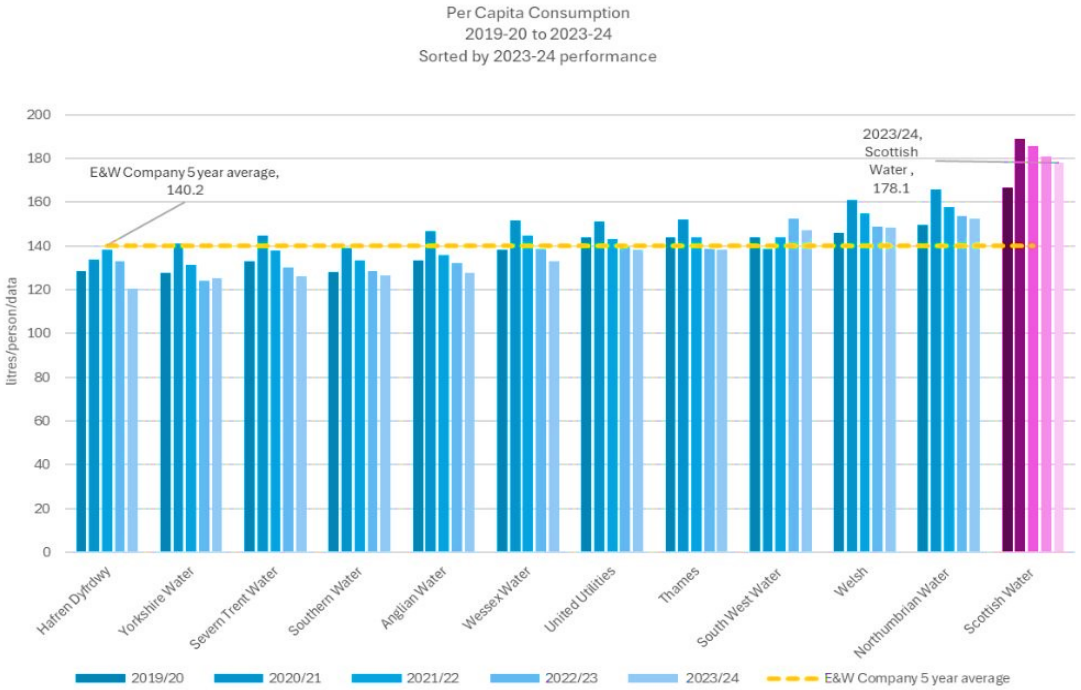

Figure 11: Average Domestic Water Consumption

Reducing demand will also help support a flourishing Scotland by enabling growth and development. To achieve this, work with both domestic and non-domestic customers will be

required to increase awareness about the amount of water consumed and its impact, highlighting ways to save water.

In early 2025, a domestic smart monitoring trial was launched in Dundee to explore if providing homeowners with regular information about their water use would change their usage patterns and to assess the potential for significantly reducing domestic demand. This trial is expected to report in 2028 with the results informing the potential role of smart monitors in reducing domestic demand in the future.

The domestic smart metering trial follows a successful pilot in SR21 with 3,000 non-household / business users in Inverness and Orkney and a nationwide rollout of smart metering for 130,000 business customers is now planned[7]. The non-household programme is targeting a sustainable demand reduction of 80ML/d to be fully realised in SR33. Within SR27 Scottish Water are forecasting the roll-out to deliver a 55ML/d reduction through the initial prioritisation of supply-demand deficit zones to address water supply constraints. The projected 80ML/d demand reduction comprises:

1. **Non-Household Customer Side Leakage (32ML/d)**: Early identification of leaks, bursts, and continuous flow (including plumbing losses) currently measured as usage / demand, enabling proactive resolution and accurate billing.
2. **Network Leakage (40ML/d)**: Enhanced visibility of consumption patterns allowing more efficient detection and repair of Scottish Water network leaks, contributing 25ML/d of the overall leakage reduction targeted in SR27 and a further 15ML/d in SR33.
3. **Non-Household Customer Demand (8ML/d)**: Behavioural changes resulting from increased customer awareness of usage patterns and their impact on bills.

Whilst work will be completed in SR27 to further understand the benefits of smart meter technology and potential opportunities from other innovations, a national conversation across stakeholders and customers will be required to identify ways of delivering significant and sustainable change to achieve consumption levels seen in other parts of the UK and Europe.

Leakage

Scottish Water operates one of the largest and most wide-spread water distribution networks in the UK with over 49,000km of pipelines across the country. Such a large network consisting of a range of pipe materials of varying ages, laid in different ground conditions presents a significant risk of losses through leakage and challenges to control leakage to sustainable levels. Without continuous activity to maintain leakage at 454 ML/d (2024/25), over the course of a year leakage would increase by the equivalent of 250 ML/d.

Since 2002, leakage has been reduced by over 50% and now represents 25% of DI compared with 45% in 2002 (Figure 12). From 2017/18 to 2024/25, average leakage reduction of 1.0% per annum (p.a.) was achieved, compared with an average of 1.3% p.a. in England and Wales which benefit from intelligence provided by domestic metering. However, an increase in the reduction rate in Scotland will be required to make early progress in achieving the Long-Term Strategy objective of 380ML/d to support overall demand reduction. Scottish Water will therefore plan to increase our leakage resources, increase customer awareness and seek further innovation in the use of technology, including the benefits from the non-household smart metering initiative[8], to

[7] Representing 95% of the total programme and is part of an active procurement process

[8] The realisation of benefits is dependent on the funding available.

help find and fix leaks. However, ageing / deteriorating pipes and climate change will make managing leakage more challenging, with more variable weather patterns affecting ground conditions leading to greater risk of burst pipes and leakage as a result of ground movement.

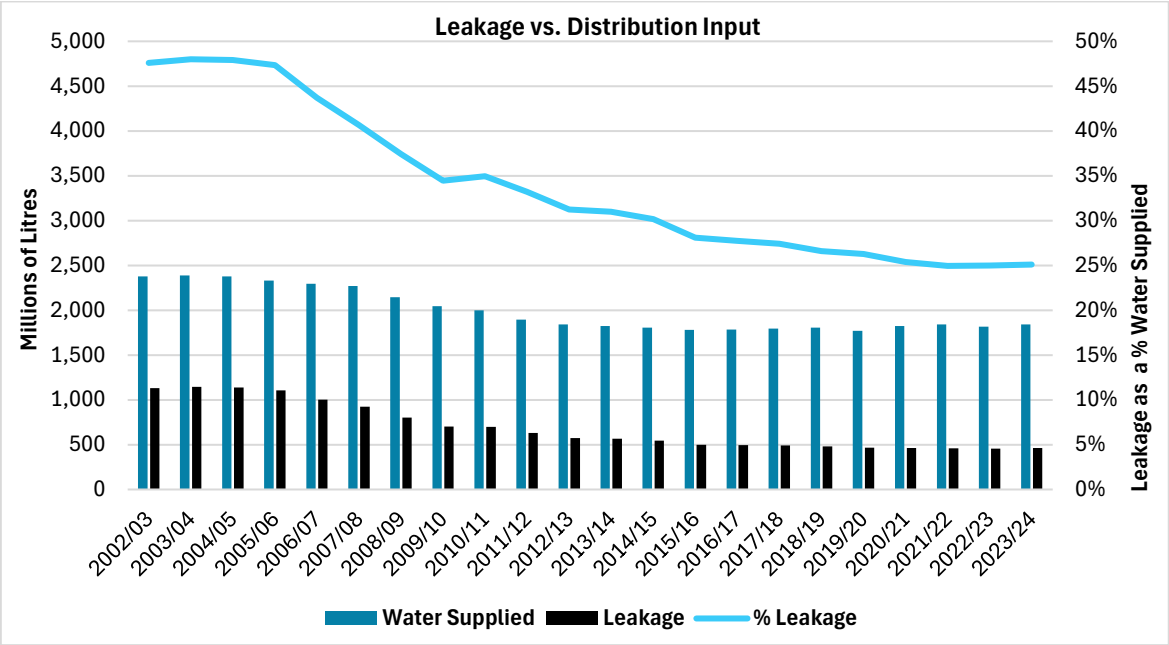

Figure 12: Annual Water Supplied and Leakage Levels 2002 – 2024

2.3.1.3 Resilience to Other Identified Hazards

Scottish Water's assets face threats from a wide range of hazards summarised in Table 2 which have the potential to disrupt supplies.

Table 2: UK Water Industry Research (UKWIR) Resilience Hazards[9]

Management Control	Management Foresight	Extreme Environmental	Natural Disaster / Extreme Events
Contamination Incident	Catchment / Site Contamination	Drought / Prolonged Hot-Dry Weather	Sea Level Rise
Reservoir or Dam Break	Extreme Reservoir Contamination	Excessive Cold & Ice / Snow	Solar Flare / Space Weather
Power Failure	Extreme River Pollution	Storms & Gales	Epidemic / Pandemic
Power Loss (extended)	Fire / Major Fire	Coastal Flooding	Civil Unrest
Cyber Attack (malicious control)	Chlorine (supply chain)	Fluvial Flooding	War
Cyber Attack (virus)	Supply Chain Failure	Groundwater Flooding	National Strike
Telecoms Failure (including telemetry)	Commodity Prices and Economic Change	Surface Water Flooding	Earthquake
Access Loss (maintenance / supply)	Materials Shortages	Landslip / Subsidence	Tsunami

[9] UKWIR: Resilience: performance measures, costs-and-stakeholder-communication (2017)

Management Control	Management Foresight	Extreme Environmental	Natural Disaster / Extreme Events
Asset Failure	Major Fuel Crisis	Lightning Strikes	Volcanic Activity
	Malicious Damage / Sabotage		Aircraft Crash
	Security & SEMD Related		Transport Disaster
	Third Party Interventions		Nuclear Incident

Although a number of the hazards are controlled by arrangements or factors external to Scottish Water, many hazards require steps to be taken by Scottish Water to ensure they are adequately controlled. Aligned with the four Rs of Resilience, these steps include asset maintenance to ensure the ongoing reliability of key strategic assets, enhancement to improve the resistance and redundancy of the asset base and having the appropriate response and recovery plans and equipment in place, in line with our Management Approaches.

To ensure the reliability of our assets, Scottish Water will need to continue our programmes for the inspection of key infrastructure assets such as reservoir structures, aqueducts, raw and treated water trunk mains, and pipe bridges, prioritising follow-on maintenance work for delivery. This will help to reduce the risk of events such as those seen in Glasgow in 2021 and 2025 where major trunk mains failed causing disruption to water supplies and the local community due to the associated flooding and damage caused (Figure 13).

Figure 13: Repairs to Trunk Main 2025 (left) and Flooding Following Trunk Mains Burst (right)

To deliver our responsibilities as Reservoir Managers under the Reservoir (Scotland) Act 2011, Scottish Water undertake statutory and non-statutory inspections of 173 operational and a further 85 non-operational impounding reservoirs to ensure their ongoing integrity, safeguarding supplies and protecting downstream communities from catastrophic flooding events. In addition to routine maintenance activities, measures to be taken in the interests of safety (MIOS) as identified by appointed inspecting engineers must be completed within designated timescales. Scottish Water forecast a total of 86 MIOS to be delivered to the designated timescales within SR27, including:

- 26 sites with current MIOS running into SR27;

- 60 sites which are likely to have standard MIOS interventions required in SR27, based on historical inspections finding MIOS on 38% of sites inspected (with 159 due for inspection in SR27).

Of particular concern are the condition of spillways, with damage being caused by increasing storm frequency and intensity, and the ability to draw down reservoirs safely. Both situations also require reservoirs to be held down for a period of time to allow remedial works to be undertaken, which may exacerbate water resource challenges by reducing the amount of stored water available for supply.

Figure 14: Camps Reservoir Spillway Repairs

Figure 15: Loch Katrine – Storm Damage to Spillway

Through our work to understand the wider impacts of climate change on our assets and services, Scottish Water have identified that some of our sites will be at an increased risk of flooding in the future, which will require enhancement investment to improve their resistance to such events. In November 2023, Ballater WTW was flooded resulting in the works being inoperable for a number of days (Figure 16).

Figure 16: Ballater WTW Site Flooding November 2023

During storm events in particular, our assets are dependent on the availability of temporary and permanent standby generation in order to maintain the operation of key plant and equipment in

the event of power interruptions. During Storm Éowyn in January 2025, 114 water treatment works, more than half of the asset base, experienced power loss, although the direct impact on supplies was limited to ~500 households. This was due to the extensive planning in both preparing for the event and responding to issues, together with previous investment to improve the resilience of key assets through permanent and mobile standby power generation capability. The number of sites where Scottish Water expect to intervene during SR27 is 32 (this includes the HV sites), delivering benefit to over 900,000 customers.

Although the connectivity between our major supply systems has improved since the formation of Scottish Water with capability to supply ~35% of customers from more than one water treatment works, some keys areas such as Dundee still have limited connectivity. With the increased risk from resilience hazards, further opportunities for increasing connectivity will be considered when developing investment to address other needs.

2.3.2 Short-Term Interruptions to Supply and Customer Impact

Existing risks to supply, primarily due to increasing pressures on an ageing or deteriorating asset base, can result in our customers and communities being directly or potentially affected by asset failures or constraints in the supply system. Issues which impact customers most frequently include supply interruptions due to burst water mains, with some customers being affected repeatedly. Burst mains can also have a wider impact as a result of localised flooding and damage, along with disruption as repairs are undertaken to restore supplies.

Although the number of bursts has decreased since 2010/11, the number of properties affected by interruptions to supply has increased from 143,000 in 2010/11 to 308,000 in 2022/23 (Figure 17). Whilst 70% of these are resolved within 3 hours, they still have an impact on customers and require intervention by operational teams and supporting contractors to undertake the repairs required to restore supplies quickly. (N.B: interruptions relating to storm and other events also included in Figure 17).

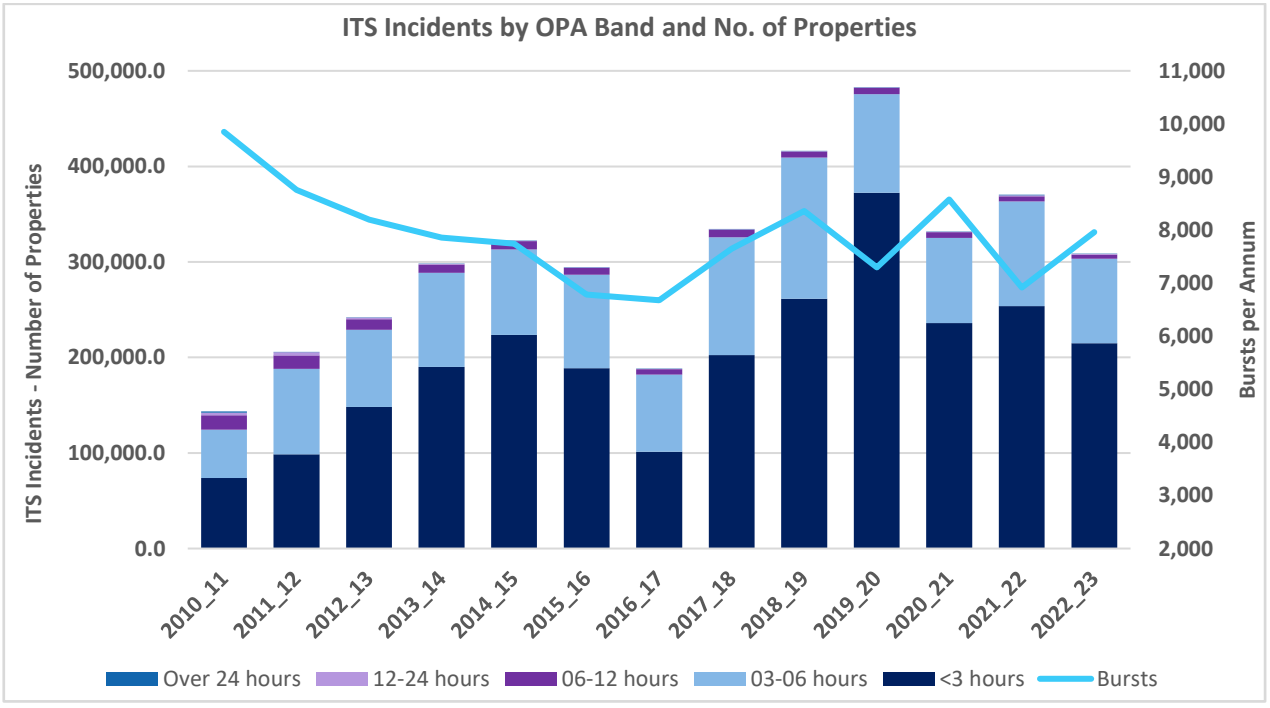

Figure 17: Mains Bursts and Associated Interruptions to Supply

Following high levels of mains rehabilitation in the SR02 investment period with 3,000km of pipes replaced, focus in SR06 and SR10 turned to leakage reduction, partly achieved through pressure reduction across distribution systems through the wider installation and use of pressure reducing valves (PRV). This delivered the added benefit of reducing the number of bursts seen from 2010/11 (Figure 17), extending the life of the distribution mains and allowing lower levels of rehabilitation. However, as pipes have continued to deteriorate, the benefits from pressure management have reduced over time resulting in greater variability in performance and the overall increase in burst rates seen from 2016/17 to 2022/23. Based on projections from our Water Asset Risk Model (WARM), burst rates will continue to rise for the majority of pipe materials as over half of the asset base progresses beyond its design life by 2053.

Of particular concern are 5,000km of asbestos cement (AC) pipes, with burst rates increasing from ~160 bursts / 1000km in 2009 to ~260 bursts / 1000km in 2024. Similar to observations made by other water companies, including Welsh Water[10], the structural strength of AC pipes deteriorates over time due to the leaching of the cement (lime) portion from of the pipe wall, both internally, due to the largely soft waters across Scotland, and externally, where pipes are laid in acidic soils. Varying ground conditions as a result of wetting and drying throughout the year can also accelerate the leaching of the cement layer and create ground movements that further weaken the pipes. The observed increase in failure rates is leading to recurring supply interruptions, increased customer contacts, and interest from community representatives. With the modelled failure rate projected to double by 2045 as the pipes approach or exceed their service life of 90 years (Figure 18), accelerated replacement is required to reduce the impact on customers.

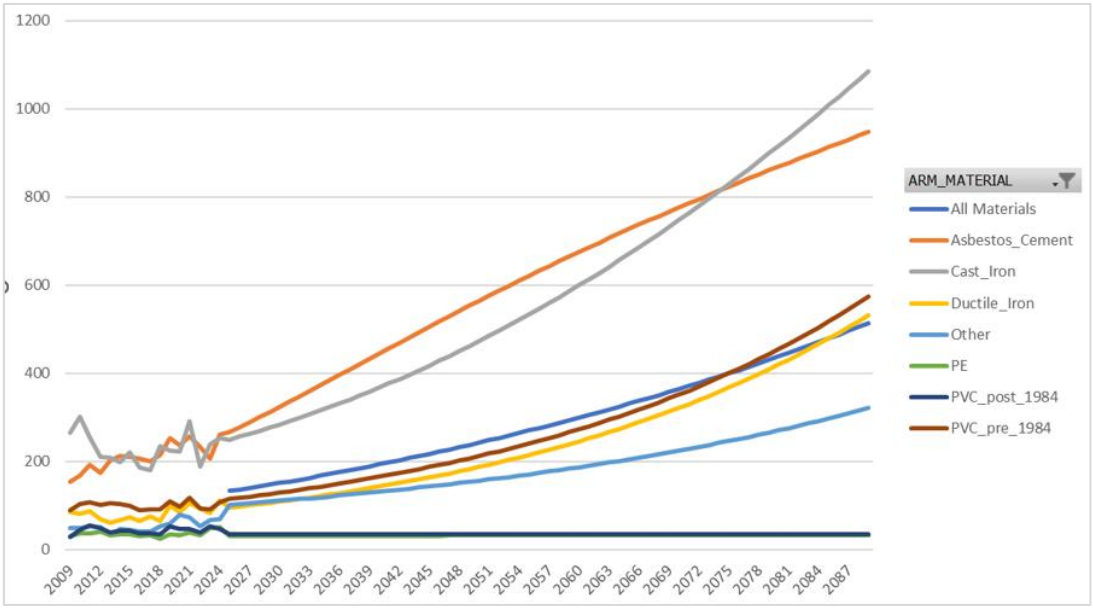

Figure 18: Modelled Burst Rates by Pipe Material

Asbestos cement pipes also contribute to the number of customers impacted by recurring interruptions to supply, with customers in 291 postcodes having to contact Scottish Water about a loss of supply on either 6 or more occasions in the past year or 10 or more occasions in the last 3 years (Figure 19). As 20% of mains which fail then go on to fail again, together with the overall predicted increase in bursts, there is a risk that more customers will experience repeat interruptions in the future, particularly in areas supplied by AC pipes.

[10] Enhanced Investment Case: WSH62-RS01 - Increasing Resilience of Tap Water Supply - Asbestos Cement Mains

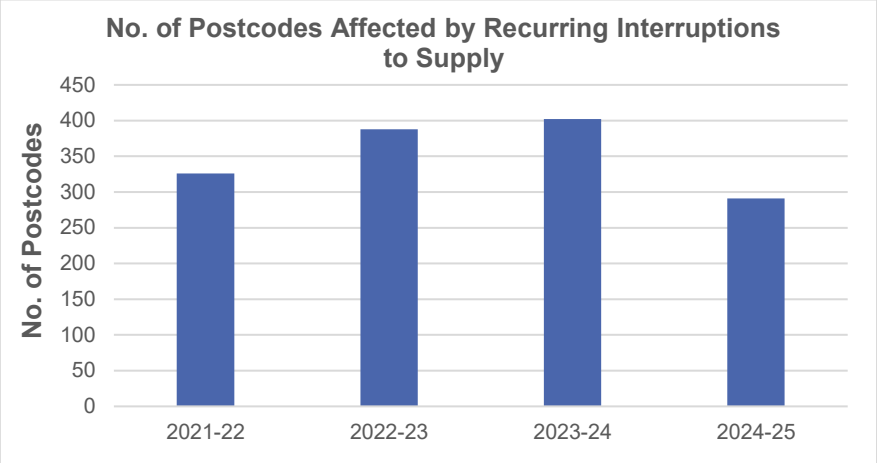

Figure 19: Recurring Customer Interruptions

Customers may also be impacted by variable or persistent low pressure as a result of deteriorating water mains or reduced system capacity. There are currently 22 properties on our Low-Pressure Register where water pressure fails to meet the minimum service standard of 1 bar, with the potential for the number of properties on the register to triple by 2050. In addition, 90 properties experience pressures of 1 to 1.5 bar which result in customers having to contact Scottish Water regarding their supply. Customers may also experience transient low pressures, typically due to one-off events such as burst mains or periods of high demand. However, a proportion of these may become persistent if there is a continued increase in demand on local networks or ongoing mains failures.

Periods of particularly high demand may also exceed the capacity of distribution systems resulting in low pressure or, in more extreme cases, interruptions in supply as the network is unable to convey sufficient water, as seen in North-East Fife during periods of warm, dry weather, coinciding with burst mains, in April 2022 and August 2024. Some small supply systems in other popular tourist locations are also more prone to seasonal variation in demand (e.g. Skye) which may compromise supplies by putting more pressure on the availability of raw water sources or exceed the capacity of the supplying water treatment works. Such events require extensive operational responses to maintain supplies, such as tankering when in 2021 and 2022 over 2,500 tanker movements were required each year. These pressures cause concern within local communities, with customers being worried about not having water when they turn on their taps, and also due to the disruption caused by response activities to maintain service, as well as putting strain on operational teams.

Repeat events such as these are reviewed in line with Scottish Water risk governance processes and policies[11] to ensure that sustainable solutions are put in place to reduce the risk of them reoccurring or to improve how they are managed.

2.3.3 Maintaining Service and Ageing / Deteriorating Assets

In addition to the maintenance of strategic infrastructure and distribution mains relating to resilience (reliability) and short-term interruptions respectively, a base level of ongoing asset repair, refurbishment and replacement (AR3) is required to maintain the operation and performance of the existing asset base to maintain current levels of service (excluding the potential impacts of climate change in the future).

[11] Policy on the Use of Tankers to Maintain Continuity of Supplies

During SR21, investment needs have been identified from inspection programmes covering a range of asset types, interventions in line with frequencies set by Management Approaches, observations of risks and issues from operational sites, and water risk management processes. Many of these needs will require to be addressed in SR27.

Scottish Water have 652 treated water pumping stations and 95 raw water pumping stations containing 2438 pumps. 80% of these are considered non-critical with interventions undertaken on a responsive basis as issues arise. For critical assets (as defined by the relevant Management Approach), proactive interventions are undertaken based on the condition and performance of the equipment, with condition-based monitoring being used for larger pumps to provide early warning of potential failures and reduce the cost of intervention.

To meet and sustain compliance with the NIS Regulations, investment is required to ensure that key control and automation technology on operational sites remains fit-for-purpose and can be routinely maintained to ensure the secure and reliable operation of water treatment works and pumping stations.

2.4 SR21 Delivery

£1,511m has been allocated to Water Continuity in SR21, with the majority (84%) designated for Asset Maintenance (AR3) and 16% divided between Enhancement and Growth.

Investment in SR21 will see the completion of the Ayrshire Resilience Scheme, which commenced in SR15. This addresses significant risks associated with the potential failure of key assets and the extended response times required for their repair. This has involved a range of activities spanning the 4 Rs of resilience, including the provision of additional storage capacity and greater connectivity with the Glasgow supply system. This increased connectivity was enabled by utilising surplus capacity realised from leakage reduction, also allowing four water treatment works to be rationalised, reducing long-term costs for customers and supporting the delivery of RBMP3 objectives through reducing abstractions.

In Aberdeenshire, investment has replaced a pre-1984 PVC main between Peterhead and Ellon, known to be brittle due to the manufacturing technique at the time, addressing multiple repeat customer interruptions, and providing additional capacity to support growth and enable future resilience flows from Forehill WTW.

SR21 has also seen a significant increase in our inspection capacity and capability to support our ongoing asset maintenance activities. Our inspection programme across non-infrastructure and infrastructure assets has visited 4,000 sites and delivered ~20,000 inspections to date. The programme involves more than 25 contractors and 200 staff and will see investment of ~£120m in inspection related activities over the SR21 period. This investment has led to an increased understanding of asset condition, and the data supports decision making to manage Water Continuity risk in line with our Management Approaches and risk management processes.

Increased inspections of our strategic infrastructure in SR21 have allowed us to intervene before assets fail and impact on service to customers. For example, inspection work undertaken on a critical trunk main which transfers water across Glasgow through the Finnieston Tunnel identified that the walls of the pipe were very thin. As the pipe was being taken out of service to undertake repairs it began leaking but, using the information gathered from the inspection, six pipe lengths, including the leaking section, were replaced without impacting on customers.

Through our inspection programmes, Scottish Water continue to work with our delivery partners to improve our inspection capability. This includes the use of non–intrusive inspection techniques, like p-CAT (a non-invasive, non-destructive technology for performing pipe condition assessment), for asset understanding to help minimise risk to interruptions to supply, water quality, environment and health and safety. Scottish Water have also commenced a programme of inspections on air valves across our distribution network, initially targeting those classed as critical (~2,250 out of 53,000) with interventions expected to be required on 10 – 15% of the asset base.

For our wider distribution network, our mains rehabilitation programmes, to address bursts and interruptions to supply, will result in the replacement of 550km of mains during SR21. Scottish Water have also made significant progress in addressing recurring customer interruptions at over 200 postcode locations across Scotland.

Investment to deliver leakage reduction and improved connectivity will improve drought resilience to customers in the Afton and Turret Water Resource Zones (WRZ). Scottish Water have also invested in updating our understanding of the impact of climate change on the yields from our raw water sources, and the implications of plausible droughts on our supplies. Scottish Water also continue to test the feasibility of our drought response options to ensure they deliver the mitigation required during a drought event.

Our reservoir safety work will see ~350 matters in the interests of safety (MIOS) across 96 sites being addressed in SR21, including spillway repairs at Fruid Reservoir in the Borders, with other reservoir maintenance work, to varying degrees, being undertaken at the majority sites.

Investment in operational technology (SCADA, PLC and HMI) will replace obsolete equipment at over 25 sites to ensure the secure and continuous operation of our water treatment works and pumping station sites. Investment to ensure the safe and continuous operation of high voltage equipment including switchgear, transformers and pump motors will include work at Glenhove Treated Water Pumping Station, Ross Priority Raw Water Pumping Station and Balmore WTW.

2.5 SR27: Drivers of Investment

There are a number of key challenges to maintaining or improving service relating to water continuity including:

- **Climate and wider environmental change** - Scottish Water will need to effectively manage our water resources at a catchment level. Scottish Water will need to make steps to adapt, and increase our resilience, to the impacts of climate change and our impact on Scotland’s precious water sources.
- **An extensive and ageing or deteriorating asset base** - the need for asset repair, refurbishment and replacement is likely to increase over the next 25 years, this includes needing to triple mains rehabilitation rates to maintain levels of service.
- **The Long-Term Strategy** recognises these challenges and risks and sets out the expected level of investment demand required to mitigate them to deliver the outcome of ensuring that Scotland’s water supply remains a source of pride.

Based on the above context and challenges, and to meet Ministerial Objectives, the main drivers for investment in SR27 are:

Adapting to Climate Change: Sustainable Supplies and Increasing Resilience

To effectively manage our water resources, Scottish Water will need to take steps to adapt, and increase our resilience, to the impacts of climate change:

- Continue to develop our understanding of the impact of climate change on our water resources and assets and develop plans to mitigate these risks.
- Improving drought resilience in key areas currently or forecast to be Not Resilient to the worst historic drought, considering supplies within the following Water Resources Zones: Clatto, Lintrathen & Whitehillocks; Fife; Turret; Edinburgh & Lothian; Daer & Camps; Castle Moffat & Hopes; Turriff, Badentinan & Glenlatterach; Roberton; Penwhirn & Auchneel; Afton; Howdenwells; Ardrishaig and Broadford.
- Ensure that Scottish Water have treatment and network capacity in key locations (including Tiree, Kenmore, Balmichael and Turriff).
- Improve our understanding of our components of our demand and develop new options for influencing domestic customer demand.
- Seeking to reduce leakage by a further 45Ml/d to 411ML/d (3-year average), equivalent to a reduction of 1.3% p.a. (consistent with rates average rates achieved in England & Wales in recent years) making early progress in delivering our Long-Term Strategy target of 380ML/d.
- Updating our Water Resource Plan and supporting the national discussion on the challenges facing the water industry through the Scottish Government policy development work and implementation of the National Adaptation Plan 2025 – 2029.
- Continuing to improve our drought management capability and developing our strategic drought plan.
- Improving our resilience to wider hazards, including power resilience, increased connectivity and our response and recovery capability, whilst updating our plans to address resilience of supplies.

Maintaining Our Assets

- **Maintain current service levels:** maintain and operate our assets in line with our water risk management processes, including inspections of key critical assets (including dams and trunk mains) to identify and mitigate emerging risks, undertaking repairs, refurbishment and replacement across the asset base to maintain performance. Ensure that our key control, automation and security systems (e.g. System Control and Data Acquisition (SCADA), telemetry) remain fit-for-purpose in line with industry standards and regulatory requirements.
- **Maintain interruptions performance:** maintaining the number of interruptions greater than 6 hours our customers experience and reducing number of customers experiencing 6 or more incidences in a year or 10 or more in 3 years. Increasing mains rehabilitation rates with a programme focused on Asbestos Cement (AC) pipes which represent the highest proportion of failures and account for the majority of recuring customer interruptions.
- **Improving low pressure performance:** Continuing to reduce the number of customers on our low-pressure register.

Understanding and Managing Risk

- Continuous development and improvement to our Water Supply Risk Management processes and undertake activities in line with our functional risk register and approved Board risk positions to reduce the number of risks above long-term tolerable thresholds.

3 Customer and Stakeholder Engagement

3.1 Our Customers and Stakeholders

3.1.1 Customers

Customers' perception of the resilience of their water they receive through their taps is initially influenced through interruptions to supply. Such events affect the confidence of customers and stakeholders, potentially compromising their trust in Scottish Water and the public water supply, and reflect the challenges our assets are now facing due to variable environmental conditions, climate change, the need to protect our natural environment and deteriorating asset condition. This highlights the ongoing need to both maintain and, in many cases, improve the capability of our assets to deliver reliable high levels of service expected by customers. In addition, there is a need for robust water resource management planning to ensure both supply and demand side interventions (reducing leakage and helping customers to be more water efficient) are in place at the right time to keep customer supplies resilient to climate change.

Customers participate in the decision-making through our customer engagement process and where the Independent Customer Group (ICG) assesses how well Scottish Water have embedded customer needs into our plan.

3.1.2 Stakeholders

Scottish Water operates within a framework of diligent oversight and collaboration, engaging with multiple stakeholders who ensure that the public water supply meets the highest standards. These stakeholders include the Scottish Government (SG), the Water Industry Commission for Scotland (WICS), the Drinking Water Quality Regulator for Scotland (DWQR) and the Scottish Environment Protection Agency (SEPA), with the wider stakeholder group also including Consumer Scotland (CS) and the Independent Customer Group (ICG):

- **Scottish Government** sets national policies and objectives for water supply standards, and its role is pivotal in shaping the regulatory backdrop and ensuring that public health and environmental sustainability are at the forefront of water management practices.
- **WICS** is responsible for economic regulation, ensuring Scottish Water operates efficiently, scrutinising financial and operational plans to guarantee that investments deliver value for money while maintaining and improving service quality.
- **SEPA** focuses on environmental protection, ensuring compliance with environmental regulations and sustainability goals.
- **Consumer Scotland** represents the interests of water customers, ensuring that their needs and concerns are prioritised.
- **ICG** works closely with Scottish Water to provide independent insights and perspectives on customers priorities, ensuring customers interests are central to decision making.

Scottish Water works closely with its regulators and stakeholders to carefully consider and ensure effective water resources management planning for current and future generations that address supply resilience and protect the environment.

3.2 Engagement

Customers are at the heart of our business, and their opinions are a key factor in our decision-making process, as set out in our Customer Research Technical Appendix. Building these views into our plans is part of our ongoing customer research approach that allows us to ensure our customers' needs are at the centre of our service delivery. The SR27 customer research programme aimed to understand customer expectations for Scottish Water over the course of SR27. However, Scottish Water also have a deep understanding of views on service issues from existing and ongoing research. Scottish Water's synthesis database contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers. These insights have been assessed and mapped into topics, and the highest quality insights have been gathered together into Key Insights which have been used to support the development of the Final Business Plan and Technical Appendices. The Research Synthesis Supporting Document sets out supporting evidence, scoring and referencing for these Key Insights.

Key Insights specifically relating to Water Continuity (Table 3) show that household and non-household customers consistently expect a reliable service, although the level of impact as a result of a supply interruption varies among them depending on circumstances and duration.

Table 3: Key Insights on Water Continuity[12]

Research Question	Key Insight
What is the **perceived impact** of an interruption to supply?	The impact of an interruption to the water supply varies depending on the individual circumstances of the customers, and the duration of the interruption. Household customers' immediate concerns are around not being able to drink, cook, shower or use the toilet. Individual factors can increase impact, such as timing (i.e. mornings whilst getting ready for the day), whether there is access to bottled water, and whether there are children in the household. The majority of households would find it very difficult to cope without water for long periods, affecting customers routines and wellbeing, and potentially incurring financial costs. Vulnerable customers are less able to cope, particularly if larger geographical areas are affected. The impact on business customers varies according to their water dependency. Some businesses may have to close in the event of an interruption to the water supply, and other who are less reliant on water can still experience disruption and difficulty. Interim solutions such as bottled water may not be sufficient to enable some businesses to continue trading.
What are customer **expectations** of Scottish Water regarding **water continuity?**	Overall, most customers consider Scottish Water to be currently performing well in delivering a reliable and consistent water supply. It is viewed as a fundamental function of Scottish Water. Customers are unlikely to have considered the risks to water continuity presented by Long-Term challenges, especially given the perceived abundance of water in Scotland. When informed, they feel Scottish Water should take action to safeguard reliability.
What are customers **perceptions** of low pressure?	Overall, customer satisfaction with water pressure is generally high. However, customers are not aware of the technical definition of low pressure, and instead use language around taking showers, the strength of flow, or time taken to fill washing machines and kettles. Some customers have experienced variable pressure throughout the day and have made the connection to peak usage times. Whilst some customers accept this, others feel a degree of annoyance. Short-term pressure issues can cause confusion and anger, but customers affected by long term issues can feel frustrated, with many adapting their homes lives to accommodate the issue. Customers may not notice that they have pressure issues unless they are prompted to check for themselves or are told by a plumber to contact Scottish Water.

[12] SR27 Customer Research Technical Appendix

Research Question	Key Insight
	Business customers may be more affected by poor pressure than household customers. Some require their buildings being able to accommodate multiple staff using taps and using toilets, and others are concerned by the potential health and safety risk of scalding from improperly functioning boilers. Some businesses rely on consistent water pressure to operate machinery.
What are customer **expectations** of Scottish Water dealing with **low pressure?**	Customers are unwilling to put up with low water pressure, not wanting to wait for slow water coming through from taps, and expecting to be able to use multiple appliances freely. Most customers think that Scottish Water should be able to manage peak flow, in the same way as electricity or broadband companies do. Some customers are unaware that Scottish Water is responsible for water pressure, and it is unclear to most customers where Scottish Water's responsibilities begin and end. When considering the issue, there is interest in more information to help customers understand how to assess water pressure (i.e. time taken to fill a kettle), and how to diagnose the cause of pressure issues.
What are customer **expectations** of Scottish Water regarding **leakage?**	Customers are generally unaware of current leakage levels but are concerned to learn about current levels. Although they are also pleased to learn about Scottish Water's improvements in this area, they can feel that not enough progress has been made and seek further reduction. Leakage can be an emotive topic, with many customers feeling that it is a moral issue. Whilst some customers accept economic arguments around the acceptable level of leakage, others feel that leakage should be reduced even if the cost of repair is more than the value of the water lost. Customers make strong connections between leakage and the risks to water resilience and supply posed by the three long-terms challenges. They often feel that addressing leakage is part of planning for future water scarcity, recognising that the value of water will rise in the future. High levels of leakage are felt by some to potentially undermine Scottish Water's efforts to change customer water use behaviours.

Also of relevance to the Water Continuity investment area are the Key Insights relating to Asset Repair, Refurbish and Replacement (Table 4) which is seen as important by both household and non-household customers. Whilst customers understand the requirement for asset maintenance and the challenges posed by ageing infrastructure, there is less awareness of the scale of infrastructure.

Table 4: Key Insights on Asset Repair, Refurbish and Replacement

Research Question	Key Insight
What is customer **understanding & acceptance** of ageing assets as a challenge?	Customers are generally surprised to hear about the scale of Scottish Water's infrastructure, and to learn its age. Customers understand and acknowledge that ageing assets are a challenge for Scottish Water. They recognise the need for investment to maintain these older assets.
What are customer **expectations** of Scottish Water in maintaining assets?	Asset maintenance is a concept that people intuitively understand. It is felt to be highly important, and core to Scottish Water's purpose as an organisation, as it is an area that is clearly Scottish Water's sole responsibility. Customers recognise the need for investment and want to see lasting solutions put in place. Making things last is seen as an important area for Scottish Water's focus, appealing to all customers and older customers in particular. They are keen to reduce the risk of service failures, as well as avoid unnecessary costs. Customers expect this to be an ongoing area of investment with a focus on preventing future problems. They generally expect Scottish Water to maintain or replace infrastructure before it fails to avoid service issues. Fixing assets on failure is perceived by some to cost more money over time than proactive intervention.

Research Question	Key Insight
	Customers may also seek some reassurance that investment is necessary. They may wish to be satisfied that investment is directed at parts of the system at risk of failing, and that interventions are future-proof, high quality and lasting.
What are customer **expectations** around climate adaptation of assets?	On hearing about the scale of challenges from climate change, and the consequent impact on the provision of Scottish Water's water and waste water services, customers believe it is important to protect infrastructure against the impacts of climate change. There is an expectation that Scottish Water will invest in innovative approaches and long-term solutions.

3.3 Demonstrating Customer and Stakeholder Support

Most customers consider Scottish Water to be currently performing well in delivering a reliable and consistent water supply. It is viewed as a fundamental function of Scottish Water. Customers are unlikely to have considered the risks to water continuity presented by long-term challenges, especially given the perceived abundance of water in Scotland. When informed, they feel Scottish Water should take action to safeguard reliability.

- **In SR27, Scottish Water will ensure that we have more treatment and network capacity in key locations, improving our understanding of our new demand, developing of components of our demand and new options to ensure an efficient, acceptable level of water supply.**

Our customers have said that the impact to non-household customers could be greater than household customers for interruptions to supply and low pressure. This is dependent on the type of business and therefore whether the business can continue to operate without water.

- **In SR27, Scottish Water are planning to roll out smart metering for our non-household customers which is expected to deliver demand reduction with a full roll out to 130,000 business customers[13].**

Our customers want long term solutions in place to mitigate the risk of ageing assets and particularly where there are higher risks of assets failing and causing outages.

- **In SR27, Scottish Water will continue to improve the resilience of our treatment works and pipes and improve our planned maintenance and operational response to reduce the amount of water which is lost and the impact on the environment in the event of a burst.**

[13] Representing 95% of the total programme and is part of an active procurement process

Our Investments

3.4 Approach

To meet the objectives of the Long-Term Strategy, investment to improve the capability of our assets is required as a minimum to maintain current service levels at acceptable levels of risk to counter the impacts an ageing / deteriorating asset base and climate change. This investment is covered through Asset Maintenance, which includes Asset Repair, Refurbishment and Replacement (AR3). To achieve further service improvements and make progress towards the Water Sector Vision, additional investment will be required (Enhancement). In SR27, our primary focus will be on maintaining our assets to ensure a consistent level of service, enhancing resilience to prevent supply interruptions, and providing network capacity to accommodate future growth.

3.4.1 Long-term Outcomes and Performance Requirements

The investment in Water Continuity aims at ensuring that water is available to customers every minute of the day, at an acceptable pressure, with no detriment on the environment. The 25-year long-term outcomes aimed at ensuring continuity of service are:

- Understanding and managing risk.
- Continue to ensure no one has persistent low water pressure and fewer people experience recurring low pressure.
- Reduce the amount of water lost through leakage by 20% to 380 million litres per day, focusing on the areas where it benefits people and the environment the most.
- Improve the resilience of our treatment works and pipes and improve our planned maintenance and operational response to reduce the amount of water which is lost and the impact on the environment in the event of a burst.
- Accelerate the replacement of our water mains pipes that Scottish Water know are more likely to burst due to their material.
- Reduce the amount of water abstracted and treated every day, helping to make us more resilient to the worst drought Scotland has experienced.
- Consider localised solutions to reduce demand and maximise the water available from our existing sources in areas at risk of water scarcity, before developing new sources.
- Improve connectivity of our existing systems to increase flexibility to move water around and improve resilience in times of drought.

3.4.2 Building our Approach for AR3

In SR21 Scottish Water introduced Management Approaches (MAs) for each asset type which set out policy of how and when Scottish Water will intervene to manage assets. Our approach is directed by our long-term outcomes, our Ministerial Objectives, current legislative requirements, and Board risk appetite statements which set the performance levels for critical and non-critical assets.

Management Approaches for each asset type have been maturing since 2023 to become economic appraisals. Impacts of climate change have also been considered, considering a range of climate hazards as identified through the Scottish Water Climate Change Adaptation Plan.

Our Management Approaches include two primary considerations:

- **When to intervene** – this considers the point in an asset's life when an intervention should occur. This includes whether to intervene after failure (responsively) or on a planned basis before failure, and if planned, at what stage to intervene to maximise the useful life of the asset while minimising the chance of failure.
- **How to intervene** – this considers what intervention is used to restore asset condition / performance. This includes options for investigations and repairs, decisions on whether to refurbish or replace. Decisions on whether to enhance or improve the resilience of an asset when it is being refurbished or replaced are considered as part of a sub-outcome approach and made on a case-by-case basis as part of systems planning.

Key Management Approaches informing the asset maintenance requirements for Water Continuity include Strategic Infrastructure (trunk mains, raw water transfers, aqueducts), Water Demand Management, Distribution Mains, Water Pumping Stations and Reservoir Safety.

3.4.3 Building our Approach for Enhancement

The requirements for Water Continuity enhancement investment during SR27 originate from a range of confirmed needs relating to maintaining the supply-demand balance and ensuring long-term resilience of service delivery to climate change. In addition, some investment requirements are associated with Scottish Water policy positions to reduce risk or improve service where the current status is considered unacceptable from a customer service perspective or where progress is required to achieve long-term strategy objectives.

All investment requirements are aligned with the needs on the Development List, (established through the Investment Planning and Prioritisation Framework (IPPF) approach introduced for SR21) as agreed by stakeholders. This includes the long-term supply demand needs identified through our supply-demand balance and water resource models.

A range of information sources have been used to identify the needs initially and provide the supporting evidence for these and the subsequent investment requirements to address them. The typical information sources are summarised by project development stage below:

Table 5: Our Stage/Gate Information Sources

Stage	Information Sources
Pre-Gate 30	To include one or more of the following: • Asset / system risk and performance data; • SR21 Development List; • Stakeholder / customer correspondence / engagement. • Needs originating from Scottish Water strategies and policies (including Management Approaches); • Water Resource Supply-Demand Models
Gate 30 – 90	As above plus: • Project Investment Appraisal stage documentation, confirming needs, considered options, costs and benefits appraisal:

Stage	Information Sources
	• Gate 30 – Stage 1 • Gate 40 – Stage 2 • Gate 50 – Stage 3a • Gate 70 – Stage 3b • Gate 80/90 – Stage 4 • Target costs based on detailed design (Gate 80).
Post Gate 90	As above plus: • Project spend profiles to confirm remaining expenditure into SR27.

3.5 Optioneering

3.5.1 Optioneering Process

The investment scenario options are built based on three key principles:

- Deliver for our existing customers: this includes carrying out essential works to maintain existing asset performance, customer experience, and health and safety, meeting legislative, regulatory and community standards and progress towards Net Zero. It also involves investing in asset enhancement to improve resilience, reliability and sustainability of service.
- Support new connections: providing adequate standards of service to our new customers.
- Consider future customers: replacing ageing assets now to ensure resilience of supply to future customers, preventing unsustainable costs being passed on to them in future.

Scottish Water use our investment hierarchy approach to develop a balanced investment portfolio across all investment areas, including Water Continuity, to prioritise projects and programmes based on our objectives, customer expectations, stakeholder needs and available funding. This approach is outlined in the table below, which links the principles with three investment need categories:

- **Category 1** covers ‘must do’ investments, which are required as a minimum to meet customers’ expectations on level of service, accounting for the majority of investment.
- **Category 2**, which accounts for the next biggest share, includes ‘should do’ investments aimed at delivering regulatory compliance and meet the expectations of regulators.
- **Category 3** covers investment choices to improve service for existing customers, enabling growth, replacing ageing assets to protect service levels for future customers.

Table 6: Our SR27 Investment Hierarchy Approach

	Customer & performance centric investment needs	Examples	Investment allocation approach		
Deliver for existing customers	1 Maintain core service performance for existing customers	Essential works to maintain existing asset performance, customer experience and health & safety	Minimum needed to maintain service. Already prioritised significantly so budget reduced as a last resort, after all other non-discretionary expenditure reduced to minimum levels	AR3 – asset category 1,2&3	Core expenditure
	2a Meet current regulatory & community commitments	Meet undertakings, legislative (RBMP3), regulatory (water quality), Improving Urban Water (IUW), community (e.g., Seafield odour.)	Named sites agreed with regulators	Enhancement	
	2b Meet current regulatory & community expectations	Water Treatment: HAA at risk Developing schemes – improved disinfections, Run to Waste.	Allocated portion of Enhancement funding	Enhancement	Remaining allocation prioritised within these areas
	3a Improve service for existing customers	Investing in asset enhancement to strengthen resilience, reliability and sustainability of service	Allocated portion of Enhancement to support Customer service issues (internal flooding and low pressure, rainwater management partnerships)	Enhancement	
Support new connections	3b Provide a service for new customers	New development and connections, including temporary works	Adress know systems that has confirmed development.	Enhancement / matched funding*	
Consider future customers	3c Replace long-life assets for future customers	Proactively replacing aging assets to tackle back log and underlying issues; water mains (Asbestos cement pipes), civil infrastructure with remaining lifetime of 40-60 years). Aim to prevent unsustainable costs being passed on to future customers	Consequential allocation as there is high demand from existing assets that impact current service. FD & investment scenarios do specify investing in long-life asset replacement. Future customer needs re-prioritised	AR3 – category 2 Civils and water mains, pressurised sewers	Additional core expenditure

*Cat 3b Match funding Income received that is allocated for Part 3 infrastructure improvements to support new connections. In addition, service relocation allocation is required to move our assets when required by a 3rd party (part funded from external sources)

An initial unconstrained investment scenario has been developed to fulfil all the principles outlined in Table 6, ensuring the delivery of all essential requirements to maintain the current level of services, as well as enhancing performance while minimising risk. From this unconstrained investment scenario, additional investment scenarios have been derived by strategically reducing or eliminating investments in certain areas, with the exception of Category 1. These “constrained” scenarios aim to achieve lower costs, but come with associated risks, as the limitation on investment may impact performance improvements and compliance with regulatory requirements, ultimately affecting customer service enhancements.

3.5.2 Unconstrained Options

The formulation of investment planning scenarios is essential for aligning strategic and financial objectives with the Water Sector Vision and our Long-Term strategy. The initial phase involved creating a comprehensive range of options to encompass potential outcomes and investment requirements. The unconstrained options incorporate all potential investment options, with a focus primarily on maintaining all assets involved in ensuring uninterrupted supply of water to customer taps.

To identify the best suite of interventions from the options, Scottish Water have undertaken an optioneering process, applying testing across various performance metrics and compliance requirements to form a series of constrained options, the investment scenarios.

3.5.3 Constrained Options: Draft Business Plan

The constrained investment scenarios were derived from the unconstrained investment options by either eliminating or reducing certain investments. The three constrained investment scenarios discussed in this section are as follows:

- **High Scenario**: The investment meets Ministerial Objectives and further reduces risk with a CPI + 6.5% per annum, maintaining the service levels achieved at the exit of SR21 with the exception of improving interruptions to supply performance and reducing bursts.

- **Working Reference Scenario**: The investment meets Ministerial Objectives, with a CPI + 4% per annum, the investment allows maintenance of the service levels achieved at the exit of SR21.
- **Flat Charges Scenario**: the reduction in investment under this "flat charge" scenario, with a CPI + 0% per annum, triggers reduced service levels compared to exit of SR21, with notable overall service impacts as measured by OPA and CEM.

For the Water Continuity investment area, the High Scenario includes continuation of our inspection programme for critical assets, improvements in our supply demand balance, delivery of the backlog growth projects and ensuring capacity for 130,000 new properties connections.

Under the Working Reference Scenario, there is an investment reduction of £162m in the replacement of AC mains, which will limit the rate of improvements to burst rates and supply interruption performance to 2050. In addition, the investment in enhancement and growth will be reduced by £104m and £12m respectively, which will limit how much Scottish Water can improve our resilience.

The Flat Charges Scenario results in a total reduction in investment of £783 million compared to the High Scenario. Asset maintenance expenditures have been reduced by £39 million, while the investment allocated for replacing AC mains has decreased by £518 million. Additionally, there is a £207 million reduction in enhancement project investments compared to the High Scenario, and growth-related investments have been decreased by £19 million.

Table 7: Summary of Investment for Water Continuity Under Constrained Scenarios

High (CPI+6.5%)	Working Reference (CPI+4%)	Flat Charges (CPI+0%)
Supply-demand balance position improved.	Supply-demand balance position stable. Stable Supply interruption	Reduced maintenance on dams, ancillary items, and SCADA, HMI and PLC.

3.5.4 Chosen Option at Draft Business Plan

The investment scenarios were tested against various performance metrics and compliance requirements to validate the scenarios' robustness and ensuring they aligned with Ministerial Objectives, customers and stakeholders' expectations, the Water Sector Vision, the Climate Change Adaptation Plan and meeting Scottish Water's Board expectations on progress towards our Long-Term Strategy and risk appetite. Based on the testing outcomes, Scottish Water progressed with the Working Reference scenario (CPI+4%) as the basis for our draft business plan submission.

3.5.5 Further refinement: Final Business Plan

Following further engagement and feedback from a broad range of our stakeholders on our draft business plan, Scottish Water have further refined our SR27 investment to reflect feedback, with two key themes:

- **Affordability**: ensuring that Scottish Water are not putting a disproportionate burden on the bills of current customers – and that Scottish Water are doing everything we can to limit impacts on bills; and

- **Ambition:** responding to feedback on our investment focus and ensuring it is adequately ambitious in the areas that matter to our customers.

Responding to this feedback has meant that Scottish Water need to make further trade-offs across our SR27 investment portfolio. This has been done this by refining our reference scenario, through careful rebalancing of investment across AR3, Regulatory Commitments and Service Choices. This has been described, in further detail, the steps taken as part of this refinement, and the impacts on our Final Business Plan in TA008 Investment Planning.

Our final chosen option is a further refined version of the Reference Scenario presented in the Draft Business Plan submission.

Scottish Water did this across all investment areas by:

- Refining the available budget associated with a CPI+3.3% pa customer charge profile, re-running the Financial Model using the latest modelling assumptions and the application of the most up to date top-down global efficiency factors to be applied.
- Feedback was incorporated from sector stakeholders, clarification of Regulator requirements, customer research feedback and further considering the requirements of the draft Ministerial Objectives. Decisions were required to navigate these limitations while ensuring a balanced investment plan.
- Several strategic options were considered to manage budgetary constraints and investment reallocation. These included potential further removal of demand in the asset repair, refurbishment, and replacement (AR3) programme areas or reduce outcomes where there is service choice. As a result, there were upwards adjustments in some areas, and downwards adjustments in others.

The **Reference Scenario** balances investment needs with acceptable customer charge increases, providing a clear path forward for the draft Business Plan submission.

3.6 Overall Strategic Option Chosen for SR27

3.6.1 SR27 Investment Plan Summary

A summary of our proposed investment on water continuity for SR27 is outlined in Table 9 below.

Table 9: Outline of chosen investment scenario by Investment Category

Spend Type (Primary)	Investment Category	Reference Scenario Total (£m, 24/25)
AR3	Cat 1	1,544
Enhancement	Cat 2a – Regulatory	63
Enhancement	Cat 3a – Improve Service	157
Growth	Cat 3b – New Customers	7
Total		**1,770**

3.6.2 Customer Benefits

The investment in water continuity is expected to yield several benefits by maintaining and enhancing performance levels. The improvements will, in turn, translate into advantages for customers and stakeholders. These interventions will lead to a reduction in instances of customers experiencing low pressure and supply interruptions, resulting from our investment in asset maintenance, aligning to customer priorities. Additionally, Scottish Water will enhance sustainability by reducing leakage and per capita consumption, thereby alleviating stress on water resources and advancing our sustainability commitments, in line with guidance from WICS. The customer benefit will be delivered by the investments outlined in Section 4.4.

Table 10: Water Continuity Performance Metrics

Level of service - metric	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Leakage Percentage reduction of three-year average leakage*	%	2.00%	2.90%	4.20%	5.80%	7.70%	9.90%
Leakage reduction in areas with supply-demand balance deficit	%	2.20%	3.30%	5.10%	7.20%	9.80%	12.90%
Percentage reduction of consumption at non-household premises	%	4.00%	4.9%	6.7%	9.1%	12.1%	14.9%
Three-year average per capita consumption	Litres / person / day	177	176	176	175	175	174
Number of properties on the low-pressure register	Number	36	39	31	28	27	26
Unplanned interruptions greater than 6 hours, excluding 3rd party	Number	7,000	7,000	7,000	7,000	7,000	7,000
Average minutes lost due to water supply interruptions (over 3 hours)	min	15.0	15.0	15.0	15.0	15.0	15.0
Repeat interruptions to water supply	Number	270	300	275	260	250	240
Customers supplied by systems not capable of meeting demand during a worst historic drought	Number	2,830,000	2,852,000	2,876,000	2,896,000	2,914,000	2,564,000
Customers supplied by systems not capable of meeting peak demand	Number	883,000	891,000	913,000	921,000	926,000	877,000

3.7 Investment Programmes

3.7.1 Abstraction, Sources and Raw Water Transfers

The investment demand allocated Abstraction, Sources and Raw Water Transfers is £427m, all of which is assigned to asset maintenance (AR3). This investment enables us to maintain the

capability of our raw water storage assets, raw water transfers, aqueducts and our underground sources. The majority of this spend (£300m) is allocated to reservoir safety and resolving matter in the interests of safety identified by our reservoir panel engineers and £73m allocated to maintain our aqueducts and tunnels.

Table 11: Catchment and Abstraction Investment

Spend Type (Primary)	Description	Investment Area	Reference Scenario (£m, 24/25)
AR3 Cat 1	Resolve matters in the interest of safety,	Maintain dams & ancillary items. Includes improving drawdown capability as required by the independent panel engineer (ARPE)	300
	Maintain boreholes	Maintain boreholes	10
	Maintain pipe bridges	Maintain pipe bridges	14
	Katrine Aqueduct refurbishment	Maintain aqueducts and tunnels	42
	Maintain aqueducts and tunnels	Maintain aqueducts and tunnels. Includes the Invercannie Aqueduct replacement	31
	Maintain raw water mains	Maintain raw water mains	16
	Maintain raw water storage assets	Maintain dams & ancillary items	1
	Maintain raw water intakes	Maintain raw water intakes	12

3.7.2 Water Treatment

The investment demand allocated to water treatment for maintaining water continuity is £7m (further investment in water treatment assets is described in the Water Quality Technical Appendix). The investment demand allocated to asset maintenance (AR3) to Water Treatment is £5m, whereas £3m are allocated to Enhancement investment.

Table 12: Water Treatment Investment

Spend Type (Primary)	Description	Investment Area	Reference Scenario (£m, 24/25)
AR3 Cat 1	Maintain sludge MEICA handling equipment at WTW.	Maintain sludge handling equipment	5
Enhancement	Eela Water clarifier hydraulic restriction	Restoration of capacity to allow WTW to be operated and maintained	1
	Torra WTW capacity increase (linked to WQ Programme and Islay Strategy)	Provide capacity to meet new demand	2

3.7.3 Water Transmission (Trunk Mains & Strategic Infra)

The investment demand allocated to water transmission is £99m, all of which is allocated to asset maintenance (AR3). This investment enables to maintain the performance of our strategic trunk main networks. The majority of this spend (£57m) is allocated to maintaining our trunk mains (including asset renewal) and critical maintenance activities to reduce recurring incidents of interruptions to supply.

Table 13: Water Transmission Investment

Spend Type (Primary)	Description	Investment Area	Reference Scenario (£m, 24/25)
AR3 Cat1	Maintain strategic valves	Maintain strategic valves	32
	Maintenance activities on sections with recurring interruptions to supply	Maintain trunk mains	5
	Assess high priority risks of flooding and options to mitigate where they have not occurred	Reduce risk of flooding from mains where it has occurred	1
	Liberton trunk mains (Glencorse System) - based on burst control or diversion solution	Reduce risk of flooding from mains where it has occurred	7
	Maintain trunk mains	Maintain trunk mains	52
	Manage the risk of failure of Sub-Sea Mains	Strategic Infrastructure	2

3.7.4 Water Pumping Stations

The investment demand allocated to asset maintenance (AR3) to pumping stations is £48m. This investment enables us to maintain the performance of our pumping and booster station assets.

Table 14: Water Pumping Station Investment

Spend Type (Primary)	Description	Investment Area	Reference Scenario (£m, 24/25)
AR3 Cat 1	Maintain Treated Water pumping	Maintain pumping equipment	6
	Maintain Raw Water pumping		42

3.7.5 Water Distribution & Demand Management

The investment demand allocated to asset maintenance (AR3) for water distribution is £655m. This investment enables us to maintain the performance of our water distribution networks and maintain our interruptions to supply performance. This includes £143m to accelerate the replacement of asbestos cement (AC) water mains (a reduction from the Draft Business Plan) which have a disproportionate impact of our distribution assets on interruption to supply performance. The rate of replacement will need to increase further in subsequent investment periods to deliver the Management Approach objective to replace 95% of asbestos cement pipes before a service life of 90 years, targeting the higher risk, smaller diameter pipes.

Table 15: Water Distribution & Demand Management Investment

Spend Type (Primary)	Description	Investment Area	Reference Scenario (£m, 24/25)
AR3 Cat 1	Maintain street iron works as required by Traffic Commissioner (Water)	Maintain Ironworks	44
	Activity for around 5,500 items of leakage management equipment (DMA meters, loggers and PRVs etc)	Maintain leakage management equipment	41
	Manage and reduce customer demand (domestic and non-domestic)	Supply Adequacy	6
	Manage and reduce losses from customers supply pipes		4
	Manage and reduce losses from raw water and water treatment work assets		1
	Manage and reduce losses from the transmission and distribution networks		20
	Optimise the supply of water		4
	Accelerated Asbestos Cement water mains replacement.	Maintain distribution mains	143
	Maintenance activities on water mains to reduce the risk to service		261
	Pressure transient management to minimise burst rate increase		1
	Maintenance activities on sections with recurring interruptions to supply		130
Enhancement Cat 3a – Improve Service	Make progress towards reduce leakage (380ML/day by 2050) and customer consumption / demand (180 l/p/d to 140 l/h/d by 2050.	Supply Adequacy	19
	Resolve properties confirmed with persistent low pressure	Improve pressure at properties with persistent low pressures	12

3.7.6 Resilience

Scottish Water plan to invest £126m to enhance resilience and meet future demand. This will help improve connectivity of our existing systems to increase flexibility to move water around and improve resilience in times of drought, particularly in Edinburgh, Fife and Dundee.

Table 16: Resilience Investment

Spend Type (Primary)	Investment area	Description	Reference Scenario (£m, 24/25)
Enhancement	Provision of emergency planning equipment	Provision of New Standby Power	31
	Resilience improvements	Dundee drought resilience	19
	Resilience improvements to evidenced hazards	Improve resilience of water supply systems to enable them to provide continuous water supplies	75
		Resilience to drought for Turret supplies	1

3.7.7 Other Programmes

The investment in other programmes related to water continuity is £377m which includes maintaining regional cross asset class programmes for AR3 and ensuring all statutory maintenance requirements are undertaken.

Table 17: Other Programmes Investment

Spend Type (Primary)	Investment area	Description	Reference Scenario (£m, 24/25)
AR3 Cat 1	Maintain SCADA, HMI, PLC	Maintain SCADA, HMI, PLC	130
	Maintain existing metering	Existing metering replaced when broken or out of tolerance	14
	Maintain telemetry – Health Safety and Security (HSS)	Maintain Remote Telemetry Unit (RTU), communication, data quality testing and remedial actions & telemetry rationalisation	12
	Maintain hydraulic models	Upkeep of hydraulic models to ensure they are fit to use	11
	Maintain legislative compliance - HSS	Fixed wire electrical systems - Water Assets	16
	Maintain legislative compliance - HSS	Statutory Maintenance items - Water assets	11
	Maintain security systems	Maintain security systems	7
	Maintain High Voltage (HV) - HSS	Maintain High Voltage (HV) - Water (Pumping stations)	23

Spend Type (Primary)	Investment area	Description	Reference Scenario (£m, 24/25)
	Maintain High Voltage (HV) - HSS	Maintain High Voltage (HV) - Water (Treatment)	11
	Improve black start capability	Improvements to communication systems, and backup generation - (Guidance awaited from Government)	1
	Provision of emergency planning equipment	Replacement or planned refurbishment / repair activities on existing equipment	2
	Maintain Motor Control Centre (MCC) - HSS	Maintain Motor Control Centre (MCC)	24
	Maintain standby generation	Maintain standby generation	5
	Water Property - Operational Buildings	Maintain safe access to water operational equipment	2
	Health, Safety, and Security	Remedial work associated with RAAC at Water Operational buildings and depots	4
	Water Property - Operational Buildings	Maintain Water Operational Buildings	38
Cat 2a - Regulatory	Metering	Meter upgrade for non-domestic premises	60
Cat 3b – New Customers	Follow market best practice metering requirements	Meter installation for all first time registered non domestic premises as per policy and provides meters for domestic occupants	7

3.8 Future Investment Requirements

Planning for the next 25 years is inherently uncertain. As part of our Long-Term Strategy, Scottish Water undertook a broad ranging and comprehensive review of the risks and opportunities across the next 25 years. The investment identified will secure our essential services by maintaining our existing asset base, allow us to adapt to climate change and meet our legislative requirements. Without major changes to how Scottish Water currently operate the water and waste water system and given the projected impact of climate change, we are currently forecasting that the funding needed to deliver sustainable services will need to increase over the next 25 years by almost double. Planning for this period is inherently uncertain and there are both opportunities and risks ahead.

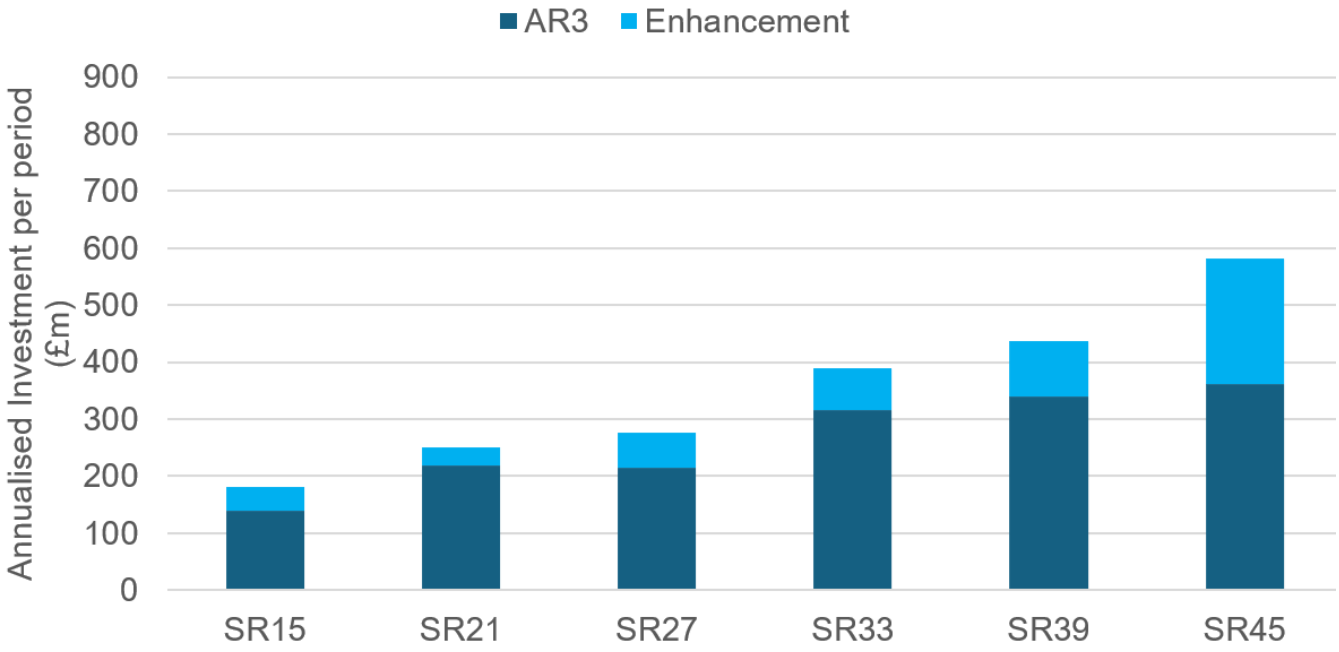

Figure 20: Historic and projected investment - Water Continuity (2015 to 2051)

For Water Continuity, the projection will see an increased in expenditure of ~88% from SR27 to SR45 from £270m to £580m per annum (see Figure 20). This is mostly driven by an increase in AR3 which is primarily associated with the replacement of AC water mains in line with the Management Approach objectives to replace 95% of the pipes within a 90-year service life. The increase in enhancement expenditure from SR27 to SR45 is to address:

- Water pressure issues for properties
- Improve connectivity and resilience of raw water sources to address known drought risks and reduce hazards that may impact on water continuity for customers.

4 Innovation

4.1 Innovation

As part of our wider innovation strategy the following innovative approaches will help us to deliver the water continuity programme:

Asset Risk and Optimisation – The Scottish Water Intelligent Control Centre transformation will deliver benefits through a combination of new ways of working, leveraging technologies, data analytics and insight, developing more proactive capabilities for early identification of service issues, whilst enabling water and waste water system performance to be better understood and further optimised.

The programme is aligned to our strategic ambitions and will build state of the art capabilities in Scottish Water that will support the safety, well-being and development of our people to deliver World Class Water Services for our customers and take care of our environment. It will also allow Scottish Water to demonstrate to stakeholders and regulators that we can reduce our cost base by delivering more effectively and efficiently whilst sustaining high levels of service.

Partnership Ecosystems (Team Scotland) – Scottish Water will evolve the Partnership Ecosystem to engage more with customers, since they will play an increasingly important role in making services sustainable. By engaging more with customers, they will better understand our challenges and increasingly support the solutions, many of which will require a change in customer behaviour. Customer support will be necessary to reduce water demand. Opportunities include the use of more efficient products, changing usage patterns and using meters to reduce consumption.

Building on innovative approaches developed in SR21 – Scottish Water will utilise new techniques to understand network mains condition, including a non-intrusive technique in SR21 which uses inverse transient analysis to check the condition of pipes, reducing cost and time on analysis.

Scottish Water will also continue to consider opportunities to use technologies such as acoustic monitoring of critical pre-stressed concrete pipes which enables condition monitoring and proactive maintenance on specific areas, if required, rather than significant intrusive investigations and pre-emptive high-cost replacement.

Scottish Water has almost half a million valves across its potable water network and some of these valves will require repair or replacement. Repairing or replacing a seized valve comes at considerable expense, with the average repair costing £10,000. A new tool, a mechanical valve release key designed to free jammed valves, was trialled in 2022. The tool uses kinetic energy to open or close stuck valves by applying kinetic shock to the spindle in a measured way. These also improve health and safety for our employees working on the network.

5 Interdependencies

This document should be read in conjunction with other Technical Appendices relating to the following:

- Climate Change Adaptation
- Enabling Growth
- Investment Planning
- Water Quality

The document should also be read in conjunction with Scottish Water's Long-Term Strategy.

6 Conclusion

The updated Reference Scenario (CPI+3.3%) was recommended as it offers the best balance between progress towards our Long-Term Strategy, contribution to the Water Sector Vision, meeting regulatory requirements, the Ministerial Objectives and customer charges, both currently and for future generations. The Investment Planning Technical Appendix provides detailed information on the investment scenarios considered and the optioneering process. The £1,770m of investment proposed through the Reference Scenario will deliver the following outcomes aligned to the Ministerial Objectives and our Long-Term Strategy to 2050:

The proposed investment will deliver our regulatory commitments in line with legislation and Scottish Water strategies and policies, including the requirements of the draft SR27 Ministerial Objectives to:

- Make progress towards the realisation of the long-term vision of the water industry.
- Understand the condition of assets, in particular those of a critical nature for maintaining service delivery and develop an evidence-based strategy to inform the long-term asset maintenance needs of the industry.
- Review and update existing plans to address the resilience of supplies (inc. raw water) and take steps to secure further improvements to resilience to ensure continuity of service.
- Promote sufficient asset maintenance to deliver required levels of service and demonstrate how investment, or lack thereof, is contributing to a change in the condition of assets and thus levels of risk and service.
- Identify the impacts of climate change on our assets and services and continue to implement and evolve plans for measures necessary to adapt to these changes.
- Work with customers to encourage, and subsequently monitor and evaluate, behaviour changes that promote water efficiency.
- Prepare and implement plans to improve the cyber, physical and personnel security of our network and systems to protect them from malicious attack.
- Help to deliver the Scottish National Adaptation Plan, including the objective (PS3) on managing Scotland's water resources.
- Identify and provide new strategic capacity that will meet the demand of all new housing development and the domestic requirements of commercial and industrial development.

In SR27 and beyond, there are a number of key challenges, such as climate change, changes in population and ageing / deteriorating assets, which have the potential to increase our risk profile, compromising our ability to meet regulatory requirements and maintain service without appropriate levels of investment.

As a result of these challenges, over the next 25 years the amount of water available in the environment for public water supplies is expected to fall short of demand requirements by ~290 megalitres per day (ML/d) during drought conditions, exacerbated by Scotland being one of the highest per-capita water users in Europe. Peak demand for water during warm, dry spells can also exceed the capacity of some of our water treatment works or parts of our distribution network requiring response measures such as tankering to maintain supplies and pressure.

Adapting to Climate Change and Increasing Resilience

- **Continue to develop our understanding of the impact of climate change** on our water resources and assets and develop plans to mitigate these risks. This will include updating our Water Resource Plan and exploring wider catchment planning opportunities and other activities to support Scottish Government work to develop water industry policy and implementation of the National Adaptation Plan 2025 - 2029.
- **Improving drought resilience in key areas, including:**
    - Addressing the supply-demand balance deficit (to 2033) in Dundee, Angus and parts of Perthshire.
    - Developing options to reduce the deficit gap in other areas not resilient to drought including Edinburgh & Lothians, Fife, Lanarkshire and Aberdeenshire / Morayshire, reviewing their priority for investment through ongoing risk assessment against other needs and within available funding.
    - Continuing to improve our drought management capability and implement our Strategic Drought Plan.
- **Ensure that Scottish Water have water treatment production and network capacity** in key locations at risk of supply interruptions during peak demands (including Tiree, Kenmore, Balmichael, Turriff and Fife), prioritising the highest risk areas.
- **Improve our understanding of and reduce the demand for water:**
    - Reduce leakage by 9.9% (equivalent to 45 ML/d) in SR27 to 411ML/d (3-year average). equivalent to a reduction of 1.3% p.a.
    - Drive change in domestic customer demand by increasing awareness and supporting industry initiatives such as water efficiency labelling of domestic appliances**.**
    - Roll out smart metering for 130,000 Non-Household Customers[14]: expected to deliver demand reduction of 55ML/d in SR27 (with 25 ML/d contributing to network leakage reduction and a further 15ML/d realised in SR33).
- **Improve our resilience:** by improving power resilience to regional power outages and increasing connectivity of our water supply systems. In addition, Scottish Water will update plans to address resilience of supplies to wider hazards (e.g. flooding) and make progress to secure improvements. We will also improve our response and recovery plans and capability.

Maintaining Service and Reducing Risk for Customers

- **Maintain current service levels:** Scottish Water will maintain and operate our assets in line with our water risk management processes, including inspections of key critical assets (e.g. dams and trunk mains) to identify and mitigate emerging risks, undertaking repairs, refurbishment and replacement across the asset base to maintain performance. Scottish Water will also ensure that our key control, automation and security systems (e.g. SCADA, telemetry) remain fit-for-purpose in line with industry standards and regulatory requirements.
- **Maintain interruptions performance:** maintaining the number of interruptions our customers experience which are greater than 6 hours and reducing the number of

[14] Representing 95% of the total programme and is part of an active procurement process

customers experiencing 6 or more interruptions in a year or 10 or more in 3 years. Scottish Water will do this by increasing our mains rehabilitation rates, with a programme focused on Asbestos Cement (AC) pipes, which represent the highest proportion of failures, and the maintenance of water pumping stations.

- **Maintaining (or improving) low pressure performance:** Continuing to address issues resulting in persistent low-pressure.

Understanding and Managing Risk

- Continuous development and improvement of our Water Supply Risk Management (WSRM) processes in relation to Water Continuity and undertake activities in line with our functional risk register and approved Board risk positions to reduce the number of risks above long-term tolerable thresholds prioritising those classed as Significant.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Water Environment

February 2026

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1 Executive Summary

This Water Environment Technical Appendix covers the proposed investment required to maintain existing assets and to comply with legislation to ensure that there is no detriment to the water environment from our service provision.

Delivering water and waste water services to customers has both direct and indirect impacts on our water environment. As a custodian of Scotland's water environment and in line with regulation, legislation and the increasing expectations of customers and stakeholders, Scottish Water are committed to managing our interaction with the water environment responsibly, minimising negative impacts upon it and contributing to its improvement wherever possible.

Scottish Water's SR27 Final Business Plan, and its proposed investment, will deliver on regulatory commitments in line with legislation and Scottish Water strategies and policies, including the requirements set out in Draft Ministerial Objectives 2027-33:

- Scottish Water must maintain or improve current levels of service over the long term
- Scottish Water must improve the current level of compliance with its environmental authorisations for abstraction and discharge into the environment, by preparing and implementing investment plans that address the risks of impacts on the environment from its assets
- Scottish Water must prepare and implement delivery plans throughout the 2027-33 period which set out how improvements to its water and sewerage infrastructure are expected to contribute effectively to River Basin Management Plan (RBMP) objectives
- Scottish Water must provide regular updates on the progress it has made towards delivering its obligations in respect of river basin management plans
- Scottish Water must prepare drainage and waste water management plans, to gain a better understanding of the performance of the sewer networks and to limit the number of plastics reaching the water environment through the sewer network.
- Scottish Water must support the Scottish Environment Protection Agency's (SEPA) work with the manufacturing sector, the Scottish Government, customers and stakeholders to control at source plastics and priority substances.
- Scottish Water must have regard to the Scottish Government's circular economy strategy (as may be amended or replaced from time to time) in its provision of water and waste water services.
- In particular, Scottish Water must assess the potential for resource recovery from sewage.
- Identify the expected impacts of climate change on its assets and assess the risk and likelihood,
- Make substantive progress in the 2027-33 period towards the climate change targets and ensure it is on an appropriate trajectory to meet or exceed those targets.
- Scottish Water must prepare and implement plans to manage its 6 remaining private finance initiative contracts which end in the 2027-33 period, to secure best value for money for the future operation of the relevant facilities.
- Scottish Water must prepare such plans for its any remaining private finance initiative (PFI) contracts which end after 2033.

The Water Environment investments we have made historically have delivered positive outcomes for customers. These outcomes have included more waterbodies now achieving 'Good' status or higher, bathing water quality showing continuous improvement since SR15 and the number of pollution incidents (Categories 1, 2, and 3) has also seen positive progress during the same period.

Scottish Water have used the learnings in delivering these improvements in the development of the SR27 Final Business Plan. However, there are a number of difficult challenges we must overcome in order to maintain and improve service provision to our customers, communities and the environment. These challenges include:

- Adapting to the impacts of climate change (e.g. the increased frequency, duration and severity of storm events and more significant drought conditions),
- Changes in population (increasing population, population movement and urban creep), and
- An ageing (deteriorating) asset base.

To identify the best suite of interventions to meet the Draft Ministerial Objectives 2027-33 and Scottish Water's Strategic Ambitions, Scottish Water have undertaken an optioneering process. The investment scenarios were tested against performance metrics and compliance requirements to validate the scenarios' robustness and ensuring they aligned with stakeholder's expectations, the Water Sector Vision, Scottish Water's Climate Change Adaptation Plan, Net Zero goal and risk appetite.

Part of this development process was the creation of a Draft Business Plan submission against which stakeholders provided feedback against their expectations and refinements were subsequently made.

Based on the refinement of the Draft Business Plan and the testing of outcomes, Reference Scenario (CPI +3.3%) is recommended. The Reference Scenario will require **£1,914m** of investment to deliver the following:

- Maintain assets as set out in Management Approaches
- Decreasing the number of Unsatisfactory Intermittent Discharges (UIDs) by addressing remaining 91 'high priority' UIDs and 59 medium priority UIDs to make sustainable progress against our long-term strategy ambition to address all UIDs by 2050
- Installing monitors and sensors across our waste water system to create an increasingly intelligent network and to bring new insight on performance, compliance and risk
- Reducing the number of serious (Category 1&2) pollution incidents caused by our operations by 37.5%
- Maintaining our high final effluent permit compliance at 96.37% against targets set in SEPA's annual monitoring plan
- Establishing our current pass forward flow performance and compliance position through improved monitoring capability and developing an improvement plan, delivering the first steps towards improved compliance through authorisation review
- Working with SEPA and other stakeholders to risk assess the potential implications of regulatory changes
- Delivering all remaining RBMP3 objectives (including bathing water objectives) to enhance the water environment

- Maintaining our 100% sludge (bioresource) compliance performance
- Investing in a cutting edge bioresource treatment facility for west central Scotland to facilitate production of an enhanced treated biosolid to reduce our agricultural land outlet risk, facilitate renewable energy generation and deliver 10% reduction in carbon footprint. The costs for this new facility are not included within this Technical Appendix nor the £1,914m total above. More detail can be found within the West Central Bioresource Technical Appendix (this represents a further demand of £557m).
- Implementing wider resource recovery from the collection and treatment of water and waste water
- Integrate returning PFI assets into the Scottish Water asset base; and
- Maintaining and improving water resources environmental monitoring and compliance

These key investments are summarised in Table 1.

Table 1: Key Water Environment Investments for SR27

Investment Category	Investment Summary	Proposed Investment (£m, 24/25)
	Maintain inlet works including inlet, screening, grit removal and storm tanks.	124
	Maintain primary treatment including tanks, wet well, pumps, instrumentation, control & monitoring, buildings, screenings, cranes, sampling	77
	Maintain screw pumps	26
	Maintain secondary treatment including tanks, septic tanks, activated sludge assets, wet well, instrumentation, BAF filter, reed bed	203
	Maintain treatment ancillaries including tanks, buildings, instrumentation, washwater, chemical dosing, sampling, tertiary lagoon	121
	Waste water ancillaries (other)	38
	Replacement of temporary chemical dosing equipment	23
	AR3 associated with PFI return	201
	Maintain bioresource treatment centres to ensure a quality product: reception & cleaning, digestion & stabilisation, storage, return liquor treatment, thermal drying and pelletising	111[1]
	Maintain sewage pumping stations (SPS) - activities to be carried out on Mechanical, Electrical, Instrumentation, Controls, Automation (MEICA) & civil assets	135
	Maintain Supervisory Control and Data Acquisition (SCADA) - Waste water Treatment	41
	Maintain Remote Telemetry Unit (RTU), communication, data quality testing and remedial actions & telemetry rationalisation	11
	Maintain odour equipment	13

[1] All investment related to West Central Bioresource can be found in that TA010 West Central Bioresources Technical Appendix

Investment Category	Investment Summary	Proposed Investment (£m, 24/25)
	Maintain Motor Control Centre (MCC) - Waste water (Network & Treatment)	32
	Maintain High Voltage (HV) - Waste water (Network & Treatment)	46
	Water & Waste water - Property & Access	28
	Access to equipment	24
	Statutory Maintenance items - Waste water Treatment assets	9
	Fixed Wire electrical systems – Waste water treatment assets	19
	Asset Transformation Operation & Maintenance (ATOM) waste water assets	13
	Maintain regulatory water resources abstraction and compensation monitoring, measurement and environmental flow equipment to comply with regulatory reporting requirements and maintain environmental flows downstream of reservoirs	6
	AR3 Total	**1,301**
Enhancement	Improve Bathing Waters at Lower Largo and Ayr South	20
	Increase total flow to full treatment at Waste water treatment works[2]	14
	Phosphorus, BOD and ammonia impact to be reduced at WWTWs where impact has been confirmed. These form part of RBMP3 objectives	58
	Reduce risk of malodour at Seafield WWTW	14
	Provision of appropriate equipment and analysis to demonstrate pass forward flow (PFF) spill compliance at WWTW and that flow is maintained during the event duration.	65
	Transition of PFIs to Scottish Water ownership and contractual obligations[3]	7
	Allanfearn WWTW – Bioresource Digesters[4]	5
	Industrial Emissions Directive (IED) compliance for existing Bioresource Treatment Centres	41
	Reduce the risk of environmental pollution from CSOs – Develop and deliver solutions to priority UIDs (catchments to be agreed with SEPA) for aesthetics & water quality	269
	Deploy Event Duration Monitors (EDM) at further locations to be agreed with SEPA	9
	Study to understand the impact of waste water discharges on the water environment	49

[2] We will develop a PFF compliance improvement plan and will deliver the first steps towards improved compliance through authorisation review. Enhancement to provide increased hydraulic capacity will be prioritised for delivery in SR33 and beyond.
[3] The Need in Table 5 is recorded as "Highland PFI Includes transition to Scottish Water ownership and contractual obligation of fair market value payment" it is proposed that this will be amended following the formal governance process
[4] This is the enhancement element of proposed work at Allanfearn WWTW to replace digesters. The remainder is included within "Maintain bioresource treatment centres to ensure a quality product: reception & cleaning, digestion & stabilisation, storage, return liquor treatment, thermal drying and pelletising" Investment Category

Investment Category	Investment Summary	Proposed Investment (£m, 24/25)
	Improve water resources environmental monitoring and flow equipment to increase compliance including the ability to provide environmental flows downstream of reservoirs. Meet RBMP commitments	40
	Long Term sludge storage - - Develop alternative sludge recycling options for WTW on Orkney to allow cessation of operations at Big Breck and Westray landfill sites - Big Breck - Develop options to close and restore the site	17
	Understand level of treatment resilience as a result of climate change and other plausible hazards	5
	Enhancement Total	**613**

The SR27 investment into Water Environment (and West Central Bioresource) makes up 31% of the total SR27 Investment of £8.1bn, as shown below.

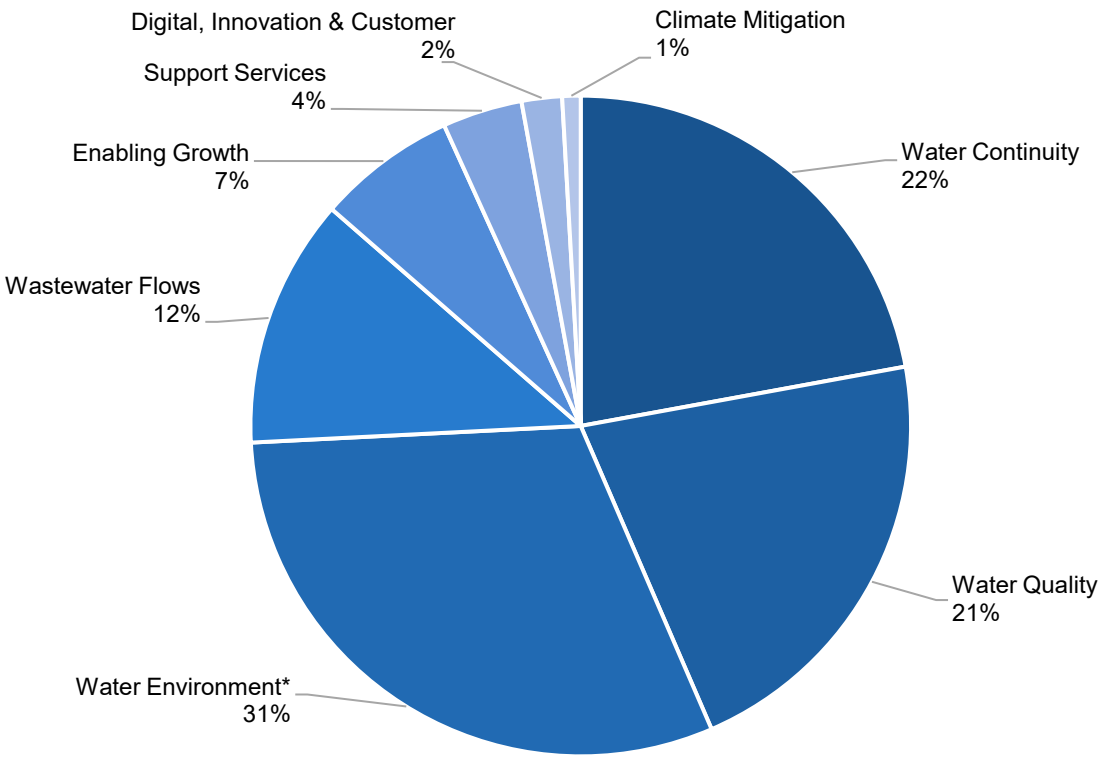

Figure 1: Water Environment investment as a proportion of the total SR27 investment

** Includes £557m of West Central Bioresource investment and £1,914m associated with the investment in this Technical Appendix*

2 Background

2.1 Scope of Technical Appendix

This Water Environment Technical Appendix covers the investment required to ensure that Scottish Water's current waste water level of service can be maintained and that we can seek to reduce our impact on the water environment.

The proposed investment needs for the Water Environment have been identified from risks associated with the ability of our assets to deliver this service whilst meeting the requirements of regulatory standards, customer expectations and Scottish Water management approaches.

The proposed investment needs presented in this technical appendix will seek to maintain service performance, whilst mitigating risks to service associated with the key long-term challenges posed by an aging asset base, climate change and growth demands, enhanced regulatory requirements and returning a significant PFI asset base to Scottish Water operation. Against these significant pressures, maintaining the relatively high levels of waste water service achieved over recent investment periods should be considered a significant success.

This Technical Appendix details the drivers behind the investments, identifies the needs that will be addressed during the next regulatory period (2027-33), and outlines the benefits for the Scottish population. It provides an overview of the allocation strategy for the investment, the methodology used for selecting options, and the most efficient delivery plan for Water Environment investments across SR27.

Figure 2 illustrates in which Technical Appendix our specific waste water investments are detailed, with the overall investment split across Water Environment and Managing Quantity of Flows.

Water Environment
•All maintenance associated with Waste Water Treatment Assets •Wastewater Asset Maintenance – Returning PFI contracts •Wastewater Treatment Discharges - Pass Forward Flow Compliance, Instrumentation and RBMP3 •Wastewater Treatment Improvements – Bathing Waters •Wastewater Studies •Unsatisfactory Intermittent Discharges •Event Duration Monitors •Bioresource •Water abstraction and compensation CAR monitoring and environmental flow equipment • CAR compliance - fish passes

Managing Quantity of Flows
•All maintenance associated with our wastewater networks (including Combined Sewer Overflows (CSOs) and outfalls) •Sewer flooding •Property level protection (mitigation measures for sewer flooding) •Repeat sewer flooding - initiatives to tackle repeat flooding caused by capacity constraints or blockages on our networks. •Flood Risk Management Act duties •Surface water management and partnership working •Customer behaviour campaigns •Wastewater model maintenance

Figure 2: Waste Water Investment Split

2.2 Context

The proposed investment needs presented in this document are required to meet Scottish Water's legislative obligations, including the Draft Ministerial Objectives 2027-33, and align with Scottish Water's Long-Term Strategy and policies. They address existing areas of unsatisfactory service

performance and risk, including non-compliance with regulatory standards, whilst mitigating risks to service associated with the key long-term challenges posed by an extensive and complex asset base, changing regulatory requirements and environmental changes.

Legislative Requirements – Scottish Water has statutory duties that must be adhered to, these include:

- **Water Framework Directive (WFD) (2000)** – European environmental legislation which aims to prevent deterioration and enhance status of aquatic ecosystems. The WFD requires the creation of River Basin Management Plans (RBMP) which set statutory objectives for Scottish waterbodies.
- **Water Environment and Water Services (Scotland) Act (WEWS) (2003)** – transposes WFD water quality protections into regulatory controls over activities to protect and the enhance the water environment.
- **Water Environment Controlled Activities (Scotland) Regulations (CAR) (2011)** – implements the requirements of WEWS and is the mechanism used by SEPA to authorise controlled activities (e.g., point source discharges). Authorisation requirements for discharges (i.e., authorisation conditions) are based on environmental need and SEPA policy at the time of issue or variation. Abstraction and impoundment of water sources must also be authorised under CAR and there is a duty to take all reasonable steps to secure efficient and sustainable water use. To meet conditions of an authorisation, the monitoring equipment and environmental flow provision assets that have been installed must be maintained and verified.
- **Urban Waste Water Treatment Directive (UWWTD) (1991) and Urban Waste Water Treatment (Scotland) Regulations (1994)** – European environmental legislation which aims to protect the adverse effects of treatment and discharge of urban waste water. It sets out specific treatment requirements for discharges based on population equivalent and receiving waterbody type and sensitivity.
- **Bathing Water Directive (rBWD) and Bathing Water (Scotland) Regulations (2008)** - environmental legislation which aims to preserve, protect and improve the quality of the environment and to protect human health by complimenting the WFD. It sets out the standards for designated Bathing Waters and determines authorisation requirements for discharges (i.e., authorisation conditions).
- **The Water Environment (Shellfish Water Protected Area) (Scotland) Regulations (2013)** – sets out the requirement for annual bacteriological conditions for waste water treatment works discharges which may impact a nearby designated shellfish protected area in line with SEPA policy at the time of issue or variation.
- **The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021 -** take "all reasonable steps to ensure that discharge (containing sewage) does not result in pollution of the water environment". This refers to all actions that are practical and feasible for individuals or organisations to take in order to minimise or eliminate pollution risks. This includes implementing best practices, maintaining equipment, monitoring water quality, and responding promptly to any issues.
- **The Environmental Authorisations (Scotland) Regulations 2018 (EASR) (amended 2025) -** On the 1st of November 2025, the Environmental Authorisations (Scotland) Regulations (EASR) came into force. These regulations incorporate SEPA's four main regulatory regimes (water, waste, industrial activities and radioactive substances) into an integrated authorisation framework (IAF). When EASR came into force, many existing regulations (including some above) were revoked, and our existing authorisations (licences) automatically became EASR authorisations (permits) on 1st November 2025.

The Regulations set out a common framework that integrates the authorisation, procedural and enforcement arrangements and standardises the process for complying with environmental legislation in Scotland. Best Available Techniques (BAT) principles have been introduced for preventing or reducing environmental impact to include the efficient use of energy and water and continual improvement based on technological progress.

Draft Ministerial Objectives 2027-33 – Our investment plans for Water Environment in SR27 are required to meet the Draft Ministerial Objectives set out in Table 2.

Table 2: Draft Ministerial Objectives 2027-33 aligned with the Water Environment Technical Appendix

Ministerial Objectives Category	Ministerial Objectives Detail
Standards of Service	Maintain or improve current levels of service over the long term
Environment	Scottish Water must improve the current level of compliance with its environmental authorisations for abstraction and discharge into the environment, by preparing and implementing investment plans that address the risks of impacts on the environment from its assets
	Scottish Water must prepare and implement delivery plans throughout the 2027- 33 period which set out how improvements to its water and sewerage infrastructure are expected to contribute effectively to the RBMP objectives
	Scottish Water must provide regular updates on the progress it has made towards delivering its obligations in respect of river basin management plans
	Scottish Water must prepare drainage and waste water management plans, to gain a better understanding of the performance of the sewer networks and to limit the number of plastics reaching the water environment through the sewer network.
	Scottish Water must support SEPA's work with the manufacturing sector, the Scottish Government, customers and stakeholders to control at source plastics and priority substances.
Flooding and Surface Water Management:	Scottish Water must identify and pursue opportunities to work with stakeholders, and respond to opportunities proposed by stakeholders, to transform how rainwater and sewerage are managed in new and existing communities
	In particular, Scottish Water, in collaboration with other parties as appropriate, must adopt and encourage a catchment management approach to sustainable storm water management wherever practical, to reduce and prevent the impacts of sewer and surface water flooding, reduce pollution from sewer overflows, enable growth, increase resilience and create natural spaces for customers and communities to enjoy.
Circular Economy:	Scottish Water must have regard to the Scottish Government's circular economy strategy (as may be amended or replaced from time to time) in its provision of water and waste water services
	In particular, Scottish Water must assess the potential for resource recovery from sewerage.
Climate Change (Adaptation & Mitigation):	Identify the expected impacts of climate change on its assets and assess the risk and likelihood
	Make substantive progress in the 2027-33 period towards the climate change targets, and ensure it is on an appropriate trajectory to meet or exceed those targets

Ministerial Objectives Category	Ministerial Objectives Detail
Private finance initiative funded projects:	Scottish Water must prepare and implement plans to manage its 6[5] remaining private finance initiative contracts which end in the 2027-33 period, to secure best value for money for the future operation of the relevant facilities.
	Scottish Water must prepare such plans for its any of these 6 remaining private finance initiative contracts which end after 2033.

Long-Term Strategy

The SR27 Final Business Plan represents the first step on the journey to achieving Scottish Water's ambitions set out in the Long-Term Strategy for the next 25 years. These are:

- Achieve 100% compliance with existing final effluent and pass forward flow standards and reduce operational risk
- Work with stakeholders to create an approach to focus on improving overall health of Scotland's waterbodies and adapting to changing use of Scotland's waters
- Work with the Scottish Environmental Protection Agency (SEPA) and others to understand the implications of future legislation related to substances of concern
- Continuous improvement in the capability of our waste water treatment work assets to deal with changing demand and minimise their impact on the environment
- Improve the resilience of our waste water systems so they can cope with expected climatic changes
- Maximise the deployment of nature-based solutions
- Maximise renewable energy generation from waste water bioresource and recover resources from bioresource, waste water and water treatment process streams, where financially viable to do so
- Identify and develop options to mitigate risk to the agricultural recycling outlet for bioresources
- Address all sewer overflows that are harming the environment or not operating as they should (i.e. UIDs) on a dynamic prioritised basis by 2050.
- Create increasingly intelligent networks which will allow us to optimise asset operations and our response approach
- We will monitor bathing water compliance and how this is impacted by overflows from the system, and we will reduce discharges to support possible classification improvement at bathing waters.

Key Challenges

There are challenges in progressing these ambitions and maintaining and improving service provision to our customers, communities and the environment. These challenges include:

- **Adapting to the impacts of climate change** (e.g. the increased frequency, duration and severity of storm events and increased drought conditions),
- **Changes in population** (increasing population, population movement and urban creep), and

[5] There are 4 PFI contracts ending in SR27

- **An ageing asset base** - the need for asset repair, refurbishment and replacement will be ongoing for the more complex treatment processes installed over the past 25 years, as well as for older assets requiring end-of-life replacement. This also includes PFI assets.

2.3 Past Performance

This section sets out Scottish Water's past performance across key performance metrics (aligning to the WICS SRC27 Final Methodology), key performance improvements that have been delivered in this period, and trends emerging from historical analysis.

Over the past 30 years Scottish Water have made significant improvements to the waste water infrastructure in Scotland's largest population centres (including Glasgow, Edinburgh, Dundee, and Aberdeen) using advanced secondary treatment systems to meet European standards required under the Urban Waste Water Treatment Directive (UWWTD). More recently, over the two previous strategic review periods, Scottish Water have invested in excess of £2.9bn in improving and maintaining Scotland's public drainage system and infrastructure, as well as delivering water quality improvements to designated Shellfish and Bathing Waters and making significant improvements to meet Water Framework Directive objectives set out within River Basin Management Plans.

Asset Repair, Refurbish, Replace (AR3)

To convey over one billion litres of waste water (dry weather flow) from properties and businesses in Scotland requires an extensive network. Since the mid-1990s, the waste water system has benefited from significant levels of investment. During operation, our assets encounter significant wear and deterioration which can impact capacity, efficiency and performance.

To help us manage this asset base, in SR21 Scottish Water created Management Approaches. For each asset type, Scottish Water created a risk-based maintenance approach to determine the maintenance tasks and frequency that should be carried out, dependent upon asset condition.

Unsatisfactory Intermittent Discharges (UIDs)

Scottish Water classes intermittent discharges as either satisfactory or unsatisfactory (UIDs) and report these in our Annual Return. We have undertaken studies during SR15 and SR21 to identify and prioritise UIDs for phased improvement over SR27 and beyond. These studies have improved the understanding of how our assets operate and where they cause environmental impacts. As a result of this greater insight into the asset base and how it performs, the number of intermittent discharges classed as unsatisfactory and therefore requiring improvement, has increased as shown in Table 3. However, around one third of the reported number of UIDs come from studies undertaken before SR15 and these require review to confirm whether the unsatisfactory status remains appropriate. This review is underway and will conclude in 2026.The number of UIDs reported in our Annual Return in 2025 is 892 and we expect the SR27 opening position to be 862 UIDs. We will work with SEPA to review the criteria which define 'unsatisfactory' status and UID priority in light of improved intelligence from event duration monitors and modelling to ensure that these continue to be fit for purpose in Scotland. Figure 3 below shows the annual reported UID number since 2022 alongside projections to the end of SR21.

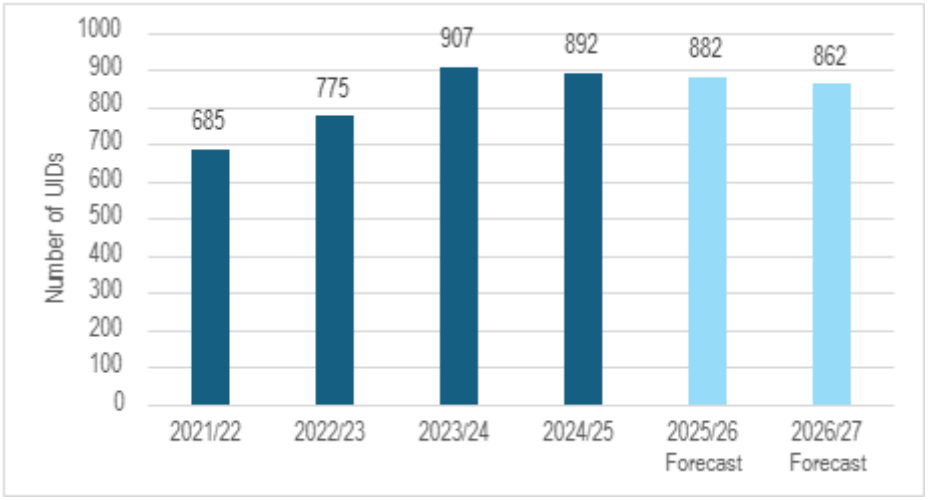

Figure 3: Number of UIDs

Bathing Waters

During SR10, we studied the impact of our waste water network and treatment assets on Bathing Water performance and developed action plans to support meeting 'Sufficient' classification where we were able to evidence that impact exists. Subsequent investment in our waste water network and treatment assets over SR15 and SR21 has reduced impacts, supported bathing water quality and contributed to improved classification. This is shown in Figure 4 by the trend in increasing number of Bathing Waters classified as Sufficient, Good and Excellent from 2017 onwards. We have not included a forward projection in Figure 4 because of the wide range of factors that can impact classification.

As catchments have evolved as a result of development and urban creep, the potential impact from our sewerage systems may also have changed and, whilst there has been an improving bathing water performance trend over recent years, this could reverse as a result of impact from our assets or from other sources. We will refresh our studies at an appropriate point (i.e. when SEPA demonstrate that classification is at risk) in order to define investment demand and to support appropriate cost/ benefit analysis.

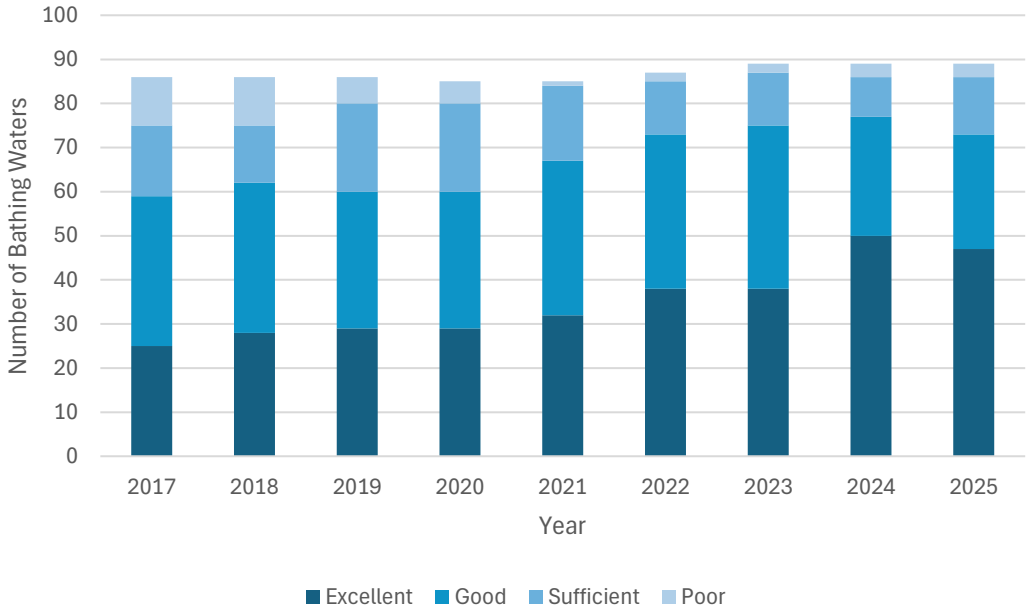

Figure 4: Bathing water classification

Waste Water Treatment Works Compliance

During SR21, WWTW compliance has been assessed against all licensed final effluent parameters for the subset of assets (around 580) which are included within SEPA's Annual Monitoring Plan. In previous investment periods, some final effluent parameters were excluded from the assessment of compliance for OPA.

The number of failing works has remained broadly stable at around 20-22 year on year, resulting in a total compliance of 96-97% as shown in Figure 5 below. Achieving this consistent compliance position reflects our effective management of the challenges presented by ageing assets, increasing demand from development, population movement, urban creep and the impacts of climate change through deployment of proactive and reactive measures to secure compliance (e.g. the use of operational controls such as continuous final effluent monitoring and temporary treatment plant).

We have undertaken non-compliance root cause analyses to inform our future investment decisions. These have shown that around a third of failures are attributed to undersized or ineffective assets and around a fifth due to operational practices. Of the remaining failures, a range of failure root causes were noted including external influences (e.g. trader discharges or adverse weather events).

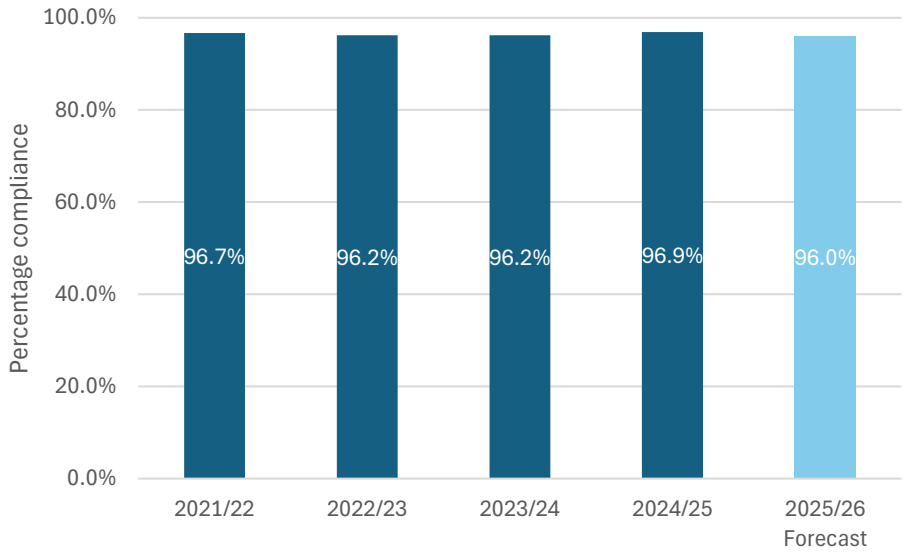

Figure 5: SR21 WWTW Compliance (OPA)

Environmental Pollution Incidents (EPIs)

Environmental Pollution Incidents (EPIs) are where a waterbody is polluted via Scottish Water infrastructure. Most incidents stem from operational issues within the sewer network (for instance chokes, blockages and collapses), but they can also originate from other waste water assets or from assets used to impound, transfer, treat and deliver drinking water.

Many EPIs are related to sewer blockages which are often caused by flushing the wrong products, such as wipes and sanitary products. Section 2.5 (SR21 Delivery) and Section 4.4.6 (Customer Behaviour Campaigns in Managing Quantity of Flows Technical Appendix explains our plans to address flushing behaviour.

The number of EPIs significantly decreased between SR10 and SR15 due to a targeted focus on this measure, including substantial efforts to enhance data quality. Since then, the numbers have remained relatively stable over SR15 and SR21, as illustrated in Figure 6.

Except for 2023, the annual number of Category 1 and Category 2 EPIs has remained below 10.

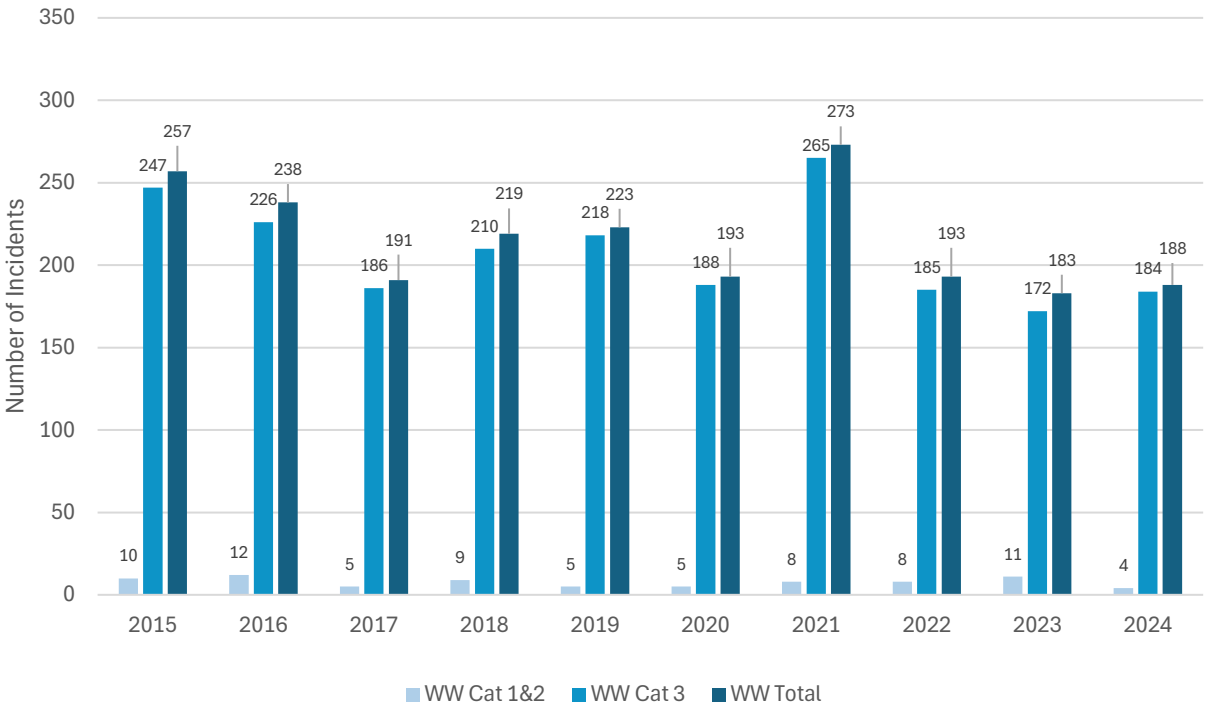

Figure 6: Environmental Pollution Incident (EPI) performance during SR15 and SR21

During the SR21 investment period, we have conducted more targeted and reactive localised 'Nature Calls' campaigns in the Borders and North regions. These areas were selected based on historically high volumes of blockages, which can lead to EPIs. A new team has been established to primarily respond to alarms from the new Event Duration Monitors installed at our overflow locations. This team has been involved in numerous EPI investigations, helping us quickly and efficiently identify the root causes. Additionally, this team has supported other activities such as proactive burn walking, more targeted CSO planned maintenance, and the installation of depth monitors within the sewer network, all of which help reduce the risk of EPIs.

Our performance is comparable to E&W for both the 'significant' Cat 1&2 EPI measure and for the total EPI / 10,000km of sewer measure. We currently rely on both SEPA and 3rd parties to help identify EPIs and we want to do better in self-reporting. We propose to develop plans to improve self-reporting of EPIs using our maturing Waste water Intelligent Network (WWIN) capability. Whilst WWIN will support early identification of operational issues and generate interventions which we expect to avoid some EPIs, it could also result in more EPI events being identified, which would be reflected in reporting.

Sludge (Bioresource) Compliance

During SR15 and SR21, sludge (bioresource) compliance has consistently remained at 100% due to the availability of both agricultural and land restoration recycling outlets, and landfill.

As assets currently under PFI operation are transferred back into our ownership and given future pressures on outlet availability (e.g. loss of the land restoration outlet within the next 2-3 years and new limits on soils suitable for agricultural recycling set out within recent guidance issued by SEPA), residual asset life of existing facilities and those being returned from PFI, we will need to invest significantly in our bioresource facilities to maintain this performance and meet net zero ambitions.

Water Resources Compliance

Past performance of abstraction and compensation regulatory compliance for the past 10 years (2014-20124) is shown below (

Figure 7). The performance is based on Scottish Water's assessment of annual data following SEPA's current compliance guidance. (Note that SEPA is developing a new assessment scheme, Environmental Performance Assessment Scheme (EPAS), which will replace the Compliance Assessment Scheme (CAS) that was in place from 2012-2019. As an interim position, SEPA has provided revised assessment categories to score compliance).

Over the last 10 years, there has been a steady improvement in the number of fully compliant authorisations, and we can now demonstrate that levels of abstraction and compensation equipment operability is consistently high (>95%). Our abstraction compliance has significantly improved in recent years increasing from 74% full compliance in 2014 to 93% in 2024. Within that time, the number of measured abstraction sites ranged from 280 to 263. However, reservoir compensation compliance has remained much lower, fluctuating between 27% and 52% during this period, with the exception of a notable increase to 65% in 2024. The higher compensation compliance in 2024 is primarily due to the unusually wet spring and summer of that year with a reduced need to adjust compensation valves.

Despite the improvement in overall compliance, compensation compliance continues to be affected by limitations in the capability of the raw water infrastructure, remote locations of assets, delivery of investment, along with the impact of operational events and the need to maximise water resources for supply.

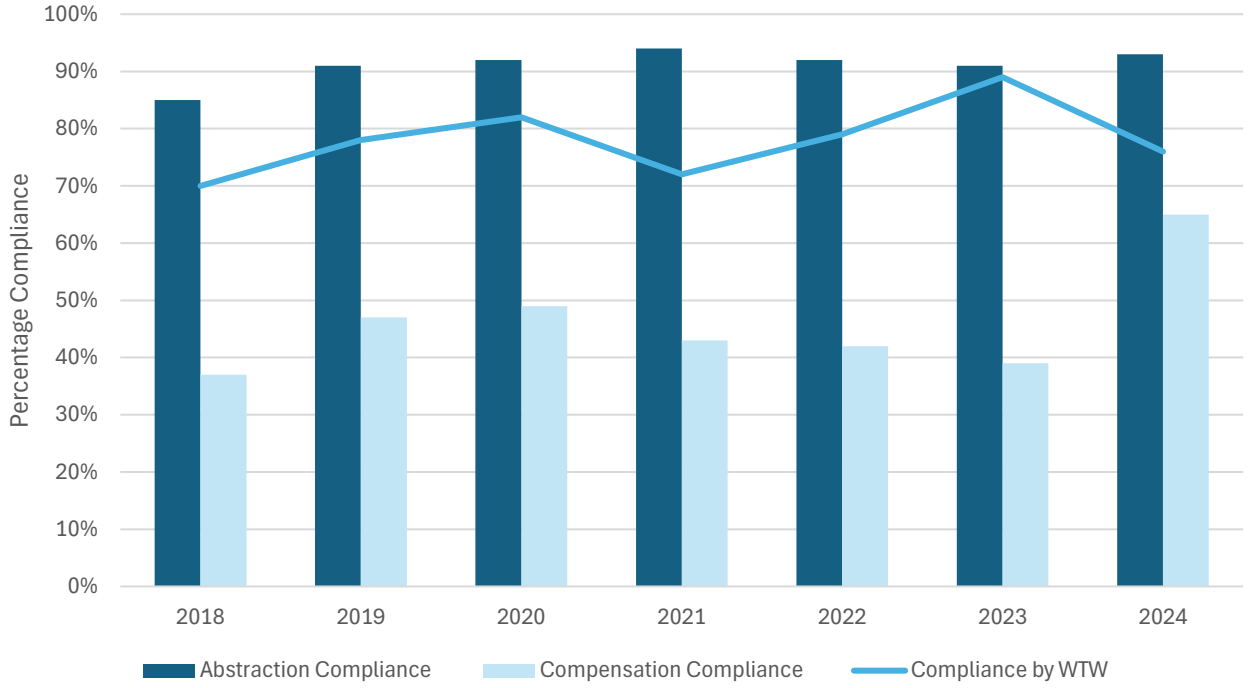

Figure 7: Our past abstraction and compensation compliance performance

2.4 SR21 Delivery

In SR21 we have continued to deliver ambitious, and often complex, programmes of work. We will utilise the learnings and developments we have made in SR21 to guide and inform our SR27 programme.

SR21 Management Approach

We used Management Approaches (MAs) as a systematic method for determining maintenance activities across all assets. Initially developed in SR21, both maintenance and enhancement MAs aimed to capture investment triggers and ensure consistent decision-making. The updated version 2 (v2) MAs for asset maintenance incorporate cost-benefit analysis, enhanced data and analytics, and resilience requirements for climate change, leading to better-informed decisions and increased confidence in policy choices. MAs associated with enhancement are being transitioned into sub outcome strategies, which have been published in the Long-Term Strategy.

Network improvement

In December 2021, we published our **Improving Urban Waters (IUW) Route Map** with primary commitments to improve monitoring and publication of overflow event data, improve water quality and reduce the release of sewage related debris to the environment. The increased provision of data on overflow events through the installation of 1,000 Event Duration Monitors (EDMs) has and will continue to improve our understanding of network performance. Through utilising this data and the initiation of study projects, we have confirmed the presence of UIDs, prioritised how to tackle these and undertaken high level solution development to inform and deliver investment during SR27 to remove high priority UIDs. Furthermore, targeted deployment of enhanced monitoring within drainage catchments through Waste water Intelligent Networks (WWIN) has provided real time visibility of sewer performance, predicting reduced performance and preventing pollution incidents.

Within the Kirkcaldy Drainage Operation Area (DOA), we have trialled **'CENTAUR'**, an autonomous system which uses dynamic penstocks to control flow within the network. Through utilising existing drainage network storage capacity to address hydraulic incapacity, this can prevent or reduce CSO spills (with a 33% reduction in spill volume quantified for Kirkcaldy). We will look to explore the potential benefits from more widescale deployment of this initiative on reducing spill volumes as a solution for improving water quality and reducing the need for new CSO screens during SR27.

Treatment works improvement

During SR21 we undertook widescale deployment of **ESNET systems** at waste water treatment works providing real time monitoring of final effluent quality at treatment works serving 55% of Scotland's total population. Provision and visibility of this data has facilitated a more planned and proactive response to process performance issues in which might be the precursor to possible compliance failures. In addition, this data has improved root cause analysis investigation which, in turn, has allowed specific needs in achieving and futureproofing compliance to be identified for future investment.

Over SR27, we will look to develop approaches to achieve compliance with a broader range of authorisation requirements. We will better understand how flow and overflow event data can be utilised and where further flow monitoring is required to support assessment of Pass Forward Flow (PFF) performance and authorisation compliance. This is informing a future study

programme to be undertaken during SR27 to initially baseline PFF performance and then develop and prioritise options for addressing non-compliance. We will start to deliver prioritised improvements to address non-compliance within the SR27 period.

We have begun to understand and quantify how projected climate change will influence the variability of the flow and load influent envelopes at our WWTW inlets. This knowledge is informing a baseline resilience assessment of our treatment processes to these variable operating conditions. In support of this we have begun utilising dynamic process models to undertake future scenario planning, identifying future compliance risks and the potential for water quality impacts which in turn will inform investment planning for SR33 and beyond. Further deployment of this modelling capability could allow for optimisation of operations and process emissions. The capabilities of this modelling will be explored further in SR27, and outputs utilised in combination with a Net Environmental Benefit metric, currently being piloted, which will allow the holistic environmental impact of waste water treatment to be quantified to guide strategic decision making.

Bioresource improvement delivery

At Denny WWTW, we trialled an '**Upflow Anaerobic Sludge Blanket (UASB)**' reactor to understand whether an anaerobic waste water treatment flowsheet is viable for deployment within Scotland's temperate climate and for combined sewerage systems. This pilot sought to validate and quantify the credentials of this technology as a chemical free, low energy and low process emission solution which could generate biogas for capture and increase ammonia strength in the effluent. This could unlock the potential transformation of waste water treatment assets into resource recovery factories and achieve carbon neutrality in support of our Beyond Net Zero ambition.

Performance and operational data from the Denny trial are contributing to the wider 'Transforming the Energy Balance of Waste water Treatment' Ofwat Breakthrough Project. From the Denny trial, initial conclusions are that the influent is too weak for the technology to work as a treatment option on combined systems. However, the technology has not been wholly ruled out as there is potential to use it as a treatment for foul only systems and for bioresource liquors. To influence further consideration of this technology, we await the results of the OFWAT Breakthrough Project. Variations of flowsheet configuration are being tested by Thames Water and Welsh Water as part of the project, and operational and performance data from these trials, will supplement our learning on this technology and influence our determination of its wider viability and consideration of this technology for application in SR27 and beyond.

At Nigg Bioresource Treatment Centre, we trialled **co-digestion of bioresource with brewery and distillery waste streams**. This resulted in increased biogas production and an agreed regulatory position from SEPA for the process. While we are not currently pursuing the introduction of co-digestion at more locations, this remains an option that may be considered if suitable capacity becomes available within the existing digester asset base. Our medium- and long-term planning is focused on accommodating growth in our own bioresource production, though interim capacity could potentially be used for other materials if appropriate opportunities arise. A digester degassing system was also trialled at Nigg that resulted in increased biogas capture and a reduction in process emissions from utilisation of the technology. The results of this trial have informed our approach, and digester degassing may be deployed in support of Industrial Emissions Directive applications at our active biogas-producing sites, subject to site-specific requirements and regulatory considerations.

In 2018 we developed a Bioresource Strategy in response to preparing for the end of PFI contracts. At the time of developing the Bioresource Strategy 80% of Bioresource was managed

through PFI contracts. The Bioresource Strategy, which is our proposed response to the assets transferring to Scottish Water ownership, will deliver benefit to society and the Environment, will maximise value from bioresource, sustainably manage existing land outlets with a future focus on further resource recovery. This bioresource strategy was reviewed and validated externally in 2023 and incorporated into the long-term strategy.

In line with this strategy, development work on a strategic Advanced Anaerobic Digester (AAD) to replace the outdated drier technology at Daldowie PFI, Meadowhead PFI and Kineil Kearse will be completed in SR21. This AAD plant will stop the use of natural gas, maximising value from bioresource by the production of energy and reducing the scale of recycling activity through the destruction of solids within the process. The proposed AAD plant is the single biggest contribution to achieving our net zero target of 2040 and producing a digestate is the most sustainable approach to managing land outlet risk. More detail on the West Central Scotland Bioresource (WCB) project can be found in the associated Technical Appendix.

In preparation for a future alternative to the agricultural outlet, we have begun to explore further resource recovery opportunities. We have conducted technology and market scans on **Advanced Thermal Conversion Technologies (ATC)** for bioresource treatment, which use temperature and pressure to create new output materials. These new materials might offer alternatives to land application, destroy pollutants in complex organics, and enable wider resource recovery. The scan helped review long-term bioresource treatment options for both large- and small-scale sites, including pyrolysis, hydrothermal carbonisation, hydrothermal liquefaction, and gasification, alongside established methods like anaerobic digestion and nature-based solutions. We now understand the costs and carbon impacts of using these technologies in treatment centres across Scotland and how they could be deployed in SR33 and beyond.

Collaborating with ATC vendors, we assessed the quality of output materials (solids, liquids, gases). A trial on hydrothermal carbonisation will explore phosphorus recovery from solid outputs, while we're also part of a gasification project with Yorkshire Water funded by OFWAT. Results from these efforts, due in 2025, will identify market opportunities, inform regulatory discussions with SEPA, and guide work for SR27.

Resource recovery potential from bioresource, waste water, and treatment process streams was studied, assessing costs, carbon impacts, and interdependencies. Screenings waste was analysed for biochar production via pyrolysis, with trials planned. Grit recovery was explored, showing cleaned grit could be used in the aggregate industry, with further research expected in SR27.

A Biocage (mesh attached inside sludge holding tanks) trial during SR21 improved solids retention within sludge holding tanks, reduced shock loading at treatment works from liquor return, increased bioresource thickness, and minimized tanker movements. More units have been deployed, with further installations planned in SR27.

PFI Return

Several PFI assets (two contracts) have been transferred to Scottish Water ownership during SR21, and we have assumed operational responsibility for these.

Table 3: SR21 PFI transfers (at the time of drafting)

PFI (Expiry/ Transfer Date)	Future Service Plan
Former Highland PFI (2022)	Maintaining service for ~105,000 customers (population equivalent) in the Inverness and Fort Willam areas (AR3)
Former Aberdeen PFI (2022)	Maintaining service for ~365,000 customers (population equivalent) in Fraserburgh, Peterhead, Aberdeen and Stonehaven areas (AR3)

Since these assets have transferred to Scottish Water ownership, the optioneering and precise AR3/enhancement investment provisions for their 'future services plans' have been included in our SR27 plan.

Water Resources Environmental Monitoring and Compliance

During SR21, significant investments have been made to improve compliance and equipment operability under the Water Resources Environmental Monitoring and Compliance Management Approach. Over 500 monitoring points for abstraction and compensation flows are used to report on 272 authorised abstractions and 94 compensations. The management approach covers the verification and repair/refurbishment/replacement of the monitoring points to meet our Legislative and Regulatory requirements. It also includes maintenance activities on assets where the purpose is solely to deliver environmental flows related CAR licence (now EASR permit) compliance (compensation valves, fish passes, measuring weirs etc).

The management approach is delivered through a rolling programme with a framework contractor, achieving consistently high operability levels despite challenges in managing extensive equipment year-round. The management approach also covers compliance improvement plans for individual sites as part of a compliance improvement programme and actions/projects which have been agreed with SEPA as part of RBMP3.

2.5 SR27 Drivers of Investment

There are a number of key challenges to maintaining or improving service relating to the quality of the water environment including:

Our Ageing Asset Base – There is need for ongoing asset repair, refurbishment and replacement of our existing asset base (including assets returned from PFI operation) in order maintain/improve the level of service we provide our customers and to protect the environment. These maintenance activities will need to be delivered to ensure that assets can continue to deliver service whilst enhancement will be required to ensure that assets can adapt to the impacts of climate change and growth demand.

Maintaining Statutory and Regulatory Compliance – We will focus on maintaining or improving statutory, regulatory and safety legislation compliance to current required standards. We will do this whilst preparing for new assessment and reporting through SEPAs Environment Performance and Assessment Scheme (EPAS) and preparing for potential legislative alignment with revised Urban Waste Water Treatment Directive (rUWWTD) requirements and any new focus through the next cycle of river basin management planning.

Climate Change – Changes to the variability and intensity of precipitation will continue to influence storm water loading through our network and increase the variability of the flow and load envelope arriving at waste water treatment works. This may increase the occurrence of overflow operation and increase the risk of WWTW non-compliance. Conversely, in extended periods of drought, concentrations of pollutants in the incoming flow are increasing, putting pressure on the treatment process, final effluent concentration, compliance and the environment at a time when river flow might also be particularly low and ecology at its most sensitive.

For compensation and abstraction activities the increased likelihood of drought conditions and reduced rainfall due to climate change will impact the yield of raw water sources and environmental flows of waterbodies which in turn makes compliance more challenging. Climate change may also increase overall water demand and the frequency of peak demand events at a time when source yields may be constrained.

Urbanisation, Population Growth and Changing Spatial Distribution of Population – Our investment will ensure our assets and the service they provide are able to cope with the increased demand for housing and associated water and waste water infrastructure. This will ensure we can support a Flourishing Scotland. For more information see the Enabling Growth Technical Appendix.

PFI Contract Expiry – Five of the remaining PFI contracts Daldowie (2026), Dalmuir (2026), Almond Valley Seafield and Esk (AVSE) (2029), Ayrshire (MSI) (2032) and Levenmouth (2040) contain limited asset hand back conditions within the contracts to ensure that the PFI assets are transferred back to Scottish Water in an operable condition (typically a five-year residual useful life requirement). However, this does not apply to the Tay (2029) and Moray (2031) PFI contracts where no residual useful life requirement is specified**.** Together these 7 PFI assets cover 37% of Scotland's population for waste water treatment and have significant and high-profile consequences on failure, therefore future service plans[6] have been prepared to extend asset life and performance by repair, replacement and refurbishment (AR3) investment to mitigate asset failure risk

Other PFI return costs – In some cases (PFI contract dependent) there may be additional transition costs such as exit payments when contracts expire. These are mandatory drivers of investment and do not vary by investment scenario.

[6] Infrastructure Projects Authority (IPA) guidance on PFI expiry

3 Customer and Communities

3.1 Our Customers and Stakeholders

Scottish Water interacts with the water environment in the provision of both our water and waste water service. We abstract raw water from rivers, reservoirs, lochs and groundwater and treat this to supply drinking water to customers. Water treatment sludge, which is the byproduct of treating raw water for drinking, typically undergoes several processes to ensure safe recycling. Domestic waste water and rainwater is collected and conveyed to treatment facilities which remove pollutants and discharge the water back into the environment. Waste water treatment produces a nutrient rich waste (bioresource) which is also collected and treated to create biosolids which are then safely returned to the environment.

The way in which we interact with the water environment is important to our customers and we are mindful to keep our interactions responsible, minimising negative impacts on the environment and contributing to its improvement wherever possible.

3.1.1 Customers

In recent years there has been increasing public interest and scrutiny of the perceived negative impacts that water companies can have on the water environment. There has been particular interest in the frequency of overflow events and pollution incidents and their perceived effects on river and bathing water quality. We have seen increasing numbers of Freedom of Information (FOI) requests and political and media interest in how we are monitoring and reporting overflow events and in when overflow events are occurring.

3.1.2 Stakeholders

Scottish Water operates within a framework of diligent oversight and collaboration, engaging with multiple stakeholders who ensure our water and waste water service delivery protects and, where possible, enhances the Water Environment. These stakeholders include the Scottish Government (SG), the Water Industry Commission for Scotland (WICS), and the Scottish Environment Protection Agency (SEPA), with the wider stakeholder group also including Consumer Scotland (CS) and the Independent Customer Group (ICG).

Scottish Government sets national policies and objectives for environmental standards, and their role is pivotal in shaping the regulatory backdrop and ensuring that public health and environmental sustainability are at the forefront of waste water management practices.

WICS plays a crucial role in regulating Scottish Water, ensuring we meet the environmental, quality, and service objectives set by Scottish Ministers. WICS sets the revenue levels that Scottish Water needs to collect through customer charges to maintain and improve water and waste water services. It also monitors Scottish Water's performance, ensuring they provide high-quality services and value for money. Additionally, WICS facilitates the transition to a sustainable future for Scotland's water sector, which includes addressing long-term challenges such as aging infrastructure and achieving net zero emissions by 2040. This involves working collaboratively with Scottish Water and other stakeholders to ensure the waste water network remains fit for purpose for decades to come.

SEPA focuses on environmental protection and enhancement, ensuring compliance with environmental regulations and sustainability goals. Their oversight ensures that our authorised activities protect the environment, safeguarding ecosystems and biodiversity.

Consumer Scotland represents the interests of customers, ensuring that their needs and concerns are prioritised.

The **Independent Customer Group** (ICG) works closely with Scottish Water to provide independent insights and perspectives on customers priorities, ensuring customers interests are central to decision making.

3.2 Engagement

Customers are at the heart of our business, and their opinions are a key factor in our decision-making process, as set out in our Customer Research Technical Appendix. Building these views into our plans is part of our ongoing customer research approach that allows us to ensure our customers' needs are at the centre of our service delivery. The SR27 customer research programme aimed to understand customer expectations for Scottish Water over the course of SR27. However, we also have a deep understanding of views on service issues from existing and ongoing research. Scottish Water's synthesis database contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers. These insights have been assessed and mapped into topics, and the highest quality insights have been gathered together into Key Insights which have been used to support the development of the SR27 Final Business Plan and Technical Appendices. The Research Synthesis Supporting Document sets out supporting evidence, scoring and referencing for these Key Insights.

The tables below show the Key Insights relevant to the Water Environment investment area.

Table 4: Key Insights on Water Environment (waste water)

Research Question	Key Insight
What is **customer understanding** of Scottish Water providing waste water services?	Whilst customers generally have a good awareness of Scottish Water, fewer are able to name Scottish Water as their waste water provider than their water provider, although awareness is rising. Whilst Scottish Water is seen by some customers as providing a silent but essential service, recent media coverage of the wider UK Water industry has increased visibility of the sector as a whole. Customers often have limited knowledge and understanding of waste water processes. When informed of the water cycle, customers acknowledge the importance of waste water services to the environment.
What are customer **perceptions of the water environment** in Scotland?	Customers see Scotland's water environment as one of its greatest assets. They recognise that the condition of rivers and beaches has a Scotland wide economic impact, citing beautiful clean beaches and wildlife as key drivers of tourism. They also recognise the importance of the water environment to communities as places for leisure, drivers of local employment and support of the local ecosystem. However, customers from urban or semi-rural areas do not tend to give river/coastal water quality much thought unless they have a negative experience whilst visiting a beach. Customers from the North of Scotland or a rural area/island are typically very positive about river/coastal water quality. Some customers are aware of water quality being tested by SEPA and are reassured by this. The vast majority of household customers use Scotland's rivers and beaches for walking and agree that poor water quality would affect everyone. Non-household customers are generally less concerned unless it impacts their business. Customers generally assess the quality of the water environment by looking for litter, discoloured water, and bad smells.

Research Question	Key Insight
	Not all customers will make the connection between waste water activities and the water environment. However, customers are becoming increasingly aware as a result of recent media coverage.
What are customer **expectations** of Scottish Water in protecting the river and coastal water environment?	Customers are generally unaware of Scottish Water's role in protecting river and coastal waters. Most customers are not particularly concerned about the quality of these waters. Whilst customers are mostly unaware of SEPAs role in testing environmental water quality, there is a general expectation that they should be informed if there is an issue. Future customers are keen for Scottish Water to protect nature and ecosystems as well as people. There is an expectation that Scottish Water will work with others to maintain the whole environment around bathing sites.
What are customer **perceptions of pollution** in the water environment in Scotland?	Customers generally do not think about the waste water system. They can be surprised to learn that rainwater is mixed with sewage in the waste water network, and that the waste water network is designed to overflow into the water environment at times of high rainfall. This can cause some concern about risk to the environment and public health. Most customers are reassured on learning that these spills contain around 1% sewage, but a small proportion remain concerned. Customers are also reassured by Scottish Water's ownership model, the role of SEPA as environmental regulator, and learning that overflows protect properties from sewer flooding. More generally, environmental pollution incidents are concerning to customers, who link them with a wide range of societal, economic and environmental impacts.
What are customer **expectations** of Scottish Water in **protecting the water environment from pollution**?	It is seen as important to protect the water environment in Scotland. There is an expectation for Scottish Water to address spills and pollution incidents, linked to customers' desire to protect the natural environment. Customer concerns may be rising as a result of UK-wide media coverage around the topic, with Scottish Water's most recent research showing that customers believing that reducing the impact of sewer overflows is of paramount importance to protecting local areas and the environment – although this is perceived by customers to be a lesser issue for Scotland than elsewhere in the UK. Customers are keen for Scottish Water to have a plan in place to deal with challenges, such as increased rainfall and demand, whilst also protecting the natural environment. Customers expect Scottish Water to work together with other water sector stakeholders to ease the strain on Scotland's waste water system.

Table 5: Key Insights on Water Environment (bioresources)

Research Question	Key Insight
What are customer **perceptions** on Scottish Water providing waste for bioresources?	Although customers are not generally aware of the term 'circular economy', they do identify sustainability as a key characteristic for a company to be considered admirable. Supported by explanations of the meaning within a water industry context, customers are in favour of Scottish Water embracing the concept more, drawing a contrast with 'throw away' culture. They can be intrigued by innovations around extracting value from bioresources, wanting to know more about concepts such as the generation of renewable energy from sewage. Business customers tend to prioritise circular economy objectives more highly than household customers and would like to see more information about Scottish Water's plans to do more.

Table 6: Key Insights on Asset Repair, Refurbish and Replacement

Research Question	Key Insight
What is customer **understanding & acceptance** of aging assets as a challenge?	Customers are generally surprised to hear about the scale of Scottish Water's infrastructure, and to learn its age. Customers understand and acknowledge that ageing assets are a challenge for Scottish Water. They recognise the need for investment to maintain these older assets.
What are customer **expectations** of Scottish Water in maintaining assets?	Asset maintenance is a concept that people intuitively understand. It is felt to be highly important, and core to Scottish Water's purpose as an organisation, as it is an area that is clearly Scottish Water's sole responsibility. Customers recognise the need for investment and want to see lasting solutions put in place. Making things last is seen as an important area for Scottish Water's focus, appealing to all customers and older customers in particular. They are keen to reduce the risk of service failures, as well as avoid unnecessary costs. Customers expect this to be an ongoing area of investment with a focus on preventing future problems. They generally expect Scottish Water to maintain or replace infrastructure before it fails to avoid service issues. Fixing assets on failure is perceived by some to cost more money over time than proactive intervention. Customers may also seek some reassurance that investment is necessary. They may wish to be satisfied that investment is directed at parts of the system at risk of failing, and that interventions are future-proof, high quality and lasting.
What are customer **expectations** around climate adaptation of assets?	On hearing about the scale of challenges from climate change, and the consequent impact on the provision of Scottish Water's water and waste water services, customers believe it is important to protect infrastructure against the impacts of climate change. There is an expectation that Scottish Water will invest in innovative approaches and long-term solutions.

3.3 Demonstrating Customer and Stakeholder Support

As described in our Customer Research Technical Appendix we have robustly and extensively tested our SR27 investment choices with our customers and stakeholders, namely our suite of scenarios as described in Section 4.2.3 and within our Investment Planning Technical Appendix.

Our customers and stakeholders have told us that they care for the water environment and the condition of Scotland's rivers and beaches. Although customers often don't often have full knowledge on how waste water services work, with increasing negative news and media pressure across the water industry regarding sewage discharges into the water environment, our customers and stakeholders are becoming increasingly aware of our activity. They are more engaged in this matter, particularly more so now as we are being more transparent with our overflow event data with the creation of an online public access portal to show these. Many of our customers are not aware of SEPAs role as the environmental regulator but are reassured that they test bathing water quality. ***In SR27 and as aligned to the Draft Ministerial Objectives 2027-33 and Long-Term Strategy, we will continue to seek to meet and, where possible, improve our level of compliance with environmental legislation both within our sewer network and waste water treatment sites. We will deliver solutions that are low carbon and cost effective and, where possible, nature based to meet our ambition to provide best value to the customer.***

Our customers are keen for us to embrace a 'circular economy' approach. ***In SR27 we plan to maximise renewable energy generation from waste water bioresource, while mitigating outlet risk, and recovering resources from waste water bioresource, waste water and water***

treatment process streams where financially viable to do so. We also aim to develop and deliver plans to generate energy and maximise value at a new Bioresource Treatment Centre serving west central Scotland at Daldowie (see West Central Bioresource Technical Appendix).

Our customers have also told us that maintaining and improving levels of service by maintaining our existing asset base is vital to them. There is an expectation that Scottish Water will replace or fix assets before any failures occur. ***In SR27 and as aligned to the Draft Ministerial Objectives 2027-33 and Long-Term Strategy, we will invest in maintaining our waste water assets to provide a continued level of service to our customers, which is core to our business. We will provide cost effective solutions to maintaining our assets, to meet our ambition to provide best value to the customer as set out within our Management Approaches. Further details about the Management Approaches can be found in the Investment Planning Technical Appendix.***

4 Our Investments

4.1 Approach

Our investment demand is built on our Asset Repair, Refurbishment and Replacement (AR3) approach (section 4.1.2) which is intended to ensure that the gains in service achieved over recent investment periods are protected. To improve the capability and resilience of our assets to counter the impacts of climate change and achieve further service improvements to make progress towards our Long-Term Strategy and the Water Sector Vision, additional investment will be required (Enhancement). In SR27, initial progress on the long-term outcomes will focus on addressing areas of non-compliance with regulatory standards and issues directly impacting customers, whilst reducing the highest risks to service or compliance.

The investment needs outlined in Section 2 reflect the increasing demands on the asset base through a changing environment and evolving regulatory requirements, highlighting the areas where improvements to asset capability are required to meet these new challenges to safeguard public health and improve customer service for the long-term. AR3 investments will support maintaining and improving authorisation compliance and arrest deterioration of assets potentially impacting the Water Environment. Proposals also include enhancements to reduce the risks of non-compliance against statutory drivers that relate to Bathing Waters improvements, waste water treatment and network sewage discharges, monitoring and instrumentation requirements to comply with statutory drivers.

Needs which are subject to regulatory enforcement and regulatory commitment relating to non-compliance will be prioritised, followed by regulatory commitments relating to high risk of non-compliance, and other areas of non-compliance and high risk not yet subject to regulatory commitment or enforcement.

4.1.1 Long-Term Outcomes and Performance Requirements

As described in Section 2, The Water Environment investment area aligns Scottish Water's legislative obligations, including the Draft Ministerial Objectives 2027-33, and aligns with Scottish Water's Long-Term Strategy and policies to address existing areas of unsatisfactory service performance and risk, including non-compliance with regulatory standards, whilst mitigating risks to service associated with the key long-term challenges posed by an extensive and complex asset base, changing regulatory requirements and environmental changes.

The table below illustrates how we will measure delivery against our outcomes

Table 7: How we will measure delivery against out outcomes

Outcome	AR3 / Enhancement	Description	Performance measure / Target
Waste Water Asset Maintenance	AR3	Our management approaches cover various asset groupings and have been economically appraised to determine the most effective approach to maintain our assets, including an assessment of costs, benefits, risks, and carbon.	96.37% compliance with SEPA discharge permits Number of serious pollution incidents (cat

Outcome	AR3 / Enhancement	Description	Performance measure / Target
Waste water Asset Maintenance – Returning PFI contracts (4 No.)	AR3	Maintenance needs for 4 PFI contracts that end between 2027and 2033 (and demand for Daldowie and Dalmuir which return in 2026)	1&2) is not greater than 8 per year Total number of WW pollution incidents from a sewerage asset is not greater than 34.8, per 10,000km of sewer 150 UIDs to be addressed in SR27, reducing the UID register
Sewer Network Discharges – Unsatisfactory Intermittent Discharges	Enhancement	Reduce the number of unsatisfactory intermittent discharges (UIDs) from the sewer system to protect and enhance receiving waterbody quality.	
Sewer Network Improvements – Event Duration Monitors	Enhancement	Continue to improve our understanding of sewer network performance.	
Waste water Treatment Discharges - Pass Forward Flow Compliance	Enhancement	Provide equipment, understand performance and set our Routemap towards achieving total compliance with regulated water and waste water treatment activities to meet specific regulatory requirements and protect receiving waterbody quality.	
Waste water Treatment Improvements - RBMP3	Enhancement	Implement improvement actions defined by legislation driving new standards and enhancement of waterbodies to enhance receiving waterbody quality.	
Waste water Treatment Improvements – Bathing Waters	Enhancement	To protect and improve Bathing Water classification at Ayr South and Lower Largo where studies have shown SW asset impacts Sufficient Status.	
Waste water Studies	Enhancement	Conduct comprehensive studies and monitoring of water and waste water activities to assess capability, resilience and environmental impact to identify enhancement needs, aligning with RBMP4 and rUWWTD objectives. Investigate the effects of climate change on water and waste water services to determine necessary investments for climate adaptation.	

Outcome	AR3 / Enhancement	Description	Performance measure / Target
Bioresource - Resource Recovery	Enhancement	Maximise renewable energy generation from waste water bioresource, whilst mitigating outlet risk, and recovering resources from waste water bioresource, waste water and water treatment process streams where financially viable to do so.	Percentage of unsatisfactory sludge disposal is not greater than 0
IED Compliance	Enhancement	We Enhance Scotland's Environment: Industrial Emissions Directive (IED) compliance for existing Bioresource Treatment Centres, including PPC authorisations	
Water Asset Maintenance - Water Environment Monitor & Comply	AR3	Maintain water resources abstraction and compensation monitoring and environmental flow equipment to maintain compliance	Percentage of fully compliant abstraction and compensation sites. Percentage operability of abstraction and compensation monitoring and measurement equipment
Water Resources Compliance - automated compensation valves	Enhancement	Improve water resources abstraction and compensation monitoring and environmental flow equipment to improve compliance with the conditions of our environmental authorisations	Percentage of fully compliant compensation sites.
Water Resources Compliance - fish passes	Enhancement	Improve compliance with the conditions of our environmental authorisations and support RBMP objectives relating to the removal of barriers to the migration of fish	Compliance with conditions of our environmental authorisations and RBMP objectives

4.1.2 Building our approach for AR3

In SR21 Scottish Water introduced Management Approaches (MAs) for each asset type which set out policy of how and when we will intervene to manage assets. Our approach is directed by

our long-term outcomes, our ministerial objectives, current legislative requirements, and Board risk appetite statements which set the performance levels for critical and non-critical assets.

Management Approaches for each asset type have been maturing since 2023 to become economic appraisals. Impacts of climate change have also been considered, considering a range of climate hazards as identified through the Scottish Water Climate Change Risk Assessment.

Our management approaches include two primary considerations:

- **When to intervene** – considers the point in an asset's life when an intervention should occur. This includes whether to intervene after failure (responsively) or on a planned basis before failure and, if planned, at what stage to intervene to maximise the useful life of the asset while minimising the chance of failure.
- **How to intervene** – considers what intervention is used to restore asset condition / performance. This includes options for investigations and repairs, decisions on whether to refurbish or replace. Decisions on whether to enhance or improve the resilience of an asset when it is being refurbished or replaced are considered as part of a sub-outcome approach and made on a case-by-case basis as part of systems planning.

Table 8: Scottish Water definitions for intervention approaches

Intervention Approach	Definition
Responsive	The intervention is responsive when an asset has failed and is impacting service provision and/or we identify that an immediate, no-choice intervention is required.
Planned	The intervention is planned when an asset has a historic service failure, or we identify that an intervention is required, at our choice, to reduce the risk of asset failure.

Table 9: Scottish Water definitions for intervention types

Intervention Type	Description
Investigation	Activities focused on gathering asset information which is required in the decision-making process prior to one of the other asset intervention types. This includes inspection programmes to identify the condition of our assets.
Operational and Maintenance Activities	Processes and practices that support an asset to continue to operate and achieve its expected operational life that do not modify the asset itself. These can be responsive or planned.
Repair	Fixing an asset to ensure it can continue to operate and achieve its expected operational asset life (this includes replacement of component parts)
Refurbish	Renovation / overhaul of older or damaged equipment or replacement of parts of the asset to bring the asset back to a workable condition to extend the expected life of the asset
Replace	Replacement of an asset (equipment, unit, or process) when it is at the end of its serviceable life, or the asset has failed and cannot be repaired or

Intervention Type	Description
	refurbished (or it is not economic to do so), or when a change in performance or capacity is required.

Key management approaches informing the AR3 requirements for waste water assets relevant to this Technical Appendix include Waste water Treatment Works, Bioresource Treatment Centres, Sewerage Pumping Stations, pipelines and Combined Storm Overflows. The key management approach informing the asset maintenance requirements for Water assets relevant to this Technical Appendix is the Water Resources Environmental Monitoring and Compliance management approach.

The investment needs for asset maintenance have been developed primarily from a combination of analytical models (used to predict the overall level of investment required for a particular asset type) together with Management Approaches (used to identify the site / asset specific needs in line with policy criteria). In addition, some investment requirements are associated with routine inspection and maintenance programmes, with others developed from historical run-rates of ongoing activities.

Analytical models which consider previous maintenance requirements to predict future requirements are utilised to inform investment needs and plans at an asset type level. The process for the analytical models is described in the Investment Planning Technical Appendix.

Management Approaches have been used inform the criteria on which specific assets identified for intervention, with appropriate adjustments to further improve performance or ensure affordability. The criticality of assets and impact to service is considered in policy option selection.

Several assets have resilience included to allow for maintenance and equipment breakdowns. These assets may have responsive management approaches where the assets are fixed on failure. Some key assets also have critical spares to ensure no impact to service.

4.1.3 Building our approach for Enhancement

The requirements for Water Environment enhancement investment during SR27 originate from a range of confirmed needs relating to non-compliance, or represent a high risk to compliance, with regulatory standards, a number of which have been escalated through regulatory enforcement or commitment to be addressed within an agreed timeframe. In addition, some investment requirements are associated with Scottish Water policy positions to reduce risk or improve service where the current status is considered unacceptable from a customer service perspective or where progress is required to achieve long-term outcomes.

All investment requirements are aligned with the needs on the Approved Needs List, (established through the Investment Planning and Prioritisation Framework (IPPF) approach introduced for SR21) as agreed by stakeholders. The more defined Needs set out in this Technical Approach have been agreed with SEPA, with supporting evidence provided through a range of sources including needs statements and regulatory commitments

4.1.4 Building our approach for PFI Expiry

The nine Private Finance Initiative (PFI) contracts that were entered into by Scottish Water's predecessor authorities in the late 1990s and early 2000s involved the outsourcing of large elements of our waste water customer service provision. These design, build, finance and operate (DBFO) arrangements involved major investments to achieve the UWWTD requirements at Scottish Water treatment works which led to a step improvement in customer service with minimal impact on customer bills as the (private) finance spread the repayments of the up-front investment over the PFI contract period. Together with ongoing operation and asset maintenance costs these are repaid to the PFI operator as service fees (for a fixed service provision). These service fees (£160.2m in the year 2023/24) are met together with a smaller element of direct payments by Scottish Water.

In the SR21 period we have undertaken a best value assessment of the contractually available options to extend the Highland, Daldowie and Dalmuir PFI contracts and demonstrated that these should return to Scottish Water control without extension. These decisions were based on customer best value (i.e. an assessment of totex and risk), with stakeholders (including WICS) briefed on these decisions at the time.

For Aberdeen PFI, the opportunity arose to buy out the PFI early (in SR21) and was again taken on a customer best value basis. These assessments have shown us that the PFI layers of overheads and profit (reflecting the DBFO original requirement) are an inefficient structure for providing an ongoing service when the design, build and finance elements are no longer required.

The below summary illustrates the high-level comparison of PFI to SW ownership, pre and post contract expiry.

Figure 8: Illustrative summary of PFI vs. SW ownership comparison of PFI assets

Our planning assumption for SR27 is that customer best value will be delivered from the PFI contracts running to expiry with the assets and operations transferring to Scottish Water thereafter. This planning assumption will continue to be validated on a case-by-case basis as improved information becomes available. The PFI contract expiry mechanisms will be used to

realise the best possible inheritance for future service. Transition planning will manage the risks to customer service and safety during the changes. Future service plans reflect how ongoing customer service will be delivered after this out-sourced service is transferred to Scottish Water and as a platform for changing customer service requirements (e.g. growth and bioresource strategy).

For the four PFIs due to expire during the SR27 period only one (Ayrshire MSI) has a contract option to extend. As described above, our plan assumes that we will allow this PFI to expire at the end of its term with a transfer of assets and operations to provide service under Scottish Water. However, we will appraise the Ayrshire extension option for customer best value before a decision is due in March 2028 and share the findings with stakeholders (WICS).

Our plans reflect a reduction in the current totex in moving from the PFI arrangement (service fees) to asset ownership (AR3 element of PFI) and operation (Tier 1) under Scottish Water. Even if contract options to extend were available, it would be highly unlikely to reflect better customer value to do so. In addition, PFI contract extensions or other outsourcing arrangements are problematic for risk transfer and service change requirements. Our future service plans associated with these PFI assets are summarised below.

Table 10: PFI Future service plans

PFI (Expiry Date)	Future Service Plan for the SR27 Period
Daldowie PFI (2026 – SR21)	Maintain service beyond 2031 when the 5-year residual life ends at the Daldowie sludge dryer (fuel) plant that processes sludge fed via a pipeline from the six major treatment works (1,763,000 population equivalent) together with tankered imports from satellite sites in the Daldowie PFI catchment (AR3 element of PFI) Enhancement – The dated drying technology that currently provides the existing service is unsustainable in the long term because of risk to recycling routes, significant asset repair and replacement costs, high operating costs and because of the high carbon footprint of gas consumed in the dryers. Stopping gas usage at Daldowie represents 10% of our carbon footprint and is the biggest single contribution in the net zero Routemap. We plan to replace this with investment in an advanced anaerobic digestion (AAD) treatment centre reusing existing assets where possible, securing IED compliance and mitigating the significant risk to recycling material to agricultural land by destroying bioresource solids and creating an enhanced treated product (see West Central Bioresource Technical Appendix).
Dalmuir PFI (2026 – SR21)	Maintain service for around 540,000 population equivalent of the Greater Glasgow conurbation (AR3 element of PFI) Seek benefits from previous (and potential further) reductions in catchment (network) infiltration. Consider a change to the treatment process as invest to save opportunity and to improve service resilience.
Almond Valley, Seafield and Esk Valley PFI (2029)	Maintaining service for around 956,000 population equivalent in the Almond Valley, Edinburgh and the Esk Valley areas (AR3 element of PFI) Enhancements – provide for growth in customers across all AVSE catchments, upgrade Seafield to secure IED compliance and support

PFI (Expiry Date)	Future Service Plan for the SR27 Period
	bioresource strategy ambition. Investment is included to reduce the risk of malodour (sludge handling improvement) which will be delivered pre-PFI expiry.
Tay PFI (2029)	Maintaining service for around 239,000 population equivalent in Dundee and Angus areas (AR3 element of PFI) Enhancements – secure IED compliance and support bioresource strategy ambitions
Moray PFI (2031)	Maintaining service for around 81,000 population equivalent on the Moray Coast (AR3 element of PFI) Enhancements – improve sludge handling to support bioresource strategy.
Ayrshire (MSI) PFI (2032)	Maintain service for around 397,000 population equivalent in the Meadowhead, Stevenston and Inverclyde catchments (AR3 element of PFI) Enhancements – Redirect sludge to new west central bioresource treatment centre.
Levenmouth PFI (2040)	Continue to provide service for around 198,000 population equivalent in the south-central Fife area through the PFI arrangement.

Outsourcing a full totex O&M arrangement is considered unlikely to offer best value due to high transaction costs, difficulty of meaningful risk transfer, requirement to maintain (Scottish Water) as provider of last resort, the service risk inherent in the change period and the significant IRR that outsourcing providers would require.

On the above basis (and planning assumption of transfer of ownership to Scottish Water), assets transferring to Scottish Water ownership have also followed the below optioneering process.

Further information can be found in the West Central Bioresource Technical Appendix.

4.2 Optioneering

4.2.1 Optioneering Process

The investment scenario options are built based on three key principles

- Deliver for our existing customers: this includes carrying out essential works to maintain existing asset performance, customer experience, and health and safety, meeting legislative, regulatory and community standards and progress towards Net Zero. It also involves investing in asset enhancement to improve resilience, reliability and sustainability of service.
- Support new connections: providing adequate standards of service to our new customers
- Consider future customers: replacing ageing assets now to ensure resilience of supply to future customers, preventing unsustainable costs being passed on to them in future.

We use our investment hierarchy approach to develop a balanced investment portfolio across all investment areas, to prioritise projects and programmes based on our objectives, customer expectations, stakeholder needs and available funding. This approach is outlined in the table below, which links the principles with three investment need categories. Category 1 covers 'must do' investments, which are required as a minimum to meet customers' expectations on level of service. This category accounts for the majority of the investment. Category 2, which accounts for the next biggest share, includes 'should do' investments aimed at delivering regulatory compliance and meet the expectations of SEPA. Category 3 covers investment choices to improve service for existing customers, enabling growth, replacing ageing assets to protect service levels for future customers. The investment proposed for Water Environment falls under the Categories 1, 2, 2a, 2b and 3.

Table 11: Our SR27 investment hierarchy approach

	Customer & performance centric investment needs	Examples	Investment allocation approach		
Deliver for existing customers	**1** **Maintain core service performance for existing customers**	Essential works to maintain existing asset performance, customer experience and health & safety	Minimum needed to maintain service. Already prioritised significantly so budget reduced as a last resort, after all other non-discretionary expenditure reduced to minimum levels	AR3 – asset category 1,2&3	Core expenditure
	2a **Meet current regulatory & community commitments**	Meet undertakings, legislative (RBMP3), regulatory (water quality), Improving Urban Water (IUW), community (e.g., Seafield odour.)	Named sites agreed with regulators	Enhancement	
	2b **Meet current regulatory & community expectations**	Water Treatment: HAA at risk Developing schemes – improved disinfections, Run to Waste.	Allocated portion of Enhancement funding	Enhancement	Remaining allocation prioritised within these areas
	3a **Improve service for existing customers**	Investing in asset enhancement to strengthen resilience, reliability and sustainability of service	Allocated portion of Enhancement to support Customer service issues (internal flooding and low pressure, rainwater management partnerships)	Enhancement	
Support new connections	**3b** **Provide a service for new customers**	New development and connections, including temporary works	Adress know systems that has confirmed development.	Enhancement / matched funding*	
Consider future customers	**3c** **Replace long-life assets for future customers**	Proactively replacing aging assets to tackle back log and underlying issues; water mains (Asbestos cement pipes), civil infrastructure with remaining lifetime of 40-60 years). Aim to prevent unsustainable costs being passed on to future customers	Consequential allocation as there is high demand from existing assets that impact current service. FD & investment scenarios do specify investing in long-life asset replacement. Future customer needs re-prioritised	AR3 – category 2 Civils and water mains, pressurised sewers	Additional core expenditure

*Cat 3b Match funding Income received that is allocated for Part 3 infrastructure improvements to support new connections. In addition, service relocation allocation is required to move our assets when required by a 3rd party (part funded from external sources)

An initial unconstrained investment scenario has been developed to fulfil all the principles outlined in Table 11 ensuring the delivery of all essential requirements to maintain current levels of service, as well as enhancing performance while minimising risk. From this unconstrained investment scenario, additional investment scenarios have been derived by strategically reducing or eliminating investments in certain areas, with the exception of Category 1. These "constrained" scenarios aim to achieve lower costs, but come with associated risks, as the limitation on investment may impact performance improvements and compliance with regulatory requirements, ultimately affecting customer service enhancements.

4.2.2 Unconstrained Options

The development of investment planning scenarios is a crucial step in ensuring that strategic and financial objectives are aligned with the Water Sector Vision and our Long-Term Strategy. The initial step involved generating a comprehensive suite of options to encapsulate potential outcomes and investment needs. The unconstrained options include all the necessary investment demands to meet the current Draft Ministerial Objectives 2027-33, covering legislative requirements, commitments to stakeholders, and customer priorities.

Table 5 outlines the unconstrained investment demand for Water Environment. The investment programmes focus primarily on maintaining current levels of service and addressing areas of non-compliance against regulatory standards subject to regulatory commitment, whilst reducing unacceptable levels of risk to supplies.

The initial phase of scenario planning involved creating a comprehensive range of options to encompass potential outcomes and investment requirements. The unconstrained options incorporate all potential investment options, with a focus primarily on maintaining all assets involved in Water Environment.

To identify the best suite of interventions from the above options we have undertaken an optioneering process, applying testing across various performance metrics and compliance requirements to form a series of constrained options, the investment scenarios.

4.2.3 Constrained Options: Draft Business Plan

The constrained investment scenarios were generated from the unconstrained investment options by eliminating, reducing or removing some of the investments. The three constrained investment scenarios were:

- **High Scenario**: The investment reduces risk with a CPI + 6.5% per annum, maintaining the service levels achieved at the exit of SR21
- **Working Reference Scenario**: It is the “reference” scenario, with a CPI + 4% per annum, the investment allows maintenance of the service levels achieved at the exit of SR21, meeting Ministerial Objectives albeit accepting more compliance risk
- **Flat Charges Scenario**: the reduction in investment under this “flat charge” scenario, with a CPI + 0% per annum, triggers reduced service levels compared to exit of SR21, with notable overall service impacts as measured by OPA and CEM.

4.2.4 Chosen Option at SR27 Draft Business Plan

The investment scenarios were tested against various performance metrics and compliance requirements to validate the scenarios' robustness and ensuring they aligned with ministerial objectives, customers and stakeholders’ expectations, Scottish Water’s Long-Term Strategy and contributes to the delivery of the water sector vision, climate change adaptation plan, SW Board aspirations for 2033 and risk appetite. Based on the testing outcomes, we progressed with the Working Reference scenario (CPI+4%) as the basis for our Draft Business Plan submission.

4.2.5 Further refinement: SR27 Final Business Plan

Following further engagement and feedback from a broad range of our stakeholders on our draft business plan, we have further refined our SR27 investment to reflect feedback, with two key themes:

- **Affordability**: ensuring that we are not putting a disproportionate burden on the bills of current customers – and that we are doing everything we can to limit impacts on bills; and
- **Ambition:** responding to feedback on our investment focus and ensuring it is adequately ambitious in the areas that matter to our customers and stakeholders.

Responding to this feedback has meant that we need to make further trade-offs across our SR27 investment portfolio. We have done this by refining our reference scenario, through careful rebalancing of investment across AR3, Regulatory Commitments and Service Choices. We have

described, in further detail, the steps we took as part of this refinement, and the impacts on our Final Business Plan in the Investment Planning Technical Appendix.

Our final chosen option is a further refined version of the Reference Scenario presented in the Draft Business Plan submission.

We did this across all investment areas by:

- Refining the available budget associated with a CPI+3.3% pa customer charge profile, re-running the Financial Model using updated and refined modelling assumptions and the application of the most up to date top-down global efficiency factors.
- We incorporated feedback from sector stakeholders, clarification of Regulator requirements, customer research feedback and further considering the requirements of the Draft Ministerial Objectives 2027-33. Decisions were required to navigate these limitations while ensuring a balanced investment plan.
- Several strategic options were considered to manage budgetary constraints and investment reallocation. These included potential further removal of demand in the asset repair, refurbishment, and replacement (AR3) programme areas or reduce outcomes where there is service choice. As a result, there were upwards adjustments in some areas, and downwards adjustments in others.

4.3 Overall Strategic Option Chosen for SR27

Our SR27 investment constitutes a foundational step in delivering our Long-Term Strategy for the water environment. We will seek to minimise deterioration in baseline performance, make targeted improvement in the number of UIDs, begin to futureproof our assets and the service they deliver, and understand the further enhancement requirements to be addressed in SR33 and beyond.

4.3.1 Waste Water

The SR27 strategy for waste water is summarised below:

- Undertake targeted and proactive repair, refurbishment and/or replacement (AR3) of existing waste water assets to reduce the risk of performance deterioration and subsequent impacts to their service of protecting the water environment
- Reduce the number of high and medium priority UIDs within the UID Register aiming to reduce the overall number of UIDs by 150 within the SR27 period
- Continue detailed design development work for UIDs in the Water of Leith catchment with a view to identifying the most appropriate mix of interventions and an evidenced cost / benefit analysis to support investment in SR33 and beyond
- Utilise improved information on Intermittent Discharges to refine and update UID status and adjust prioritisation accordingly to support investment in SR33 and beyond
- Investigate potential UIDs by utilising improved data from monitoring and modelling to understand our PFF performance and compliance position at waste water treatment works, sewage pumping stations and CSOs
- Undertake an extensive study programme to identify future service risks and determine future enhancement requirements and priorities for waste water activities post-SR27
- Increase the monitoring and modelling capabilities of our waste water asset base through deployment of instrumentation and models, utilising data and intelligence in decision-making.
- Undertake prioritised system planning to ensure that comprehensive plans are developed for the most complex systems (referred to here as the Drainage Operational Area). The

plans will be co-created and will outline over 25 years how we will provide a resilient and sustainable service that protects the environment both now and in the future.

- Focus on reducing the number of significant EPIs (Cat 1 & 2) which occur on our waste water network through increased use of intelligence, including real time monitors and more targeted planned maintenance.

4.3.2 Bioresources

The SR27 strategy for Bioresources is summarised below:

- Maximise renewable energy generation from waste water bioresource, while mitigating outlet risk, and recovering resources from waste water bioresource, waste water and water treatment process streams where financially viable to do so.
- Develop and deliver a replacement bioresource treatment centre at Allanfearn (Inverness) to replace the failed anaerobic digester assets which returned to SW when the PFI contract ended. This facility will provide sufficient treatment capacity for the highland area
- Develop and deliver plans to generate energy and maximise value at Daldowie Bioresource Treatment Centre (more information can be found in the West Central Bioresources Technical Appendix).

4.3.3 PFI

Where assets have returned to Scottish Water ownership in SR21, the scale of investment demand in SR27 has been developed through the optioneering process described in Section 4.1.2.

Our planning assumption for PFI contracts expiring in SR27 is that best value for customers will be delivered from the contracts running to expiry with the assets and operations then transferring to Scottish Water. This planning assumption will continue to be validated on a case-by-case basis as improved information becomes available. The PFI contract expiry mechanisms will be used to realise the best possible inheritance for future service. Transition planning will manage the risks to customer service and safety during the changes. Future service plans reflect how ongoing customer service will be delivered after this out-sourced service is transferred to Scottish Water and as a platform for changing customer service requirements (e.g. growth and bioresource strategy).

As such we have included PFI exit fees, AR3 investments and Tier 1 costs for the assets under this PFI (from the time of contract expiry) as part of our SR27 investment plan.

4.3.4 Water Resources Environment Monitoring and Compliance

The SR27 strategy for water service regulatory abstraction and impoundment is summarised below:

- Undertake targeted verification and repair/ refurbishment/ replacement of monitoring and measurement equipment (AR3) for abstraction and collection of water and maintain environmental flow provision assets to reduce risks of over-abstraction from the water environment and comply with regulatory reporting requirements
- Work towards long- term outcomes of improving compensation and abstraction equipment to ensure compliance with our EASR permits (formally CAR licences) and make improvements aligned with the River Basin Management Plan where cost beneficial and technically feasible e.g. investment in automated valves to improve reservoir compensation compliance and investment in fish (eel) passes
- Develop a strategy to focus on improved compensation compliance, building on our understanding of how our assets respond to variable weather conditions

- Continue to work with SEPA on Compliance Improvement Plans for non-compliant sites
- Continue to work with SEPA on actions/projects to meet RBMP objectives
- Engage with SEPA on prioritisation of investment
- Engage with SEPA on authorisation change requirements for non-compliant sites
- Involvement in consultation for RMBP4

4.3.5 SR27 Investment Plan

We have categorised the SR27 investment plan by the investment hierarchy category as per our investment planning strategy.

Table 12: SR27 Investment Plan by investment hierarchy (including PFIs transferred)

Investment Type (Primary)	Investment Hierarchy	Final Business Plan Reference Scenario £m (24/25)
AR3	Cat 1	1,301[7]
Enhancement	Cat 2a - Regulatory	489
Enhancement	Cat 2b - Regulatory	119
Enhancement	Cat 3a – Improve Service	5

4.3.6 Performance Outcomes

The outcome measures marked with an asterisk are those that we consider there is scope to align with the measures in England and Wales. We are exploring this further. We have included investment to reduce the number of UIDs by 150 over the SR27 investment period. The total number of UIDs in the register is dynamic and can increase and decrease as new UIDs are added or removed following investigation or intervention or by using new criteria for assessing status. The numbers below presume that the UID register will have 862 entries at the end of SR21 and that this will be reduced to 712 by the end of SR27 (150 removals). We anticipate that the actual number of UIDs at the end of SR21 will be fewer than 862 as cleansing activities currently underway are concluded. Specific UID locations to be addressed in SR27 will be dynamic (as solution scopes and costs are confirmed) and changes will be agreed with SEPA through regular review.

Table 13: The outcomes we are seeking to achieve in SR27

Level of Service	Unit	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Percentage compliance with SEPA discharge permits	%	96.37	96.37	96.37	96.37	96.37	96.37

[7] £201m of this £1,301m is associated with PFI return sites

Level of Service	Unit	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
[Measure(s) to be proposed] UIDS	Number	823	800	793	773	747	712
Number of serious pollution incidents* (W & WW)	Number	8	7	7	6	6	5
The total number of pollution incidents from a WW asset affecting the water environment*	Number per 10,000kms length of sewers	34.8	34.8	34.8	34.8	34.8	34.8
Percentage unsatisfactory sludge disposal	%	0	0	0	0	0	0
Net Zero Emissions	tCO2e	306,930	266,522	255,559	249,685	209,158	198,126

4.4 Risks and Opportunities

Horizon scanning has identified key risks and challenges which do, will or could influence our ability to maintain service to the environment. We have also identified opportunities that may help us overcome challenges we have identified throughout this document.

4.4.1 Risks

Ageing Infrastructure

Significant investment has been made within our waste water service over the last three decades to meet new legislative requirements (UWWTD, Bathing and Shellfish Water Directives and WFD). Many of these new assets are now approaching the end of their design lives and, without sufficient repair, refurbishment and/or replacement (AR3), the risk of service failures or reduced service performance will increase. The service provided by PFI assets returning to Scottish Water ownership will also be a factor of the asset condition upon hand back.

Climate Change and Extreme Weather Events

The anticipated increase in climatic variability and subsequent increase in the frequency and magnitude of extreme weather events and periods of prolonged drought will increase the risk of service failures or reduced service performance. This has the potential to affect both water and waste water services.

Urbanisation and Population Growth

Population growth and changing spatial distribution of population will increase the demand for housing and associated water and waste water infrastructure. The increased proportion of impermeable surfaces will increase rainfall runoff and hydraulic loading to the sewer system leading to an increased risk of sewer flooding and increases in overflow events. There is further discussion on how we plan to manage this risk within the Managing Quantity of Flows Technical Appendix.

Environmental Regulation

The emergence of new environmental legislation (e.g. the recast Urban Waste Water Treatment Directive rUWWTD), or the revision of existing environmental legislation e.g. River Basin Management Planning (RBMP), will change how our water and waste water service is regulated. This may require investment to meet tighter authorisation standards to meet enhanced environmental standards.

Community Engagement and Awareness

Increased public and political scrutiny of the impact of water and waste water activities on the environment could result in the need for transformational change to improve our environmental performance. This would be compounded by alignment with the policy adopted by English and Welsh water companies of focusing on reducing the number of overflow events without consideration of resultant environmental benefit. However, this also provides an opportunity for greater engagement with customers and communities on their role in reducing environmental harm and influencing customer behaviours (e.g. reducing potable water use, preventing disposal of inappropriate items to the sewer).

Changes to Compliance Reporting

SEPA is developing a new approach to compliance assessment, and, from 2026, the Environmental Performance Assessment Scheme (EPAS) will replace the Compliance Assessment Scheme that operated until the Covid-19 pandemic. The coverage of the new scheme is significantly broader than our current compliance focus under the OPA regime. This will mean that Scottish Water's reported compliance position could change even although performance levels and environmental impact risks are maintained in SR27. Shadow reporting will be undertaken in SR21 and SR27 to assess the scale of any change to our reported compliance position.

Recycling Bioresources

In SR21 we have been utilising historic open cast coal mines as an outlet for our bioresources. By using our bioresource on these sites we have provided land suitable for tree planting and ultimately have been supporting the Scottish Government's Net Zero target. However, during SR27 we will have restored all of these sites and, therefore, biosolid recycling could become a more significant challenge. We have plans to address this risk in SR27 by investing in a bioresource treatment facility in Glasgow that will produce enhanced treated biosolids suitable for agricultural recycling.

Exclusions from investment demand:

- No specific investment demand has been allocated to resolve underlying asset incapability or to enhance the resilience of WWTWs to the impacts of climate change on flow and load variability
- RBMP4 is currently in development and will be consulted upon during 2026 and 2027 prior to formal publication in December 2027. At present it is not possible to ascertain the objectives to be implemented (ie controls on micropollutants or pharmaceuticals) and the subsequent investment required to achieve these. As such, no investment demand beyond study and surveillance has been allocated for RBMP4 within SR27
- The rUWWTD came into force for the EU on 1st January 2025. A Scottish Government policy position on whether Scotland will align or diverge from the Directive is currently being drafted and consulted upon. Costs and benefits of full alignment, of a risk-based approach to

alignment and of full divergence are being assembled in support of this consultation. However, until a policy position is agreed and implemented, no investment demand has been allocated for alignment with the rUWWTD within SR27. Proposed UID improvements and activity set out to Managing Quantity of Flows may result in some improvement against rUWWTD requirements

- No specific investment demand has been allocated to reduce the frequency of CSO spills to designated Bathing Waters or other asset improvement to meet any enhanced bathing water classification ambition. Investment is SR27 is limited to delivering improvement where our assets negatively impact bathing waters failing to achieve sufficient status and carrying out new studies where directed. Ambition around the future designation of bathing waters and classification change is still to be defined by Scottish Government and further objectives may be included in RBMP4

Unit cost increases – In order to deliver on our ambition of making satisfactory all high priority UIDs by the end of SR27 (excluding those in the Water of Leith catchment where further development work will be required) and supporting our long term strategy of addressing all UIDs by 2050. we will need to remove 91 high priority and 59 medium priority UIDs from the UID register. We are forecasting that these needs would need to be delivered for at £269 million; i.e. each overflow would need to be made satisfactory at an average cost of c£2 million. However, there is a risk that, as the design of these schemes mature, the actual unit cost projected is greater than that forecast.

Delivery timescales – The Water of Leith catchment strategic UID solution development work will continue throughout SR27 in order to identify the most appropriate mix of interventions and an evidenced cost / benefit analysis to support investment in SR33 and beyond. Development work has yet to conclude on some other strategic UID and flooding solutions (Daldowie, Shotts and Swinstie) and it is possible that unforeseen problems will be encountered and the process of identifying preferred solutions and delivering improvement to realise benefits will be delayed. We will update stakeholders quarterly on UID programme progress.

4.4.2 Opportunities

Digital Transformation – Greater availability of real time performance data, the application of data analytics and enhanced modelling capability to provide new intelligence and insight could transform the efficiency and performance of the waste water service and enhance environmental performance.

Innovation of automated infrastructure – Compensation flow compliance continues to face challenges due to factors such as raw water infrastructure limitations, the need for manual valve adjustments by staff, remote asset locations, the pace of investment delivery, and operational incidents. To address this, a project is planned to trial automated compensation valves with enhanced capabilities for handling variable flows at selected reservoir sites. The results will guide SR27 investment decisions.

Artificial intelligence and data analytics – As more Event Duration Monitors (EDMs) and Sewer Level Monitors (SLMs) are installed, the availability of sewer performance data increases through our maturing Waste Water Intelligent Network (WWIN) capability. To make the most of this, we aim to enhance the use of data analytics and artificial intelligence to identify trends and take proactive measures to prevent overflow events. This includes exploring remote cameras on overflows and leveraging machine learning to prioritize maintenance and clean-up efforts. Additionally, utilising near and real-time environmental data, like that collected through the Forth

Environmental Resilience Array (Forth-ERA) living laboratory, will help shape long-term strategies for safeguarding and improving the water environment.

Once our new Advanced Anaerobic Digestion (AAD) bioresource treatment centre in west central Scotland is delivered, we will become nearly 100% reliant on the agricultural land outlet for waste water biosolids. Recycling biosolids to agricultural land currently remains the most sustainable option, but challenges like recent guidance limiting recycling rates, changes in public perception and the requirement to monitor, assess and manage risk from micropollutants all pose risk to this outlet. We will continue to review emerging research and engage with Water UK, UKWIR and other industry bodies to increase our understanding of emerging technologies and the alternative products and marketplaces that these represent. We will develop different approaches that will allow us to move away from the agricultural outlet when this represents the best balance of risk and value.

Advanced Thermal Conversion (ATC) technologies - In collaboration with suppliers and UK water companies, we are working to gain deeper insights into how ATC technologies operate and to understand the products and mass / energy balance that these produce. This knowledge will help us identify target markets, collaborate with SEPA to create regulatory and commercial pathways, and develop value chains for recovered resources. Additionally, these materials will be used to explore opportunities for nutrient recovery from char and ash, while informing waste treatment solutions for small-scale rural and island communities.

Emerging bioresource technologies – We will trial technologies to evaluate their benefits. This includes technologies that reuse screenings and grit removed from treatment works influent.

Nature-Based Solutions (NbS) – During SR27, as we work on removing surface water from the network, we will continue to investigate how NbS can be used to treat surface water and protect the quality of receiving waterbodies. This effort will involve close collaboration with delivery partners and the supply chain to ensure the necessary expertise for designing, building, and maintaining NbS is available in SR27 and beyond. We will continue to promote and consider the applicability of NbS to meet the demands of catchment growth and enhanced standards at our WwTW.

Monitoring – Further research is needed to understand the interactions between waste water networks and treatment systems. This includes evaluating the impact of widescale surface water removal and improved water efficiency on network performance, influent flow variability to waste water treatment works (WWTWs), treatment performance, and on compliance and environmental risk. Treating trade discharges at their source could also reduce the load on WWTWs, potentially eliminating the need for investments to address asset incapability and lack of resilience and reducing the need for enhanced treatment at WWTWs.

Proactive solutions to enhance resilience and compliance – In order to achieve total waste water treatment works compliance in a changing climate, we need a greater understanding of both the permanent and shorter-term proactive solutions that can be deployed to enhance resilience and manage compliance during adverse weather events. We will seek to address this knowledge gap through undertaking a technology horizon scan, trialling viable technologies and working as an integrated team comprising of planning, operations, engineering and innovation to consider the practicalities of deployment as part of adverse weather response planning. To ensure we fully utilise the capability of our existing asset base, we have identified a knowledge gap on the role of microbiology within the waste water treatment process in performance optimisation,

and the mechanisms by which we can encourage efficient and effective treatment and breakdown of pollutants.

Leveraging partnerships – To enhance the waste water treatment asset base, we will continue working with academia, other water companies, and delivery partners to identify innovative technologies and practices. Our focus will be on mapping technologies that align with our strategic goals, such as low-energy, low-emission, and low-chemical alternatives to conventional treatment, and exploring viable deployment options.

4.5 Investment Programmes

We have set out the following sections by asset group level and separated by AR3 and Enhancement investment. The majority of the investment within this water environment technical appendix is associated with our waste water assets but, as described in the sections above, there is a small element of investment associated with assets involved in the management and supply of drinking water (section 4.5.2).

4.5.1 Waste Water Programme

4.5.1.1 Waste Water Treatment

The table below highlights the investment requirements for the waste water treatment asset group (total £983m), covering the AR3 (asset maintenance) which totals £813m across the full asset base. The enhancement cost totals £170m and is associated with studies, moving towards understanding of wider aspects of permit compliance and addressing impacts from Scottish Water assets (RBMP3 and Bathing Waters) where studies have been undertaken and needs are understood.

Table 14: SR27 Investment for Waste Water Treatment Sites

Spend Type	Management Approach		Description	Investment Area	Reference Scenario £m (24/25)
	Reference	Name			
AR3	MA057	WWTW Ancillaries	Waste water ancillaries (other)	Maintain Treatment Ancillaries	38
			Maintain treatment ancillaries including tanks, buildings, instrumentation, washwater, chemical dosing, sampling, tertiary lagoon		121
	MA017	WWTW Inlet Works	Maintain inlet works including inlet, screening, grit removal and storm tanks.	Maintain Inlet Works Processes	124
	MA042	WWTW Primary Treatment	Maintain primary treatment including tanks, wet well, pumps,	Maintain Primary Treatment Processes	77

Spend Type	Management Approach		Description	Investment Area	Reference Scenario £m (24/25)
	Reference	Name			
			instrumentation, control & monitoring, buildings, screenings, cranes, sampling		
	MA036	Screw Pumps - WW	Maintain screw pumps	Maintain Screw Pumps	26
	MA043	WWTW Secondary Treatment	Maintain secondary treatment including tanks, septic tanks, activated sludge assets, wet well, instrumentation, BAF filter, reed bed	Maintain Secondary Treatment Processes	203
	MA021	Temporary Process Units	Replacement of temporary chemical dosing equipment	Replacement of Temporary Assets	23
	MA108	PFI (Private Finance Initiative)	AR3 associated PFI return sites	AR3 associated with PFI return sites	201
Enhancement	MA084	WWTW Improvements	Improve Bathing Waters	WWTW improvements at Ayr South and Lower Largo	20
			Phosphorus, BOD and ammonia to be reduced at WWTWs where environmental impact has been confirmed. These form part of draft RBMP3 objectives	WWTW Improvements	58
			Reduce risk of malodour at Seafield WWTW	Reduce the risk of environmental pollution at named sites	14
			Provision of appropriate equipment and analysis to demonstrate pass forward flow (PFF) compliance during overflow events at WWTW and that flow is maintained during the event duration.	WWTW Improvements	65

Spend Type	Management Approach		Description	Investment Area	Reference Scenario £m (24/25)
	Reference	Name			
			Increase total flow to full treatment at Waste water treatment works		14

4.5.1.2 Waste Water Bioresource Treatment

The table below highlights the investment requirements for the waste water bioresource treatment asset group, covering the AR3 asset maintenance cost of £111m at sites across Scotland. The enhancement costs of £46m is to support meeting requirements of the Industrial Emissions Directive at all bioresource treatment centres (SW and PFI) where digestion activities will continue over SR27 and for the enhancement element of replacing digestion equipment at Allanfearn (Inverness) which was demolished on return from PFI.

In the implementation of the Bioresource Strategy we have developed our approach to the West Central area of Scotland as part of the Scotland-wide bioresource system, comprising a new AAD Bioresource Treatment Centre at Daldowie and associated bioresource dewatering hubs at WWTW in the wider area. Replacing the thermal drying technology installed through the expiring PFI arrangements, as it reaches the end of its 5-year residual life will provide a safe, reliable and sustainable service, producing quality product to support recycling to agricultural land, maximising energy generation and the value of our bioresource. The West Central Scotland Bioresource Technical Appendix explains the justification for this investment in more detail. Our planning assumption is that the new facilities will be operational from 2031 and that pellet production to support energy from waste use will continue until that time.

Table 15: SR27 Investment for Waste water Bioresource Treatment Centres

Spend Type	Management Approach		Description	Investment Area	Reference Scenario (24/25)
	Reference	Name			
AR3	MA024	Sludge Treatment Centres	Maintain sludge treatment centres to ensure products support SR27 outlet availability. Includes thickening, dewatering, digestion & stabilisation. Sludge storage, return liquor treatment, thermal drying and pelletising	Maintain Bioresource Treatment Centres	111

Spend Type	Management Approach		Description	Investment Area	Reference Scenario (24/25)
	Reference	Name			
Enhancement	MA077	We Enhance Scotland's Environment	Industrial Emissions Directive (IED) compliance for existing Bioresource Treatment Centres Interventions to mitigate environmental risks (air, land, soil and water)	Industrial Emissions Directives (authorisation under PPC regime).	41
	MA109	Bio-Resources	Allanfearn WWTW – Sludge Digesters	Highland sludge strategy	5[8]

4.5.1.3 WTW Sludge Storage

The table below highlights the investment requirements for WTW sludges to a cost of £17m, investment is to develop solutions to mitigate long term sludge storage sites and ensure sustainable outlets are available for future disposal of WTW sludges.

Table 16: SR27 Investment for WTW Sludge Storage

Spend Type	Management Approach		Description	Reference Scenario (24/25)
	Reference	Name		
Enhancement	MA085	Long Term Sludge Storage	Sludge removal and remediation work to sludge lagoons at Turret WTW	11
			Develop alternative sludge disposal route options for WTW on Orkney to allow cessation of operations at Big Breck and Westray land fill sites; as part of long-term Orkney sludge strategy.	6

4.5.1.4 Waste Water Sewer Networks

The table below highlights the investment requirements for the sewer network asset group, covering the AR3 asset maintenance cost of £135m to maintain sewage pumping station sites across Scotland There are enhancement costs of £278m associated with the improvement of Unsatisfactory Intermittent Discharges (UID) to support our Long-Term Strategy ambitions and for additional overflow event duration monitors to increase coverage of intermittent discharges

[8] Allanfearn has AR3 investment in addition to the Enhancement investment

(both network and WWTW overflows) to approaching 100%, providing data on overflow events and enhanced performance intelligence.

Table 17: SR27 Investment for Waste Water Sewer Networks

Spend Type	Management Approach		Description	Investment Area	Reference Scenario £m (24/25)
	Reference	Name			
AR3	MA023	Sewage Pumping Stations	Maintain sewage pumping stations (SPS) - activities to be carried out on Mechanical, Electrical, Instrumentation, Controls, Automation (MEICA) & civil assets	Maintain Sewage Pumping Stations	135
Enhancement	MA005	UID	Reduce the risk of environmental pollution from overflows – Develop and deliver solutions for 150 priority UIDs (agreed with SEPA) for aesthetics & completing UID water quality objectives set out in RBMP3	Unsatisfactory intermittent discharges	269
	MA107	Intelligent Networks	Deploy, ~1,300 Event Duration Monitors (EDM) to increase ID coverage towards 100%	Network monitoring	9

Scottish Water have around 900 UIDsacross our waste water system (network and WWTWs) and have agreed with SEPA a categorisation and prioritisation approach to deliver improvement in line with our Long-Term Strategic ambition to address UIDs. High priority UIDs are those confirmed as causing a water quality impact or having an unsatisfactory aesthetic impact and a high number of public complaints. Our SR27 investment in UIDs builds on the successes of the SR21 Improving Urban Waters programme and uses the same approach.

Our Plan is to address all remaining 91 high priority UIDs (excluding the Water of Leith catchment where further development work is required) and 59 medium priority UIDs in SR27, removing 150 UIDs from the register in line with our strategic ambition. In parallel, Scottish Water will complete a cleanse of around 300 legacy UIDs included in the register, with the expectation to reduce UID numbers further. UID investment demand will be allocated as follows:

- Complete 18 Water Quality projects as part of Improving Urban Waters SR21 programme, that have a deadline of December 2027,
- Complete development activity to identify best value approach to addressing high priority Water of Leith UIDs (16) beyond SR27.
- Deliver solutions to address the remaining 73 high priority aesthetic UID needs,
- Complete development work and deliver solutions for 59 medium priority UID needs to be agreed with SEPA
- Move towards 100% EDM coverage of intermittent discharge locations. The planning phase will identify the best locations for these monitors and will consider the use of our hydraulic modelling capability as 'virtual monitors' at difficult to access locations This will significantly enhance our intelligent network capabilities. By improving our understanding of catchment hydraulics and performance, Scottish Water can increase the accuracy of our hydraulic model predictions, including forecasting and insights into overflow events and confirmation of UID classification and priorities.

4.5.1.5 Waste Water Other

Table 18 highlights the investment requirements for region-wide asset groups across the waste water asset base, covering the AR3 asset maintenance cost of £236m across Scotland. There are £54 million enhancement costs linked to our net zero and environmental targets through two key investments:

- Conducting studies to better understand the impact of waste water discharges on the water environment (£49m)
- Understanding level of treatment resilience as a result of climate change impacts and other plausible hazards (£5m)

Table 18: SR27 Investment for other Waste water asset groups

Spend Type	Management Approach		Description	Investment Area	Reference Scenario £m (24/25)
	Reference	Name			
AR3	MA013	SCADA	Maintain Supervisory Control and Data Acquisition (SCADA) - Waste water Treatment	Maintain Supervisory Control and Data Acquisition (SCADA)	41
	MA044	Telemetry	Maintain Remote Telemetry Unit (RTU), communication, data quality testing and remedial actions & telemetry rationalisation	Maintain Telemetry Systems	11
	MA049	WWTW Odour Equipment	Maintain odour equipment	Maintain Odour Equipment	13
	MA118	MCC	Maintain Motor Control Centre (MCC) - Waste water (Network & Treatment)	Maintain Motor Control Centre (MCC)	32
	MA091	HV	Maintain High Voltage (HV) - Waste water (Network & Treatment)	Maintain High Voltage (HV)	46

Spend Type	Management Approach		Description	Investment Area	Reference Scenario £m (24/25)
	Reference	Name			
	MA120	Water & Waste water - Property and Access	Maintain fencing/gates	Maintain Site Property and Access	52
	MA068	Statutory & Planned Maintenance	Statutory Maintenance items - Waste water Treatment assets	Maintain Statutory & Planned legislative compliance	9
	MA068	Statutory & Planned Maintenance	Fixed wire electrical systems - Waste water treatment assets	Maintain Statutory & Planned legislative compliance	19
	MA068	Statutory & Planned Maintenance	ATOM waste water assets	ATOM Waste water Assets	13
Enhancement	MA076	Waste water Studies	Studies to understand the impact of waste water discharges on the water environment to inform RBMP4 and recast UWWTD implementations (network, secondary, tertiary and quaternary treatment needs). Understand level of treatment resilience as a result of climate change and other plausible hazards	Waste water Studies	54

4.5.2 Our Investment Programmes – Water

A key part of the investment programme will continue to be delivered under the Water Resources Environmental Monitoring and Compliance Management Approach. This constitutes AR3 investment to maintain and improve authorisation compliance and SEPA reporting requirements. It is further divided into three areas:

- Maintenance of abstraction and compensation control or monitoring equipment.
- Verification monitoring and measurement equipment & weir calibration.
- Maintenance activities on assets where purpose is solely to deliver environmental flows related authorisation compliance (compensation valves, fish passes, measuring weirs etc.).

The benefit of this investment is that it will maintain authorisation compliance, reduce the potential for environmental incidents, reduce non-compliance risks and gives assurance to SEPA that the asset maintenance programme is in place and delivering. It is already an established programme (10 years) where the contractor works closely with Scottish Water's Water Resources Team.

As Scottish Water improve our understanding of how our assets behave under varying weather and flow conditions, we will also build a strategy to improve compensation compliance. Scottish Water will trial installation of automated compensation valves with enhanced capabilities for handling variable flows at selected reservoir sites.

Enhancement investment to meet the Long-Term Strategy for Regulatory Abstraction and Impoundment has been estimated which aims to improve our compliance position over 25 years, support RBMP objectives and also adapt to climate change risks. These investment needs will require further development in line with our compliance strategy and future RBMP cycles.

4.5.2.1 Water Abstraction - Water Resources Environmental Monitoring and Compliance

Table 19: Investment for Water Abstraction

Spend Type	Management approach		Description	Investment Area	Reference Scenario (24/25)
	Reference	Name			
AR3	MA063	Water Enviro Monitor & Comply	Maintain water abstraction and compensation monitoring, measurement and environmental flow equipment to maximise compliance	Install or maintain abstraction and compensation monitoring equipment	6

4.5.2.2 Water Reservoir Compensation Compliance and RBMP Enhancement

Table 20: SR27 Investment for Water Reservoir Compensation

Spend Type	Management approach		Description	Investment Area	Reference Scenario (24/25)
	Reference	Name			
Enhancement	MA063	Water Enviro Monitor & Comply	Improve Water Resources Environmental Compliance and support RBMP objectives. (Automated compensation valves / Fish passes)	Water Framework Directive Improvements	40

4.5.3 Our Investment Programmes – PFI Transfers

The four PFI contracts that will expire during SR27 (AVSE, MSI, Moray and Tay) require further detailed studies (including condition assessments) to corroborate modelled assumptions used for the development of proposed SR27 investments presented within this plan.

Table 21: SR27 Investment for PFI Transfer Sites

Spend Type	Management approach			Description	Investment Area	Reference Scenario (24/25)
	Reference	Name				
Enhancement	MA108	PFI (Private Finance Initiative)	Transition planning and MSI Fair Market Value / Termination Payment	PFI other returns		7

4.6 Future Investment Requirements

4.6.1 Our Water Environment Strategy

Over the next 25 years, Scottish Water will work towards achieving the outcome of improving the quality of Scotland's rivers and seas through protecting and enhancing our water environment.

To achieve this outcome through our waste water service, Scottish Water will plan and deliver targeted investment to deliver sustainable waste water management solutions that protect public health and enhance environmental quality. Through investment in the maintenance and enhancement of our assets, Scottish Water will seek to employ efficient and innovative approaches to ensure resilient infrastructure and reliable service that meets regulatory standards and delivers holistic net environmental benefit. The objectives of the long-term waste water service strategy which support the proposed outcome for the water environment are described in Section 2.

To achieve these objectives, we will continue to improve our knowledge of the condition, performance, operation, capability and resilience of our waste water assets and service as well as the impact of climate change on the receiving water environment. This will support the deployment of a 'whole catchment' system planning approach to prioritise and optimise interventions and solutions, ensuring they deliver the greatest benefit. This approach will be further strengthened through increased performance monitoring and deployment of data analytics to support tactical to strategic decision-making. Whilst we focus on protecting and enhancing the water environment, we will balance decision making with consideration for wider holistic environmental targets such as reducing process emissions and enhancing biodiversity.

We will continuously monitor risks (e.g. amendments to environmental regulation) and opportunities (e.g. development of innovative technologies) to ensure our long-term water environment strategy is dynamic and adaptable.

This waste water service strategy aligns with the Water Sector Vision in ensuring that waste water discharges continue to protect the quality of receiving waterbodies and support enhancement wherever appropriate whilst seeking to maximise the recovery of water and waste water resources and build a sustainable circular economy.

An outcome outlined in the Long-Term Strategy for protecting and enhancing the water environment also relevant to waste water strategy, is as follows:

- Continue to work with stakeholders to ensure our approach to protecting the water environment focusses on improving the overall health of waterbodies in Scotland, to ensure we can deliver best value for customers, communities and the environment. This will include adapting to the changing uses of Scotland's waters and the designation of new or further enhanced bathing waters.

Our Long-Term Strategy specifically for the abstraction and impoundment sub-outcome area is:

- Over the next 25 years, we will improve our compensation and abstraction equipment to ensure compliance with our authorisations, making improvements aligned with the River Basin Management Plan where cost beneficial and technically feasible.

There is also a separate long-term strategic objective for water demand reduction which is relevant as one of its main aims is to reduce water abstraction from the environment. Reduction in treated water demand over the long-term will reduce water abstraction from the environment, reduce the demand on services, assets, increase drought resilience and support wider economic activity within catchments.

4.6.2 Future Trends and Pressures

Planning for the next 25 years is inherently uncertain. As part of our Long-Term Strategy, we undertook a broad ranging and comprehensive review of the risks and opportunities across the next 25 years. The investment we have identified will secure our essential services by maintaining our existing asset base, allowing us to adapt to climate change and meet our legislative requirements. Without major changes to how we currently operate the water and waste water system and given the projected impact of climate change, we are currently forecasting that the funding needed to deliver sustainable services will need to increase over the next 25 years by almost double. Planning for this period is inherently uncertain and there are both opportunities and risks ahead.

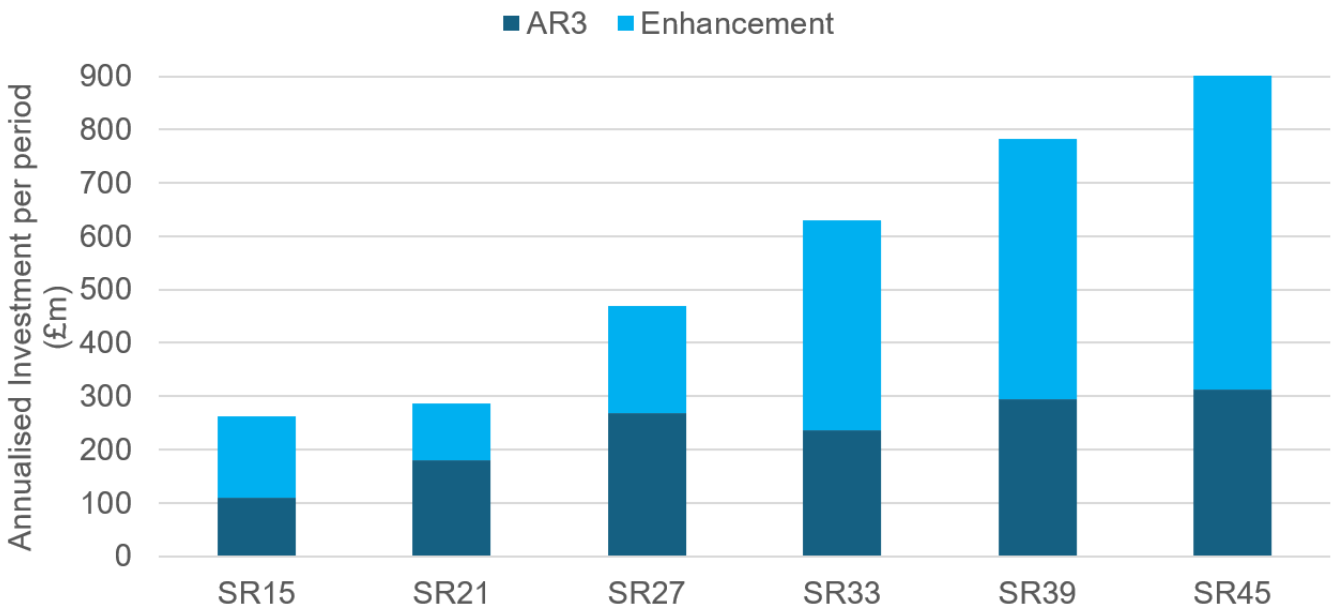

Figure 9: Historic and projected investment - Water Environment (2015 to 2051)

For the Water Environment, our investment projection suggests that we will see annualised expenditure nearly double from £470m in SR27 to £930m per annum in SR45 (see Figure 9). This is driven by enhancement requirements aligned to a number of key long-term performance requirements:

- Waste water Networks – address all high, medium and low UIDs by 2051
- Waste water Treatment – address known compliance, capability and pass forward flow risks and ensure assets are resilient to the impacts of climate change
- Address all known compensation flow compliance issues.

It should be noted that these projections of expenditure exclude any new requirements that might emerge under RBMP (including enhanced bathing water ambitions) and recast UWWTD as referenced in section 4.4.1.

5 Innovation

We are committed to employing innovative strategies and interventions to enhance water quality and ensure sustainable management of resources. In the upcoming SR27 investment period, the focus will be on pioneering technologies and advanced methodologies to address emerging challenges and optimise treatment processes. By integrating cutting-edge technologies, novel methodologies and research initiatives, we aim to address both current and future challenges within the waste water collection and treatment process. Our innovations will be focused on specific issues or risks we have identified in meeting our long-term outcomes and will help us to overcome these challenges. Our innovation activities may include the following examples:

- Enhanced monitoring to understand how sewer blockages could affect CENTAUR dynamic penstocks
- A trial of automated compensation valves with enhanced capabilities for handling variable flows at selected reservoir sites
- Collaboration on the UKWIR project "National Framework for Water Resources: Environmental risks Investigation Framework." which focuses on balancing water supply sustainability amid climate change while improving biodiversity and low-flow ecological resilience through partnerships with regulators, stakeholders, and other abstractors.
- Improved data analytics and artificial intelligence to support insight provided from our growing estate of EDMs
- In order to achieve a much broader measure of waste water treatment works compliance (required under EPAS) in a changing climate, we need a greater understanding of both the permanent and shorter-term proactive deployment solutions to enhance resilience and manage compliance during adverse weather events. In addition to utilising data from ESNET monitoring of final effluent, we will seek to address this knowledge gap through undertaking a technology horizon scan, trialling viable technologies and working across the business to consider the practicalities of deployment as part of adverse weather response planning.
- Continued partnerships with academia, other water companies, and delivery partners to identify innovative technologies and practices more generally. Our focus will be on mapping technologies that align with our strategic goals, such as low-energy, low-emission, and low-chemical alternatives to conventional treatment, and exploring viable deployment options.
- Research into small-scale or decentralized passive treatment solutions for rural and remote communities as alternatives to conventional septic tanks. Additionally, we will further investigate the use cases and advantages of Nature-Based Solutions (NbS) for waste water treatment.

- Set up of large-scale demonstrators of Advanced Thermal Conversion (ATC) technologies in collaboration with suppliers and UK water companies to gain deeper insights into their operation and the bioresources produced.
- Trial of emerging Advanced Thermal Conversion (ATC) technologies to mitigate the loss of the agricultural landbank risk for our bioresource recycling.

6 Interdependencies

This document should be read in conjunction with other Technical Appendices including:

- West Central Bioresources
- Climate Change Adaptation
- Investment Planning
- Supply Chain
- Digital
- Transformation and Innovation

The document should also be read in conjunction with Scottish Water's Long-Term Strategy.

7 Conclusion

In summary, over the course of SR15 and SR21 our investment in water and waste water assets has improved our level of service to customers and improved the water environment, supporting RBMP objectives and bathing water ambitions. More waterbodies are now achieving 'Good' or better status, bathing water quality has shown continuous improvement since SR15, and pollution incident numbers have also seen positive progress during the same period.

However, we recognise the need to further reduce the impact of our discharges on the water environment. On that basis, we have selected an SR27 investment scenario which aligns with Draft Ministerial Objectives 2027-33 and our Long-Term Strategy and ambitions, meets customers and stakeholders' expectations, delivers climate change adaptation plan requirements and meets Scottish Water's Board aspirations and risk appetite for 2033.

Our Reference Scenario will require **£1,914m** of investment to deliver the following:

- Maintaining water and waste water assets as set out in our Management Approaches
- Decreasing the number of Unsatisfactory Intermittent Discharges (UIDs)
- Installing event duration monitors and sensors across our waste water system to create an increasingly intelligent network
- Reducing the number of more serious (cat 1&2) pollution incidents caused by our operations by nearly 40%
- Maintaining our high SEPA discharge permit (final effluent) compliance 96.37%
- Understanding and maintaining our pass forward flow performance and compliance position
- Working with SEPA, Government and other stakeholders to risk assess the potential implications of future legislation
- Delivering all remaining improvements to meet RBMP3 objectives to support enhancement of the water environment
- Carrying out studies to support decision making for RBMP4 and implementation of requirements set out in the recast UWWTD.
- Maintaining our 100% sludge (bioresource) compliance performance
- Investing in a cutting edge bioresources facility in west central Scotland to facilitate the renewable energy generation (see West Central Bioresources Technical Appendix for more details) and to replace digesters at Allanfearn bioresource treatment centre in Inverness.
- Implementing wider resource recovery from the collection and treatment of water and waste water
- Plan for and integrate PFI assets into Scottish Water asset base
- Maintaining and improving water abstraction and compensation compliance.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Managing Quantity of Flows

February 2026

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1 Executive Summary

The Managing Quantity of Flows Technical Appendix covers the SR27 investment required to manage our waste water network assets, resolve chronic issues and create capacity in the network.

Scottish Water must ensure that the waste water networks continue to be maintained, and existing capacity is utilised and optimised and that we address chronic capacity constraints.

As set out in our Storm Water Management Strategy, we must progress developing and deploying rainwater removal solutions, such as blue green infrastructure projects to create capacity in the network to adapt to a changing climate.

It is our role to ensure that customer's waste water and rain water is collected and returned safely to the environment, without any disruption to customers or communities.

The proposed investment will deliver on regulatory commitments in line with legislation and Scottish Water strategies and policies, including the requirements of the Draft Ministerial Objectives 2027-33 to:

- Maintain or improve current levels of service over the long-term.
- Identify and pursue opportunities to work with stakeholders, and respond to opportunities proposed by stakeholders, to transform how rainwater and sewerage are managed in new and existing communities.
- In collaboration with other parties as appropriate, must adopt and encourage a catchment management approach to sustainable storm water management wherever practical, to reduce and prevent the impacts of sewer and rainwater flooding, reduce pollution from sewer overflows, enable growth, increase resilience and create natural spaces for customers and communities to enjoy.
- Assess and manage climate change risks to infrastructure.

To achieve these objectives, Scottish Water must continue to overcome several key challenges. To identify the optimum blend of interventions to meet our Draft Ministerial Objectives 2027-33 and strategic ambitions, we have undertaken a strategic assessment process to review several potential investment scenarios. The investment scenarios were tested against various performance metrics and compliance requirements to validate the scenarios' robustness and ensuring they aligned with stakeholders' expectations, the water sector vision, Scottish Water's Climate Change Adaptation Plan, Net Zero aspirations and risk appetite.

Part of this development process was the creation of a Draft Business Plan submission against which stakeholders provided feedback against their expectations and refinements were subsequently made.

Based on the refinement of the Draft Business Plan and the testing of outcomes, Reference Scenario (CPI +3.3%) is recommended. The Reference Scenario will require £970m (24/25 price base) of investment to deliver the following:

- Maintain assets as set out in our management approaches
- Maintain the numerical internal sewer flooding At Risk Register SR21 exit position at the end of SR27, with significant risk associated with unit rate
- Continue to mitigate the impact of internal flooding on customers, where technically feasible, carrying out maintenance on these assets and evaluate their feasibility to be

classed as a permanent solution. In SR27 we are planning on installing mitigation measures at 800 properties
- Initiatives to reduce the number of repeat internal flooding incidents caused by blockages
- Deliver projects to resolve around 600 externally flooded areas using a blend of prioritised external only sewer flooding projects and as a consequence of internal sewer flooding projects
- Deliver activities to meet our Flood Risk Management Act duties
- Develop and deliver rainwater removal projects focusing on blue green infrastructure solutions, working in partnership with others to reduce overall flood risk
- Support further roll out of customer behaviour campaigns

1.1 Maintaining our Assets

Scottish Water will take steps to ensure the reliability of our assets and minimise any adverse impact on customers and the environment. Our critical network assets will be managed according to our management approaches, utilising data driven solutions to proactively intervene before incidents such as asset failure or sewer collapses occur. When issues occur, we will respond quickly to resolve them. We will seek to optimise our existing networks and ensure we maximise existing capacity.

1. **Clearing blockages**: Regular maintenance ensures that blockages caused by debris; typically, wet wipes, grease, or tree roots are cleared, allowing waste water to flow freely and preventing backups. This will reduce sewer flooding, and Environmental Pollution Incidents (EPIs) caused by operational issues.
2. **Repairing damages**: Identifying and repairing cracks, leaks, or collapses in sewer pipes can restore their full capacity and prevent infiltration of groundwater, which can reduce the effective capacity of the sewer system.
3. **Optimising flow**: Maintenance activities such as cleaning and desilting improve the hydraulic efficiency of sewers, allowing them to handle higher volumes of waste water.
4. **Preventive measures**: Routine inspections and maintenance can identify potential issues before they become significant problems, ensuring the sewer system operates at its designed capacity.

1.2 Enhancement

Our customers have told us, that internally flooding properties is the biggest impact that Scottish Water can have on properties. Overall, the underlying likelihood of sewer flooding occurring is increasing due to a combination of changes in weather patterns, caused by a changing climate and urban creep. It is reflected in our Internal and External Sewer Flooding At Risk Registers numbers which have been slowly increasing. Our ambition for SR27 is to maintain the internal sewer flooding At Risk Register position so that the exit position from SR27 is the same as the SR27 entry position. We will also continue to focus on the highest priority external sewer flooding.

Scottish Water will support customers who have been internally flooded with mitigation solutions where possible, to prevent it happening again. We will also support the enhancement of customer behaviour campaigns, promoting only flushing the 3 Ps (Poo, Pee and toilet Paper), and property level disconnection.

1.3 Enhancing **Strategic Drainage Planning**

Scottish Water want to accelerate the pace at which we deploy rainwater management solutions, notably blue-green infrastructure to help remove rainwater from the combined system therefore reducing flood risk. Strategic Drainage Partnerships help to address multi-sector challenges of the climate emergency, ageing infrastructure, increasing population and increasing flood risk by jointly planning with local authorities, for both above and below ground infrastructure.

We will work with others to set up two new strategic drainage partnerships and maintain our three existing partnerships.

This will result in multi-stakeholder partnerships across most of Scotland's densely populated regions. This will include continuing to help others to divert rainwater from their buildings and car parks away from the combined sewer system. It is also likely that Strategic Drainage Partnerships will be central to producing Integrated Urban Waste Water Management Plans if Scotland choses to adopt a form of the revised Urban Waste Water Treatment Directive.

This is a key investment area for Scottish Water, as customers have told us through research that flooding properties and community amenities can have a significant impact on their lives. We must maintain flooding performance levels and start to make the long-term shift towards sustainable drainage network which manages rainwater as it falls on the surface.

These key investments are summarised in Table 1.

Table 1: Managing Quantities of Flows Investment Areas

Investment Category	Investment Summary	Proposed Investment (£m, 24/25)
AR3 - Cat 1	Maintain critical sewers	21
	Maintain non-critical sewers	281
	Sewage pumping stations- bring legacy vested equipment up to standard	10
	Maintain CSO screens	23
	Maintain outfalls	7
	Maintain network model - Upkeep of models with a population equivalent of more than 10,000	16
	Maintain pipe bridges	49
	Maintain rising mains	127
	Maintain air valves	1
	Maintain storm tanks	9
	Maintain Automated Pumped Non-Return Valves (APNRV) and flood mitigation devices	4
	Maintain syphons	1
	Maintain Sustainable Urban Drainage Systems	5
	Other Network assets - Fixed wire electrical systems - Street Iron works - Statutory maintenance items	49

Investment Category	Investment Summary	Proposed Investment (£m, 24/25)
Flooding - Cat 2a - Regulatory	Provide fit for purpose models required as minimum legislative requirement under Flood Risk Management Act	4
Flooding - Cat 3 – Improve Service	Develop and deliver rainwater removal projects, in collaboration with others, to reduce overall flood risk	70
	Provide protection to customers from the risk of flooding whilst permanent solutions are being identified and implemented	12
	To reduce flood risk to customers impacted by high consequence external sewer flooding where not disproportionately expensive	45
	To reduce flood risk to customers impacted by high consequence internal sewer flooding where not disproportionately expensive	218
	Supporting customer education campaigns	2
	Tackling repeat flooding due to other causes	16

The Investment Planning Technical Appendix provides detailed information on the investment scenarios considered and the optioneering process.

The £970m SR27 investment into Managing Quantity of Flows makes up 12% of the total SR27 Investment of £8.1bn, as shown below.

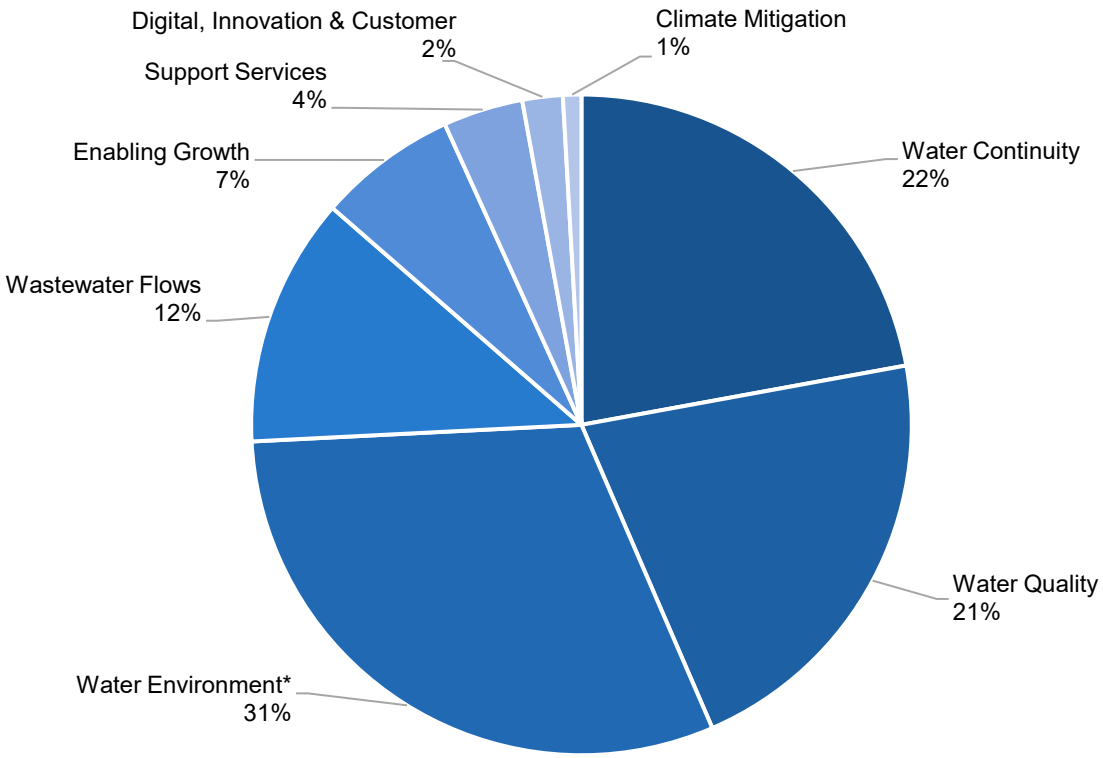

Figure 1: Managing Quantity of Flows investment as a proportion of the total SR27 investment
** Includes West Central Bioresource investment*

2 Background

2.1 Scope of Technical Appendix

The Managing Quantities of Flows Technical Appendix covers the investment required to ensure our waste water networks continue to be maintained, and that existing capacity is optimised, whilst addressing chronic capacity constraints. It also details how we will start to build resilience against future threats.

Scottish Water must ensure that we support the collection and safe return of our customer's waste water back to the environment without any disruption to customers and communities. The investment needs for Managing Quantities of Flows have been identified from risks associated with the ability of our assets to deliver this service whilst meeting the requirements of regulatory standards, customer expectations and Scottish Water policies.

The investment needs presented in this Technical Appendix are required to address service performance and risk, whilst mitigating risks to service associated with the key long-term challenges posed by an ageing asset base, increasing requirements from our customers and stakeholders, and environmental changes.

This Technical Appendix details the drivers behind the investments, identifies the needs that will be addressed during SR27 and highlights the importance of this investment for customers, communities and the environment in Scotland.

Figure 2 illustrates in which Technical Appendix our specific waste water investments are detailed, with the overall investment split across Water Environment and Managing Quantity of Flows.

Water Environment
• All maintenance associated with Waste Water Treatment Assets
• Waste water Asset Maintenance – Returning PFI contracts
• Waste water Treatment Discharges - Pass Forward Flow Compliance, Instrumentation and RBMP3
• Waste water Treatment Improvements – Bathing Waters
• Waste water Studies
• Unsatisfactory Intermittent Discharges
• Event Duration Monitors
• Bioresource
• Water abstraction and compensation CAR monitoring and environmental flow equipment
• CAR compliance - fish passes

Managing Quantity of Flows
• All maintenance associated with our waste water networks (including Combined Sewer Overflows (CSOs) and outfalls)
• Sewer flooding
• Property level protection (mitigation measures for sewer flooding)
• Repeat sewer flooding - initiatives to tackle repeat flooding caused by capacity constraints or blockages on our networks.
• Flood Risk Management Act duties
• Surface water management and partnership working
• Customer behaviour campaigns
• Waste water model maintenance

Figure 2: Waste water investment split

2.2 Context

The investment needs presented in this document are required to meet Scottish Water's legislative obligations and align with Scottish Water's Long-Term Strategy and policies to address existing areas of unsatisfactory service performance and risk, whilst mitigating risks to services associated with the key long-term challenges posed by an extensive and complex asset base, changing regulatory requirements and increasing customer expectations.

2.2.1 Legislative Requirements

Scottish Water also has statutory duties related to flooding which must be adhered to.

Sewerage (Scotland) Act 1968

- To provide and maintain public sewers that can effectively drain rainwater from the curtilage of properties under 'usual' rainfall events

Flood Risk Management Act 2009 (FRM Act)

- The definition of flooding under the act does not include flooding solely from a sewerage system (which falls under Scottish Water duties).
- The FRM act identifies all the parties involved in mapping, understanding, planning and preparing for flood risk.
- Scottish Water has responsibilities for sewers, Scottish Environmental Protection Agency (SEPA) has responsibility for flood mapping and flood warning, and Local Authorities have powers to reduce flood risk where sustainable.
- Scottish Water must identify where it considers that a flood is likely to originate from a sewerage system and estimate the volume of sewage which is likely to be released in the event of such a flood.
- Exercise flood risk related functions with a view to reducing overall flood risk.

The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021

- take "all reasonable steps to ensure that discharge [containing sewage] does not result in pollution of the water environment". *This refers to all actions that are practical and feasible for individuals or organisations to* take in order to minimise or eliminate pollution risks. This includes implementing best practices, maintaining equipment, monitoring water quality, and responding promptly to any issues

2.2.2 Draft Ministerial Objectives 2027-33

Draft Ministerial Objectives 2027-33 – Our investment plans for Managing Quantities of Flows in SR27 are required to meet the Ministerial Objectives set out in Table 2.

Table 2: Draft Ministerial Objectives 2027-33 aligned with the Managing Quantities of Flows Technical Appendix

Ministerial Objectives Category	Ministerial Objectives Detail
Standards of Service	Maintain or improve current levels of service over the long term
Flooding and Rainwater Management:	Scottish Water must identify and pursue opportunities to work with stakeholders, and respond to opportunities proposed by stakeholders, to transform how rainwater and sewerage are managed in new and existing communities
	In particular, Scottish Water, in collaboration with other parties as appropriate, must adopt and encourage a catchment management approach to sustainable storm water management wherever practical, to reduce and prevent the impacts of sewer and rainwater flooding, reduce pollution from sewer overflows, enable growth, increase resilience and create natural spaces for customers and communities to enjoy.
Climate Change (Adaptation & Mitigation):	Identify the expected impacts of climate change on its assets and assess the risk and likelihood,
	Make substantive progress in the 2027-33 period towards the climate change targets, and ensure it is on an appropriate trajectory to meet or exceed those targets

In addition to the Draft Ministerial Objectives 2027-33 above, the significance of implementing an ambitious flood risk reduction programme is emphasised throughout the Commissioning Letter (*Water Industry Commission for Scotland. (2025). Commissioning Letter for the Strategic Review of Charges 2027-33*[1]). This letter, issued by the Cabinet Secretary for Wellbeing Economy, Net Zero, and Energy in May 2024, underscores the critical need for proactive measures, specifically highlighting several key areas where such a programme can make a meaningful impact, including:

- Challenges of a changing climate on the industry both in terms of mitigation and adaptation.
- Need to move to nature-based solutions that deliver on response to climate change, the nature crisis, environmental protection and green spaces for the enjoyment of Scotland's population.
- Partnership projects that deliver outcomes in relation to drainage and the reduction of flood risk will require Scottish Water to work closely with Local Authorities, developers, landowners and communities. This requires flexibility so that Scottish Water can deliver to agreed timetables within partnership frameworks.

2.2.3 Long-Term Strategy

SR27 represents the first step on the journey to achieving Scottish Water's ambitions set out in the Long-Term Strategy[2] for the next 25 years. These are:

- Address chronic network capacity issues for our most at-risk customers and pubic areas to provide protection against sewer flooding from a 1-in 30-year rainfall event.
- Have no customers experiencing repeat sewer flooding in their homes by 2050.
- Support customers who are vulnerable to sewer flooding in their homes, by delivering solutions to quickly prevent it happening again.

[1] WICS - Strategic Review of Charges
[2] Scottish Water's Long-Term Strategy

- Accelerate our approach to blue green infrastructure solutions to manage rainwater, using a mixture of engineered and nature-based solutions to increase the resilience of our network and reduce pollution for localised and strategic drainage issues.
- Increase our monitoring capabilities to improve our understanding on how other drainage systems, such as road drains, culverts, roofs and run-off from roads and pavements interact with our sewers.
- All cities and many larger towns will have strategic drainage partnerships which allow collaborative working to more easily and efficiently undertake the necessary work to manage rainwater better.
- Introduce a community fund to support small-scale, localised initiatives like planters and rain gardens in community buildings such as church halls, community halls, libraries and schools.
- Increase our emphasis on partnerships – ensuring we work with public, private and third sector organisations, and involve householders and local communities- to change how we manage rainwater, creating place-based solutions which will help to increase the resilience of our sewer networks and reduce demand on treated water.

2.3 Key Challenges

Managing our waste water networks presents several key challenges which contribute to the complexity of maintaining efficient and reliable sewer systems, requiring innovative solutions and proactive management strategies:

- **Climate change** – Extreme weather events are becoming more frequent, resulting in an increased number of property flooding incidents. Forecasts indicate that a growing number of customers will face the risk of both internal and external flooding as rainfall intensity continues to rise (Climate Change Adaptation Plan[3]).
- **Urban creep** – The gradual increase of impermeable surface within developed areas, such as paving over of gardens to create parking space, increases the speed of rainwater entering in sewer network. When this occurs in areas already under hydraulic stress, it puts further pressure on an already over exerted network.
- **Sewer blockages –** Continued flushing of inappropriate items such as wet wipes, continues to happen across Scotland, resulting in sewer blockages and often repeat incidents in the same locations.
- **An ageing asset base** - Ageing infrastructure is a significant challenge in managing sewer networks. Many of our sewers were constructed decades ago and as these assets age, they become more prone to failures, blockages, and leaks, which can lead to sewer flooding and pollution incidents.
- **Changing Legislation:** Scottish Government's policy development work for the water industry is giving consideration to whether future legislation could strengthen Scotland's approach to how rainwater is managed. Potential changes could include:
    - Creation of a Drainage Service as a core function for Scottish Water to sit alongside the Water & Waste Water Services
    - How Scottish Water and Local Authorities could be better enabled to plan, deliver, operate, maintain and protect sustainable rainwater drainage infrastructure to support Climate Adaptation of our urban landscapes.
    - Introduction of legislation to align with EU revised Urban Waste Water Treatment Directive

[3] Climate Change Adaptation - Scottish Water

2.4 Past Performance

2.4.1 Repair, Refurbish, Replace (AR3)

To convey over one billion litres of waste water from properties and businesses in Scotland requires an extensive network. Since the mid-1990s, the waste water network has benefited from significant levels of investment in maintenance activities. During operation, our assets encounter significant wear and deterioration which can impact capacity, efficiency and performance.

To help us manage this asset base, in SR21 we created management approaches. For each asset type we created a risk-based maintenance approach to determine the maintenance tasks and frequency that should be carried out, dependent upon asset condition.

For most of our assets, our management approach is to be reactive, when a failure occurs, we fix the asset as quickly as possible. We are normally able to keep our assets operating or provide service continuity through measures such as installation of temporary equipment or additional operator intervention.

Some asset types have specific maintenance approaches, not on a reactive basis to enable us to better manage the risk of environmental impact. For example, critical sewers and pipe bridges, we intervene based on condition grade and for rising mains we maintain based on age.

2.4.2 Sewer Flooding

Sewer flooding typically occurs due to two main reasons. The first is operational issues, such as blockages, pipe collapses, and other system failures that prevent our assets from functioning properly. The second cause is when the flow of water exceeds the design capacity of our sewer networks, which happens during severe rainfall.

Sewer flooding can impact properties internally, known as internal sewer flooding, or cause external flooding, areas outside the fabric of a property. When this flooding occurs in a rainfall event with a likelihood of occurring 10% in any year, these properties or areas are added to our At Risk Registers. If the rainfall event is above this threshold, the incident is recorded and reported on but is not added to the At Risk Registers. Only flooding which is classified as being caused by sewer overloading is added to the At Risk Register. Due to the key challenges set out above in Section 2.3 the overall underlying risk of sewer flooding is increasing, which is evidenced by our Internal and External Sewer Flooding At Risk Registers.

Internal sewer flooding is considered a higher priority than external sewer flooding for several reasons. Experiencing flooding within one's home can be traumatic, leading to anxiety, stress, and other mental health issues. The emotional toll can be considerable. This has consistently been a theme coming out of our customer research and our Independent Customer Group. Internal flooding disrupts our customers daily lives, in the most severe cases making homes uninhabitable. This can cause significant inconvenience and stress. However, it is not always ‘clear-cut’ in terms of priority as external flooding is often very difficult to mitigate and properties in our highest priority clusters can suffer external flooding multiple times a year. External flooding can influence whole communities by flooding access roads and public spaces.

2.4.3 Internal Sewer Flooding

The definition of Internal Sewer Flooding

Internal flooding has been defined as flooding which enters a building or passes below a suspended floor. Buildings are restricted to those normally occupied and used for residential, public, commercial business or industrial purposes. This includes:

- Cellars/basements forming part of the property, regardless of purpose
- Garages linked to the property via internal door and garages with living areas

Buildings excluded from this definition include:

- Buildings primarily used for storage (e.g. outbuildings, sheds).
- Detached garage or garage where there is no direct access from garage to living area

Internal Sewer flooding is classified as either:

- Internal Flooding Overloaded Sewers (IFOS) where the property is flooded due hydraulic incapacity of the network
- Internal Flooding Other Causes (IFOC) where the property is flooded due to other causes such as sewer collapse, blockages etc.

Incidents of flooding due to IFOS and IFOC are recorded and reported upon in Scottish Water's Annual Return reporting process. Repeat incidents of flooding can occur in cases where the cause of flooding is attributed to either IFOS or IFOC.

Internal Sewer Flooding At Risk Register

The Internal Sewer Flooding At Risk Register records internal sewer flooding occurrences caused by overloaded sewers (IFOS), that have been experienced events and remain at risk from a storm event with a 10% annual probability. Figure 3 displays the total number of properties on the Internal Flooding At Risk Register from 2007 onwards.

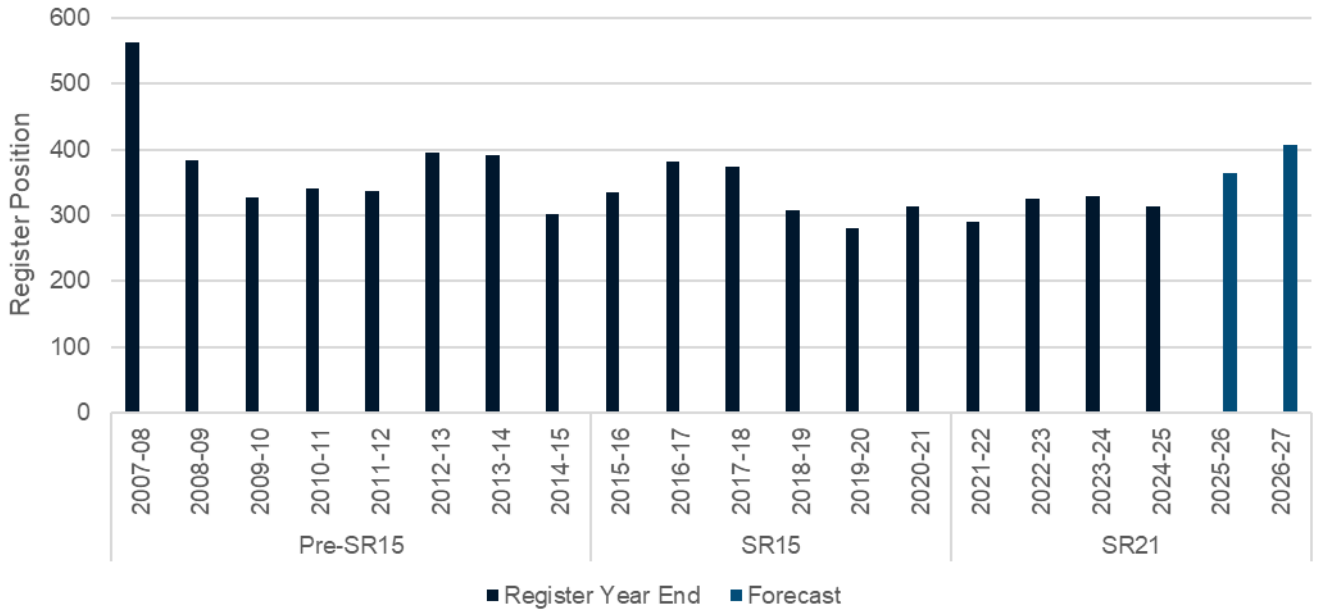

Figure 3: Total historic number of Internal Sewer Flooding at Risk Register properties

2.4.4 External Sewer Flooding

The definition of External Sewer Flooding

External flooding is defined as any flooding in an area which is not classed as internal flooding. External flooding is further split into 3 categories:

- Curtilage – any flooding not classed as internal flooding that occurs within the curtilage of a building. This includes the areas excluded from the definition of internal flooding
- Highways – any flooding to highways, including footpaths
- Other- public open spaces, agricultural land or car parks

External Sewer flooding is classified as either:

- External Flooding Overloaded Sewers (EFOS) where the area is flooded due hydraulic incapacity of the network
- External Flooding Other Causes (EFOC) where the area is flooded due to other causes such as sewer collapse, blockages etc.

Repeat incidents of flooding can occur in cases where the cause of flooding is attributed to either EFOS or EFOC.

Incidents of flooding due to EFOS and EFOC are recorded and reported upon in Scottish Water's Annual Return reporting process.

These definitions have been agreed with WICS (Water Industry Commission for Scotland) and are used in all reporting. The definition of external flooding differs from the OFWAT definition[4], which does not include highways and other areas.

Ahead of SR21, we undertook a data quality improvement project, to improve the quality of data that was entered into the At Risk Register. This programme revealed that the number of properties on our external At Risk Register was significantly lower than we had previously thought. This is shown in the drop in the At Risk Register between 19/20 and 20/21 in Figure 4.

In the early years of SR21, several severe rainfall events led to widespread flooding, significantly increasing the need for Flooding Investigations. During this period, suspected internal sewer flooding was prioritised, resulting in fewer investigations into external sewer flooding. Consequently, there were fewer additions to the external At Risk Register, causing a plateau between 2020/21 and 2021/22. After completing the internal sewer flooding investigations, a backlog of external investigations existed. Over the following years, these external sewer flooding investigations were carried out, with some leading to additions to the At Risk Register, and the external At Risk Register position grew again to 2019/20 levels.

[4] Ofwat - External Sewer Flooding

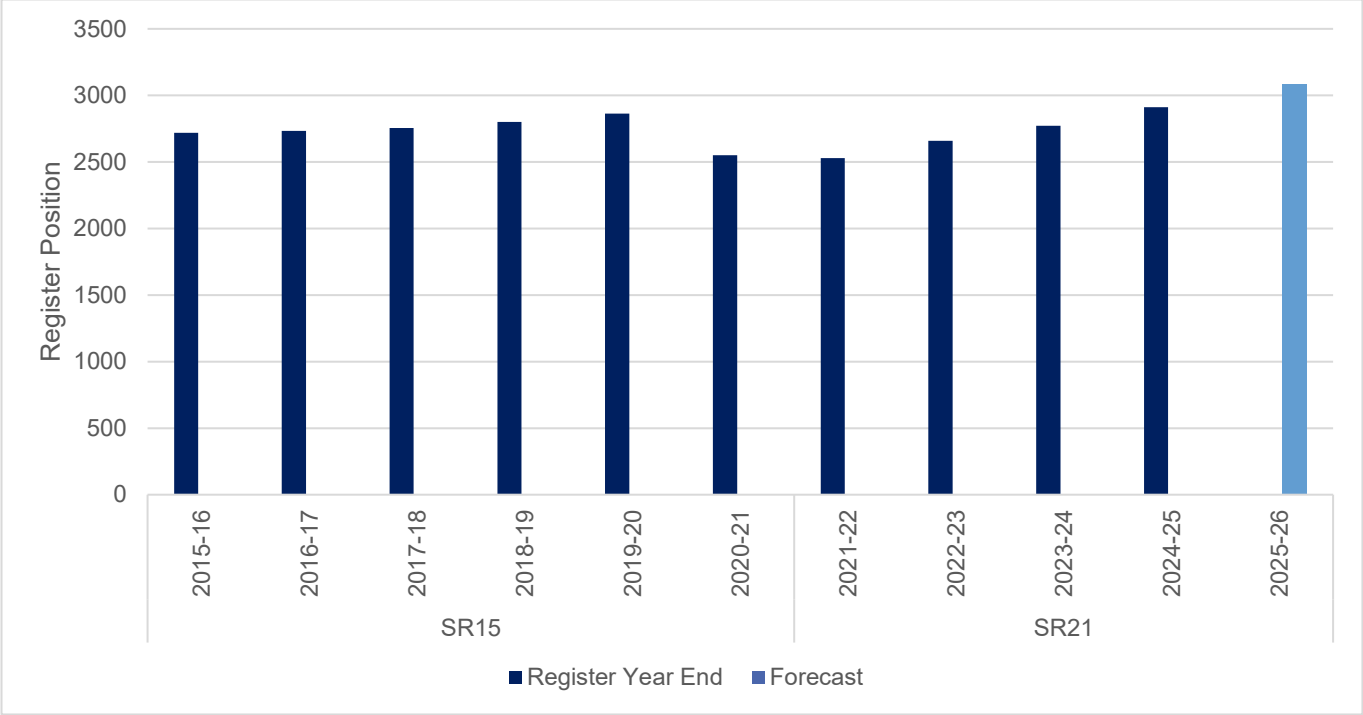

Figure 4: External At Risk Register Position

Pre-2015 data on external sewer flooding was collected using older methods, so it's less detailed and consistent than what we have now. Since then, we've introduced stronger reporting standards and improved systems, meaning post-2015 data is far more robust.

2.4.5 Rainwater Removal

Ahead of the start of SR21, Scottish Water launched its Storm Water Management Strategy [5] which moves away from reliance upon the traditional approach of increasing sewerage asset capacity and reliance on CSOs (Combined Sewer Overflows) towards an approach which reduces the amount of (of slows the pace at which) rainwater that enters the system.

The Storm Water Management Strategy can be summarised as:

- Allow no new or substantially re-developed site surface water connections into the existing combined network
- Work with all stakeholders on removing/ reducing storm water from the existing combined network
- Supports sustainable economic growth for all stakeholders
- Supports Sustainable Drainage System (SuDS) which feature place making blue-green city landscapes

2.5 SR21 Delivery

In SR21 Scottish Water have continued to deliver ambitious, and often complex, programmes of work. We will utilise the learnings and developments we have made in SR21 to guide and inform our SR27 programme. Further details on these learnings are given below.

[5] Storm Water Management Strategy

SR21 Management Approach

Scottish Water used management approaches (MAs) as a systematic method for determining maintenance activities across all assets. Initially developed in SR21 v1, both maintenance and enhancement MAs aimed to capture investment triggers and ensure consistent decision-making. A key change from our last AR3 process for the 2021 regulatory period, is adopting a standardised approach to the repair, refurbishment, and replacement of our assets through the production and implementation of our MAs. MAs for each asset type set out policy of how and when we will intervene to manage assets. Impacts of climate change have also been considered, considering a range of climate hazards as identified through the Scottish Water Climate Change Risk Assessment.

A key component of the MAs is the systematic inspection and categorisation of asset condition. Our MA's include inspection programmes to help us monitor and understand how our assets are deteriorating with age and the environment within which they operate, which in turn informs our long-term replacement needs and AR3 programme prioritisation to maintain service levels.

MAs associated with enhancement are being transitioned into sub outcome strategies, which have been published in the Long-Term Strategy[6].

Enhancement – Internal Flooding Programme

Since 2007, we have maintained our At Risk Register largely between 300 – 400 properties at risk. The average additions to our register over the last ten years have been 50 per year. In SR15 these additions were offset by removing an equivalent number of properties from the At Risk Register through capital interventions. In SR21 however we have not been able to maintain this offset due to two reasons:

1. Increasing cost per intervention
2. Reduced sewer flooding funding

1. Increasing cost per intervention

In SR21 removing properties from the At Risk Register is becoming increasingly more expensive (see Figure 5), this means that we can't remove as many properties as planned. This is due to two main reasons.

- Price rises due to inflation. The prices of essential building materials like concrete and steel have surged.

[6] Long Term Strategy - Scottish Water

- Solutions are becoming increasingly complex/properties where the solution is straightforward and low-cost have already been addressed. A portion of new properties added to our At Risk Register can be addressed with lower-cost, less complex solutions. Historically, these types of projects have been successfully implemented. However, larger, more expensive, and complex solutions have sometimes been deferred due to financial constraints or the need for further evaluation. As a result, the number of long-standing properties increases, making up a larger proportion of our register overall. In SR21, we began tackling this backlog of complex projects and successfully delivered more of these challenging schemes, which has led to an increase in the unit rate.

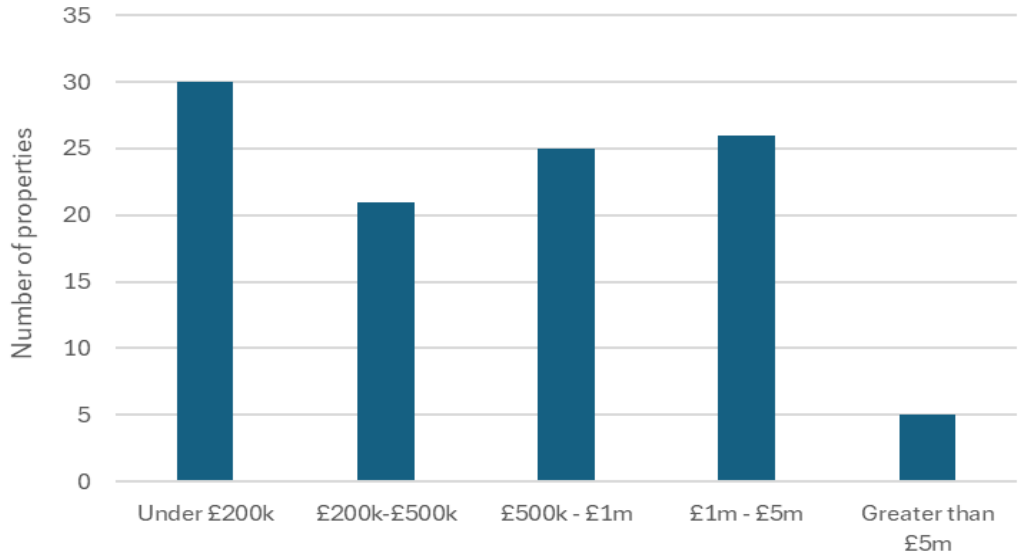

Figure 5: SR21 Cost per Property on the Internal Sewer Flooding At Risk Register

2. Increasing cost per intervention Reduced Sewer Flooding Funding

The internal sewer flooding programme experienced funding constraints in SR21 following the decision to take lower customer charges during the cost of living crisis. This meant that there was not as much funding available as originally anticipated. The funding constraint meant that we took the decision to reprioritise and reallocate our investments towards the internal sewer flooding programme.

Repeat Internal Sewer Flooding

Scottish Water want to reduce the consequences of sewer flooding on affected properties as quickly as we can. Mitigation measures are property level flooding protection measures designed to prevent floodwater from entering a building and to minimise damage if flooding occurs. The goal is to protect the property and its contents, ensuring a quicker recovery and reducing the overall impact of flooding. They provide significant value to our customers by protecting their homes and businesses.

In 2023 we created a dedicated team responsible for delivering an enhanced mitigation programme. The aim of the team is to reduce the impact of repeat sewer flooding on customer properties, widening the envelope of customers who qualify for mitigations. We tested this policy expansion with our Independent Customer Group (ICG) and through customer research and both the ICG and research showed support for the expansion. Our Sewer Flooding Mitigation Policy is as follows:

Mitigation measures will always be considered for:

- Any property on the Internal Sewer Flooding At-Risk Register with a 2 in 10 or 1 in 10 return period.
- Any property on the Internal Sewer Flooding At-Risk Register with 1 in 20 return period.
- Properties that have flooded internally 3 times in 10 years or 2 times in 5 years BUT at least 1 internal incident must have been caused by a rainfall event with a return period less than 1 in 30 years.
- Properties, or other external area, added to the External Sewer Flooding At-Risk Register that meet the criteria defined in the External Flooding Mitigation Decision Matrix.
- Properties that have experienced repeat flooding because of severe weather and meet the criteria defined in the Internal Flooding Mitigation Decision Matrix

Scottish Water have installed mitigations at properties that have previously experienced Internal Sewer Flooding to reduce the occurrence of repeat incidents. As of October 2025, we have installed mitigation measures at 673 properties, at a total cost of **£6.2m**. This leads to a forecast SR21 spend of **£8.3m**. Customers are, in general, supportive of mitigation with no reported incidents of repeat internal flooding. Mitigation measures can also protect properties against other types of flooding, such as pluvial and fluvial, which are not the responsibility of Scottish Water, so provide wider benefits to our customers. Table 3**Error! Reference source not found.** below demonstrates the scale and success of mitigation measures when subjected to summer storms in 2025.

Table 3: Representation of scale and success of mitigation measures.

	Glasgow	Edinburgh	Dundee
Number of properties mitigated	363	184	63
Month / return period	July 3 - 30 year return period affecting multiple basements in the West End	July >500 year return period over 1 hour duration	August >1000 year return period also including large hailstorms
Number of mitigated properties flooded	0	0	0

Scottish Water is also responsible for the maintenance of these measures, which costs an average £500 per property per year. We intend to continue to deploy these solutions in SR27 as described in Section 4.

Mitigating external flooding presents more challenges as solutions may lie outside the property boundaries and require additional approvals from stakeholders such as local authorities and private landowners.

External Sewer Flooding

In SR21 Scottish Water have made some progress towards implementing external sewer flooding-only solutions. The focus has been on delivering high-priority projects based on flood risk

prioritisation. Throughout SR21 we have also removed external areas from the register as a consequence of delivering an internal flooding project.

We have prioritised the top 20 clusters of External Flooding Overloaded Sewer (EFOS) areas. These projects will likely be on site in SR21, completing in SR27 and will considerably reduce the risk of external flooding at nearly 100 properties.

We are currently projected to invest £41 million across SR21 to remove 42 areas from the external ARR through six projects. Additionally, other areas will be addressed by investing in the removal of properties from the internal ARR, achieved by increasing the waste water network's hydraulic capacity.

Despite increasing our overall investment in external sewer flooding in recent years, we have seen limited improvements in our External Sewer Flooding At Risk register statistics.

In SR21 however we have not been able to maintain or decrease the number the number of areas on our External Sewer Flooding At Risk Register because of two key factors:

1. Increasing cost per intervention
2. Prioritisation of funding towards internal sewer flooding projects

1. *Increased cost per intervention*

The average unit rate to remove an area in SR15 was £501k which has risen to £720k in SR21 as areas remaining on the External Sewer Flooding At Risk register are increasingly complex and therefore solutions for these areas are increasingly higher cost.

2. *Prioritisation towards internal sewer flooding*

The external sewer flooding programme experienced the same funding constraints as the internal sewer flooding programme in SR21. The funding constraint meant that we had to reprioritise and reallocate our investments towards the internal sewer flooding programme.

As a result, Scottish Water are forecasting our SR21 External Sewer Flooding At Risk Register exit position close to 3000 areas.

Customer Behaviour Campaigns during SR21

In addition to targeting sewer blockage hotspots, we have also been tackling the problem of sewer blockages in a new customer behaviour change campaign aimed at protecting the planet. This activity, called 'Nature Calls', is a pan-Scotland campaign involves TV, radio, social, digital and partnership collaborations.

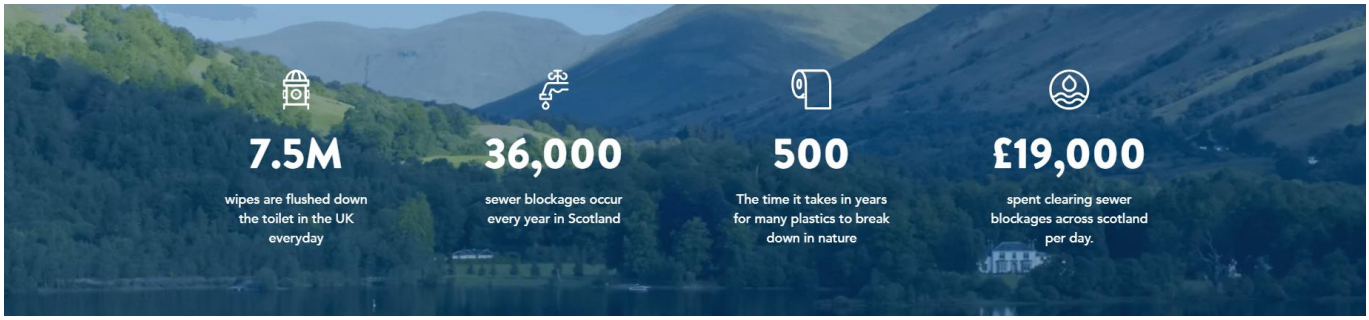

Figure 6: Nature Calls still from campaign

Nature Calls has had a marked impact on the business and society more broadly. Not only did major retailers such as Tesco, Boots and Aldi start removing plastic wipes from their shelves, but we also saw governments respond, both north and south of the border. In November 2025, UK government banned the supply and sale of wet wipes containing plastic. The Scottish Government is expected legislate in 2026. It is anticipated that the ban will come into effect in 2027.

Behaviour change with the public has been impressive. After the campaign launched, between February 2022 and August 2022, sewer chokes reduced by 16% (vs. same period in the previous year*[7]) saving the business substantial costs (it costs the business on average £296 to attend a choke). This behaviour change has been sustained – chokes are down by approximately 4% compared to pre-campaign levels (12-month cumulative totals = 36,882 in Jan 2022 vs 35,394 in Dec 2025). Although a stiff challenge still remains; choke data can fluctuate with extreme weather conditions and we do notice chokes rise when campaign activity is paused. Therefore there is a strong need to continue raising awareness of this issue with our customers to achieve sustained, long-term, behaviour change.

As the campaign has evolved, we have taken a more 'localised approach' using blockage data to target hotspot areas, going into communities worse impacted and requiring additional support for change.

YouGov Scottish Omnibus post campaign survey showed significant shifts in attitudinal metrics and claimed behaviours as a result of seeing the campaign:

- 69% of people who are aware of the campaign say they will think more carefully about what they flush down the toilet.
- 74% now agree that wipes are often made with micro plastics.
- 88% would support a call for wipes containing plastic to be banned.
- 73% of those who had seen the ad recall the main message was 'you shouldn't flush wipes down the toilet'

We are also working at both a national and international level to influence policy and legislation relating to wet wipes.

[7] *16% reduction for the first 6 months of the campaign (versus the same period in the year prior).
Feb-Aug 2021 = 23,249 chokes
Feb-Aug 2022 = 19,560 chokes
Difference = 3,689 chokes
3,689 as a percentage of 23,249 = 16%

Partnership Working

Alongside Scottish Government (as evidenced in their Draft Ministerial Objectives 2027-33) we believe that working in partnership with others is essential. In SR21 we have focussed on partnership working arrangements:

- Continuing with the successful Metropolitan Glasgow Strategic Drainage Partnership (of which we are a founding member), which was founded 2002, with five key objectives; supporting economic growth, flood risk reduction, water quality improvement, habitat improvement and integrated investment planning. The formal partnership approach has worked well, it has delivered significant benefits to reducing flood risk in Glasgow, such as the Shieldhall Tunnel and the Glasgow Smart Canal.
- Developing our approach to partnership working. We have developed two additional partnerships;
    - Edinburgh and the Lothians Strategic Drainage Partnership (ELSDP), alongside City of Edinburgh Council, Midlothian and East Lothian Councils. Through the ELSDP we have identified priority areas for joint planning, which has resulted in projects to reduce the volume of rainwater entering the sewers. Planning is ongoing to identify areas of the city where rainwater can be held on the surface, ready for delivery in SR27.
    - Water Resilient Dundee, which is a collaboration with Dundee City Council. We have carried out an opportunity identification exercise across the whole city, prioritising areas for planning and investment. We have already made improvements in Craigie Street and at Douglas Community Park. Our SR27 plans includes increasing capacity of the city's sewer system by preventing or slowing down rainwater entry into the sewers, largely due to the creation of surface water interceptor sewers.

Rainwater Management in SR21

In SR21 Scottish Water began utilising rainwater management as a solution to internal and external sewer flooding, utilising solutions to reduce risk for internal and external sewer flooding. Rainwater management solutions can complex and costly to implement.

Currently, around 8% of our internal sewer flooding protection projects will have delivered a rainwater management element. As a result of focus will have attenuated over 5,600m^3 of water over the SR21 period – thus reducing the impacts of stormwater on the hydraulic capacity of our sewer system and therefore significantly reducing the risk of flooding as a result.

Climate Change adaptation

As we plan our flooding solution projects, we plan for a 2°C increase in temperature by 2050 and preparing for a 4°C increase in temperature beyond 2080, which is set out in our Climate Change Adaptation Plan, published in 2024 [8].

Waste Water Hydraulic Modelling

Waste water hydraulic models are a vital tool used to help design robust solutions. Model Maintenance is required to preserve or improve model confidence to maintain their predictive abilities and ensure they are 'Fit for Purpose' for their specific use.

[8] Scottish Water Adaptation Plan

We have over 300 hydraulic models that are assigned a model maintenance category (Operational, Essential, Active and Responsive). Our current MA policy is based on a target age of model within each category. Currently we have 49% of models within MA policy. As models are returned following model maintenance then the proportion within policy is expected to fluctuate slightly before increasing to 65% as we exit SR21.

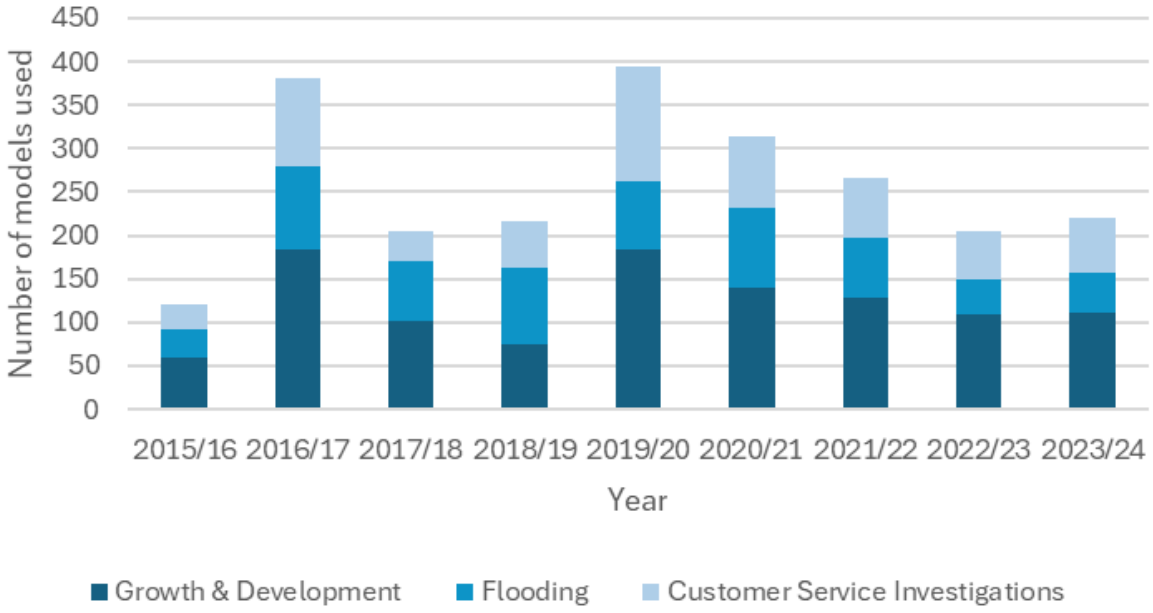

Figure 7: Waste water Model use across Scottish Water

Key SR21 Learnings

In SR21 Scottish Water have developed our approach to sewer flooding and rainwater management by embracing software advances and piloting new technologies. We have done this to improve the service offering we provide our customers, to drive value for money in the solutions we develop and deliver and to further our understanding of flood risk on our waste water network.

Some of the new tools/ applications we have trialled, and which will be taken forward into SR27 are:

- **Meniscus**[9] - the Meniscus Rainfall Tool, known as MAP Rain, is a high-performance, cloud-based solution designed for rainfall and flood monitoring analytics. This has led to improvements in understanding our customers' flood risk. We can see how rainfall moves and changes across catchments and can undertake return period analysis in seconds rather than the 15 minutes using the previous software. Within one hour, Meniscus can find historic storm events with certain characteristics This was typically very difficult to do using older software. This analysis gives us a much richer understanding of properties' flood history.
- **Optimatics**[10] - The optimiser software combines the power of Hydraulic Models, the Integrated Catchment Model (ICM) Exchange Tool, and Cloud Computing to quickly identify optimal plans by considering thousands of potential alternative interventions and solutions. This significantly reduces the time and costs associated with traditional modelling methods, which can be lengthy and costly due to the complexity of networks and the iterative process involved.

[9] Meniscus
[10] Optimatics | Plan Smarter

- **SCALGO Live**[11] - Powerful platform that enables rapid flood risk analysis by providing detailed statistics on rainwater flow across catchments. It significantly reduces planning time by allowing quick edits and representations of surface interventions like Sustainable Urban Drainage Systems (SUDS) and Blue-Green Infrastructure (BGI).

Reassessment of Customer Flood Risk

To determine the flood risk for a property or location, we use a standard method from the UK Water Industry that looks at how often heavy rainfall happens. Previously, we used older data from the Flood Estimation Handbook (FEH)1999, which only included rainfall patterns up to 1999. However, this didn't consider the effects of climate change on rainfall since then.

In SR21, we reassessed the flood risk for areas previously investigated, using updated data from the FEH13 (rainfall patterns up until 2013) dataset. This reassessment confirmed that climate change is already affecting rainfall patterns and flood risk. Customers on our database were found to have a higher risk level of flooding (moving from example a 5% risk to a 10% risk of flooding annually) when assessed using the FEH13 dataset confirming that their risk has increased over time as rainfall patterns have altered due to climate change.

Since then, in late 2022, the Centre for Ecology and Hydrology (CEH) significantly updated the FEH rainfall statistics, now known as FEH22. To understand the impact of this update, Scottish Water commissioned CEH to produce technical reports detailing rainfall patterns across Scotland. These reports revealed smaller changes compared to the 1999-2013 update, but new regional variability patterns have emerged.

We are about to receive 25 new FEH22 Design Rainfall series and will soon be able to produce additional series ourselves. These will include a base FEH22 series and climate change projections for 2050 and 2070. We plan to adopt the FEH22 rainfall dataset for flood risk assessment, with this transition expected to occur between 2025 and 2026, this may increase the cost of projects as bigger assets will be required to deal with the rainfall.

Waste Water Intelligent Networks (WWIN)

In SR21 we embarked on a journey to better understand how our networks and assets were performing across an initial four catchments. Event Duration Monitors (EDMs) & Sewer Level Monitors (SLMs) were installed and an internal WWIN Dashboard developed to visualise the data from the monitors.

In addition, the WWIN Dashboard supported by machine learning and artificial intelligence was able to share alerts and alarms to the Intelligent Control Centre (ICC) enabling a proactive Operational Response to potential flooding and environmental events. Across some of the monitored catchments the WWIN Dashboard in now successfully identifying potential blockages within the network, prior to these causing any issues. On average in 2025 the response team attended 50 potential blockages per month. Tools and systems are being developed to predict blockages even more time in advance, reducing the risk further of customer or environmental issues.

[11] Scalgo

An additional ~1450 EDMs[12] associated with Improving Urban Waters commitments have also been incorporated into the WWIN dashboard and a public facing Near Real-time overflows map was launched in December 2024. This new public facing portal provides transparency to our customers and stakeholders regarding how our monitored overflows are performing. Data is refreshed hourly and further information is provided regarding investment down to asset level. In summer 2025, further improvements were made, including incorporating weather, bathing water locations and overall unmonitored assets. Future enhancements be explored through engagement with external parties, such as Surfers Against Sewage.

In the remainder of SR21 we will continue to install EDMs at prioritised locations and publish data through the overflows map. SLM deployment across a further 12 catchments is underway. These monitors will improve our intelligence on our network performance, leading to proactive blockage clearance. Overall, this approach is enhancing SWs capability to deploy monitors in the network and also balance the needs of an increasing number of operational responses.

In the future, data and intelligence gathered from overflows monitors and sewer level monitors will be used to verify the WW Hydraulic Models more dynamically, allowing greater confidence in the model predictions providing further intelligence how our networks are performing and supporting investment choices.

2.6 SR27: Drivers of Investment

Scottish Water must ensure that the waste water networks continue to be maintained, and existing capacity is utilised and optimised and that we address chronic capacity constraints. It is our role to ensure that customer's waste water and rainwater is collected and returned safely to the environment, without any disruption to customers or communities. To allow us to do this, significant investment is required in SR27.

Maintaining our Ageing Asset Base – There is need for ongoing asset repair, refurbishment and replacement of our existing asset base in order maintain/improve the level of service we provide our customers and to protect the environment.

Our network assets will be managed according to our management approaches, utilising data driven solutions to proactively intervene before incidents such as asset failure or sewer collapses occur. When issues occur, we will respond quickly to resolve them. We will seek to optimise our existing assets and networks and ensure we maximise existing capacity.

While regular maintenance of sewers is crucial for retaining asset integrity, preventing blockages and ensuring system functionality, it alone cannot address capacity constraints, which can lead to flooding customers properties. To effectively manage increasing demand due to more regular, intense rainfall and prevent sewer flooding and unacceptable spills from overflows, infrastructure upgrades are also necessary. Even if every asset and network is maintained at optimum levels, sewer flooding resulting from hydraulic incapacity will still occur. As such we require to continue with interventions, to recover and improve the capacity of our networks and reduce the number of customers who experience flooding of their property, through enhancement investment.

[12] Data at 30th November 2025

Enhancement

The underlying likelihood of sewer flooding occurring is increasing due to a combination of changes in weather patterns, due to the changing climate and urban creep. Continuing investment to resolve internal flooding as quickly as possible is key to our long-term strategy. As Scottish Water see unit costs continuing to rise, our highest-risk customers facing the fear of potential disruption and associated distress. Furthermore, new additions to the At Risk Registers will increase the backlog of necessary investments required to bring our networks up to an acceptable standard.

We will support customers who have been internally flooded with mitigation solutions where possible, to prevent it happening again. We will also support the enhancement of customer behaviour campaigns, promoting only flushing the 3 Ps (Poo, Pee and toilet Paper), and property level disconnection.

Enhancing strategic drainage planning

A new approach for SR27 is the focus on recovering the capacity of the combined sewer system by removing rainwater.

It is important that we begin building strategic partnerships with local authorities now. Establishing such partnerships takes time, and any delays in this process will defer the efficient and collaborative delivery of blue-green infrastructure for many years.

3 Customer and Stakeholders

3.1 Our Customers and Stakeholders

Scottish Water operates within a framework of diligent oversight and collaboration, engaging with multiple stakeholders who ensure that customers and communities are not affected by sewer flooding. We engage regularly with the ICG and carry out wider customer research.

3.2 Customers

We receive customer contacts from a variety of sources, which can be seen in the graph below. We have seen an increasing trend below. These are typically inquiries around our sewer flooding programmes. Contacts come in a variety of forms, including direct from customers and through their elected representatives. Freedom of Information and MP/MSP requests relating to flooding generally account for 10% of those received by Scottish Water.

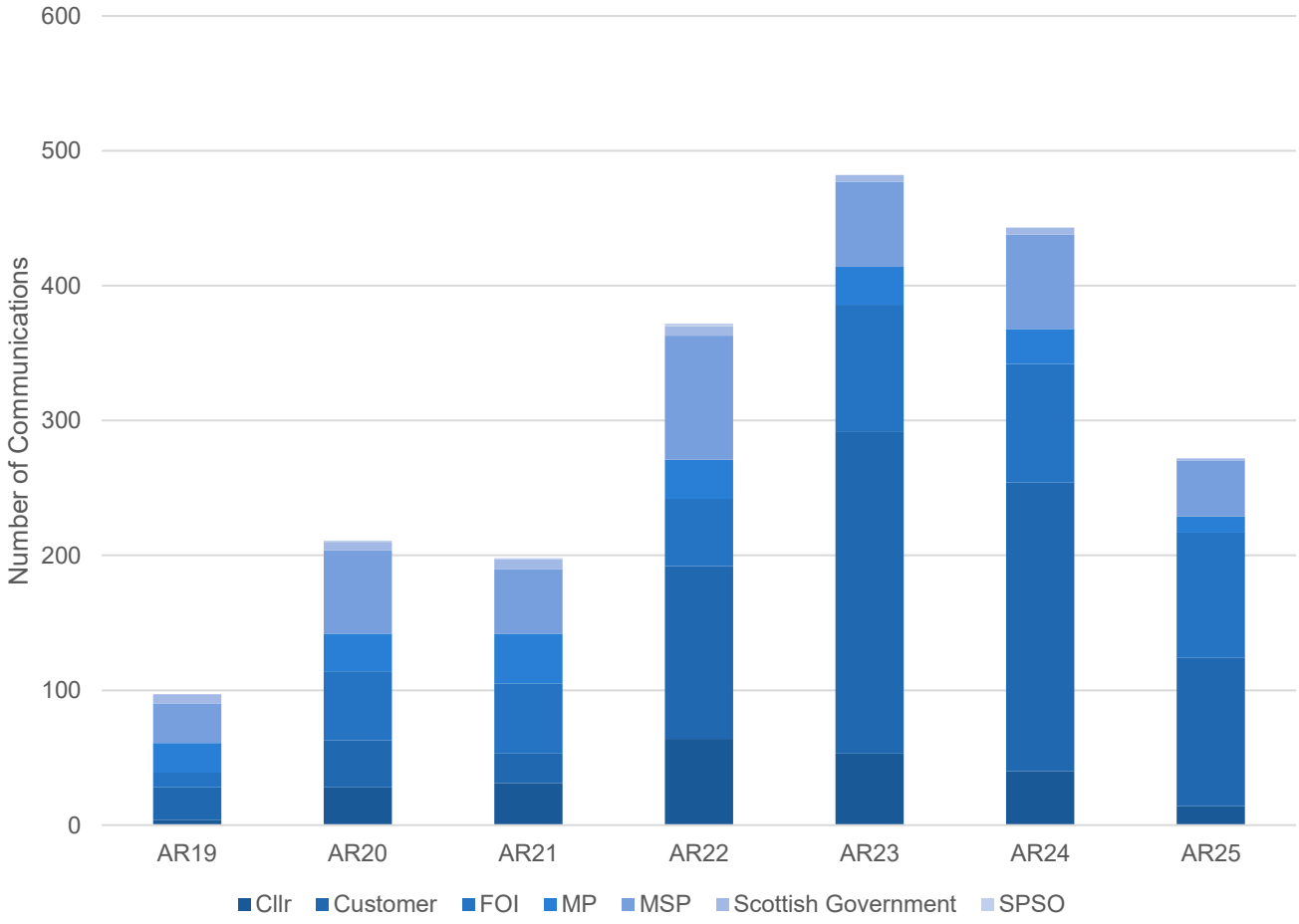

Figure 8: Annual Customer & Stakeholder contacts 2024

3.3 Stakeholders

The **Scottish Government** is a key stakeholder in Scottish Water, setting strategic objectives, overseeing regulatory principles, and monitoring performance. They also collaborate on investment planning to ensure our waste water infrastructure meets current and future needs, maintaining high-quality services and public trust.

WICS is responsible for economic regulation, ensuring Scottish Water operates efficiently. They scrutinise financial and operational plans to guarantee that investments deliver value for money while maintaining and improving service quality.

SEPA focuses on environmental protection, ensuring compliance with environmental regulations and sustainability goals. Their oversight ensures that water treatment processes minimise environmental impact, safeguarding ecosystems and biodiversity.

Consumer Scotland represents the interests of water customers, ensuring that their needs and concerns are prioritised.

Local Authorities and Scottish Water collaborate closely to manage and mitigate flooding risks. Scottish Water is responsible for operating public sewers and managing issues related to sewer overflows and blockages. They also handle the drainage of rainwater from roofs and paved areas connected to the public sewer. Local authorities, on the other hand, are responsible for managing drainage on local roads and public highways, dealing with tidal and river flooding, and providing flood defences. They also coordinate emergency responses and temporary accommodations during severe flooding events.

Community groups collaborate with Scottish Water by reporting flooding incidents, participating in public consultations, and organising educational campaigns. They also engage in volunteer initiatives and collaborative planning sessions to enhance flood management efforts and ensure local concerns are addressed.

The **Independent Customer Group** works closely with Scottish Water to provide independent insights and perspectives on customers priorities, ensuring customers interests are central to decision making.

In the development of our SR27 Final Business Plan we continue to engage with both our customers and stakeholders in a dynamic and transparent manner. Further detail of our work with customers and communities can be found in our Customers and Communities technical appendix.

3.4 Customer Engagement

Customers are at the heart of our business, and their opinions are a key factor in our decision making process, as set out in our Customer Research Technical Appendix. Building these views into our plans is part of our ongoing customer research approach that allows us to ensure our customers' needs are at the centre of our service delivery. The SR27 customer research programme aimed to understand customer expectations for Scottish Water over the course of SR27. However, we also have a deep understanding of views on service issues from existing and ongoing research. Scottish Water's synthesis database contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers. These insights have been assessed and mapped into topics, and the highest quality insights have been gathered together into Key Insights which have been used to support the development of the Final Business Plan and Technical Appendices. The Research Synthesis Supporting Document sets out supporting evidence, scoring and referencing for these Key Insights.

The tables below show the Key Insights relevant to the Managing Quantity of Flows investment area.

Table 4: Key Insights on Internal Sewer Flooding

Research Question	Key Insight
What is the **perceived impact** of an internal sewer flooding incident?	Customers consistently tell us that an internal sewer flood has the highest personal impact of all service issues. Household customers are concerned by the potential health and safety impact of sewage in their homes, whilst business customers express concerns about damage, potential impact on insurance premiums, and reputational damage.
What are customer **expectations** of Scottish Water regarding internal sewer flooding?	Customers generally feel that addressing internal sewer flooding is important, and a priority for Scottish Water, especially when properties are affected by repeated incidents. However, some customers perceive it as an issue that does not affect many customers and may prioritise other areas of investment which affect more people. Informing customers about concepts such as 'at risk' register for internal sewer flooding, and the fact that this register involves a churn of properties can help to deepen customers understanding of the need for continual investment. Some customers may expect Scottish Water to work in partnership with other organisations such as Local Authorities and housing developers to manage planning and design issues which can cause flooding issues. They also expect Scottish Water to work with the wider public to address behaviours which can cause internal flooding such as flushing wet wipes.

Table 5: Key Insights on External Sewer Flooding

Research Question	Key Insight
What are customer **perceptions** of external sewer flooding?	As is the case with many aspects of Scottish Water's waste water service, external sewer flooding is not top of mind for most customers, or a major concern. Customers often group external sewer flooding with other types of flooding e.g. rain on roads. As such, less informed customers can perceive the issue to be part of living in Scotland. However, when external sewer flooding affects homes and businesses, customers become concerned. Business customers may be concerned about impact on the accessibility of their premises. When connections are made with sewage, customers are concerned about health and safety. Waste water flooding that impacts culture, tourism or heritage is considered to be damaging to Scotland as a whole.
What are customer **expectations** of Scottish Water regarding external sewer flooding?	Customers recognise that external sewer flooding can have significant impact, but do not think that resolving the issue is Scottish Water's sole responsibility. They may expect Scottish Water to work in partnership with others, such as the Scottish Government, Local Authorities and housing developers to manage the issue. They also expect Scottish Water to work with the wider public to address behaviours which can cause external sewer flooding such as flushing wet wipes.

Table 6: Key Insights on Surface Water Management Measures

Research Question	Key Insight
What are customer **perceptions** of **surface water management measures?**	Customer generally do not have high awareness of surface water management, with low awareness of household rainwater source control measures, and low awareness of larger schemes such as SUDS. Customers may have heard of, or have seen, some approaches, but might not have connected them to managing surface water and flooding. Once explained, customers are supportive of the use of blue-green infrastructure and like the wording and connotations of the phrase 'nature-based solutions. They are positive about the community and environmental benefits of these approaches. There can be some concerns around the practicalities, effectiveness and costs of blue-green approaches. Customers acknowledge that a mix of blue-green and traditional engineering solutions is needed to tackle surface water flooding in Scotland. Customers

Research Question	Key Insight
	expect Scottish Water to take a proactive approach, with more investment, partnership working and making use of local knowledge.

Table 7: Key Insights on Asset Repair, Refurbish and Replacement

Research Question	Key Insight
What is customer **understanding & acceptance** of aging assets as a challenge?	Customers are generally surprised to hear about the scale of Scottish Water's infrastructure, and to learn its age. Customers understand and acknowledge that ageing assets are a challenge for Scottish Water. They recognise the need for investment to maintain these older assets.
What are customer **expectations** of Scottish Water in maintaining assets?	Asset maintenance is a concept that people intuitively understand. It is felt to be highly important, and core to Scottish Water's purpose as an organisation, as it is an area that is clearly Scottish Water's sole responsibility. Customers recognise the need for investment and want to see lasting solutions put in place. Making things last is seen as an important area for Scottish Water's focus, appealing to all customers and older customers in particular. They are keen to reduce the risk of service failures, as well as avoid unnecessary costs. Customers expect this to be an ongoing area of investment with a focus on preventing future problems. They generally expect Scottish Water to maintain or replace infrastructure before it fails to avoid service issues. Fixing assets on failure is perceived by some to cost more money over time than proactive intervention. Customers may also seek some reassurance that investment is necessary. They may wish to be satisfied that investment is directed at parts of the system at risk of failing, and that interventions are future-proof, high quality and lasting.
What are customer **expectations** around climate adaptation of assets?	On hearing about the scale of challenges from climate change, and the consequent impact on the provision of Scottish Water's water and waste water services, customers believe it is important to protect infrastructure against the impacts of climate change. There is an expectation that Scottish Water will invest in innovative approaches and long-term solutions.

3.5 Demonstrating Customer and Stakeholder Support

Engaging with customer on the topic of internal sewer flooding can be challenging. It can be difficult to communicate mechanisms such as 'churn rate', where new properties are added to the Flooding Register every year, and other properties are removed. Customers can find it hard to understand why new properties are added, and why the issue cannot be 'solved' at a national level through a single one-off investment.

It can also be challenging to communicate service level risk to customers - where although one property might be removed from the Register, other surrounding properties may benefit from a reduced risk of flooding - even if those properties have not experienced sewer flooding. These complexities can make it hard for customers to make a value judgement about the costs and benefits of investment in sewer flooding, especially when internal sewer flooding is examined alongside other service areas which can be perceived by customers to affect more people. Scottish Water will continue to develop our approach to engaging with customers on this topic - particularly around communicating service level risks.

Internal Flooding

Our customers have consistently told us that internal flooding of properties is one of the worst ways Scottish Water can impact their daily lives. Household customers are primarily concerned about health risks, stress, and damage to their belongings. Non-household customers, on the other hand, worry about business loss and increased insurance premiums. Customers generally feel that addressing internal sewer flooding is important, and a priority for Scottish Water, especially when properties are affected by repeated incidents. However, some customers perceive it as an issue that does not affect many customers and may prioritise other areas of investment which affect more people. Informing customers about concepts such as 'at risk' register for internal sewer flooding, and the fact that this register involves a churn of properties can help to deepen customers understanding of the need for continual investment. Customers believe that the responsibility for addressing these issues is shared between Scottish Water, Local Authorities, and other relevant stakeholders. ***In SR27 (as described in Section 4) and aligned with the Draft Ministerial Objectives 2027-33, our goal is to maintain the number of properties on our Internal Sewer Flooding At Risk Register. We aim to achieve this through both traditional grey solutions and broader alternative approaches, such as mitigation measures and blue-green infrastructure. Our focus is on delivering the best overall value to our customers, considering not only cost but also performance and wider benefits.***

External Sewer Flooding

External sewer flooding can be segmented into two categories: flooding in public spaces, such as highways and playparks, and flooding in private areas, such as gardens. Customers often group external sewer flooding with other types of flooding e.g. rain on roads. As such, less informed customers can perceive the issue to be part of living in Scotland. However, when external sewer flooding affects homes and businesses, customers become concerned. Waste water flooding that impacts culture, tourism or heritage is considered to be damaging to Scotland as a whole. Customers recognise that external sewer flooding can have significant impact, but do not think that resolving the issue is Scottish Water's sole responsibility. They may expect Scottish Water to work in partnership with others, such as the Scottish Government, Local Authorities and housing developers to manage the issue. ***In SR27 (as described in Section 4) we will put greater focus on our external sewer flooding interventions using rainwater removal to reduce overall flood risk.***

Stakeholder Roles and Engagement

Both household and non-household customers view Scottish Water, Local Authorities, and other stakeholders as having shared responsibility for addressing sewer flooding. Effective engagement and collaboration among these stakeholders are crucial to ensure timely and efficient responses to sewer flooding incidents, protecting both property and health. ***In SR27 (as described in Section 4 and as aligned to the Ministerial objectives our ambition is to expand and enhance our partnership working arrangements and increasing the benefits that they bring, including delivering more joint projects.***

Rainwater Management

Our customers generally have less awareness around rainwater management and what this may entail. Whilst they may have seen or heard of some of these approaches, they are unlikely to have connected them to managing rainwater and flooding. However, when explained, customers are generally supportive of these measures – including blue-green infrastructure and nature based solutions. They also expect us to take a proactive approach with more investment, partnership working, and using local knowledge. ***In SR27 (as described in Section 4) Scottish Water will develop and deliver rainwater removal projects, in partnership with others, to reduce overall flood risk.***

Asset Maintenance (AR3)

There is some surprise when our customers learn about the age of our assets and the overall scale of our infrastructure - but customers understand the challenges this brings, and the need for investment. Customers believe asset maintenance is important - and want to see lasting solutions in place. Our customers also expect us to protect infrastructure against the impacts of climate change. ***In SR27 (as described in Section 4) we will maintain our assets as set out in our management approaches.***

By understanding the different concerns and priorities of our customers and communities, and recognising the roles of various stakeholders, we can better address the challenges posed by sewer flooding and work towards more effective solutions.

4 Our Investments

4.1 Approach

Scottish Water's long-term goal, as set out in our Long-Term Strategy is to progressively reduce the number of customers at risk of internal and external sewer flooding, aiming for near-zero repeat internal flooding by 2050 and ensuring no long-standing customers remain on the at-risk register. In the near term, we will continue to deliver Ministerial Objectives to maintain current service levels, and to counter the impacts of climate change and urban creep, at acceptable levels of risk.

To achieve this, we need to tackle critical hydraulic capacity issues on our network, whilst removing surface rainwater from our system. Our approach also provides resilience against climate change, and the impact of further urbanisation. We will continue to collaborate with local authorities and others to build resilience against these challenges. By maintaining a consistent approach to flooding issues, we will ensure fair and equitable service for all customers and communities, both now and for future generations.

During SR27 for managing quantities of flows, we will aim to:

- Maintain assets as set out in our management approaches
- Maintain the numerical internal sewer flooding At Risk Register SR21 exit position at the end of SR27, with significant risk associated with unit rate
- Continue to mitigate the impact of internal flooding on customers, where technically feasible, carrying out maintenance on these assets and evaluate their feasibility to be classed as a permanent solution. In SR27 we are planning on installing mitigation measures at 800 properties
- Initiatives to reduce the number of repeat internal flooding incidents caused by blockages
- Deliver projects to resolve around 600 externally flooded areas using a blend of prioritised external only sewer flooding projects and as a consequence of internal sewer flooding projects
- Deliver activities to meet our Flood Risk Management Act duties
- Develop and deliver rainwater removal projects focusing on blue green infrastructure solutions, working in partnership with others to reduce overall flood risk
- Support further roll out of customer behaviour campaigns

This will be achieved through a combination of Capital Maintenance (Asset Repair, Refurbishment and Replacement (AR3)) and Enhancement expenditure.

4.2 Strategic Outcomes and Performance Requirements

Scottish Water investment plans for Managing Quantities of Flows in SR27 are required to meet the following Draft Ministerial Objectives 2027-33:

- Maintain or improve current levels of service over the long term.
- Identify and pursue opportunities to work with stakeholders, and respond to opportunities proposed by stakeholders, to transform how rainwater and sewerage are managed in new and existing communities.
- In collaboration with other parties as appropriate, must adopt and encourage a catchment management approach to sustainable storm water management wherever practical, to reduce and prevent the impacts of sewer and rainwater flooding, reduce pollution from

sewer overflows, enable growth, increase resilience and create natural spaces for customers and communities to enjoy.

The delivery of the Long-Term Strategy outcomes relating to managing quantity of flows will be based on the following principles**:**

- Have no customers experiencing repeat sewer flooding in their homes by 2050.
- Support customers who are vulnerable to sewer flooding in their homes, by delivering solutions to quickly prevent it happening again.
- Accelerate our approach to place-based solutions to manage rainwater, using a mixture of engineered and nature-based solutions to increase the resilience of our network and reduce pollution for localised and strategic drainage issues.
- Increase our monitoring capabilities to improve our understanding on how other drainage systems, such as road drains, culverts, roofs and run-off from roads and pavements interact with our sewers.
- All cities and many larger towns will have strategic drainage partnerships which allow collaborative working to more easily and efficiently undertake the necessary work to manage rainwater better.
- Introduce a community fund to support small-scale, localised initiatives like planters and rain gardens in community buildings such as church halls, community halls, libraries and schools.
- Increase our emphasis on partnerships – ensuring we work with public, private and third sector organisations, and involve householders and local communities- to change how we manage rainwater, creating place-based solutions which will help to increase the resilience of our sewer networks and reduce demand on treated water.

Table 8: How we will measure delivery against our outcomes

Outcome	AR3 / Enhancement	Description	Performance measure / Target
Asset Maintenance	AR3	Our management approaches cover various asset groupings and have been economically appraised to determine the most effective approach to maintain our assets, including an assessment of costs, benefits, risks, and carbon.	- Number of External Sewer Flooding Incidents - Number of properties on our External Sewer Flooding At Risk Register - Number of Internal Sewer Flooding Incidents - Number of properties on our Internal Sewer Flooding At Risk Register

Outcome	AR3 / Enhancement	Description	Performance measure / Target
			- Number of properties - experiencing repeat sewer flooding
External Sewer Flooding	Enhancement	Deterioration in the position of the External Sewer Flooding At Risk register, but ensuring that the highest priority areas are addressed.	- Number of External Sewer Flooding Incidents - Number of properties on our External Sewer Flooding At Risk Register
Internal Sewer Flooding	Enhancement	Maintaining the number of properties on our Internal Sewer Flooding At Risk register and ensuring that we reduce the number of customers experiencing repeat sewer flooding.	- Number of Internal Sewer Flooding Incidents - Number of properties on our Internal Sewer Flooding At Risk Register - Number of properties experiencing repeat sewer flooding

4.3 Building our Approach for AR3

In SR21 Scottish Water introduced management approaches (MAs) for each asset type which set out policy of how and when we will intervene to manage assets. Our approach is directed by our ambitions, long-term outcomes, our ministerial objectives, current legislative requirements, and Board risk appetite statements which set the performance levels for critical and non-critical assets.

Management approaches for each asset type have been maturing since 2023 to become economic appraisals. Impacts of climate change have also been considered, considering a range of climate hazards as identified through the Scottish Water Climate Change Risk Assessment.

Our general approach to management approaches includes two primary considerations:

- **When to intervene** – this considers the point in an asset's life when an intervention should occur. This includes whether to intervene after failure (responsively) or on a planned basis before failure, and if planned, at what stage to intervene to maximise the useful life of the asset while minimising the chance of failure.
- **How to intervene** – this considers what intervention is used to restore asset condition / performance. This includes options for investigations and repairs, decisions on whether to refurbish or replace. Decisions on whether to enhance or improve the resilience of an asset when it is being refurbished or replaced are considered as part of a sub-outcome approach and made on a case-by-case basis as part of systems planning.

Table 9: Scottish Water definitions for intervention approaches

Intervention Approach	Definition
Responsive	The intervention is responsive when an asset has failed and is impacting service provision and/or we identify that an immediate, no-choice intervention is required.
Planned	The intervention is planned when an asset has a historic service failure, or we identify that an intervention is required, at our choice, to reduce the risk of asset failure.

Table 10: Scottish Water definitions for intervention types

Intervention Type	Description
Investigation	Activities focused on gathering asset information which is required in the decision-making process prior to one of the other asset intervention types. This includes inspection programmes to identify the condition of our assets.
Operational and Maintenance Activities	Processes and practices that support an asset to continue to operate and achieve its expected operational life that do not modify the asset itself. These can be responsive or planned.
Repair	Fixing an asset to ensure it can continue to operate and achieve its expected operational asset life (this includes replacement of component parts).
Refurbish	Renovation / overhaul of older or damaged equipment or replacement of parts of the asset to bring the asset back to a workable condition to extend the expected life of the asset.
Replace	Replacement of an asset (equipment, unit, or process) when it is at the end of its serviceable life, or the asset has failed and cannot be repaired or refurbished (or it is not economic to do so), or when a change in performance or capacity is required.

Key management approaches informing the asset maintenance requirements for Managing Quantities of Flows include maintain sewer network assets namely, Pipe bridges, Waste Water Pumping Mains, Waste Water Outfalls, CSOs, Sewer Structures, Gravity Sewers and finally Waste water Network Model Maintenance.

The investment needs for asset maintenance have been developed primarily from a combination of two different approaches:

- Analytical models[13] (used to predict the overall level of investment required for a particular asset type); and
- Management approaches (used to identify the site / asset specific needs in line with policy criteria).

In addition, some investment requirements are associated with routine inspection and maintenance programmes, with others developed from historical run-rates of ongoing activities.

[13] Further details of our analytical models are described in our Investment Planning Technical Appendix

Waste Water Model Maintenance

Hydraulic waste water models are essential for several reasons:

1. **Confirm Capacity Constraints**: Hydraulic models simulate the flow of waste water through sewer systems under various conditions, including heavy rainfall and peak usage times. This helps identify areas where the system may become overwhelmed and cause flooding
2. **Optimising Infrastructure Design**: These models accurately predict water flow, helping design efficient systems that use resources wisely and avoid unnecessary construction
3. **Supporting Climate Resilience**: With climate change causing more extreme weather events, these models test system performance under various scenarios, ensuring long-term resilience
4. **Capacity Planning**: Hydraulic models help understand capacity limitations within the system, aiding in better planning for capital and operational improvements

Scottish Water propose to revise our model maintenance strategy for SR27. Instead of relying on a standard time-based approach, we will implement a model confidence trigger to determine when updates are necessary. The changes will involve:

1. Modification of Maintenance Frequency:
    - Adjust the frequency of Model Maintenance for the Operational and Essential categories to better align with the current capabilities and speed of conducting studies.
2. Enhanced Decision-Making Process:
    - Introduce a more intelligence-driven and evidence-based approach to determine the necessity of proceeding with model maintenance studies. This adaptation addresses cost and funding challenges by implementing thorough model reviews prior to scoping MM. These reviews will assess the need for action at the current stage.
    - Amend the Model Assessment policy to date stamp the completion of the review, initiating the timeline policy from this date rather than the date of the last model update, as per the existing policy.
3. Integration of WWIN Data:
    - Incorporate WWIN data into the decision-making process to enhance the accuracy and relevance of model assessments.
    - Integrate any smart technologies where we can

4.4 Building our Approach for Enhancement

An investment demand for the SR27 Managing Quantity of Flows portfolio was developed using historical trends, average unit rates and climate change projections.

The demand covers:

- Internal Sewer Flooding
- Mitigation programme
- External Sewer Flooding
- Repeat Sewer Flooding due to other causes
- Delivering Flood Risk Management Act duties
- Partnership working to reduce overall flood risk using rainwater removal solutions
- Continued roll out of customer behaviour campaigns

The following sections describe the intervention options considered when building our plan. It is varying combinations of these intervention options that comprise the scenarios we have considered.

4.4.1 Internal Sewer Flooding approach

Our SR27 strategy for Internal Sewer Flooding will build on our established methods. This includes:

- Applying our enhanced **prioritisation process** to promote fairness and transparency, making sure investments reach customers most at risk. The details of this process are outlined below.
- Undertaking **robust and comprehensive optioneering** as part of every project to find the best solutions to internal sewer flooding that offer value to our customers. Wherever possible this will incorporate rainwater management.

Prioritisation Process

Scottish Water uses a structured prioritisation process to manage internal sewer flooding. While it isn't feasible to remove every property currently on the Internal At Risk Register and address all new additions within a single investment period, our prioritisation process ensures that investment is focused on the highest risk properties.

Our prioritisation process uses a risk-based methodology that combines the probability and consequence of flooding to rank affected locations. This approach reflects our commitment to equity and transparency, ensuring that resources are allocated where they deliver the greatest benefit in terms of reducing vulnerability and risk. The factors currently considered as part of the prioritisation process are shown below in Figure 9.

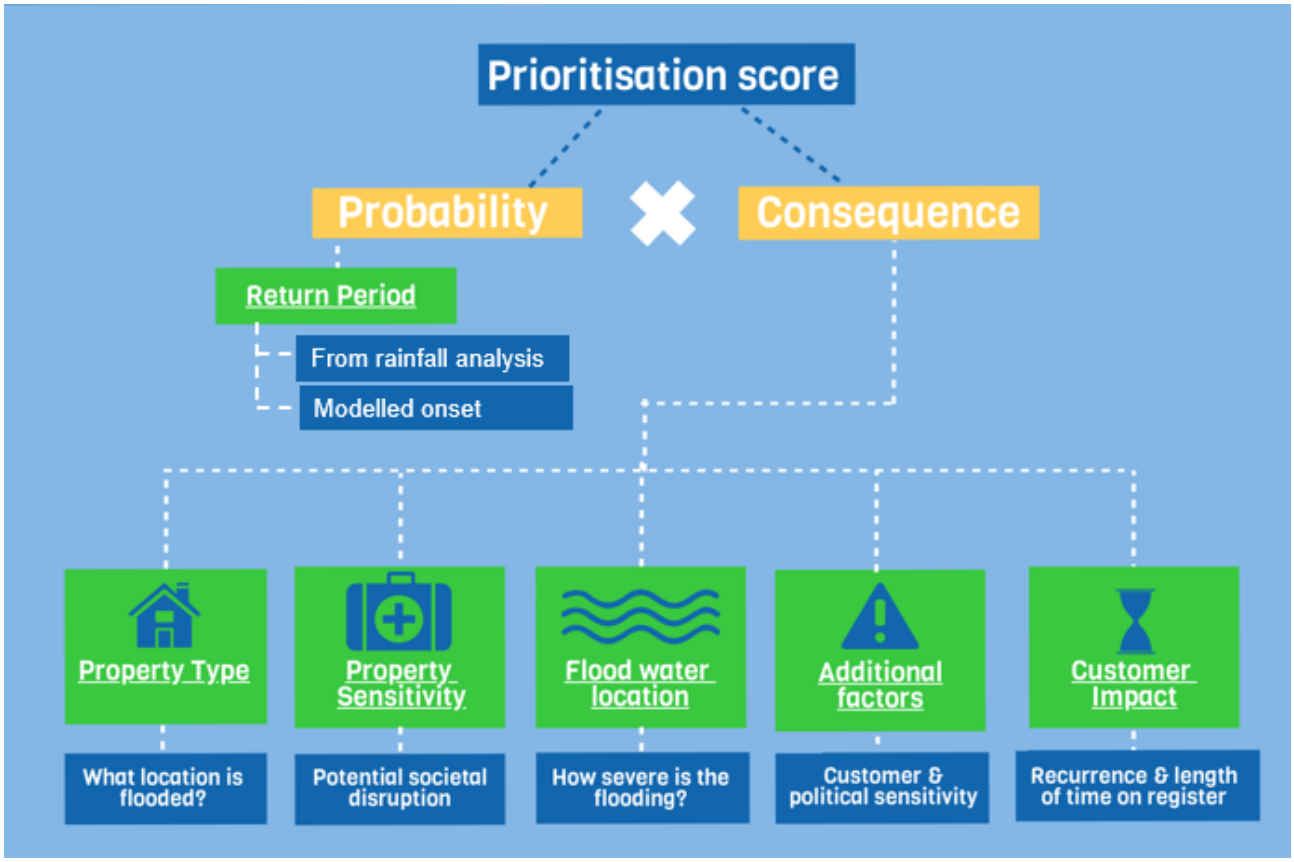

Figure 9: Sewer Flooding Prioritisation Criteria

Our prioritisation process was recently shared with, and reviewed by, our Independent Customer Group and Consumer Scotland. As a result of this stakeholder engagement and feedback we intend to update process in early 2026 to include key factors, such as if the property has mitigation measures in place.

We do not put a unit rate cap per property for an internal flooding project, and cost does not feature in our prioritisation process. This means that there is not a set maximum amount of money spent per property. Each flooding location and the outline design are considered on a case-by-case basis, and a holistic view is taken of the impact of flooding on the customer and the wider benefits of the scheme as well as the cost. It is rare that a scheme will not be delivered and in general any schemes that cannot be funded within the internal flooding funding constraints of the current investment period would be deferred to the next investment period.

The named projects currently listed in Table 5, along with the broader Internal Sewer Flooding funding for properties added to our register between now and the end of SR27, form our baseline Internal Sewer Flooding plan for SR27. However, there is the potential for further improvement of this plan as we update and improve our prioritisation process and as a result reprioritise internal sewer-flooded properties.

Internal Sewer Flooding projects in general deliver more benefit than simply reducing the risk of flooding at the internally flooded property. They provide additional network capacity and draw down the hydraulic gradient, often across a much larger area. This reduces the risk of flooding to neighbouring properties, often reducing associated frequently occurring external and highway flooding.

These interventions enhance community resilience by protecting homes and businesses from the disruptive and damaging effects of flooding. Additionally, in some cases these projects contribute to environmental sustainability by reducing spills from overflows. Furthermore, effective flood management can lead to economic benefits by reducing property damage and associated repair costs, and by maintaining the functionality of critical infrastructure.

Intervention Types

There are several intervention types available to address hydraulic capacity constraints in the network. However, the technical viability of any option is dependent on the specific location of the need. Resolving known hydraulic capacity issues will require a mix of interventions.

Considerable work is undertaken during our 'Plan' phase to develop a range of potential options and to identify the best overall solution to address a particular need. We have a structured hierarchy that is used for every project. Options should be considered in hierarchical order. Combinations of options should be considered as required.

Table 11: Intervention Hierarchy

Tier	Option	Philosophy	Scope
Tier 1	Do Nothing	Accept	Demonstrate no hydraulic overloading (other causes or third party responsibility)
	Systems Optimisation	Operate	Minor modifications or operational changes to the network
	Flow Transfer	Excavate (Minor)	Divert flow to another sewer
	Isolation	Excavate (Minor)	Cut and pump with APNRV
	Low Cost Modifications / Property Purchase / Temporary	Innovate	Ground reprofiling, diverting flows to low risk location, raising floor level, walls (without access), bury or raise manholes (not sealing), property purchase, Temporary option
Tier 2	Separation / Surface Water Management	Innovate / Excavate (High)	Remove surface water runoff from combined system (e.g. into SuDS/surface water sewers/watercourses; partial or full removal, reduced peak flows). Manage flows on the surface
Tier 3	CSO	Excavate (Med)	New CSO or modify / change flow at existing CSO
	Upsizing / New Sewers	Excavate (High)	Increase capacity of downstream network including pumping stations
	Storage	Excavate (High)	Provision of on-line or off-line storage

We adhere to an optioneering hierarchy when identifying options, and other than very low cost interventions, such as APNRVs, rainwater management is the first intervention type that will be considered. Rainwater management can involve either attenuating rainwater before it is slowly

released to the combined sewer, or full disconnection where rainwater is removed from the sewer network and discharged elsewhere e.g. to a watercourse.

The preferred option is selected based on a value management approach taking into consideration whole life cost, the benefits delivered including indirect benefits, residual risk, phasing and environmental and community impact.

All flooding projects follow Scottish Water internal governance processes and are subject to rigorous scrutiny. We do not currently deploy a unit rate cap per property. Each flooding location and the outline design are considered on a case-by-case basis, and a holistic view is taken of the impact of flooding on the customer and the wider benefits of the scheme as well as the cost. Higher costs associated with projects are as a result of increased complexity of solution and ground conditions.

Rainwater management will not be a viable option at every location suffering from chronic capacity constraints. Rainwater management often relies on interventions like ponds, rain gardens, permeable pavements, and disconnection of rainwater from combined sewers. These require space and suitable topography. In dense urban areas or locations with limited land availability, implementing such measures is impractical. It also should be recognised that on the whole rainwater management is most beneficial where it can be implemented on an opportunity basis, in partnership with others.

However, where it can be implemented successfully, rainwater management plays a significant role in mitigating the impacts of climate change. There are several ways in which is supports adapting to climate change as shown in Figure 10.

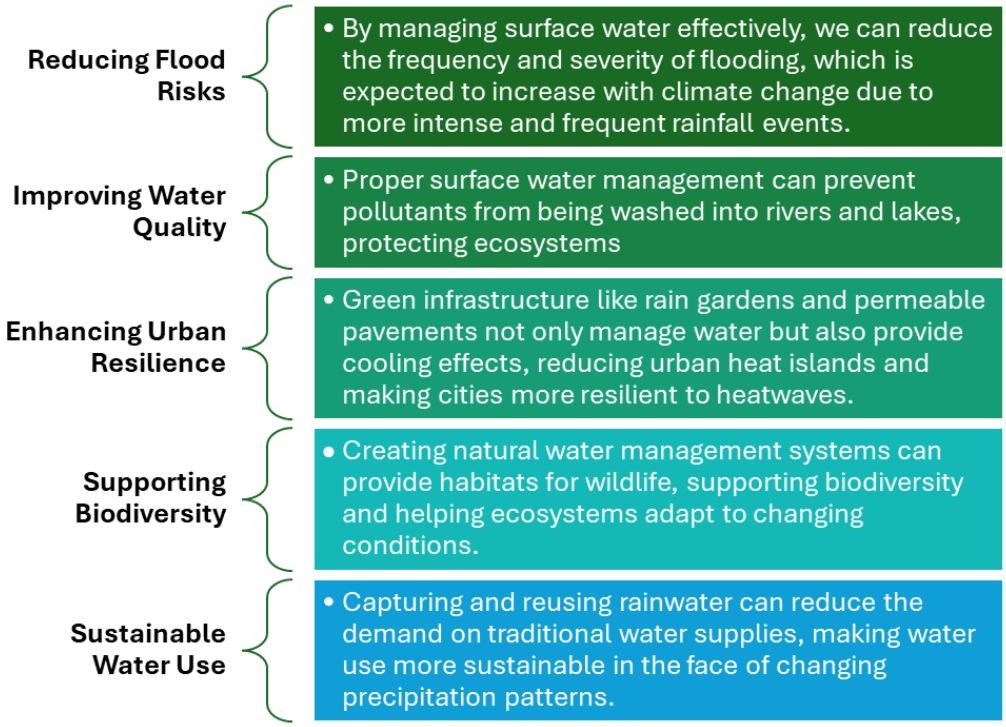

Figure 10: How a rainwater management and nature-based approach supports tackling the impact of climate change

Grey infrastructure is generally considered to be the most technically viable in terms of providing guaranteed delivery of the required service level at a specific location. Particularly when targeting

level of service of 1 in 30 years. Grey infrastructure typically allows more control over flows and storage. Modelling allows us to design grey infrastructure to meet specific capacity requirements ensuring schemes perform effectively under extreme conditions. In densely populated urban areas, grey infrastructure can be integrated into existing built environments without requiring significant changes to land use. This makes it a practical solution for cities where space is limited. At present, grey infrastructure is generally less expensive than the alternative rainwater management option.

Between our Draft and Final Business Plans, WICS commissioned industry consultants, WSP, to assess a range of Scottish Water's projects and programmes. In relation to the Internal Sewer Flooding programme, the WSP report found that Scottish Water has a mature process for prioritising and delivering flood mitigation and that lower-cost projects offered good value for money. The report also stated that higher cost projects have elevated unit rates and that this is an area that would benefit from further scrutiny. In response, we note that all flooding projects follow Scottish Water internal governance processes and are subject to rigorous scrutiny. We do not currently deploy a unit rate cap per property. Each flooding location and the outline design are considered on a case-by-case basis, and a holistic view is taken of the impact of flooding on the customer and the wider benefits of the scheme as well as the cost. Higher costs associated with projects are because of increased complexity of solution and ground conditions at the flooding project site.

The cost assumptions and information associated with named projects in this area have been provided to WICS in line with the Final Methodology. We recognise the importance of rigorous scrutiny for high-cost projects and will continue to develop our approach to cost estimation and benchmarking in this area.

Mitigation programme

When mitigation measures are installed at a property, this prevents customers from experiencing the consequence of flooding, but do not increase hydraulic capacity or reduce flood risk. These low-cost, high-value solutions help prevent repeat internal flooding.

Examples include:

- Smart air bricks
- Flood doors
- Non-return valves

These easy-to-deploy interventions provide effective, affordable protection, often even during severe weather. We will continue tracking and reporting the number of installations.

Figure 11: Example of mitigation measures we have provided

In SR27 we plan to continue to follow the Mitigation Policy developed in SR21. Properties that have experienced repeat internal sewer flooding during severe rainfall and those most frequently impacted by external sewer flooding will receive mitigations measures if technically feasible.

4.4.2 Tackling Repeat Flooding due to Other Causes (IFOC/EFOC)

The SR27 Repeat Flooding programme is a new initiative designed to address repeat flooding incidents, that occur due to other causes. The programme will achieve this by investing £16.5m, through a combination of team resourcing, advanced monitoring (WWIN), blue-green infrastructure (BGI), and customer engagement.

Additional resource requirement is essential for programme coordination, data analysis, stakeholder engagement and support, and administration, ensuring the repeat internals initiative is delivered effectively and monitored throughout.

The programme will take a multi-intervention approach to inform evidence led decisions on network operations and interventions to reduce the risk of repeat internal and external sewer flooding incidents to our customers.

WWIN – Monitoring and Reactive Maintenance	BGI – Blue-Green Infrastructure Rollout	Customer Behaviours & Consultation
WWIN (Waste water Intelligent Network) is a strategic investment to shift Scottish Water from reactive to predictive flood management.	Using plants, soil, and water management features to create healthier, more resilient communities Focus will be on installing water butts and planters at homes in flood-prone areas	Engage affected customers, encourage proactive flood prevention behaviours, and gather feedback to refine programme delivery

Figure 12: Repeat Sewer Flooding activities

4.4.3 External Sewer Flooding Approach

Scottish Water's SR27 approach to external flooding focuses on delivering long-term resilience and addressing sewer flooding at our most at risk locations on the External At-Risk Register. We aim to address chronic network issues through targeted investment, partnership working with local authorities, and integrated rainwater management solutions. This approach not only mitigates flooding risk but also supports wider environmental and community benefits, such as biodiversity improvements and enhanced public spaces.

Prioritisation is risk-based and transparent. Each location is assessed considering a scoring system that combines the likelihood of flooding, informed by hydraulic modelling and historical incident data, with the severity of impact, considering property type, frequency of events, and customer vulnerability. These prioritisation scores help to rank projects so that investment is directed to areas with the greatest need. While cost efficiency is considered later in planning, the initial focus remains on reducing risk and protecting customers most affected by external flooding.

External flooding can be resolved using the similar solutions as described in Internal Sewer Flooding Approach. In SR27 we want to focus on using rainwater removal solution options. Rainwater management can involve either attenuating rainwater before it is slowly released to the combined sewer, or full disconnection where rainwater is removed from the sewer network and discharged elsewhere e.g. to a watercourse. Rainwater management may not be a viable option at every location suffering from chronic capacity constraints.

4.4.4 Flood Risk Management Act

Under Section 16 of the Flood Risk Management (Scotland) Act 2009, Scottish Water is responsible for assessing flood risks originating from sewerage systems in potentially vulnerable areas identified by SEPA (Scottish Environment Protection Agency). This is a Statutory requirement which must be carried out.

We will ensure that sewer infrastructure is managed effectively to minimise flood risks and protect communities. The process for this is as follows:

- Assessment Preparation: Scottish Water prepares an assessment for each identified area, detailing where floods are likely to originate from sewerage systems, estimating the volume of sewage likely to be released, and including other specified information.
- Consultation: SEPA consults with Scottish Water and other responsible authorities before identifying areas for assessment.
- Integration: The assessment integrates with flood risk information held by SEPA and other responsible authorities.
- Review and Update: Scottish Water reviews and updates the assessments periodically, at least every six years.
- Collaboration: Scottish Water collaborates with SEPA and other authorities to ensure the assessments are comprehensive and up to date.
- This process helps manage and mitigate flood risks from sewerage systems, contributing to overall flood risk management efforts in Scotland.

4.4.5 Develop and Deliver Rainwater Removal Through Partnership Working

Working in collaboration with others has been recognised as an essential tool to help Scotland prepare for the climate challenges of the future. The recently published Scottish Flood Resilience Strategy and ongoing Scottish Government policy development encourages collaborative working between public bodies.

Scottish Water has a vital role; bringing technical expertise and funding to partnerships. We currently are involved in three well established partnerships.

- Metropolitan Glasgow Strategic Drainage Partnership
- Edinburgh and Lothians Strategic Drainage Partnership
- Water Resilient Dundee Strategic Drainage Partnership

All three groups share a common objective, to deal with water on the surface, to prevent it reaching the sewers and have historically delivered a number of co-funded projects, including Orchard Park Swale in Edinburgh.

In SR27 we will continue to work with our partners, to identify areas where rainwater removal can be removed from the waste water network. This may take the form of working through our Strategic Drainage Partnerships or directly in partnership with communities and individual property owners. We also use the partnership way of working to help to smooth development and redevelopment projects. We are in the process of setting up an internal Scottish Water governance board to ensure that projects are consistently funded.

4.4.6 Customer Behaviour Campaigns

Research has shown the customer behaviour campaigns must be run regularly to remind the public of their responsibilities with regard to treating the sewer network with respect. The Nature Calls campaign, run throughout SR21 has been successful, we have seen a 5% reduction in the number of chokes. The ‘localised approach’ will be utilised as a solution option in SR27, alongside an evolving message of encouraging customers to disconnect their property roof drainage from the waste water network.

It is important to run campaigns on an ongoing basis, as part of our toolkit to prevent sewer flooding and pollution incidents, for the following reasons:

1. **Awareness and Education**: Regular campaigns help keep customers informed about the causes of sewer blockages and how to prevent them. This is crucial as new residents move in and others may forget previous advice.
2. **Behaviour Change**: Changing habits takes time and reinforcement. Repeated messages can help solidify the importance of proper disposal practices, like not flushing wipes or pouring grease down the drain.
3. **Seasonal Factors**: Different times of the year can bring different challenges. For example, heavy rains can increase the risk of blockages, so timely reminders can be particularly effective.
4. **Ongoing Issues**: Sewer systems can face recurring issues, and ongoing communication ensures that customers remain vigilant and proactive in preventing blockages.
5. **Community Engagement**: Regular campaigns foster a sense of community responsibility and engagement, encouraging everyone to contribute to maintaining a healthy sewer system.

4.5 Optioneering

4.5.1 Optioneering Process

The investment scenario options are built based on three key principles:

- Support new connections: providing adequate standards of service to our new customers.
- Deliver for our existing customers: this includes carrying out essential works to maintain existing asset performance, customer experience, and health and safety, meeting legislative, regulatory and community standards and progress towards Net Zero by 2024. It also involves investing in asset enhancement to improve resilience, reliability and sustainability of service.
- Consider future customers: replacing ageing assets now to ensure resilience of supply to future customers, preventing unsustainable costs being passed on to them in future.

We use our investment hierarchy approach to develop a balanced investment portfolio across all investment areas, including Managing Quantities of Flows, to prioritise projects and programmes based on our objectives, customer expectations, stakeholder needs and available funding. This approach is outlined in the table below, which links the principles with three investment need categories.

- **Category 1** covers ‘must do’ investments, which are required as a minimum to meet customers’ expectations on level of service. This category accounts for the majority of the investment.
- **Category 2**, which accounts for the next biggest share, includes ‘should do’ investments aimed at delivering regulatory compliance and meet the expectations of legislation and regulation.
- **Category 3** covers investment choices to improve service for existing customers, enabling growth, replacing ageing assets to protect service levels for future customers.

The approach is outlined in the table below, which links the principles with investment allocation.

Table 12: SR27 Investment hierarchy approach

	Customer & performance centric investment needs	Examples	Investment allocation approach		
Deliver for existing customers	1 Maintain core service performance for existing customers	Essential works to maintain existing asset performance, customer experience and health & safety	Minimum needed to maintain service. Already prioritised significantly so budget reduced as a last resort, after all other non-discretionary expenditure reduced to minimum levels	AR3 – asset category 1,2&3	Core expenditure
	2a Meet current regulatory & community commitments	Meet undertakings, legislative (RBMP3), regulatory (water quality), Improving Urban Water (IUW), community (e.g., Seafield odour.)	Named sites agreed with regulators	Enhancement	
	2b Meet current regulatory & community expectations	Water Treatment: HAA at risk Developing schemes – improved disinfections, Run to Waste.	Allocated portion of Enhancement funding	Enhancement	Remaining allocation prioritised within these areas
	3a Improve service for existing customers	Investing in asset enhancement to strengthen resilience, reliability and sustainability of service	Allocated portion of Enhancement to support Customer service issues (internal flooding and low pressure, rainwater management partnerships)	Enhancement	
Support new connections	3b Provide a service for new customers	New development and connections, including temporary works	Adress know systems that has confirmed development.	Enhancement / matched funding*	
Consider future customers	3c Replace long-life assets for future customers	Proactively replacing aging assets to tackle back log and underlying issues; water mains (Asbestos cement pipes), civil infrastructure with remaining lifetime of 40-60 years). Aim to prevent unsustainable costs being passed on to future customers	Consequential allocation as there is high demand from existing assets that impact current service. FD & investment scenarios do specify investing in long-life asset replacement. Future customer needs re-prioritised	AR3 – category 2 Civils and water mains, pressurised sewers	Additional core expenditure

*Cat 3b Match funding Income received that is allocated for Part 3 infrastructure improvements to support new connections. In addition, service relocation allocation is required to move our assets when required by a 3rd party (part funded from external sources)

4.5.2 Unconstrained Options

The development of investment planning scenarios is a crucial step in ensuring that strategic and financial objectives are aligned with the Water Sector Vision and our long-term strategy. The initial step involved generating a comprehensive suite of options to encapsulate potential outcomes and investment needs. The unconstrained options include all the necessary investment demands to meet the current Draft SR27 Ministerial Objectives 2027-33, covering legislative requirements, commitments to stakeholders, and customer priorities.

The unconstrained options incorporate all potential investment options, with a focus primarily on maintaining all assets involved in managing quantities of flows.

To identify the best suite of interventions we have undertaken an extensive optioneering process, applying testing across various performance metrics and compliance requirements to form a series of constrained options, the investment scenarios.

4.5.3 Constrained Options: Draft Business Plan

The constrained investment scenarios were generated from the unconstrained investment options by eliminating, reducing or removing some of the investments. The three constrained investment scenarios considered were:

- **High Scenario**: The investment reduces risk with a CPI + 6.5% per annum, maintaining the service levels achieved at the exit of SR21
- **Working Reference Scenario**: It is the “reference” scenario, with a CPI + 4% per annum, the investment allows maintenance of the service levels achieved at the exit of SR21, meeting Ministerial Objectives albeit accepting more compliance risk
- **Flat Charges Scenario** the reduction in investment under this “flat charge” scenario, with a CPI + 0% per annum, triggers reduced service levels compared to exit of SR21, with notable overall service impacts as measured by OPA and CEM.

The table below compares the investment across the three constrained investment scenarios, summarised by Investment Programme:

Table 13: Summary of investment in Managing Quantities of Flows under constrained scenarios

High (CPI + 6.5%)	Working Reference (CPI + 4%)	Flat Charges (CPI + 0%)
Internal At Risk Register position significantly improved returning to SR15 exit position Significant progress in enhancing and establishing new partnerships Step change- ramping up of rainwater management interventions and external sewer flooding projects	Internal At Risk Register position held stable at SR21 forecast exit level Existing partnerships maintained with some progress in developing new partnerships. Limited progress on rainwater management and external sewer flooding Maintain AR3 approach	Internal At Risk Register position deteriorates. No additional progress on external flooding other than completion of SR21 projects with spend in SR27.

4.5.4 Chosen Option at Draft Business Plan

The investment scenarios were tested against various performance metrics and compliance requirements to validate the scenarios' robustness and ensuring they aligned with ministerial objectives, customers and stakeholders' expectations, Long-Term Strategy for the water sector, climate change adaptation plan, Scottish Water Board aspirations for 2033 and risk appetite. Based on the testing outcomes, we progressed with the Working Reference scenario (CPI+4%) as the basis for Draft Business Plan submission.

4.5.5 Further Refinement: Final Business Plan

Following further engagement and feedback from a broad range of our stakeholders on our draft business plan, we have further refined our SR27 investment to reflect feedback, with two key themes:

- **Affordability**: ensuring that we are not putting a disproportionate burden on the bills of current customers – and that we are doing everything we can to limit impacts on bills; and
- **Ambition:** responding to feedback on our investment focus and ensuring it is adequately ambitious in the areas that matter to our customers.

Responding to this feedback has meant that we need to make further trade-offs across our SR27 investment portfolio. We have done this by refining our reference scenario, through careful rebalancing of investment across AR3, Regulatory Commitments and Service Choices. We have described, in further detail, the steps we took as part of this refinement, and the impacts on our Final Business Plan in TA008 Investment Planning.

Our final chosen option is a further refined version of the Reference Scenario presented in the Draft Business Plan submission.

We did this across all investment areas by:

- Refining the available budget associated with a CPI+3.3% pa customer charge profile, re-running the Financial Model using updated and refined modelling assumptions and the application of the most up to date top-down global efficiency factors.
- We incorporated feedback from sector stakeholders, clarification of Regulator requirements, customer research feedback and further considering the requirements of the draft Ministerial Objectives. Decisions were required to navigate these limitations while ensuring a balanced investment plan.
- Several strategic options were considered to manage budgetary constraints and investment reallocation. These included potential further removal of demand in the asset repair, refurbishment, and replacement (AR3) programme areas or reduce outcomes where there is service choice. As a result, there were upwards adjustments in some areas, and downwards adjustments in others.

4.6 Overall Strategic Option Chosen for SR27

4.6.1 SR27 Investment Plan

The strategy for SR27 aligns with the framework set out in the Long-Term Strategy and follows the overall theme of a multi-directional approach. As such, the key parts of the SR27 Managing Quantity of Flows portfolio are:

- Internal Sewer Flooding – We will maintain the Internal Sewer Flooding At Risk Register position so that the exit position from SR27 is the same as the SR27 entry position – currently forecast to be 395[14].
- Mitigation measures programme – We will deliver mitigation measures at 800 properties, for properties and external areas that have experienced flooding due to overload sewers. In SR27 we will be considering whether to adopt mitigation measures as permanent solutions, thereby removing properties with mitigations from the At Risk Registers.
- Deliver projects to resolve around 600 externally flooded areas using a blend of prioritised external only sewer flooding projects and as a consequence of internal sewer flooding projects
- Flood risk management - We will carry out our duties as specified in the Flood Risk Management Act.
- Partnership working – We will work in partnership with others (including local authorities and local communities) to plan and deliver surface management on a prioritised basis. This will allow us to seize opportunities as they arise to remove rainwater from our networks and recover capacity and resilience. We plan to also establish a further 2-3 drainage partnerships. These partnerships and projects, jointly funded with others, will deliver the benefits for climate resilience, improved recreational and aesthetic benefits and biodiversity, to these local areas. We are working with our existing partners to jointly plan and prioritise projects in their respective cities. When identified and agreed, information about these projects will be published.
- Customer behaviour campaigns – We will continue to use customer behaviour campaigns in areas where flooding incidents due to blockages remain high.

[14] Forecast SR21 exit position, October 2025

- Response to repeat flooding – We will reduce the number of recorded incidents of repeat internal sewer flooding caused and aim to maintain zero repeat internal sewer flooding caused by overloaded sewers.
- Smart sewer networks – We will continue to increase real-time visibility of our sewers' operation to make the transition to smart sewer networks. The data gained will provide visibility to prevent and reduce the risk of customer flooding or pollution incidents due to blockages. We will build on the successes and learning from SR21 and expand our coverage of waste water intelligent networks.
- We will continue to maintain our network assets according to the guidance set out in our management approaches.
- We will continue to maintain our hydraulic waste water models on a planned risk basis.

Table 14: Summary of investment for Managing Quantities of Flows for SR27

Investment Area	Investment Hierarchy	Reference Scenario (CPI+3.3%) £m 24/25
AR3	AR3	603
Flooding - Flood Risk Management Act requirements	Cat 2a – Regulatory	4
Flooding – Enhancement	Cat 3a – Improve Service	364
Total		**970**

4.6.2 Customer and Stakeholder Benefits

The investment proposed in this Technical Appendix will provide the following benefits to customers and stakeholders.

Internal, External Sewer Flooding and Mitigations

Stakeholders – Primary: Customers

Secondary: Local Authorities, wider community, SEPA

- Protecting property: Prevents damage to homes and businesses, reducing repair costs and preserving property value.
- Health and Safety: Minimises exposure to harmful pathogens and contaminants found in sewage, protecting public health. Improves mental health of customers directly impacted by internal sewer flooding.
- Environmental protection: Interventions often reduce the risk of sewage spills that can harm local ecosystems and water quality.
- Improved quality of life: Enhances living conditions by preventing unpleasant odours and unsanitary conditions.

Partnership working and rainwater removal

Stakeholders – Primary: Local Authorities

Secondary: Customers, Scottish Government, Community Action Groups, SEPA and other public sector organisations

- Enhanced collaboration: Brings together diverse expertise and resources from various sectors, leading to more innovative and effective solutions.

- Shared funding: Access to a broader range of funding sources, reducing financial burdens on individual stakeholders.
- Improved outcomes: Combines efforts to achieve better environmental, social, and economic outcomes, such as reduced flood risk, enhanced biodiversity, and improved public health.
- Community engagement: Involves local communities in planning and decision-making, fostering a sense of ownership and pride in the projects.
- Knowledge sharing: Facilitates the exchange of information and best practices, leading to continuous improvement and innovation.
- Long-term sustainability: Promotes sustainable development by integrating green infrastructure into urban planning, ensuring long-term benefits for the environment and society.

Customer Campaigns

Stakeholders – Primary; Customers and Communities

- Reduced flooding: By preventing blockages, these campaigns help minimise the risk of sewer flooding, protecting homes and businesses from damage.
- Improved Public Health: Reducing blockages decreases the likelihood of sewage overflows, which can spread harmful pathogens and contaminants.
- Environmental protection: Preventing blockages helps protect local waterways and ecosystems from pollution caused by sewage spills.
- Cost savings: Fewer blockages mean lower maintenance and repair costs for both homeowners and Scottish Water.
- Enhanced system efficiency: Clear sewers operate more efficiently, ensuring reliable waste water management and reducing the need for emergency interventions.
- Community awareness: These campaigns educate the public about proper disposal practices, fostering a sense of responsibility and community engagement.

Performance Outcomes

The outcome measures marked with an asterisk are those that we consider there is scope to align with the measures in England and Wales.

Table 15: The outcomes we are seeking to achieve in SR27

Measure of Level of Service	Level of Service	Unit	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Internal Sewer Flooding	Number of internal sewer flooding incidents	Number normalised by number of sewer connections	1.53	1.52	1.51	1.50	1.49	1.48
Internal Sewer Flooding	Number of properties at risk of internal flooding	Number normalised by number of sewer connections	1.53	1.66	1.60	1.56	1.53	1.47
External Sewer Flooding	Number of external sewer	Number normalised by number	10.55	10.67	10.79	10.92	11.04	11.16

Measure of Level of Service	Level of Service	Unit	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
	flooding incidents	of sewer connections						
External Sewer Flooding	Number of properties at risk of external flooding	Number normalised by number of sewer connections	11.67	12.13	12.40	12.69	12.48	11.88

To enable the strategy for sewer flooding to develop we proposed to report the risk register and external sewer flooding metric to a Forum of stakeholders to ensure that the resources are used most effectively to resolve and protect customers and communities and develop the wider rainwater management. A target on the register will drive a particular approach that may not be in the best interests of the Long-Term Strategy and our customers communities and environment. Our aim is to build reputation in the way we report and make decisions to fulfil our strategy. The SR27 period provides the opportunity bring this to fruition and provide the reporting and information platform for the long term.

4.6.3 Risk and Opportunities

Throughout the development of our SR27 plan we have identified several challenges and opportunities that we are working to overcome to enable us to deliver successfully upon our investments:

Technical Knowledge: Addressing the complexity of hydraulic capacity erosion requires further advancements in modelling and predictive capabilities. We will work with our supply chain partners and upskill our staff to mitigate this risk

Resource Constraints: Limitations in skilled workforce availability may impact the timely delivery of SR27 objectives.

Adaptation to Climate Impacts: The growing intensity and frequency of extreme weather events require adaptive strategies, which present ongoing challenges in terms of planning and execution. We will continue to address this risk by using the most up to date information on the appropriate climate change updates more specifically, there is a risk that the assumption of 50 per year annual additions to our Internal Sewer Flooding at Risk Register could increase due to climate change. Climate Change Risk assessment work is currently in progress to understand the likely impact of climate change over the coming investment periods.

Legislative and Policy Changes: Keeping pace with evolving regulatory and ministerial requirements adds further complexity to project prioritisation and implementation.

Complex Problems and Associated Unit Rates: If we are to deliver on our ambition of maintaining the position of the Internal Sewer Flooding At Risk Register, we will need to carefully monitor the unit rate for flooding projects and ensuring that the average cost is at or below the unit rate.

As already discussed in Section 4.1.4 our current prioritisation framework is designed to uphold fairness and transparency by directing investment to the customers most at risk, using a consistent methodology that considers both the likelihood and impact of flooding. However, a cost driven approach maximises the number of properties directly protected, although may not provide the wider benefits of larger more complex hydraulic schemes and may result in critical flooding

and waste water projects being delayed or excluded, increasing customer vulnerability and damaging Scottish Water's reputation.

Mitigations Measures Delivery - The delivery partner is assumed to remain the same, with current provision below market value. Should we need to change Delivery Partner this could increase the cost of delivering these measures.

Although we acknowledge there are several challenges to the delivery of our SR27 plan, we do also see several opportunities that we are looking to leverage:

- **Benefit capture** – we know that our flooding schemes, and rainwater management interventions, can often have a much wider hydraulic impact on the local area in terms of improving network capacity and resilience. We are progressing towards a better quantification and tracking of this to allow us to understand the full benefits delivered by the programme.
- **Delivery of blue-green infrastructure** - Our strategic partners and alliance delivery partners are typically set up to deliver grey infrastructure schemes. As such this procurement route is not necessarily the most efficient or cost-effective means of delivering blue-green infrastructure, particular at pace. Work is ongoing to explore procurement routes and opportunities and leverage this opportunity to push the innovation of our supply chain – see our Supply Chain Technical Appendix for further detail.
- **Develop and adopt enhanced survey techniques**, such as use of drones or other remote information gathering equipment to improve our efficiency and output. For example, we have worked closely with our Delivery Partners to develop a drone to survey difficult critical sewers where normal Crawler type CCTV units are unable to function and we will continue to utilise this going forwards.
- In SR27 we will continue to work with our **Delivery Partners to develop and innovate new asset inspection techniques** and we also hope to share data on asset degradation over time within the wider water industry. Obtaining more site-specific information will also enable the development of detailed system plans and these plans will facilitate economic repair or replacement of assets with equivalent or modern alternatives.
- **Innovation in Drainage Solutions**: Exploring advanced technologies for flood risk management and rainwater retention can enhance long-term resilience.
- **Collaborative Partnerships**: Partnerships provide opportunities for integrated investment planning and joint initiatives to address rainwater challenges.
- **Future-Proofing Infrastructure**: Investments in SR27 offer the chance to address longstanding capacity issues, increase network resilience, and prepare for climate change impacts.
- **Customer-Centric Enhancements**: Expanding mitigation measures and improving clean-up responses strengthen customer trust and satisfaction.
- **Waste water Intelligent Networks** – as we roll out more 'smart' networks we will obtain a much better understanding of how our networks operate, and where there may be opportunities for dynamic control.

4.7 Investment Programmes

The following sections provide greater detail on our SR27 investment programme broken down by AR3 and enhancement investment.

4.7.1 AR3 Option Chosen for SR27

Table 16: Proposed AR3 investment

Investment Area	Investment Category	Description	Reference Scenario (£m, 24/25)
Maintaining Pipe bridges	Cat 1	Maintenance existing pipe bridges	49
WW Pumping Mains	Cat 1	Maintain rising mains and air values	127
WW Outfalls	Cat 1	Maintain existing waste water outfalls	7
Maintaining CSOs	Cat 1	Maintain existing CSO screens	23
Sewer Structures	Cat 1	Maintain Automated Pumped Non-Return Valves (APNRV) and flood mitigation devices Maintain syphons Maintain storm tanks Maintain Sustainable Urban Drainage Systems	19
Gravity Sewers	Cat 1	Maintain non-critical sewers Maintain critical sewers	302
Waste Water Model Maintenance	Cat 1	Maintain network model - Upkeep of models with a population equivalent of more than 10,000	16
Other Network Assets	Cat 1	Fixed wire electrical systems Street Iron works Statutory maintenance items	49
Sewage Pumping Stations	Cat 1	Ensure legacy SPS meet the appropriate standard - Bring legacy vested equipment up to standard.	10
		TOTAL	603

4.7.2 Enhancement Option Chosen for SR27

Table 17: Proposed enhancement investments

Investment Category	Need	Investment Summary	Proposed Investment (£m, 24/25)
Flooding - Cat 2a - Regulatory	833	Provide fit for purpose models required as minimum legislative requirement under Flood Risk Management Act	4
Flooding - Cat 3a – Improve Service	841 & 839	Develop and deliver rainwater removal projects, in collaboration with others, to reduce overall flood risk	70
	831	Provide protection to customers from the risk of flooding whilst permanent solutions are being identified and implemented	12
	835	To reduce flood risk to customers impacted by high consequence external sewer flooding where not disproportionately expensive*	45
	837	To reduce flood risk to customers impacted by high consequence internal sewer flooding where not disproportionately expensive	218
	907	Customer education campaigns	2
	2407	- Tackling repeat flooding due to other causes (IFOC/EFOC)	16

*Additional areas will be also removed as a consequence of Internal Sewer Flooding projects

4.7.3 Internal Sewer Flooding

Our ambition for SR27 is to maintain the internal sewer flooding At Risk Register position. The table below shows our baseline SR27 programme. As discussed in Section 4.1.4 we use our prioritisation process to ensure fairness for customers by directing investment to those most at risk. This will be enhanced in early 2026 and may result in the reprioritisation of internal sewer flooding properties.

Table 18: Internal sewer flooding projects

Group	SR21 project	Comments	Number of properties removed from ARR	Cost
Internal sewer flooding project Glasgow	✓	Project not named due to customer confidentiality (code 5363110201).	10	£15.2m
Internal sewer flooding project Stirling	✓	Project not named due to customer	2	£8.0m

Group	SR21 project	Comments	Number of properties removed from ARR	Cost
		confidentiality (code 5363113549).		
Internal sewer flooding project Dumfries	✓	Project not named due to customer confidentiality (code 5363110205).	4	£7.9m
Internal sewer flooding project Perth	✓	Project not named due to customer confidentiality (code 5363110202).	2	£10.1
Internal sewer flooding project Gretna	✓	Project not named due to customer confidentiality (code 5363110206).	4	£9.4m
Internal sewer flooding project Edinburgh	✓	Project not named due to customer confidentiality (code 5363113565).	2	£6.2m
Internal – SR21 Named Flooding Projects -	✓	80 Flooding Projects current beyond GW30 but not yet at GW90 with spend forecast beyond March 2027.Project LBEs all <£6m.	160	£84.1m
IFOS Emerging SR21 & SR27 Non-named Projects	X	Projects to be delivered on a prioritised approach.	TBC	£77.1m
Total				**£218m**

4.7.4 Mitigation Measures

The total projected spend of **£12m** for SR27 mitigations is derived from a detailed forecast of property flood mitigation activities, unit costs, and anticipated delivery volumes. This figure reflects both historical data and forward-looking assumptions about the types and numbers of mitigations required, as well as expected cost uplifts.

The projection is based on the anticipated number of properties requiring mitigation and based set out in the mitigation measure matrix.

Annual average additions in each risk category have been used to calculate total projected additions for SR27. Forecast mitigation numbers are based on current percentage of mitigations in each category.

Table 19: Mitigations risk level, forecast and total cost

Risk Level (return period)	Total Forecast Mitigations	Total Cost
IFOS 1:10/2:10	240	£2,670,000
IFOS 1:20	149	£1,652,000
EFOS 2:10	369	£5,490,000
IFOS Severe	105	£1,168,000
Consequential mitigation*	156	£1,735,000
	1019	£12,715,000

**Mitigation of neighbouring properties to offset flooding detriment caused by mitigating target properties.*

4.7.5 Tackling Repeat Flooding due to Other Causes (IFOC/EFOC)

In addition to continuing with the internal mitigation measures to alleviate repeat internal sewer flooding, we will also look to start to reduce internal flooding caused by blockages. The SR27 Repeat Internals programme is a comprehensive initiative designed to address repeat flooding incidents through a combination of team resourcing, advanced monitoring (WWIN), blue-green infrastructure (BGI), and customer engagement. The total projected spend of £16.4m reflects a multi-year, multi-component investment, as detailed in the financial projections.

Table 20: Tackling repeat flooding due to other causes – project breakdown

Activity	Description	SR27 Cost
Resource	Programme coordination, data analysis, stakeholder engagement, and administration.	£6,806,000
WWIN – Monitoring and Reactive Maintenance	Enables real-time sensor data and hydraulic modelling to forecast flooding risks, identify high-risk properties, and support rapid deployment of mitigations, especially for repeat flooding cases.	£5,280,000
BGI – Blue-Green Infrastructure Rollout	Focus will be on installing water butts and planters at homes in flood-prone areas, helping to absorb rainwater,	£2,266,000

Activity	Description	SR27 Cost
	reduce flooding, and enhance the local environment.	
Customer Behaviours & Consultation	Engage affected customers, encourage proactive flood prevention behaviours, and gather feedback to refine programme delivery.	£2,000,000
		£16,352,000

The projected spend of **£16.5m** for SR27 is justified by the scale and complexity of the programme. It encompasses:

- Sustained team resourcing for effective delivery.
- Enhanced monitoring and maintenance through WWIN, with a significant uplift for SR27.
- Strategic rollout of blue-green infrastructure to mitigate flooding.
- Robust customer engagement and consultation.

4.7.6 External Sewer Flooding

The external At Risk Register is expected to continue growing throughout SR27, as it has consistently done during SR21, leading to more customers being affected by external flooding. We will focus on addressing the highest priority external sewer flooding clusters within the SR27 funding constraints. As outlined earlier in this document, we completed planning activities for our top 20 clusters in SR21.

In SR27, we will aim to implement the projects that offer the highest value and benefits for our customers. The table below shows the split of funding between SR21 projects already in flight and with delivery due to span SR21 – SR27 and the funding available for the next highest priority clusters.

Table 21: External sewer flooding investments

Group	SR21 project	Comments	Removals from External ARR	Cost
External SR21 Named Flooding Projects -	✓	5 Flooding Projects current beyond GW30 but not yet at GW90 with spend forecast beyond March 2027.	95	£16.9m
EFOS Emerging Priority Areas		Forecast additional removals at a unit cost of £500k/ area	34	£27.7m
Total				**£44.5m**

In total we anticipate that this funding will ensure around 200 areas will be removed from our External Sewer Flooding At Risk Register as a result of our SR27 External Sewer Flooding Programme. Further areas will be removed as a consequence of Internal Sewer Flooding projects.

4.7.7 Flood Risk Management Act

Under Section 16 of the Flood Risk Management (Scotland) Act 2009, Scottish Water is responsible for assessing flood risks originating from sewerage systems in potentially vulnerable areas identified by SEPA (Scottish Environment Protection Agency). This statutory duty will be undertaken as part of our plan and based on SR21 run rates, we anticipate this will cost £4m.

4.7.8 Partnerships and Rainwater Removal

The funding for Partnerships and delivering rainwater removal projects, £70m, can be described as follows:

Partnerships

This funding is to undertake strategic long-term catchment planning and delivery of rainwater management interventions in our Strategic Drainage Partnerships; Metropolitan Glasgow Strategic Drainage Partnership, Edinburgh and Lothians Strategic Drainage Partnership and Water Resilient Dundee.

We will seek to expand this Strategic Drainage Partnership approach, expanding into at least 2 others, working in collaboration with local authorities and external agencies.

This funding will allow for the continuation and delivery of work carried out in the existing partnerships to remove rainwater from the combined system.

These activities include developing and delivering sustainable drainage strategies and practical projects, engagement with local authorities, communities and public sector organisations, mapping existing drainage systems to identify opportunities for rainwater disconnection and attenuation promoting all rainwater management measures including disconnection and installation of place-based Sustainable Drainage Systems (SuDS) in new developments and retrofits, co-ordinating multi-agency partnerships to ensure integrated and place-based approaches to RWM, and raising public awareness. These programmes will be exemplars for sustainable urban water practices across Scotland.

We are working with our existing partners to jointly plan, prioritise and fund projects in their respective cities. When identified and agreed, information about these projects will be published.

We are in the process of setting up an internal Scottish Water governance board to ensure that projects are consistently funded.

These partnerships and projects, jointly funded with others, will deliver the benefits for climate resilience, improved recreational and aesthetic benefits and biodiversity, to these local areas. We have consistently set out that we need a dual approach to improving our networks - addressing chronic capacity issues while also improving resilience through rainwater management. Working fully in partnership moves us beyond individual organisations dealing with “their part of the problem”, to a framework where multiple issues can be identified and addressed in a planned and co-ordinated manner to provide multiple benefits to partner organisations and communities.

Through partnership collaboration, Scottish Water will benefit from efficiencies of time and cost through co-ordinated planning and delivery, access to new avenues of joint funding, and new delivery mechanisms. This will enable us to deliver greener, place-based solutions which will increase the resilience of the sewer network to future climates, whilst improving the level of service to a much wider range of customers than those who are targeted through individual projects aimed at resolving specific chronic issues (under the flooding and UID programmes). The interventions and projects delivered under these partnerships will start to build network resilience and offset the impact of climate change.

Examples of ongoing work include the delivery of Strathmartine Connections[15] project as part of the Water Resilient Dundee partnership. The multi-benefit project is currently in the detailed design phase, will transform the St Leonards Park area of Dundee, incorporating rainwater removal from the combined sewer system, active travel routes to two schools, road safety improvements as well as additional greenspaces.

Within ELSDP, projects have been identified to continue rainwater removal in the Craigleith area of Edinburgh, which includes significant place making activities around Easter Drylaw and Arboreteum Place, in addition to rainwater removal improvements, also include active travel and road safety improvements.

Working with others to tackle rainwater removal

This programme aims to deliver a series of rainwater management initiatives that reduce flood risk, improve climate resilience, and enhance biodiversity across Scotland. The approach combines practical interventions with education and engagement to create long-term benefits for communities and the environment.

Educational and public sector buildings

We will seek to introduce rainwater management measures at schools and other public education facilities. These projects will mainstream SuDS, reduce combined sewer overflows, and provide outdoor learning spaces. They will also engage pupils and communities, fostering awareness of water sustainability.

Public sector buildings such as Libraries, NHS facilities, and other government buildings tend to have large roof spaces and drain into the combined sewer system. We will work with others to adapt these to attenuate, disconnect, or reuse rainwater runoff. This will ease pressure on combined sewers while promoting biodiversity and placemaking.

Property level rainwater removal

Private households will be offered water butts and raingarden planters to encourage participation in rainwater management, where the property is connected to the combined sewer system or surface water system is under strain. This programme is under development, with commercial agreements to order significant volumes of water buts and planters required.

[15] Strathmartine Connections - Water Resilient Dundee

4.7.9 Customer Behaviour Campaigns

We will use £2m to help support the Nature Calls campaigns, focusing on encouraging customers to disconnect their property roof drainage from the waste water network, this campaign will follow the 'Drain the Rain' concept that has been deployed in Edinburgh as part of Improving Urban Waters awareness campaign.

4.7.10 Additional Investment Options which are Excluded from Plan

In developing our SR27 investment plan, we have considered a wide range of options for investment but had to make decisions based on risk and affordability for customers. For areas in our plan where we have reduced or curtailed investments, we have made provision in our Risk and Opportunity Management Plan.

Within Managing Quantities of Flows, items we have NOT included in our investment plan are:

- Recover the SR15 internal At Risk Register exit position – ARR position of 314
- Deliver Higher level of rainwater management funding to allow high priority external sewer flooding schemes to be delivered with a blend of grey and blue-green infrastructure and additional blue-green infrastructure scope at 5-10 UID projects.

4.8 Future Investment Requirements

4.8.1 Future Pressures on our Waste Water Network

Planning for the next 25 years is inherently uncertain. As part of our Long-Term Strategy, we undertook a broad ranging and comprehensive review of the risks and opportunities across the next 25 years. The investment we have identified will secure our essential services by maintaining our existing asset base, allowing us to adapt to climate change and meet our legislative requirements. Without major changes to how we currently operate the water and waste water system and given the projected impact of climate change and urban creep, we are currently forecasting that the funding needed to deliver sustainable services will need to increase over the next 25 years significantly. Planning for this period is inherently uncertain and there are both opportunities and risks ahead.

For Managing Quantities of Flows, the projection will see an increase in total expenditure of cira four-fold between SR27 and SR45 from £188m to £779m per annum (Figure 13).

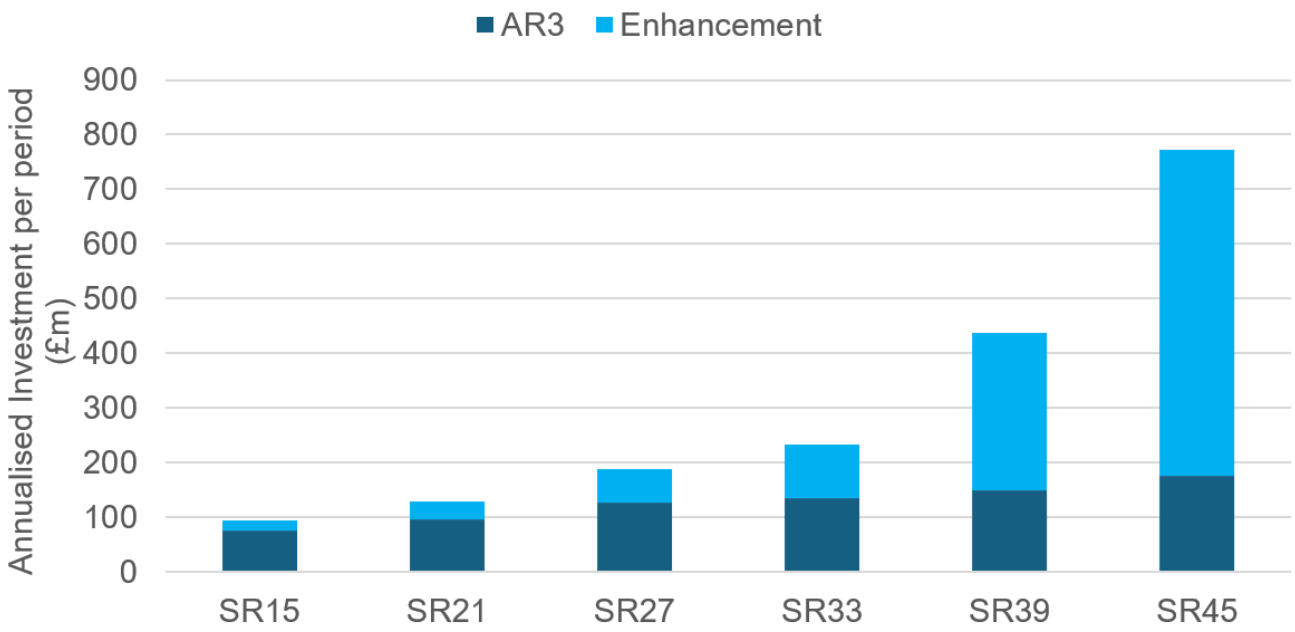

Figure 13: Historic and projected investment - Managing Quantities of Flows (2015 to 2051)

This driven by increased enhancement expenditure due to:

- An increase in properties that come onto the At Risk due to the effects of climate change.
- Significant investment in rainwater management – where we will be increasing the work we do with partner organisations to reduce the amount of rainwater entering our sewers and therefore having a negative impact on our network and ultimately significantly reducing the risk of flooding to customers in the long term.

A detailed breakdown is shown in Figure 14 below. The chronic issues on the Waste Network our Long-Term Investment Strategy sub-outcome that covers all reported sewer flooding (both internal and external) occurring with an annual risk of reoccurring of 3% or higher.

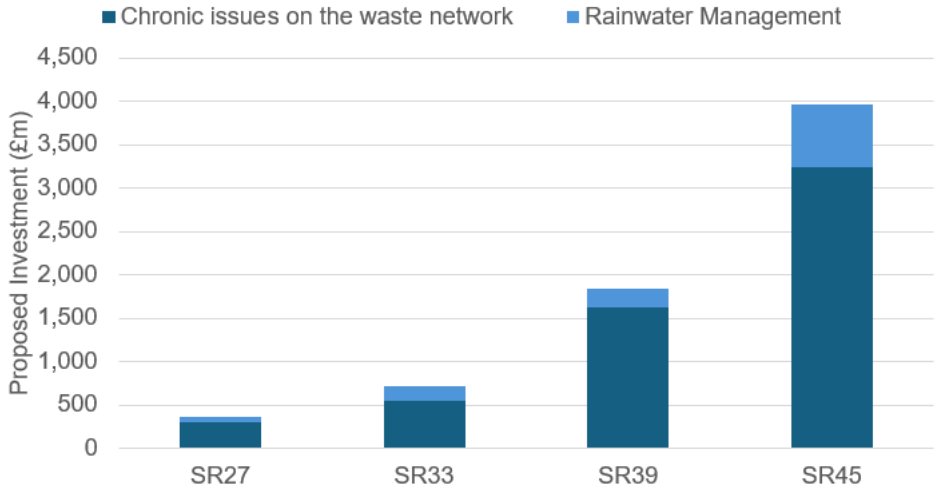

Figure 14: Long Term Enhancement Expenditure Projection for Managing Quantities of Flows (2027 - 2051)

We are forecasting an increase in AR3 investment required annually over the longer term (from ~£100m per year in SR27 to ~£170m per year in SR45). We have planned to invest heavily in the

renewal of our rising mains, pipe bridges and other associated sewer infrastructure in SR27 thus lowering the increases in our overall AR3 spend out to SR45.

5 Interdependencies

This document should be read in conjunction with other Technical Appendices including:

- Water Environment
- Enabling Growth
- Climate Change Adaptation
- Investment Planning
- Supply Chain
- Digital strategy

The document should also be read in conjunction with Scottish Water's Long-Term Strategy.

6 Conclusion

In summary, over the course of SR15 and SR21, our performance across internal and external flooding incidents has been broadly stable, this is due a combination of investment in long-term hydraulic schemes and new programmes such as mitigations, which target repeat flooding. On that basis, we have selected the Working Reference Scenario for SR27, which aligns with ministerial objectives and our long-term strategy and ambitions, meets customers and stakeholders' expectations, climate change adaptation plan, Scottish Water's Board aspirations for 2033 and risk appetite.

Our Reference Scenario (CPI+3.3%) will deliver require £970m of investment to deliver the following:

- **Maintain existing sewer network asset during SR27:** Maintaining our existing sewer asset base is critical to the provision of service to our customers and stakeholders. We intend to spend £603m during SR27, which will also support flooding issues.
- **Maintain number of properties on the Internal Flooding At Risk Register (ARR):** Our key focus of SR27 will be to continue to tackle and resolve internal flooding for our most at risk customers, ensuring that exit numbers of properties at risk of internal flood at the end of SR27 will not exceed SR21 exit number which is likely to concluded at [395]. This will require to address properties on the register from projects already identified in SR21, Emerging Properties, Emerging SR21 Non-named Projects and Emerging Properties and Impact of Climate Change – Properties not on Register from the start of SR27, arriving at 395 properties at risk as the exit position of SR27.
- **Mitigate the impact of internal and external sewer flooding** where technically feasible to do so.
- Initiatives to **reduce number of repeat internal flooding incidents** caused by blockages
- **Tackle a number of our highest priority clusters currently on the External Flooding At Risk Register (ARR**): The strategy seeks to tackle our highest priority external flooding, which we know can have a significant impact on both individuals and communities This will address external flood by commencing external named flooding projects deferred or overhanging from SR21 and new and Emerging Priority Areas during SR27.
- **Maintain the total number of internal flooding incidents**: Our strategy to maintain the total number of internal flooding incidents is to replicate SR21 scale and expenditure of mitigation measures programme. Building on our success in SR21, our SR27 Mitigation measures strategy remains a key component in our solution as a low-cost high value means of protecting customers against the worst impacts of flooding and preventing repeat flooding event. We will also look to target repeat internal flooding that are not caused by hydraulic overloading. This coupled with the Customer Behaviour Campaign, will help reduce the number of incidents.
- Deliver activities to meet our **Flood Risk Management Act** duties.
- Develop and deliver rainwater removal projects, **in partnership with others**, to reduce overall flood risk.
- Support further roll out of customer behaviour campaigns.

Scottish Water
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BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Enabling Growth

February 2026

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1 Executive Summary

The Enabling Growth investment area covers the investment required to meet the relevant Draft Ministerial Objectives 2027-33, by providing the strategic capacity for all new domestic properties connecting to our water and waste water systems as well as the domestic demand associated with commercial properties. These Draft Ministerial Objectives 2027-33 are:

- Scottish Water must identify and provide new strategic capacity that will meet the demand of all new housing development and the domestic requirements of commercial and industrial development for the 2027-33 period.
- Scottish Water must:
    - work with the industrial sector to facilitate the provision of capacity that will meet the non-domestic needs of new and expanding industry,
    - work with stakeholders to influence strategic development in areas where there is already capacity, and to consider all possible measures to release capacity in existing assets before requiring enhancement of water and waste water infrastructure,
    - work with the Scottish Government to support the Scottish Government's objective of ensuring reliable and sustainable rural waste and water services.
- Scottish Water must ensure that such strategic capacity is delivered in support of committed investment to minimise the likelihood of redundant capacity.

Scottish Water recognise, in our Long-Term Strategy, that the population of Scotland is growing and changing, and that this is one of the three key challenges that we are facing (along with more extreme weather and ageing assets). As the population grows, so does the demand on our networks and treatment works.

Where strategic capacity (headroom) at water and waste water treatment works is limited, and population growth is increasing demand, then investment may be required to restore headroom (e.g. through upgrades and extensions to the network). Scottish Water must meet this demand while enabling all new household connections, providing any required new capacity "just ahead of need."

To identify the best suite of interventions to meet this challenge, Scottish Water have undertaken an optioneering process, combined top-down and bottom-up investment scenario planning to identify and scope out our recommended Enabling Growth investments for SR27. The investment scenarios were tested against various performance metrics and compliance requirements to validate robustness whilst ensuring they meet: Draft Ministerial Objectives 2027-33; customers' and stakeholders' expectations; our Long-Term Strategy and contribution to the Water Sector Vision; and Climate Change Adaptation Plan, while meeting Scottish Water's Board expectations and risk appetite.

Part of this development process was the creation of a Draft Business Plan submission against which stakeholders provided feedback against their expectations and refinements were subsequently made.

Based on the refinement of the SR27 Draft Business Plan and the testing of outcomes, Reference Scenario (CPI +3.3%) is recommended. The Reference Scenario will deliver £551m (24/25 price base, post-efficiency) of investment to meet the relevant Draft Ministerial Objectives 2027-33,

maintaining overall compliance, and ensuring we will continue to identify and provide the new strategic capacity to meet the demand of all new housing development, and the domestic requirements of commercial and industrial development.

We will deliver the outcomes above by investing in Waste Water Growth, Water Growth, Infrastructure Investment, and Service Relocations.

Table 1 below summarises our key investments, along with the programme area and investment hierarchy.

Table 1: Enabling Growth SR27 Investment Summary (24/25 price base, post-efficiency)

Investment Category	Investment Hierarchy	Programme	Investment value (£m, 24/25)
Waste water Growth MA026	Cat 2a – Regulatory Cat 3b – New Customers	Provision of Part 4 capacity to meet strategic & local growth requirements	£319m
Water Growth MA087	Cat 3a – Improve Service Cat 3b – New Customers	Provision of Part 4 capacity to meet strategic & local growth requirements	£71m
Infrastructure Investment MA032	Cat 2a – Regulatory	Provision of strategic capacity in our networks to meet new demand	£123m
Service Relocations MA065	Cat 2a – Regulatory	Comply with legislative requirements – Water & Waste Water	£38m
Total Enabling Growth Investment			**£551m**

The £551m SR27 investment in Enabling Growth makes up 7% of the total SR27 Investment of £8.1bn, as shown below.

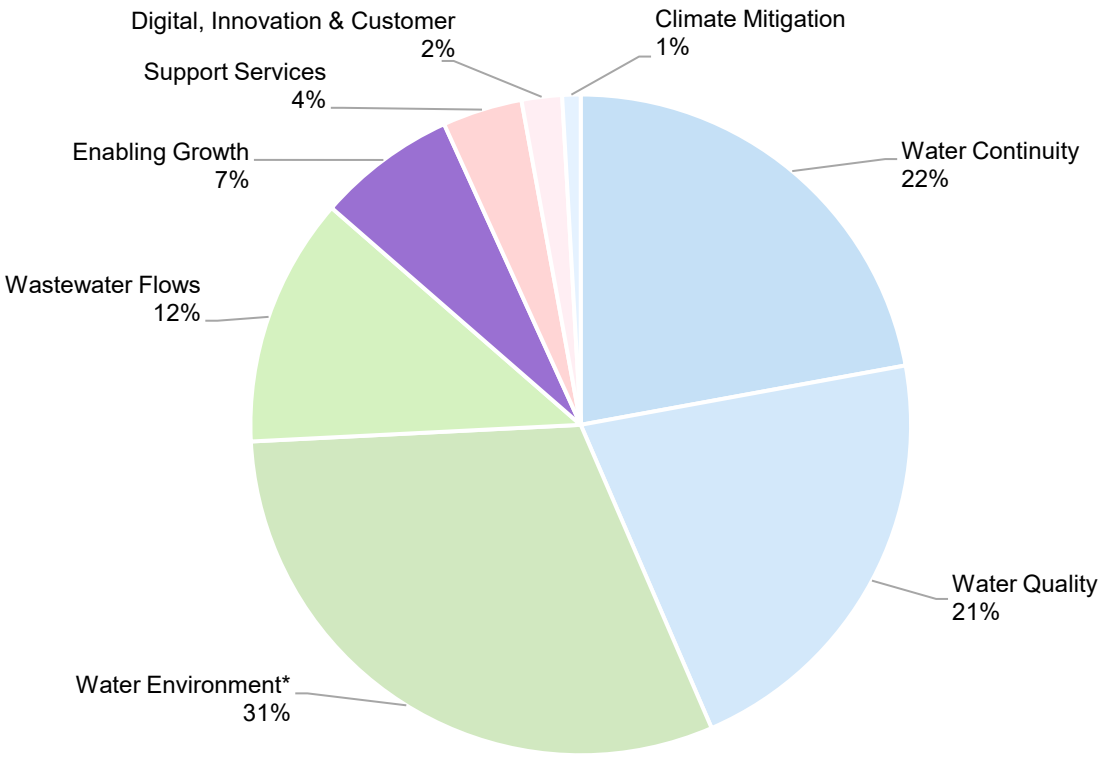

Figure 1: Enabling Growth investment as a proportion of the total SR27 investment.
** Includes West Central Bioresource investment*

2 Background

2.1 Scope of this Technical Appendix

This Technical Appendix covers the proposed investment required to ensure there is the necessary strategic water and waste water capacity to facilitate new housing connections and new domestic demand associated with commercial properties, thereby supporting sustainable economic growth in Scotland.

2.2 Draft Ministerial Objectives 2027-33

The Draft Ministerial Objectives 2027-33 for Supporting Sustainable Economic Growth are described below:

- Scottish Water must identify and provide new strategic capacity that will meet the demand of all new housing development and the domestic requirements of commercial and industrial development for the 2027-33 period.
- Scottish Water must:
    - work with the industrial sector to facilitate the provision of capacity that will meet the non-domestic needs of new and expanding industry,
    - work with stakeholders to influence strategic development in areas where there is already capacity, and to consider all possible measures to release capacity in existing assets before requiring enhancement of water and waste water infrastructure,
    - work with the Scottish Government to support the Scottish Government's objective of ensuring reliable and sustainable rural waste and water services.
- Scottish Water must ensure that such strategic capacity is delivered in support of committed investment to minimise the likelihood of redundant capacity.

Scottish Water's Long-Term Strategy[1] has incorporated these requirements into the wider long-term outcome of enabling Scotland's sustainable economic and housing growth. This aligns with the Water Sector Vision[2] of ***We will enable the economy to prosper****,* by ensuring that we do not cause unnecessary delay to development.

Supporting customer research highlighted that our customers believe Scottish Water infrastructure should support economic growth, although not at the expense of the environment.

2.3 Legislation and Regulations

The key legislation and regulations relating to Enabling Growth are set out in Table 2.

Table 2: Legislation and regulations directly applicable to the Enabling Growth investments

Statutory Duty / Regulatory Obligation	Summary
The Scottish Water (Objectives: 2021 to 2027) Directions 2020:	Under the Water Industry (Scotland) Act 2002, Ministerial Directions were given to Scottish Water

[1] Our-Sustainable-Future-Together_Scottish-Water-Long-Term-Strategy.pdf

[2] Scottish Water's Water Sector Vision

Statutory Duty / Regulatory Obligation	Summary
	by Scottish Ministers for 2021 to 2027 for supporting sustainable and economic growth.
The Water (Scotland) Act 1980:	Part 2 Section 6 – 'It shall be the duty of Scottish Water to provide a supply of wholesome water to every part of [its] limits of supply where a supply of water is required for domestic purposes and can be provided at a reasonable cost'.
The Sewerage (Scotland) Act 1968:	Requires Scottish Water to effectively drain its area of domestic sewage, surface water runoff from roofs and paved areas within the curtilage of premises, and trade effluent. Note: Scottish Water is not obliged to do any of the above which is not practicable at reasonable cost.
The Provision of Water and Sewerage Services (Reasonable Cost) (Scotland) Regulations 2015:	Determines what Scottish Water's reasonable cost contribution should be, by specifying what will, and will not, be taken into account in calculating the reasonable cost contribution and also by specifying the method for calculating the maximum amount.
The Principles of Charging for Water and Sewage Services 2021-27:	Confirms cost arrangements for new household, commercial and industrial development.
The Urban Waste Water Treatment Directive (UWWTD):	Sets out the impact of development on receiving waters whereby secondary treatment is a requirement when the threshold of a town grows bigger than 10,000 in population numbers. For example, this the case for the town of North Berwick.
Highway Authorities and Utilities Committee (HAUC (UK) 7) Code of Practice	Scottish Water has a statutory requirement to contribute towards the relocation and integration of assets, such as water pipes and sewers, associated with large infrastructure schemes. The HAUC code of practice gives guidance on both undertakers' and authorities' responsibilities with regard to street or road works under the legislation including: • Transport (Scotland) Act 2019 • Transport (Scotland) Act 2005 • New Roads and Street Works Act 1992 • Roads (Scotland) Act 1984

Scottish Water will continue to invest to meet the challenge of providing the capacity necessary to enable growth. Failure to do so, would otherwise mean that we could compromise compliance

with current environmental licences, we may not meet the expected security and resilience of Scottish Waters' services, and may result in limitations on supporting future developments.

2.4 Understanding Strategic Capacity

The strategic water and waste water capacity, also known as Part 4[3], is set out in the figure below. Further details of the component parts of new connections and capacity is provided in the annex.

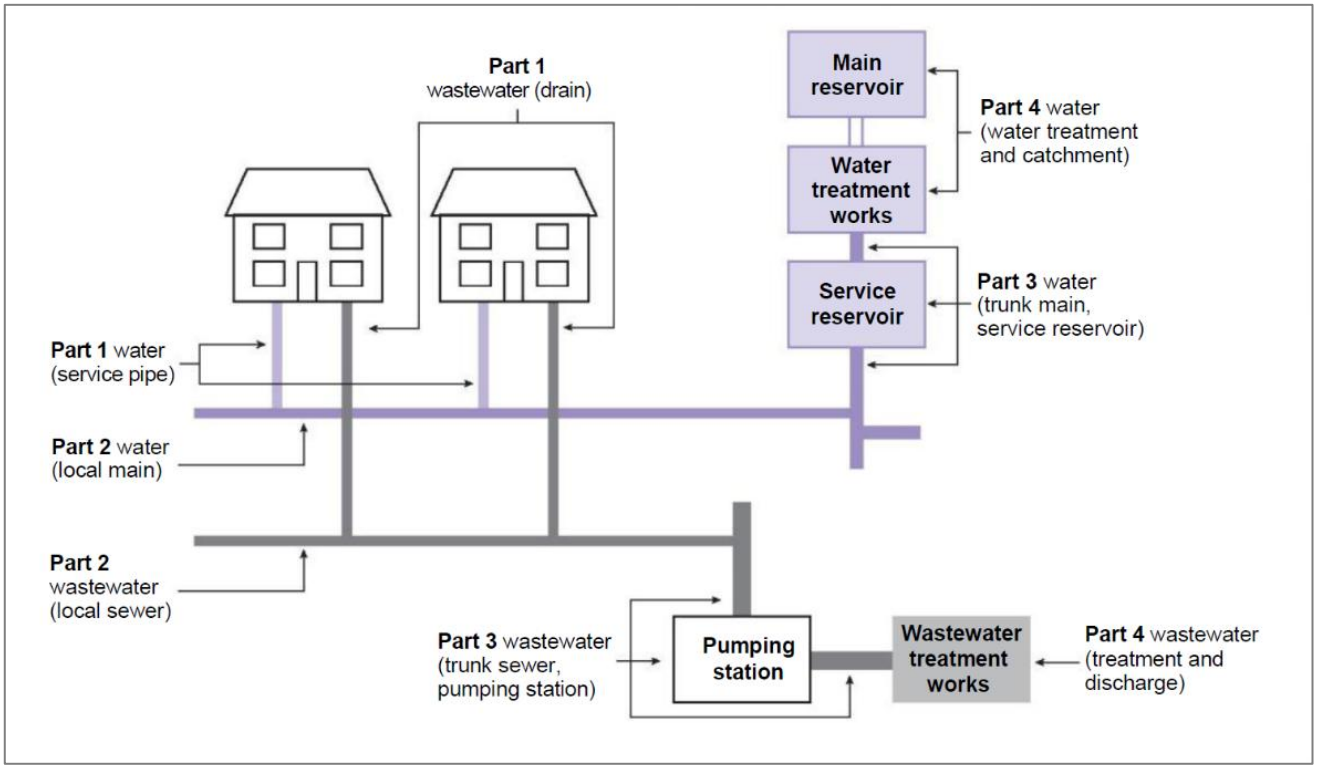

Figure 2: An illustration of the four component parts of new connections and capacity.

Under the Draft Ministerial Objectives 2027-33, Scottish Ministers direct Scottish Water to meet the Part 4 strategic capacity requirements of all new housing developments and the domestic requirements of commercial and industrial customers. Scottish Water will continue to deliver against this requirement to ensure the capacity requirements of developments are enabled "just ahead of need". When visibility of commercial or industrial requirements come forward then we will engage with our customers to ensure we support their development needs.

2.5 Our Strategy

Scottish Water recognise, in our Long-Term Strategy, the changing population of Scotland is one of the three key challenges that we are facing. As such, one of our Long-Term Outcomes is to continue to play a key role in enabling Scotland's sustainable economic and housing growth. We commit to enabling growth in support of a flourishing Scotland by ensuring on-time, as-needed, effective connections for all new housing developments to our water and waste water networks. It also states a need to work collaboratively with developers, planning authorities and other agencies to understand the timing and scale of their new developments.

Scottish Water will encourage development where there is already capacity by influencing decision makers, develop schemes for new strategic capacity where it is highly likely that capacity

[3] See Table 11 for definitions

expansion will be required, and take the lead in providing strategic water and waste water infrastructure where it is most cost effective to do so and there is high confidence that the associated development will progress. Specifically, we will:

- Engage with the Scottish Government, local authorities, and developers to encourage and support development in areas where we have existing capacity at our water sources and treatment works.
- Encourage the development of water efficient homes and businesses and provide developers with standard, low-carbon infrastructure, to make connecting to our assets easy and efficient for everyone involved.
- Continue to encourage the development of homes and businesses which capture rainwater for reuse and keep rainwater on the surface through sustainable drainage systems (SuDS) and blue-green rainwater management systems, and the use of permeable materials for driveways and car parks.

2.5.1 Key Drivers

Scottish Water are responsible for providing water and waste water services that are essential to everyday life for households and businesses across Scotland: making a critical contribution to the country's health, wellbeing, economic prosperity, and natural environment. Customers expect us to provide an affordable, sustainable, low carbon service – and the changing climate will increasingly threaten our ability to deliver this service.

Scottish Water's Enabling Growth strategy is to provide strategic capacity "just ahead of need." Scottish Water will do this by identifying where new strategic capacity is required at our assets and initiate investigations as development is confirmed. This allows us to connect new developments as they are required. The key criteria that we consider are local authority development plans, land ownership status, planning permission status, and developer timescales and build out rates. Consideration of these factors gives us the necessary confidence that the development is going ahead, and we can therefore be certain that we are investing in the right places at the right time. This also ensures we are delivering value for money, meeting the expectations of new customers, whilst avoiding any impacts to the service of our existing customers.

Population growth is the driver of this investment area. The population of Scotland has been growing for the last 25 years and is projected to continue to grow. However, the growth is not evenly distributed across Scotland, with larger cities experiencing higher rates of growth.

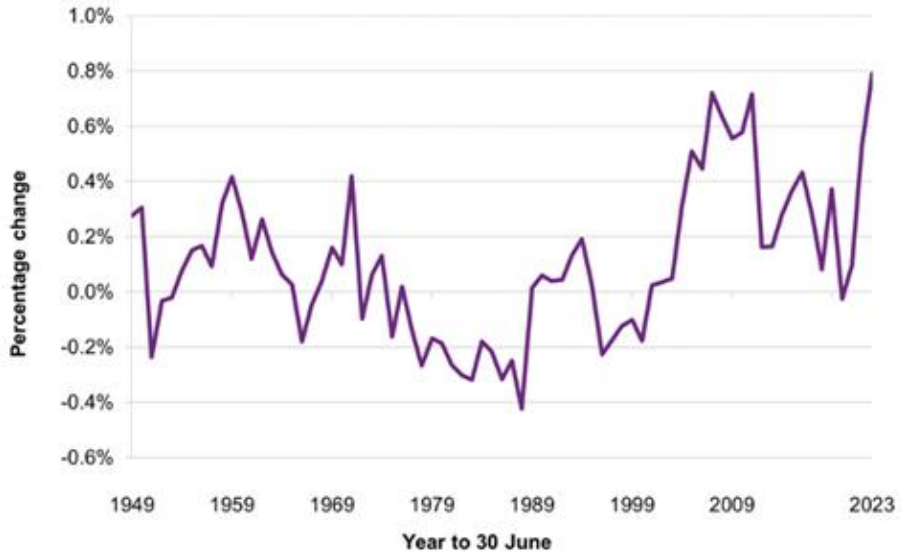

Figure 3: The population increase between 2022 and 2023 was the largest in at least 76 years (Annual population change (%), Scotland, 1949 to 2023)[4]

This increase in population and resulting housing growth means that we will need to provide more water if our customers keep using water at the same rate we do today. Subsequently, the increase in population, new housing and new businesses, will put more pressure on our water and waste water networks and result in a need for new assets to treat the additional volume of water and waste water.

2.6 What we have done so far

During SR21, we have continued to successfully[5] work alongside the development community to:

- Meet the Draft Ministerial Objective of Supporting Sustainable Economic Growth for the current investment period. The outputs measure associated with this investment area are Population Equivalent (PE) which is indicative of the increase in capacity delivered. The strategic capacity outputs delivered so far are.
    - Waste water growth 39,349 PE
    - Water growth 8,217 PE
- 75,554 newly connected properties in the first 4 years of SR21
- Meet our statutory requirement to provide domestic water supply at reasonable cost within our supply area,
- Support a flourishing Scotland, by enabling development just ahead of need through engagement with developer customers and local authorities to gain sufficient visibility of development plans, ensuring that we are prioritising investment in the assets at the right time.
- Minimise impact to existing customers, through engagement and forward planning with developers and Local Authorities.

[4] Reference: National Records of Scotland website

[5] Our successful work alongside the development community is evidenced by the increase in our Development Customer Experience Measure (dCEM) performance scores over the last 2 years, as shown in Figure 4.

2.7 What has changed since SR21 submission

During SR21, Scottish Water undertook a series of waste water growth investigations, in locations where confirmed development was progressing, to understand the available remaining capacity and the capability of our waste water treatment works assets. These investigations monitored actual flows and established the hydraulic and biological loading baseline and determined the impact that future growth may have at a given asset.

Scottish Water evaluates the possible impact of population growth driven changes in effluent discharge flow on the quality of riverine and coastal receiving waters. This is necessary to ensure that, where required, treatment works processes are adapted or upgraded to mitigate any risks to the environment that might arise. The approach to evaluating possible impacts differs by waterbody type, which entail different modelling and assessment techniques. The outputs of these modelling assessments inform provisional license standards to be defined and endorsed by the Scottish Environment Protection Agency (SEPA) and we now carry this out at a much earlier stage in each growth project lifecycle, saving both time and money.

The benefit to Scottish Water carrying out this work, is that it will provide confidence in understanding the contribution of discharges from its assets in the catchments in relation to impacts on water bodies, and that any required investment will deliver the desired environmental and compliance outcomes.

2.7.1 What we have learned

The outcome from these investigations confirms the need and the case for change for an increase in treatment capacity to ensure that environmental standards continue to be met. In some cases, the investigation confirms that sufficient headroom exists at our waste water assets which enables development to proceed without detriment to existing customers or the environment. To date, 23 growth investigations have been completed during SR21, where four confirmed that capacity was available, and 19 confirmed the need for investment. Scottish Water have an estimate of 46 planned for completion during SR27.

In SR27, a similar approach will be adopted to ensure we are only investing in areas which have a genuine need, to meet the requirements set out in the Draft Ministerial Objectives 2027-33.

2.8 Key Risks, Challenges and Opportunities

2.8.1 Risk

Through correct and timely investment to provide strategic capacity, we can minimise the risk of impacts to existing customers, such as experiencing interruptions to supply, low pressure water supply, and internal or external sewer flooding. In addition, Scottish Water can enable future developments, without unnecessary delays.

Scottish Water also mitigate environmental compliance risks that may otherwise materialise. This is because an increase in population in a catchment increases the biological loadings to our waste water treatment works and in turn tighter discharge standards may apply. This is dependent upon the dilution in the current watercourses and the scale of the development. The challenge of this may increase in the future as climate change impacts the volumes of water flowing in our rivers and burns due to dry spells.

Scottish Water are committed to ensuring that both new and existing customers receive the services and benefits that they expect, which we have committed to deliver. Section 3 describes how we will overcome this risk through our approach to identifying specific investments needs and the projects enabled by the resulting recommended investments.

2.8.2 Connections

Based on a review of the actual numbers connected over the last five years, Scottish Water expect to connect ~20,000 domestic properties (households) per year over SR27. Continued housebuilding to support; a growing population, population movement, and changes in typical household occupancy, increases the demand to connect into our network.

It is difficult to precisely predict the number of connections per year. There is variation in annual connections of around 2,000 connections, or approximately 10% year to year. This estimate is supported by the housing completion certificates issued across Scotland which demonstrate similar ranges.

Based on the actual connections over the last three years, we estimate that we will have connected around 3,500 non-domestic or commercial premises over the SR21 period and plan for a similar number in SR27.

2.8.3 Planning

Given the challenges set out above, investment planning for future growth is by nature uncertain due to the size and timing of new development demand. Along with this uncertainty, Scottish Water are faced with multiple challenges including ageing assets and climate change. Our strategy to enable development “just ahead of need”, ensures that investment is prioritised at assets where the risk posed by connection of new development, is minimised to maintain current service levels. This is the risk that growth (new connections) exceeds the available headroom at a water or waste water treatment works ahead of the investment being delivered, and the asset is then at risk of breaching licence conditions.

Rural communities and areas with smaller water courses

Population increase can have specific and additional impacts in those areas that have smaller water courses, and in rural communities. In small water resource zones or waste water catchments, even a small change in population can greatly affect the available treatment capacity, since a relatively small development makes up a large proportion of the total. This in turn can impact the solution required and the relative cost to provide water and waste water services.

Firstly, waste water discharges can have a greater impact for smaller water courses as the dilution factor is less, and can result in tighter standards. Therefore, the appropriate waste water treatment technology may not be available or could be higher cost than standard solutions. Secondly, population changes typically have a bigger relative impact on rural communities, and meeting their needs can increase the costs and required investments by a relatively greater amount.

3 Customer and Communities

3.1 Customers / Stakeholder Engagement and Support

Our customers are the development community who require connections to our network for water and waste water services. We have historically strived to connect our customers *just ahead of need* to enable their developments. This approach is clearly favoured by customers and as such receives positive feedback; the Development Customer Experience Measure (dCEM) is currently tracking above target, indicating that we are providing a high level of service.

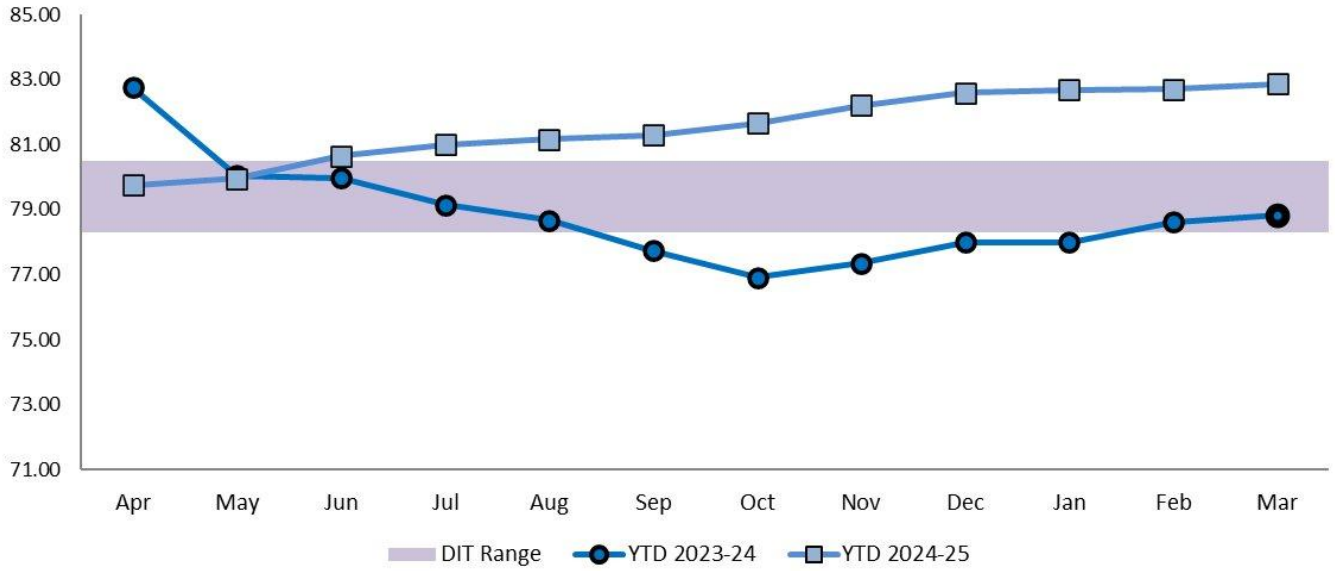

Figure 4: Our dCEM performance scores over the last 2 years (score out of 100. DIT (Delivery Improvement Target) represents the target range for the dCEM score.)

Whether it is a single house or a larger housing developer, the purpose of the dCEM is to inform and drive improvements in all developers' service experience, both with regards to the service they receive and how Scottish Water resolves any issues with services. dCEM includes both Household and non-Household measures with qualitative and quantitative elements. The figure above shows the year-to-date dCEM performance for the current and previous year.

Following the decrease in the dCEM score in 2023-24, an improvement plan was put in place to understand the root cause of the decrease with a weekly managed incident to focus on customer service. Improvements implemented included every low score was followed up, customer service training for all Development Services employees and customer call backs and updates were monitored to ensure they were addressed. These continued improvements saw the dCEM score increase beyond target where further work continues improving faster timescales and communication.

Scottish Water's Development Services team organises an annual Development Forum event to build relationships and understand how we can further support the development community. The feedback from the Development Forum in 2025 was positive where we had our highest ever feedback score of 4.31/5 and comments included how beneficial the opportunity was to strengthen working relationships as well as the value added from Scottish Water to answer questions and support understanding.

Scottish Water have a good relationship with Homes for Scotland (HFS) who represent 200 member organisations across the development community. We recently collaborated with HFS by sponsoring a Small Medium Enterprise SME report[6]. The report was largely positive but indicated some areas of improvement which we are taking forward.

Furthermore, last year Scottish Water requested that Trinity McQueen complete a pilot survey with our managed Developer Customers. The objective of the survey was to provide a measurement from our managed Developer Customers on how easy we are to work with and overall satisfaction with the Development Manager/Development Management team. The survey also gathered deeper insights into areas of service excellence as well as areas for development or focus. The results from the survey provided positive indicators that our Development Managers are meeting our Managed Development Customers' expectations, with positive themes around knowledge, responsiveness, collaboration, and enablement reported.

We will seek to create incentives to encourage developers to minimise water usage in their developments, such that they do not increase the total water demand in the area. In SR27, we aim to explore ways to further incentivise developers to exceed these standards. When constructing in an area, developers can consider methods for their projects to manage surface water from surrounding areas as well. By adopting this comprehensive approach, developments not only mitigate their own impact on the surface water network but also contribute to the broader management of surface water within the community. This holistic strategy can lead to reduced flooding risks and enhanced resilience of urban areas to climate change.

3.2 Partnership Working

Scottish Water continue to build on existing partnerships with local authorities and Developers to ensure these relationships stay strong even with changes of personnel. Also, we have been attending meetings with Water UK to maintain our relationship and to get a better understanding of what is happening in Development Planning in England and Wales.

Scottish Water have been involved in the Edinburgh and Lothians, Metropolitan Glasgow, and Dundee Strategic Drainage Partnerships.

The National Planning Framework (NPF) is a long-term plan for Scotland. NPF sets out where national developments and infrastructure is needed to support sustainable and inclusive growth. The current version is National Planning Framework 4 (NPF4). We are heavily involved in the NPF4 in supporting the local authorities in the preparation of the documentation required for this process. This includes the provision of available capacity information at our water and waste water treatment works to influence development in areas where we have existing capacity at our water and waste water treatment works.

There is also opportunity for future collaborations with local authorities and Transport Scotland (and potentially other bodies) for strategic working partnerships particularly where there are City Deals.

[6] Scotland's SME Home Builders 2024: Data Review and Industry Insights

4 Our Investments

4.1 Investment Context and Approach

The connection of new households may require the provision of strategic capacity. Where sufficient strategic capacity is already available then no additional investment is required. However, the available remaining capacity is decreased where new houses have been connected.

Where there is insufficient strategic capacity to support new connections, then investment to provide additional capacity is required.

4.1.1 Investment Priorities

Where available capacity in our network or at our treatment works is limited, and there is future development in the local development plan, investment into the restoration of the headroom will be prioritised based on several factors; the scale, timing and confidence that development progresses, as well as an assessment of the service risk to existing customers.

Water asset investment priorities are where there is a risk to the supply of water to existing customers caused by new growth. Waste water assets investment priorities are where the new connections to the network lead to increased flows and loads at the treatment works and present a risk to service or the environment.

Where Scottish Water are unable to deliver a solution in the necessary timescale, we will manage the risk through operational interventions or deliver smaller interim solutions to ensure connections are enabled.

4.1.2 Just ahead of need

The timescale of when investment in strategic capacity is required is dependent upon the development build out rates, i.e. the rate that new properties are completed and connected to the Scottish Water network. We strive to provide this strategic capacity “just ahead of need.”

4.1.3 Approach to identifying specific investment needs

The current approach to growth investment planning begins with growth forecasting, using local authority plans and national population projections to develop forecasts. These forecasts are used to identify growth needs at water and waste water treatment works. Once a development is confirmed, we will initiate investigations to establish the actual remaining asset capacity, the headroom.

This includes flow and load studies, and process assessments to understand the operational baseline of the asset, any constraints, and potential requirements for investment.

Once the needs are identified, the process moves to options appraisal and investment prioritisation.

The proposed investments are set out across the four categories detailed below: Waste Water Growth, Water Growth, Infrastructure Investment, and Service Relocations.

4.2 Our Existing Policies

Scottish Water introduced Management Approaches (MAs) for SR21, to set out the policies of how and where we will intervene to manage particular assets. There are four key management approaches (see the *Investment Planning Technical Appendix* for further details) that directly inform our efforts to Enable Growth. These are:

- **Enabling Development – Waste Water Growth Management Approach** sets out the provision of waste water treatment capacity to meet local, strategic and commercial growth requirements where the risk of additional connections to the network and the subsequent increased flows and loads at the treatment works would present a risk to service or the environment due to the future development demand.
- **Water Resilience and Growth Management Approach** sets out how resilient our water supply systems are, assessed against a defined list of hazards, and how we prioritise the appraisal of options to improve resilience. The growth element is part of the Water Resources assessment, and the risks are assessed through the Supply Demand Balance model (SDB) using growth model data. The Tankering Strategy (Use of Tankers to Provide Continuity of Water Supplies) is included within this policy and sets out where potable water tankering is considered as an alternative to investment in WTW upgrades. (Enhancement elements of this Management Approach are set out within the Water Continuity Technical Appendix.)
- **Enable Economic Growth - Infrastructure Investment Management Approach** sets out the investment approach to new infrastructure and outlines the funding responsibility between developers, customers, and Scottish Water. This is based on the Principles of Charging for Water and Sewage Services 2021-27.
- **Comply with Legislative Requirements – Service Relocations Management Approach** sets out the statutory requirement to contribute towards the relocation and integration of assets, such as water pipes and sewers, associated with large infrastructure schemes.

4.3 Outcomes

The outcomes for Enabling Growth are:

- **Level of Service Water Growth** - Part 4 capacity, for all new domestic properties connecting to our water system, and the domestic element of commercial properties connecting to our water system, shall be provided.
- **Level of Service Waste Water Growth** - Part 4 capacity, for all new domestic properties and the domestic element of commercial properties connecting to our waste water system, shall be provided.
- **Level of Service Customer** - We strive to connect our customers “just ahead of need” to enable their developments.
- **Investment Areas** – Waste Water Growth, Water Growth, Infrastructure Investment, and Service Relocations.

4.3.1 Customer benefits

Scottish Water aim to meet the expectations of new customers while minimising the risk of impact to existing customers. The main benefit to our customers, in this case the developer community, is that they can connect all new housing developments to water and waste water services on time and *just ahead of need*. To enable this, we will ensure that there is sufficient capacity and capability of strategic and local water and waste water assets for the new developments when they need it.

4.3.2 Performance

Scottish Water will measure how well we are serving our customers in this area through the Developer CEM (dCEM), which focusses on those customers requiring a water and/or waste water connection.

Through targeted measures and analysis of the data behind them, we are better able to understand customers, where points are being lost and where there is a need to drive to resolve and reduce points lost to provide a better experience. The dCEM score is calculated monthly out of a score starting from 100, with deductions made from several elements (e.g. formal complaints, service issue contacts, upheld regulatory complaints). Points cannot be regained, but proactive approaches and timely repairs can prevent future losses. The forecast for this measure is below.

WICS ref	Short title	Base year	Unit	Description of base	End of SR27	End of SR33	End of SR39	End of SR45
1.01	dCEM	83.25	Score (1 to 100)	3-year average to 2026/27	84.23	85.18	86.07	86.90

Table 3: dCEM projections through till the end of SR45

4.4 Optioneering

As set out in our Investment Planning Technical Appendix, Scottish Water have developed our options through a series of steps: building investment scenarios on our key principles, using our investment hierarchy to inform options, developing a full list of unconstrained and constrained options at draft business plan, and finally rebalancing and refining our investments following feedback from our stakeholders. We have set out these steps in detail below.

4.4.1 Scottish Water's Investment Options

When considering the level of investment that we require for development work in SR27, we have worked through several investment planning scenario options. These are essential for aligning strategic, financial, and Draft Ministerial Objectives 2027-33 with our vision for the water sector and our Long-Term Strategy.

Recognising the potential demands on our customers and the overall ambition of the Scottish Government, we developed a series of top-down investment scenarios to impose constraints on the bottom-up first-pass demand needs. The effect of these constraints was to require certain investments to be reduced or eliminated.

4.4.2 Constrained Options: Draft Business Plan

The three constrained investment scenarios discussed in this section are as follows:

- **High Scenario:** our initial estimates of what would be required to meet Draft Ministerial Objectives 2027-33 and make good progress against our Long-Term Strategy.

  This investment, with a CPI +6.5% per annum, maintains the service levels achieved at the exit of SR21, meets with a reduced risk of non-compliance.
- **Working Reference Scenario:** a mid-range scenario above the previous SR21 Final Determination but lower than the High Scenario.

At CPI +4% per annum, this investment allows maintenance of the service levels achieved at the exit of SR21.

- **Flat Charges Scenario:** that considered available investment and progress if customer charges were limited to inflationary-only increases on an annual basis.

  The reduction in investment under this "flat charge" scenario, with a CPI +0% per annum, would trigger reduced service levels compared to exit of SR21, with notable overall service impacts as measured by OPA and CEM.

4.4.3 Enabling Growth Investment Options

The above investment scenarios are broken down into levels of investment in the specific demand areas. Within the Enabling Growth area, High Scenario includes the investment required to provide the capacity for all new domestic property connections, a range of WWTW and WTW enhancements and development, and investment allocated to anticipated emerging demand.

The outcome of this Investment Area is to deliver strategic capacity, and an initial assessment of these scenarios is set out below.

Table 4: Testing the scenarios against Draft Ministerial Objectives 2027-33

Draft Ministerial Objective / Investment	High Scenario CPI + 6.5% (£9.5bn)	Working Reference Scenario CPI + 4% (£8.5bn)	Flat Charges Scenario CPI + 0% (£7.0bn)
Supporting Sustainable Economic Growth	Provide strategic capacity to enable all new domestic property connections, at reduced risk (risk that growth exceeds the available headroom at water or waste water treatment works so that assets are then at risk of breaching license conditions.) 100% WWTW confirmed need from SR21, for delivery in SR27: - 3 WTW (Tiree, Kenmore & Balmichael), - Seafield WWTW development, and - Emerging, but as yet unconfirmed, demand,	Provide strategic capacity to enable all new domestic property connections, with increased risk (that growth exceeds available headroom) 100% WWTW confirmed need from SR21, for delivery in SR27: - 3 WTW (Tiree, Kenmore & Balmichael), - Seafield WWTW development, and - Higher compliance risk at 14 WWTW.	Reduced ability to provide strategic capacity to enable all new domestic property connections. 50% of WWTW confirmed need from SR21, for delivery in SR27, being delivered: - 2 WTW (Tiree & Kenmore), - No investment in Seafield WWTW development, - High compliance risk at 34 WWTW.

Draft Ministerial Objective / Investment	High Scenario CPI + 6.5% (£9.5bn)	Working Reference Scenario CPI + 4% (£8.5bn)	Flat Charges Scenario CPI + 0% (£7.0bn)
	as indicated by our long-term modelling.		

4.4.4 Chosen option at Draft Business Plan:

The investment scenarios were tested against various performance metrics and compliance requirements to validate the scenarios' robustness to understand how they align with Draft Ministerial Objectives 2027-33, customers' and stakeholders' expectations, Long-Term Strategy, Water Sector Vision, Climate Change Adaptation Plan, SW Board aspirations for 2033 and risk appetite. Based on the testing outcomes, we progressed with the Working Reference Scenario (CPI+4%) as the basis for our Draft Business Plan submission.

4.4.5 Further refinement: SR27 Final Business Plan

Following further engagement and feedback from a broad range of our stakeholders on our draft business plan, we further refined our SR27 investment to reflect feedback, with two key themes:

- **Affordability**: ensuring that we are not putting a disproportionate burden on the bills of current customers – and that we are doing everything we can to limit impacts on bills; and
- **Ambition:** responding to feedback on our investment focus and ensuring it is adequately ambitious in the areas that matter to our customers and stakeholders.

Responding to this feedback has meant that we need to make further trade-offs across our proposed SR27 investment portfolio. We have done this by refining our reference scenario, through careful rebalancing of investment across AR3, Regulatory Commitments and Service Choices. We have described, in further detail, the steps we took as part of this refinement, and the impacts on our SR27 Final Business Plan in Investment Planning Technical Appendix.

Our final chosen option is a further refined version of the Reference Scenario presented in the SR27 Draft Business Plan submission.

We did this across all investment areas by:

- Refining the available budget associated with a CPI+3.3% pa customer charge profile, re-running the Financial Model using the latest modelling assumptions and the application of the most up to date top-down global efficiency factors to be applied.
- We incorporated feedback from sector stakeholders, clarification of Regulator requirements, customer research feedback and further consideration of the requirements of the Draft Ministerial Objectives 2027-33. Decisions were required to navigate these limitations while ensuring a balanced investment plan.
- Several strategic options were considered, to manage budgetary constraints and investment reallocation. These included potential further removal of demand in the asset repair, refurbishment, and replacement (AR3) programme areas or reduced outcomes where there is service choice. As a result, there were upwards adjustments in some areas, and downwards adjustments in others.

Following the Draft Business Plan submission for Enabling Growth, we assessed any changes in development timelines based on the most recent local authority housing plans and information from developers. This analysis provided insight into the phasing requirements for strategic capacity delivery and enabled us to further refine our planning assumptions. As a result, we adjusted project phasing and reduced anticipated investment within SR27, ensuring that developer needs continued to be met. However, any deviation from these planning assumptions may result in an increase in the risk to the current service level we provide to our customers if build out rates are higher than expected.

4.5 Overall Strategic Option Chosen for SR27

The **Reference Scenario** allows Scottish Water to continue to meet the needs of our customers and developers, by providing the required strategic capacity just ahead of need, enabling all new connections.

However, overall investment into our network will be reduced so there will be a likely impact on overall resilience and an increased risk of non-compliance in certain areas.

Details of the Enabling Growth breakdown for this investment scenario are set out below.

Table 5: Overview of recommended investment (24/25 price base, post-efficiency)

Investment Category	Investment Hierarchy	Programme	Investment value
Waste water Growth MA026	Cat 2a – Regulatory Cat 3b – New Customers	Provision of Part 4 capacity to meet strategic & local growth requirements	£319m
Water Growth MA087	Cat 3a – Improve Service Cat 3b – New Customers	Provision of Part 4 capacity to meet strategic & local growth requirements	£71m
Infrastructure Investment MA032	Cat 2a – Regulatory	Provision of strategic capacity in our networks to meet new demand	£123m
Service Relocations MA065	Cat 2a – Regulatory	Comply with legislative requirements – Water & Waste Water	£38m

The water and waste water growth programmes are rolling programmes where delivery of confirmed need spans the investment periods SR21, SR27 and beyond. These investment programmes are dynamic by nature where the projects are prioritised on an ongoing basis. This is due to the uncertainty associated with future development plans, as well as delivery and investment constraints. Continuous prioritisation of the current programme is also required as the timing and size of a development has a variable impact on a particular waste water treatment works (WWTW) dependent upon the current operational capability and headroom availability.

This Technical Appendix covers water and waste water growth only and therefore asset maintenance is not included. However, there will always be economic benefit to deliver multiple drivers together and this will be pursued wherever possible along with appropriate allocation of

cost. The operational baseline[7] will be established during the Growth Investigation stage to understand the impact of the future growth.

4.5.1 Waste Water Growth

Introduction

Growth is one of the principal drivers of investment when assessing future needs of waste water treatment works. Through our waste water growth investment planning process, we identify where forecast growth exceeds the available headroom at a WWTW and the asset is at risk of breaching current license conditions (flow and final effluent quality).

Within scope here are investments in the WWTW asset base, (currently capable assets), that become incapable due to future growth.

Out of scope are existing service issues, quality enhancements, or climate change, these are covered in as AR3 and Enhancement investments in the Water Environment, Managing Quantity of Flows, and Climate Change Adaptation technical appendices.

SR27 Waste water Growth Investment

In the SR21 investment programme, there are 55 of our 1,852 waste water treatment works where the need has been confirmed for the provision of additional strategic capacity. These confirmed needs will be delivered during the SR27 investment programme. At these treatment works, it was determined that further connections to the network and the subsequent increased flows and loads at the treatment works could present a risk to service or the environment due to confirmed development demand. Development is confirmed by understanding criteria associated with the development including local authority development plans, land ownership status, planning permission status, and developer timescales and build out rates. In addition to these confirmed needs, we expect there to be a further 50 WWTWs at potential risk due to projected future development demand which we will investigate in SR27.

This equates to the SR27 investment demand for the waste water strategic capacity of £319m which will deliver c175,000 population equivalent (PE) outputs[8]. The breakdown of this investment is detailed in the table below:

Table 6: Waste Water Growth SR27 Investment details (24/25 price base, post-efficiency)

Investment Category	Investment Hierarchy	Programme	Description	Investment value (£m, 24/25)
Waste water Growth **MA026**	Cat 2a - Regulatory	Provision of Part 4 capacity to meet strategic growth requirements	North Berwick, East Stirlingshire	£118m

[7] Operational baseline – the actual capacity and capability of an asset in normal operation, i.e. flow volumes, biological loadings etc

[8] This is the number of the outputs in PE (population equivalent) associated with the growth projects which achieve Gate 100 during SR27. This is different from the connections enabled.

Investment Category	Investment Hierarchy	Programme	Description	Investment value (£m, 24/25)
	Cat 3b – New Customers	Provision of Part 4 capacity to meet local growth requirements	Confirmed development in catchments which require investment	£201m
Total Waste water Growth Investment				**£319m**

When development occurs in a catchment, it may be necessary to accelerate refurbishment or replacement cycles to support growth requirements.

The waste water growth investment is a rolling programme where the timing and scale of development coming forward in a particular area dictates the phasing of delivery. The planned investment is based on the current information from the local authority housing and developer build out plans. An alternative investment choice considered is the delivery of short-term solutions which enable growth but do not address the long-term needs for all growth in a catchment. Delivery of interventions of this nature are proven not to be the best whole life cost option, however they may be necessary where timescales to meet developer commitments are short and immediate compliance risk is high.

A reduced service in this area would also impact our customer expectations around the timing of the provision of new strategic capacity, resulting in customer complaints. Furthermore, it would increase the risk of service failures, with the potential of associated increase in expensive reactive operational activity.

4.5.2 Water Growth

Introduction

This area of investment covers the improvement and expansion of strategic water treatment and catchment capacity, and capability deemed necessary through the growth of communities.

Within this same Management Approach, there is investment allocated as Enhancement, to improve resilience of water supply systems to enable them to provide continuous water supplies. This is not due to new demand, so is not considered part of Enabling Growth and is further covered as part of the broader Water Continuity Technical Appendix.

In total, out of scope are existing service issues, quality enhancements, or climate change, these are covered in as AR3 and Enhancement investments in the Water Continuity and Climate Change Adaptation technical appendices.

SR27 Water Growth Investment

The Water Growth programme for SR27 is set out in the table below. Planned investment in SR27 is reflective of identified constrained assets where there is sufficient confidence in the forecast growth in water demand. Sustainability of demand-side intervention solutions at these assets would be inadequate with increased development demand, and not investing in a supply-side

solution would result in continued Interruptions to Supply (ITS) events. Details our SR27 investments are set out below.

Table 7: Water Growth SR27 Investment details

Investment Category	Investment Hierarchy	Programme	Description	Investment value (£m, 24/25)
Water Growth MA087	Cat 3b – New Customers	Provision of Part 4 capacity to meet strategic & local growth requirements	Increase the availability of water to meet strategic growth requirements - Water	£69m
	Cat 3a – Improve Service		Tankers and tanker fill points to meet peak capacity at small WTW	£1m
Total Water Growth Investment				**£71m**

The following projects are included within this investment category and phased delivery of these schemes will ensure that funding is sufficient.

Table 8: Specific project details within Water Growth

Project Name	Scope Description
Taymouth Growth	Supply new demand though infrastructure connection and WTW/Water Resource upgrades to Kenmore WTWs.
Balmichael Resilience	The resilience of Balmichael WTW is currently determined by its lack of yield, restrictions within the treatment process, and lack of storage available – all of these could result in an ITS event. The scope of work is to provide a resilient water supply to the 3,989 customers on Arran and provide capacity for future growth.
Tiree Resilience	The resilience of Tiree WTW is currently determined by its lack of yield and no strategic connectivity due to its location. There are also constraints at the WTW, which could result in supply issues. The scope of work is to provide a resilient water supply to the 870 customers on Tiree.
Tankering	Pan Scotland Tankering Strategy to provide Part 4 capacity for rural locations as a solution

The Pan Scotland Tankering Strategy was developed to manage supply deficits caused by growth in rural networks across Scotland. It aligns with Scottish Government objectives for sustainable economic growth where the approach prioritises the use of existing assets and the deployment of an alternative measure such as tankering. This helps to bridge the gap between an increase in demand at peak times and longer term growth needs which require committing to costly upgrades

of WTWs. Other demand-side interventions include water efficiency campaigns and leakage sweeps which help support rural water communities with reliable and sustainable supplies.

4.5.3 Infrastructure Investment

Introduction

The investment within this programme area is associated with increasing the capacity of existing assets for water and waste water network infrastructure, directly associated with new development where it is not readily attributable to a (single) particular developer.

New water and waste water connections are subject to an 'infrastructure charge' (where the party requesting the new connection is charged a fee per connection) and Scottish Water reallocate revenues from these charges to pay for enhancements to our existing network assets. These are financed by all developers through infrastructure charges with the enhancements delivered by Scottish Water or by developers.

Excluded from this investment is the resolution of existing service issues; repair or refurbishment activities associated with existing water and waste water infrastructure and flooding, however, opportunities will be sought for efficient delivery of multiple drivers.

SR27 Infrastructure Investment

Since 2021, investment reflective infrastructure charges have funded the extension of existing network capacity by Scottish Water (where not readily attributable to a particular developer), to support housing development and the domestic requirements of the non-household sector, in accordance with the Scottish Government's Principles of Charging. It is proposed that a formalised charge mechanism for setting infrastructure charges in SR27 is agreed with the Water Industry Commission for Scotland (WICS) which transparently maintains the balance of infrastructure funding between agreed parameters to support responsive delivery of capacity whilst maintaining stable and affordable charges for developers.

The estimated SR27 Infrastructure Investment is £123m, to be reinvested in network capacity required for new development. This investment is directly linked to the number of infrastructure charges paid and will change if the number of charges paid is more or less than forecast.

During SR27, Scottish Water will continue to produce strategic network impact assessments to understand where impacts may occur due to new development connecting to our water and waste water networks. Work will continue to create new, and update existing, strategic network impact assessments as new local development plans are released by the 32 local authorities in Scotland. The outputs from these assessments are used to inform our investment plans for upsizing existing infrastructure where confirmed new development will create a new impact e.g. waste water flooding or low pressure on the water network. This investment programme is prioritised on the future development build out rates. The table below details the SR27 investment

Table 9: Infrastructure Investment SR27 Investment details (24/25 price base, post-efficiency, values have been rounded so do not sum up to the total)

Investment Category	Investment Hierarchy	Programme	Description	Investment value (£m, 24/25)
Infrastructure Investment **MA032**	Cat 2a - Regulatory	Provision of strategic capacity in our networks to meet new demand	Reinvestment of the receipts from the Infrastructure Charge to create or restore capacity in the general network	£69m
		Enable economic growth - Water		£55m
Total Infrastructure Investment				**£123m**

4.5.4 Service Relocations

Introduction

We have legal obligations to provide investment contributions for New Road and Street Works Act (NRSWA) diversions as required by the NRSWA Diversions Code of Practice. The SR27 investment will ensure that we can facilitate, and support transportation schemes promoted by Transport Scotland, Bear Scotland, 32 Local Councils and Network Rail where our assets conflict with the scheme proposals.

The boundary of this investment is limited to resolving asset conflicts by diversion or asset protection measures. Out of scope is the funding of increasing capacity or resolving existing asset issues. We have based our required SR27 investment on previous investment run-rates and investment profiles, and by providing estimates for the future investment period.

SR27 Service Relocations Investment

The table below sets out Scottish Water's investment in this area.

The total investment forecast for Service Relocations is higher than Scottish Water's investment, as 82% of the cost is recoverable from the clients under the Highway Authorities and Utilities Committee (HAUC (UK) 7) Code of Practice. This figure is based upon a run rate from previous investment periods albeit this figure has reduced as there is evidence that the run rate is decreasing. Details of our SR27 investments are set out below.

Table 10: Service Relocations SR27 Investment details (24/25 price base, post-efficiency, values have been rounded so do not sum up to the total)

Investment Category	Investment Hierarchy	Programme	Description	Investment value (£m, 24/25)
Service Relocations **MA065**	Cat 2a – Regulatory	Comply with legislative requirements - Waste	Scottish Water's statutory contribution towards the relocation and integration of Scottish Water assets associated with large infrastructure schemes	£14m
		Comply with legislative requirements - Water		£25m
Total Service Relocations Investment				**£38m**

4.6 Investment that Spans SR21 and SR27

The funding for the Part 4 investment area comes from existing customers. It is a regulatory requirement set out in the Ministerial Directions to deliver Strategic Capacity - Part 4 capacity, for all new domestic properties and the domestic element of commercial properties connecting to our water and waste water system, shall be provided.

For Waste Water Growth, the 2021-27 investment allowances are £232.9m (IPS 25.2) and we are forecasting that £319m will be required to provide strategic capacity during the 2027-33 period.

This scale of investment is anticipated due to the continued increase in the migration of people into Scotland, continued housing development in areas where there is no available headroom at the waste water treatment works.

4.7 SR27 Knowledge and Capability Gaps

We recently commissioned and completed a review of our processes for development of growth forecasts, identification of investment, and prioritisation of the programme. Included in the review was a comparison of our growth forecasting processes against the existing frameworks used across the water sector, including the approaches taken by a range of companies in England and Wales. Through this exercise we have been able to identify specific examples of good practice.

We were able to identify several challenges and subsequently have identified the required improvements to our processes. The improvement areas identified were around our growth forecasting, prioritisation of projects, cost allocations, and more realistic costs estimating.

A range of improvements across the process were identified, which could support Scottish Water in its decision-making process, better manage the uncertainty inherent in development forecasts and streamline the process going forward. Implementation of these improvements has started and will continue through SR27.

5 Interdependencies

This document should be read in conjunction with our Long-Term Strategy, overall SR27 Final Business Plan, Data Tables and Commentary, and the following Technical Appendices:

- Water Continuity
- Water Environment
- Managing Quantity of Flows
- Investment Planning
- Supply Chain

6 Conclusion

Our Reference Scenario has been selected, and the specific investments within it, to ensure that we can meet the Draft Ministerial Objectives 2027-33, customers, and stakeholders' expectations, our Long-Term Strategy, climate change adaptation plan, and Scottish Water Board aspirations for 2033 and risk appetite. The shift from the Draft to the SR27 Final Business Plan within Enabling Growth, saw an adjustment in project phasing, to align with the reduction in the anticipated investment within SR27 in alignment with the Reference Scenario.

The Reference Scenario will require £551m (24/25 price base, post-efficiency) of investment across our water and waste water assets to enable growth, by the provision of the necessary strategic capacity to ensure on-time, as-needed effective connections for all new housing developments and business premises.

For the population of the Data Tables and for the Business Plan submission, we will present our Reference Scenario (CPI+3.3%), along with Alternative Scenarios at CPI+3.8% and CPI+4.2%.

Annex: Supplementary Information

Component parts of new connections and capacity

The four components of the network, Parts 1-4, provide the new connections and capacity. Responsibility and payment for these is split between us and the relevant developer, as described below:

Table 11: Description of the component parts of new connections and capacity

Component	Description	Cost / Delivery Responsibility
Part 1	The connection from individual premises to a water main or sewer	Developer responsible for costs
Part 2	The water mains and sewers that connect developments (for example, a street of houses) to trunk mains and trunk sewers and some sustainable urban drainage systems (SUDS)	Any required extensions or upgrades to Part 2 or 3 elements are funded by the developer, with a contribution towards the cost of the works from Scottish Water to take account of the future income that will be received from the new connection
Part 3	The local bulk infrastructure, such as trunk mains and trunk sewers, water service reservoirs, waste water pumping systems and some SUDS	
Part 4	The strategic assets such as raw water intakes, water impounding reservoirs, water pumping stations and aqueducts, and water and waste water treatment works.	The cost and programming of any work associated with upgrading the Part 4 elements of the network are the responsibility of Scottish Water

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BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Climate Change Adaptation

February 2026

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1 Executive Summary

Scottish Water has statutory duties under the Climate Change (Scotland) Act 2009 to support the government's climate change plan to deliver net zero, and Scotland's National Adaptation Plan, reflected in SR21 and SR27 Draft Ministerial Objectives. This Technical Appendix focuses on adapting our assets and transforming our services to address the impacts of climate change.

Climate change is an existential threat to the wellbeing of nature, society and our future prosperity. The climate emergency[1] is exacerbating the nature crisis[2] and will significantly impact the ability of the water environment to provide the resources we rely on. Changes in weather patterns and the increased risks of extreme rainfall or drought events will impact all core services by:

- Disrupting the ability of our natural environment to provide sufficient good quality water for us to treat and supply to customers;
- Exceeding the capacity of urban and rural landscapes, the environment and our drainage systems, to deal with excess rainfall without flooding customers or assets;
- Impacting the ability of waste water systems and treatment processes to cope with increasingly frequent and extreme weather, driven by climate change, and still protect the environment; and
- Challenging our people and supply chains to sustain or recover services and infrastructure, disrupted by more frequent and extreme events.

Our response focuses on three areas:

- *Operational resilience* – the way we will respond and manage climate and weather events, from floods to droughts;
- *Asset resilience* – building climate change projections and responses into longer term service, asset management and investment plans; and
- *Service transformation* – the first two approaches alone will not be sufficient; we cannot just build our way to climate adaptation. Our Natural resources are deteriorating, and we must transform the way we operate – working with others at catchment scale to invest in nature's resilience to provide the water, environmental capacity and flood management services we need.

Our proposed climate change investment in the SR27 period allows us to meet relevant statutory obligations and the Draft Ministerial Objectives 2027-33 (Table 1).

Table 1: Draft Ministerial Objectives 2027-33 relevant to Climate Change

Climate Change Related Draft Ministerial Objectives 2027-33	
Climate Change Adaptation	Identify the expected impacts of climate change on its assets and assess the risk and likelihood;
	Continue to implement and evolve plans for adaption measures necessary to protect its services;
Climate Change Mitigation	Make substantive progress in the 2027-33 period towards climate change targets and ensure it is on an appropriate trajectory to meet or exceed those targets.

[1] https://netzeronation.scot/about/campaigns/climate-emergency
[2] Tackling the nature emergency - gov.scot

Our approach, set in our Climate Change Adaptation Plan[3] is to plan for 2 degrees Celsius of warming by 2050 and prepare for 4 degrees Celsius by the 2080s, reflecting guidance from the UK Climate Change Committee[4].

We have done this by:

- Assessing 2 and 4 degree Celsius climate change pathways to the 2080s using the latest UK Met Office Climate Projections (UKCP18)[5].
- Applying these pathways to undertake a Climate Change Risk Assessment (CCRA) across our assets and services focused on two types of risk:
    - Increasingly frequent and extreme weather, such as storm events with acute service impacts that directly disrupt service; and
    - Chronic longer-term impacts where the changing climate erodes the quality and capacity of natural systems (such as water resources) and infrastructure (for example hydraulic capacity).

In 2024, we published our Climate Change Adaptation Plan[3] which sets out in detail the outcome of our CCRA, the implications for service and adaptation responses we will make. Our CCRA informed our SR27 Plan and explains the key risks to service under the 2- and 4-degree pathways and our adaptation approach through Operational Resilience, Asset Resilience and Service Transformation.

In SR27 (and subsequent periods) we will undertake further CCRAs, updated with the latest climate projections, pathways and tools. We will use this to understand how risk is changing and the effectiveness of adaptation actions and embed this within our asset management and service investment planning approaches. The updated CCRA will inform a refresh of our Climate Change Adaptation Plan that will ensure we are responding to the information the CCRA is telling us. In turn this will support our Long-Term Strategy focussed on our key long-term outcomes over the next 25 years. Actions will be promoted in future investment plans (including the development of SR33), to deliver the climate resilience expectations of Scottish Ministers[6] and the Water Sector Vision[7] shared across stakeholders, to work together to adapt to climate change.

[3] Climate Change Adaptation - Scottish Water
[4] Independent-Assessment-of-UK-Climate-Risk-Advice-to-Govt-for-CCRA3-CCC.pdf
[5] UK Climate Projections (UKCP) - Met Office (inclusive of 2022 updates as per UKCP18-Probabilistic-Update-Report.pdf)
[6] Draft Ministerial Objectives 2027-33
[7] Water Sector Vision - Scottish Water

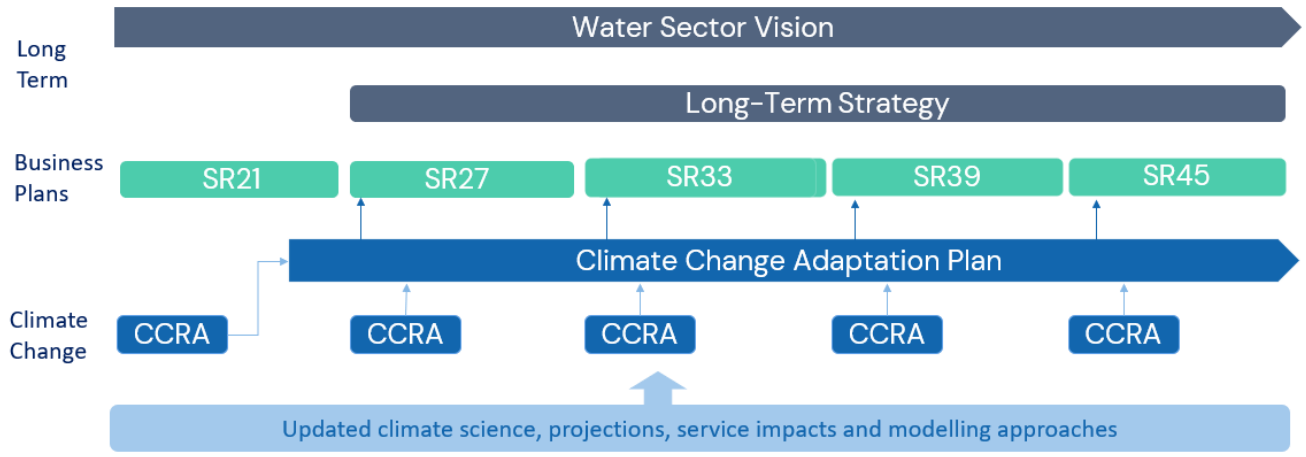

Figure 1: Alignment of Climate Change Risk Assessments, Business Planning and Long-Term Strategy

1.1 Our SR27 Investments

Our SR27 plans are directly informed by the Draft Ministerial Objectives 2027-33 to identify and assess the climate risks, continue to implement and evolve plans for adaptation, and to work with customers and industry to reduce water use. We will do this through Operational Resilience, Asset Resilience and Service Transformation. All investment is summarised in Table 2.

Operational Resilience

Operational Resilience focuses on sustaining or recovering services and assets during increasingly frequent and extreme weather, driven by climate change. In SR27, we will:

- Invest £6m in additional standby generators to provide climate resilience to water supply assets, from power outages; and
- Continue to respond to weather events to maintain customer service, through our Emergency Planning, Incident Response and Drought Plan procedures.

Asset resilience

Asset Resilience focuses on how we make our infrastructure more resilient to climate change. In SR27, we will aim to:

- Deliver climate related adaptation in Water Continuity. Supply Demand Balance investment is projected to require £187m, of which climate change adaptation drivers are estimated to contribute £75m;
- Deliver climate related adaptation in Water Quality. Enhancements to our water treatment are projected to require £856m, of which adaptation to climate change impacts already experienced, is estimated to contribute £123m;
- Deliver climate related adaptation in Customer Flooding. Customer Flooding is projected to require £298m, of which climate change adaptation drivers are estimated to contribute £45m;
- Invest £26min Research and Innovation, of which adapting to climate change is estimated to contribute £5m;
- Invest £7min studies to better understand the resilience of our waste water treatment works to climate change risks; and
- Invest £2.0m to refresh the CCRA and develop further tools to inform future investment.

Scottish Water will embed the climate projections and models arising from our risk assessment work within our asset management framework at all levels. Management Approaches that set asset policies and choices need to reflect climate risks and responses across service areas, System Plans need to consider long term climate risks, needs, interdependencies and plan interventions at the right time, and Project Investment Appraisal must ensure climate change informs the delivery of resilient options.

Further risks were identified for some service areas, but with too much uncertainty to include in SR27 investment demand. These will be further refined as needs and projects are developed. Instead, these are identified as "retained risks" and are reported in the Risk Technical Appendix. If these risks are realised as the programme is developed and climate change considered at project level, they will be considered through the Investment Planning and Prioritisation Framework.

Service Transformation

Service Transformation recognises that we cannot simply rely on building our way out of climate change but will need to do things differently to secure resilience. It focuses on new ways of working, investing in nature, managing catchments and working with others at landscape scale to ensure resilient services in a changing climate.

The majority of our water catchments and the water bodies we discharge will deteriorate under climate change. We need nature to be resilient in a changing climate – for the natural capital stocks and biodiversity to be regenerative and able to support society's demands for water, flood protection, environmental capacity, food, amenity. In SR27, we will aim to:

- Invest £70m in rainwater management and drainage partnerships to collaborate with local authorities, efficiently delivering blue-green infrastructure to reduce high priority surface water flood risk;
- Invest £7m in multi-disciplinary partnerships to transform three pioneer catchments to become more resilient to climate change, reducing risk of deteriorating raw water quality and asset and customer flooding;
- Invest to restore peatland in our own and third-party catchments to reverse the deterioration of water quality due to climate change and to retain more water in our catchments for drought/flooding resilience;
- Invest to increase woodland, improve our landholdings, and create nature and biodiversity management plans to increase the resilience of the landscapes we rely on, improve water retention and reduce run off for the benefit of our source water quality and to support the pathway to net zero emissions. Enhancing nature will support longer term climate resilience; and
- Invest to develop farmland biodiversity and nature management plans with our tenants, to ensure regenerative and biodiverse catchments for our water supplies.

The outcome from this investment is expected to support delivery of Scottish Water's Climate Change Adaptation plan and meet the Draft Ministerial Objectives 2027-33, contributing to Scotland's long-term resilience.

Table 2: SR27 Climate Change Adaptation Investment Summary

Investment Category	Total SR27 Investment (£m)	Investment attributed to Climate Change Adaptation (£m)
SR27 Investments		
Standby Generators	31	6
Water Continuity (aligned to Supply Demand Balance)	187	75
Managing Sewer Flood Risk	298	45
Water quality	856	123
Climate Change Risk Assessment	2	2
Waste water Treatment Studies	54	7
Research and Innovation	26	5
Pioneer Catchments and Biodiversity	11	11
Drainage Partnerships and Rainwater Management	70	70
Totals		344
SR27 – Retained investment risks		
AR3	5,128	1
Water Environment	559	42
Water Quality	856	64
Enabling Growth	69	1
Totals		109

2 Background

2.1 Global Climate Change

The climate threat is accelerating and is an existential threat to the way we live today as we see more extreme climate events globally and locally. Climate change will have a varying impact, dependent on location and not all places will be impacted equally, or in the same way. Some parts of the world will be more vulnerable to drought and flooding, whilst high latitudes will see the greatest impacts from warming – for example, warming of polar regions leading to loss of ice at the poles and in glaciers. Current projections show that global sea levels will rise between 0.5-1 m by 2100[8], but there is a significant level of uncertainty on how impacts will manifest. Globally, this may mean extreme droughts, floods and loss of agricultural productivity around the world leading to major social and economic challenges. The implications of climate change reflected in weather patterns, and their impact on our environment means we need to understand the impacts in Scotland to inform our adaptation approach to a range of future uncertainties.

2.2 What will Climate Change Mean for Scotland?

Scotland's climate is already changing. Adaptation Scotland[9] provides a summary of data[10] published by the UK Met Office which tells us:

- **Scotland's temperatures have been getting warmer and will continue to do so:** Scotland's 10 warmest years on record have all occurred since 1997. The average temperature for the last decade (2015-2024) was 1°C warmer than the 1961-1990 average, and the warmest year on record was 2022;
- **Scotland's winters have been getting wetter, and this will continue:** There has been an increase in rainfall over Scotland in the past few decades. The annual average rainfall in the last decade (2015-2024) was 9% wetter than the 1961-1990 average, with winters 25% wetter;
- **Sea levels have been rising, and this will also continue:** Mean sea level around the UK has risen by ~19.5cm since the start of the 20th century, and the rate of sea level rise has increased over the last 30 years; and
- **Scotland is experiencing extreme weather events:** Since 2015 when storm naming convention began, Scotland has been impacted by at least 60 named storms (when Met Office amber or red warnings for all/part of the UK are issued).

We know that these changes will become more substantial in coming decades (Figure 2) and we detail this in our Climate Change Adaptation Plan. The temperature on the hottest day may increase by 5 °C by 2080, whilst the average number of days per month above 25 °C may increase from less than 1 today to more than 4 per month in 2080. We may see the number of rainy days per summer month fall by a quarter – however, the intensity of summer storms (wettest day) may increase over 50% by 2080[11]. This will have a significant impact on our water resources and ability to drain and treat waste water.

[8] IPCC Chapter 9: Ocean, Cryosphere and Sea Level Change | Climate Change 2021: The Physical Science Basis
[9] The Adaptation Scotland Programme is how the Scottish Government offer advice and support to the public sector, businesses, communities and households on how to take adaptation action.
[10] Climate Projections for Scotland Summary
[11] Projection from UK Met Office using High Emission Pathway and historical weather extremes at this location.

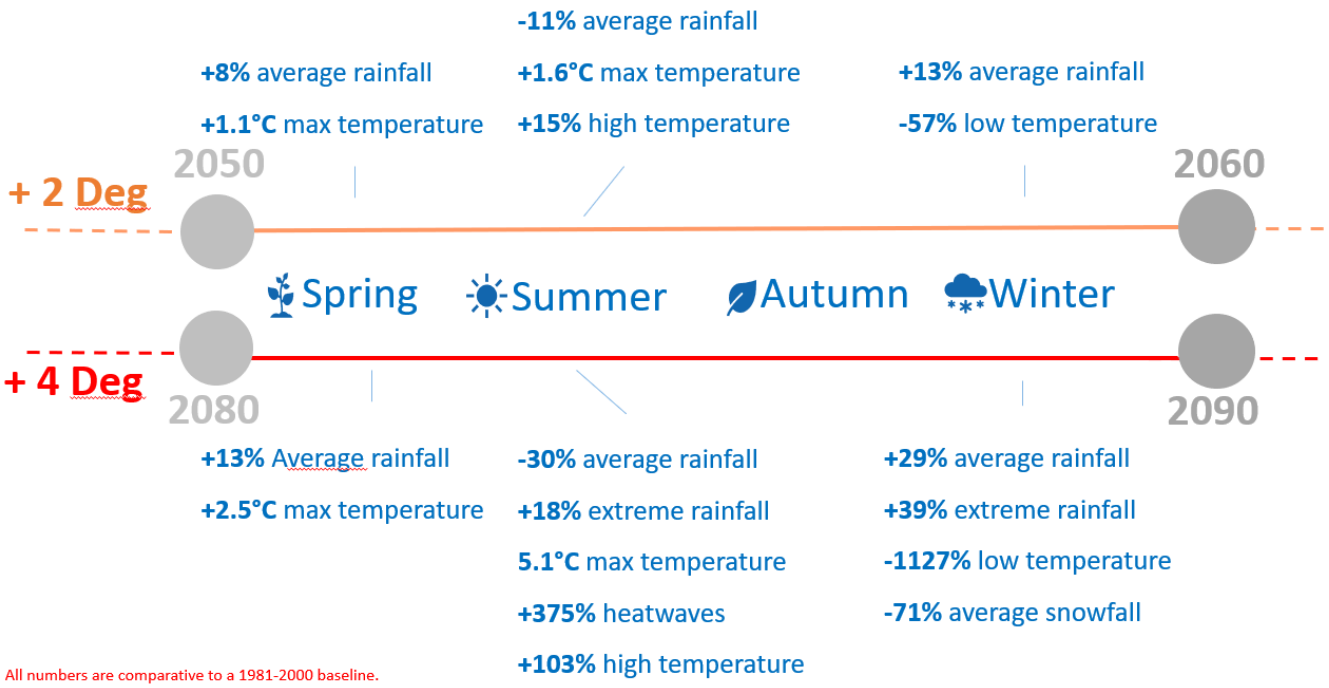

Figure 2: Average rainfall and temperature changes across 2 and 4 degrees Celsius, derived from UKCP18 projections for RCP6.0 and RCP8.5).

2.3 Climate Change and Scottish Water

Climate Change does not just pose a future risk (Figure 3); the climate change we have already experienced is causing problems for our customers. Our CCRA (section 4.1.2) assesses the current risks we face from climate change and compares these with future climate scenarios of 2 degrees Celsius of global warming by 2050 and 4 degrees Celsius of global warming by 2080.

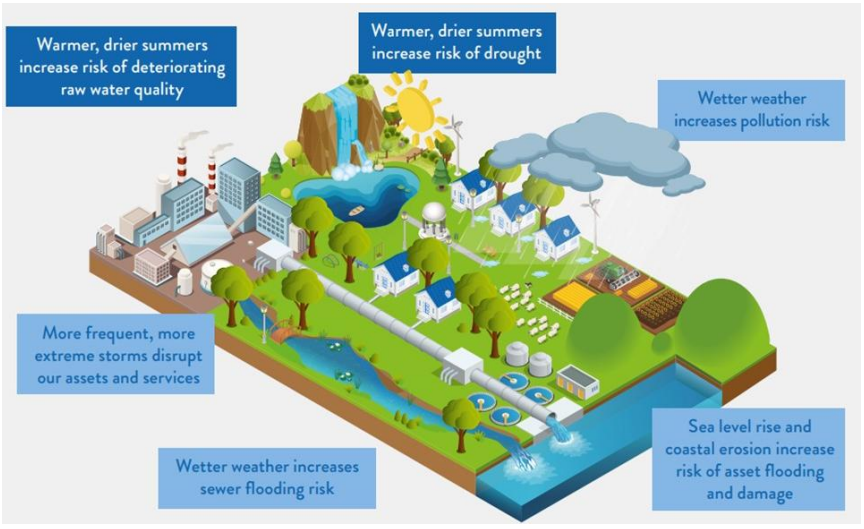

Figure 3: Summary of climate change risks to service provision

Those risks which score highest with current levels of climate change, are already being experienced. These are exemplified by the following recent case studies:

- **Drought conditions cause lower river flows and/or reservoir levels affect the ability to abstract from source waters resulting in local or regional water supply deficits and loss of supply to customers;**

July 2022 saw the UK experience a period of hot weather following a relatively dry spring[12]. Heatwave warnings were issued for parts of Scotland in mid-July and customer demand for water increased. Drought plans were followed in multiple places across Scotland and in 30 areas supplies were augmented by tankering water from other areas. This coincided with the Open Golf championship at St Andrews which significantly increased local water demand. Supplies were augmented by tankering water for 8 days to ensure service levels to St Andrews and the East Neuk of Fife. In 2025, Fife and Tayside have been impacted again, following the lowest annual period of rainfall in this area for over 50 years[13].

- **More frequent/extreme rainfall increases frequency and magnitude of river and surface water flooding at water treatment works, resulting in loss of supply to customers;**

In November 2022, Aberdeenshire experienced 134% of average monthly rainfall[14]. Inchgarth reservoir on the River Dee, supplies over 100,000 properties and 250,000 customers from Inverurie to Stonehaven. The bankside storage reservoir overtopped, and the site became flooded, submerging pumps and leading to a temporary shutdown of the works. River water flooded the site and buildings. Supply was maintained through strategic storage in the system and extensive work by operational teams. The River Gairn levels also breached the Ballater Water Treatment Works and submerged the pumps, forcing a shutdown, with the raw water quality also unsatisfactory. Supply was maintained by tankering water from Invercannie WTW, a 45 mins drive away.

- **High summer temperature and lower rainfall cause algal blooms making water treatment is more difficult, leading to quality, taste and odour impacts to customers;**

Raw water geosmin concentrations in Carron Valley reservoir breached Scottish Water's internal trigger level of 5ng/l on the 15 April 2024. Scottish Water received a total of 309 water quality contacts from customers supplied from this source, between 01 June 2024 and 18 August 2024 related to earthy/musty taste and odour. This incident was caused by a seasonal increase in raw water geosmin concentrations in the catchment and inability of the treatment process to adequately remove the compound[15]. Maximum summer temperatures in this area of Scotland are already 1.5 ºC higher than the average from 1981-2000[16].

- **More frequent/extreme rainfall sees drainage systems and sewers become overloaded with storm water and surface water flows entering the network, this results in increased flooding of customer properties and environmental impact;**

In July 2021, a cloud burst event occurred over Edinburgh, where 57.6mm of rain fell in 1 day, around 80% of the months average. An attribution study assessed that this event was 30% more likely to have occurred due to currently experienced climate change[17]. Properties and gardens were flooded in the Marchmont area of Edinburgh, because of sewers becoming overloaded and

[12] Unprecedented extreme heatwave July 2022 - Met Office
[13] Customers in Tayside urged to save water
[14] Hydrological summary November 2022.pdf
[15] DWQR Incident Assessment Carron Valley B RSZ 14703
[16] Local Authority Climate Report | Falkirk | Report Builder for ArcGIS
[17] Tett, S. F. B., Y. Cha, K. Donovan, G. Geffers, and E. Hawkins, 2023: The Impact of an Extreme Cloud burst on Edinburgh Castle. *Bull. Amer. Meteor. Soc.*, **104**, E1807 - E1816, https://doi.org/10.1175/BAMS-D-22-0196.1.

surcharging. Scottish Water has invested £9m[18] to increase the sewer network capacity and storage within the Marchmont catchment which will reduce the risk of flooding to businesses and residents who have been affected by flooding.

- **Increased variability in weather - drier conditions followed by extreme rainfall events increases land runoff, erosion and flushing of organic matter and pollutant and impacts quality of source waters, making water treatment more difficult, affecting quality and supply of water to customers;**

In June 2023, Argyll and Bute experienced a heatwave[19], followed by thundery downpours, resulting in several landslides causing significant impact to the raw water supply to Alexandria WTW. The turbidity and organic matter loading were much higher than the site was used to treating. A decision was made to close the intake and shut down the works, relying on storage to keep the public in supply. The skill and experience of the operators were key in keeping the public safe. They were also supported by scientists who used an instrument called a Zetasizer to determine the optimal coagulation dose. As the water quality started to reach a treatable level, the works were then brought back online quickly and effectively with no interruption to public water supply or public health impact.

- **Drier and hotter conditions, cause low reservoir levels and the warmer water leads to release of chemicals such as iron and manganese from sediments impacting the quality of source waters and making water treatment more difficult, affecting quality and supply of water to customers.**

300,000 customers in Lanarkshire were affected by elevated manganese levels between August and October 2021[20]. The driest spring for 160 years[21], resulted in low reservoir levels, susceptible to disturbance from heavy rainfall, wind and runoff from the catchment. Intense rainfall in August 2021 saw the start of deterioration in raw water quality with dissolved Manganese at 10 times normal levels.

With increased climate change, these issues already experienced are anticipated to increase in both likelihood and impact, whilst additional risks to our water environment are expected to materialise.

2.4 Legislation, Policy and Ministerial Objectives

Our approach to Climate Change Adaptation meets our obligations and duties under legislation, the outputs of the UK Climate Change Committee risks assessments, Scotland's 3rd National Adaptation Plan (SNAP3), and Scotland's National Performance Framework. Our approach is also aligned the WICS Final Methodology for SR27 and intended to meet the Draft Ministerial Objectives 2027-33.

2.4.1 Legislation

Table 3 below sets out our regulatory and legislative duties and how they have informed our approach to climate change. We also include drivers for biodiversity and nature as the resilience of natural systems is a key element of longer term adaptation and the resilience of our services, as well as meeting wider expectations and duties for managing and improving biodiversity.

[18] Marchmont Road Flood Alleviation Scheme (2024) |
[19] Climate change impacts June temperature records - Met Office
[20] DWQR Incident Assesment Daer WTW 11955 August 2021
[21] Hydrological summary September 2021

Table 3: Scottish Water's legislative duties to adapt to Climate Change

Legislation	Duty	Meeting this duty in SR27
Climate Change (Scotland) Act (2009)	• To support Scottish Government plans, strategies and objectives for climate change. • To report annually progress in delivering plans, strategies and objectives for climate change.	Our SR27 approach is aligned to support the achievement of the third Scottish National Action Plan – and we will continue to contribute annual updates to support its Monitoring and Evaluation framework. We will also continue to submit reports on climate change adaptation progress through our Public Bodies Climate Change Duties Reports.
Flood Risk Management Act (2009)	• To identify where Scottish Water considers that a flood is likely to originate from a sewerage system and estimate the volume of sewage which is likely to be released in the event of such a flood. • To exercise flood risk related functions with a view to reducing overall flood risk.	In SR27 we will build on our understanding of flood risk from the sewerage system, through the inclusion of detailed climate change projections in our hydraulic models.
The Water (Scotland) Act 1980	• To provide a supply of wholesome water to every part of its limits of supply.	In SR27, we will consider the future climate when designing solutions for problems that are experienced today for both water continuity and water quality. We will work with infrastructure providers to better understand and adapt to events that disrupt our ability to provide service.
Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR Regulations)	• To take all reasonable steps to secure efficient and sustainable water use. • To take all reasonable steps to ensure that	In SR27 we will promote water efficiency through our “Water is Always Worth Saving” campaign and will consider the future climate when designing solutions for problems that are

Legislation	Duty	Meeting this duty in SR27
	discharge [containing sewage] does not result in pollution of the water environment.	experienced today in the water environment.
Sewerage (Scotland) Act 1968	• To provide and maintain public sewers that can effectively drain surface water from the curtilage of properties under 'usual' rainfall events (currently interpreted to mean up to the 1:30 year rainfall event).	In SR27 we will apply climate change uplifts to rainfall data used to plan improvements to our waste water network.
Nature Conservation Act 2004 Wildlife and Natural Environment Regulations 2011	• To further the conservation of biodiversity in Scotland, contribute to the Scottish Government's biodiversity goals and to report progress 3-yearly.	In SR27 we will invest in peatland restoration and woodland creation on our landholdings, update our Biodiversity report and support (with others) the development of the multi-agency approach and establishment of the pioneer catchment resilience delivery programme.

2.4.2 UK and Scottish Policy

UK Level Risk Assessments: UK Climate Change Committee (CCC)

The CCC produces 5-yearly Climate Change Risk Assessments for the UK (UKCCRA), which include National Assessments for Scotland. The third risk assessment, UKCCRA3[22], was published in 2021 and highlighted that the risk of flooding to people, communities and buildings to be among the most severe risks for Scotland, and the costliest hazard to business. It further identified the impact climate change will continue to have on natural and marine environments with wide ranging negative health and social outcomes

In 2023, the CCC published an independent assessment of progress in adapting to climate change in Scotland[23]. This noted that policies, plans and progress towards a well-adapted water system (all aspects of water policy), were insufficient.

Scottish Water used the CCC advice and CCRA3 to inform its Management Approach for Climate Change. Recommendations were followed to adopt clear pathways for climate change and approaches to risk assessment, consider 2 - 4 degrees Celsius of warming through this century and focus on the key risks this presents. For Scottish Water this means:

- "too little water" and the risk of increasing drought risk;
- "too much water" and rainfall intensity increasing flood risk;

[22] UK Climate Risk
[23] Adapting to climate change - Progress in Scotland - Climate Change Committee

- combination of both impacting water and environmental quality; and
- increased risk of extreme weather events disrupting assets and services.

We set this out in detail in our 2024 Climate Change Adaptation Plan[24] and Chapter 4 in this document explains how we have used this to inform our SR27 approach.

The CCC is currently developing its 4th risk assessment (UKCCRA4). We have engaged with the process, made our latest risk assessment and Adaptation Plan available and are informing on specific water service-related risks in Scotland.

Scotland's 3rd National Adaptation Plan

The 3rd Scottish National Adaptation Plan[25] (SNAP3), published in September 2024, is the Scottish Government's response to the CCC's independent risk assessments. It sets out how Scotland will address the risks posed by climate change up to 2029. SNAP3 sets out Scottish Governments strategic and policy expectations, which are focussed on five outcomes and 23 objectives (Figure 4). As a named body in the Climate Change (Scotland) Act (2009), Scottish Water must, whilst exercising its functions, act in a way best calculated to help the Scottish Government deliver the outcomes of SNAP3.

Five adaptation outcomes; 23 objectives	
Nature Connects	
Nature connects across our lands, settlements, coasts and seas.	
NC1: Nature-based solutions	NC2: Landscape scale solutions
NC3: Development planning	NC4: Nature networks
NC5: Marine, coastal and the blue economy	NC6: Natural carbon stores and sinks
Communities	
Communities are creating climate-resilient, healthy and equitable place.	
C1: Regional and place-based collaborations	C2: Locally-led adaptation
C3: Community resilience	C4: New and existing buildings
C5: Culture and historic environment	C6: Coastal communities
Public Services & Infrastructure	
Public services are collaborating in effective and inclusive adaptation action.	
PS1: Public body duties and capacity	PS2: Public service and infrastructure resilience
PS3: Scotland's water resources	PS4: Transport system
Economy, Business & Industry	
Economies and industries are adapting and realising opportunities in Scotland's Just Transition.	
B1: Business understanding of climate risk	B2: Support for farming, forestry, fishing and aquaculture sectors
B3: Innovation opportunities	B4: Economic development and supply chains
International Action	
Scotland's international role supports climate justice and enhanced global action.	
IA1: Supporting vulnerable communities globally	IA2: International Advocacy
IA3: Knowledge advocacy	

[24] Climate Change Adaptation - Scottish Water
[25] Climate change: Scottish National Adaptation Plan 2024-2029 - gov.scot

Figure 4: Outcomes and Objectives of the Third Scottish National Adaptation Plan, reproduced from the Scottish National Adaptation Plan[26]

We engaged closely with Scottish Government in the production of SNAP3, which aligns with our Adaptation Plan. Our 2024 Climate Change Adaptation Plan, approach to service delivery and proposed adaptation activities in SR27, support key areas outlined in SNAP3.

SNAP3 also makes clear the mechanisms for delivery will be across multiple policy and planning frameworks, agencies and strategies, all working together to reduce risks posed by 2 or 4 degrees Celsius of climate change. We will work to ensure the challenges of climate change for water, waste water and drainage service resilience are reflected in these policy and planning levers.

2.4.3 Draft Ministerial Objectives 2027-33

The Draft Ministerial Objectives 2027-33 relevant to adaptation set out that in SR27 Scottish Water must:

- Identify the expected impacts of climate change on its assets and assess the risk and likelihood;
- Continue to implement and evolve plans for adaption measures necessary to protect its services;

To meet these, Scottish Water will:

- Review and update our climate change risk assessment and adaptation plan to reflect the latest models, projections and climate impact intelligence;
- Implement activities identified in our climate change adaptation plan to address drought, water treatment, waste water flooding and power resilience risks;
- Ensure climate risk is reflected in all elements of investment decision making to inform cost-effective investment in assets to support climate resilience;
- Continue our “Water is Always Worth Saving Campaign” to work with customers to increase the value placed on water; and
- Work in partnership on three pioneer catchments to provide landscape scale adaptation measures.

2.5 The Water Sector Vision, our Long-Term Strategy and our Climate Change Adaptation Plan

Adapting to climate change will be an ongoing challenge over multiple investment periods with good engagement and partnership across many stakeholders.

2.5.1 The Water Sector Vision

The Vision[26] outlines that Scotland’s Water Sector will be admired for excellence, secure a sustainable future and inspire a Hydro Nation. All parts of the sector – Scottish Water, government, regulators, supply chains and others must contribute to “… transform how we work to live within our planet’s resources, work with the natural environment and maximise our contribution to Scotland achieving net zero emissions and adapting to climate change.” We cannot deliver adaptation alone and Scottish Water is committed to working in partnership towards a resilient service.

[26] Water Sector Vision - Scottish Water

2.5.2 Long-Term Strategy

Scottish Water's Long-Term Strategy (LTS)[27] highlights the climate crisis as one of the three main challenges to achieving our long-term outcomes. It is also directly relevant to each of the three strategic ambitions that drive Scottish Water – Service Excellence, Great Value and Financial Sustainability and Beyond Net Zero. It impacts our ability to serve, how we adapt (or fail to adapt) impacts cost and efficiency, and risks will grow if global emissions are not curbed.

Our Long-Term Strategy key approaches (aligned with the Vision) to address climate change are:

- **Collaborate and lead partnerships**: we cannot deliver adaptation alone - for climate change we need strong committed partnerships for drainage, landscape and catchment resilience, regional and local resilience and adaptation partnerships with communities;
- **Transform and drive efficiency:** embedding climate change into all our investment decision making processes, along with partnerships will support cost-effective pathways for adaptation; and
- **Reduce demand on our services and assets:** the ability of nature to provide the services we need will deteriorate with climate change**.** Reducing consumption and leakage to support water resources deficit and to more sustainably draining stormwater will reduce risks from our systems.

2.5.3 Our Climate Change Adaptation Plan

Our 2024 Climate Change Adaptation Plan[28] that informs SR27 across all service areas is to:

- Plan for 2 degrees Celsius of warming by the 2050s;
- Prepare for 4 degrees Celsius of warming by the 2080s.

The plan details the risk assessment and approaches to managing these risks. Adaptation actions are classed under three strategic approaches:

- **Operational Resilience**: Increasingly frequent and extreme weather, driven by climate change, will lead to acute service impacts to customers – droughts, water quality incidents, flooding. Operational responses – tankering, standby power, clean ups and service recovery are vital, and operational resilience plans will take account of future climate change to support Service Excellence;
- **Asset Resilience**: We will fully integrate climate change into our Sustainable Investment Decision Making processes to ensure our natural and built assets are resilient. This will support long term investment planning and operation of water and waste water systems to deliver service resilience; and
- **Service Transformation**: The first two approaches alone will not be sufficient. We cannot just build our way out of climate change; we need to find new ways to ensure resilient services in a changing climate. We will need to work with customers, stakeholders and industry to reduce the amount of water we need to take from the environment, reducing our exposure to some of the impacts of climate change on water resources, water quality and urban drainage.

Some of the activities already enabling us to adapt to the risks identified are summarised in Table 4.

[27] Our Sustainable Future Together - Scottish Water
[28] Climate Change Adaptation - Scottish Water

Table 4: Adaptation action against key climate change risks identified in our CCRA

Climate Driver	Risk	Impact	Example of Adaptation Action to Date
Drought conditions	Lower river flows and/or reservoir levels affect the ability to abstract from source waters	Local or regional **water supply deficits** lead to service disruption and loss of supply to customers	**Leakage reduced** by 58% over the last 15 years, to support our Supply Demand Balance.
Drier conditions followed by extreme rainfall events	Increased land runoff, erosion and flushing of organic matter and pollutants, impacts quality of source water	**Water treatment is more difficult** affecting quality and supply of water to customers	Investing £4.2m in SR21 to **restore damaged peatland** and £15m in land management and **woodland creation**, to reduce runoff risk to water quality, in partnership with NatureScot, Peatland Action and Forestry and Land Scotland.
More frequent / extreme rainfall	Drainage systems and sewers become overloaded with storm water and surface water flows entering the network	Increased **flooding of customer properties**; increased environmental impact	Creation of the innovative Metropolitan Glasgow Strategic Drainage Partnership with over **£1.5 billion invested in major flooding** and environmental projects in Glasgow. And disconnection of surface water from the sewer network into raingardens and trees in Dundee
Drought conditions	River levels fall reducing the ability of the environment to cope with waste water discharges without causing **pollution during low flow events**	Potential tighter standards for environmental discharges	Developed industry leading **modelling improvements** to help us understand future rainfall impacts to drainage catchments and flow at waste water works
More frequent / extreme rainfall	Increased frequency and magnitude of river and surface water **flooding at water treatment and waste water sites**	Operational impact leading to loss of supply for customers, risk of environmental pollution & increase in repair & refurbishment costs	**Elevated vulnerable equipment** at critical assets above the flood plain and installed flood protection measures
Extreme weather and storm events	Disruption of power network and **power outages** impacts pumping	Operational disruptions, loss of customer service, increased	Investing £8m in SR21 on additional **standby generators** for critical assets

Climate Driver	Risk	Impact	Example of Adaptation Action to Date
	and treatment as well as communications	emergency response	to ensure we can maintain service during storm events

3 Customer and Communities

3.1 Our Customers and Stakeholders

3.1.1 Our Approach

Media reports increasingly highlight the global impacts of climate change from wildfires in California[29] to floods in Spain[30] and extreme storms in Bangladesh[31]. In the UK we have seen a series of damaging storms[32] and in Scotland an increase in drought[33] and wildfires[34] in recent years.

Climate change adaptation is fundamentally about the resilience of the service we provide to customers in the future. Climate change is already disrupting the lives of our customers – the increased intensity and frequency of storm events that can cause service interruptions, and in the increased incidence of droughts that lead to us needing to act to keep customers in supply, and in excess rainfall that can impact the quality of the environment we enjoy. Customers expect that Scottish Water will take the necessary steps to ensure their services are resilient and their lives are not disrupted by climate change.

Customers are at the heart of our business, and their opinions are a key factor in our decision making process, as set out in our Customer Research Technical Appendix. Building these views into our plans is part of our ongoing customer research approach that allows us to ensure our customers' needs are at the centre of our service delivery. The SR27 customer research programme aimed to understand customer expectations for Scottish Water over the course of SR27. However, we also have a deep understanding of views on service issues from existing and ongoing research. Scottish Water's synthesis database contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers. These insights have been assessed and mapped into topics, and the highest quality insights have been gathered together into Key Insights which have been used to support the development of the Final Business Plan and Technical Appendices. The Research Synthesis Supporting Document sets out supporting evidence, scoring and referencing for these Key Insights.

3.1.2 Summary of Engagement

We know that climate change can be an important issue for our customers – and there can be concern about the impacts. This is especially true for younger people. Some of our customers have a good sense of the impact climate change will have on our services and infrastructure but others are surprised by the scale of the issue.

Generally, however, our customers understand that the impacts of climate change will be felt more acutely in the longer-term if we do not act today - and there is an expectation on us to act now to protect our services and infrastructure.

As highlighted in the Research Synthesis and other Technical Appendices, customers have high expectations for water continuity, water quality, management of waste water flows and protection of the environment. Within this there is an expectation that their service will be protected from climate change and general support for Scottish Water to seek to use novel solutions such as

[29] LA fires in maps: Where are they and how bad is the damage? - BBC News
[30] Before and after images show devastating impact of Valencia floods - BBC News
[31] Cyclone Mocha: Deadly storm hits Myanmar and Bangladesh coasts - BBC News
[32] Climate change drives increase in storm rainfall - Met Office
[33] Climate Crisis: informing Scotland's actionable mitigation and adaptation response to water scarcity | CREW | Scotland's Centre of Expertise for Waters
[34] Wildfire Risk in Scotland - James Hutton Institute

blue-green infrastructure and to work with nature for climate resilience, whilst acknowledging the continued need for traditional infrastructure.

Table 5 below sets out our Key Insights alongside the relevant research questions on Climate Change Adaptation

Table 5: Key Insights on Climate Change Adaptation

Research Question	Key Insight
What is customer **understanding** of climate change as a challenge?	Climate change is acknowledged as an important issue by customers, with future customers showing more concern. However, customers can be surprised by the scale of the issue and potential impact on Scottish Water's services. After this information has been shared, customers generally acknowledge climate change as a challenge to Scottish Water's long-term outcomes.
What are customer **expectations** around climate adaptation of assets?	On hearing about the scale of challenges from climate change, and the consequent impact on the provision of Scottish Water's water and waste water services, customers believe it is important to protect infrastructure against the impacts of climate change. There is an expectation that Scottish Water will invest in innovative approaches and long-term solutions.
How do customers **view their role** in supporting Scottish Water's adaptation to climate change?	Customers feel that there is a shared responsibility between the Scottish Government, Scottish Water, businesses, communities and individuals in tackling the impacts of climate change on water and waste water services in Scotland. Whilst many customers believe they are already doing what they can to tackle the causes and impacts of climate change, many customers are unsure of how they can contribute. Customers can also be initially sceptical about the effectiveness of personal behavioural changes or perceive there to be financial or practical barriers to adopting more sustainable behaviours. However, on learning more about the issue, customers generally support the need to raise awareness of the value of water, and there is an appetite for more information and communications.

Our SR27 approach to Climate Change Adaptation addresses several aspects of customer feedback:

- We will enhance resilience of our assets to the impacts of climate change by integrating rainfall changes due to climate change into water resources and flooding investments;
- We will continue to improve our understanding of risks across all areas of water and waste water service provision and climate change which will be reflected in the options that are developed for water and environmental quality;
- We will continue to pursue blue-green options in drainage, with a goal that 10% of flooding and drainage options should include blue-green measures in SR27, and seek to build partnerships that will address the impacts of climate change through landscape scale interventions, such as at Loch Katrine to protect water quality, improve biodiversity and capture carbon; and
- We will continue our "Water Is Always Worth Saving" campaign[35] to engage customers in understanding the value of water to change behaviours on water consumption.

3.2 Partnership Working

Scottish Water cannot deliver adaptation alone – engaged and committed partnership working focused on long term delivery is vital for effective adaptation. Partnerships must extend across national and local government, public agencies, infrastructure providers, landowners and communities.

[35] Water is always worth saving - Scottish Water

There are fantastic examples of effective partnerships at scale – such as the Metropolitan Glasgow Strategic Drainage Partnership, but we need more collective action across landscapes where no single organisation can deliver.

The expected SR27 outcomes from partnership working are provided in section 4.2.4, and there are some key aspects of partnership working that are central to Scottish Water's Climate Change Adaptation Plan:

- With others to transform how we manage and invest in the resilience of our landscapes and the catchments we rely on for our services. Working across local authorities, landowners, SEPA, NatureScot, Forestry and Land Scotland, farmers (including our own tenants), industry and others to support regenerative, resilient natural landscapes to safeguard water resources, support flood management and maintain environmental capacity in our pioneer catchments and elsewhere;
- With customers and communities to change our relationship with water – how we value and manage water to reduce our demand on the environment in a water constrained future;
- With local authorities, roads authorities, developers and communities to reshape our urban landscape to deal with extreme rainfall and develop blue-green infrastructure and make our cities more resilient places in a climate changed world; and
- With infrastructure providers whose services we rely upon to deliver water and waste water services, to understand and manage the interdependent risks (from power and telecoms failure, to travel disruption) that climate changes pose.

We need a particular focus on water resources, water quality and flooding in catchments. In response to the climate emergency the Scottish Government is working in partnership with Scottish Water and other industry stakeholders to develop policy for the future of the water industry in Scotland, recognising that water is a precious resource that supports our lives, agriculture and businesses and our environment. The aim of this work is to help protect Scotland's environment and water resources so we can all continue to rely on them for generations to come.

No single organisation can lead this - many sectors rely on nature to provide key services (water quality, flood management, soil health etc) and will benefit from and contribute to catchment measures. To be effective and sustainable we need to progress interventions such as peatland restoration, woodland creation, riparian flood management and upland soil management at landscape scale to make the water catchments resilient to climate change. We will continue to do this on our own land, and in partnership in our Pioneer Catchments, as described in section 4.2.4.

We already have examples of good partnerships that support effective outcomes. Urban drainage partnerships in Glasgow[36] and Edinburgh[37] provide a model for delivery between Scottish Water, SEPA, Local Authorities, Developers and others, investing over £1bn in improving water flows across the cities, reducing flood risk and enhancing the environment. Scottish Water's partnership with Forestry and Land Scotland will deliver a 10 year Land Management Plan[38] for landscape scale measures to restore peatland, create woodland, capture carbon, enhance biodiversity and secure the resilience of Glasgow's water supply.

Partnership and collaborative work are also needed to help customers reduce the amount of water they use, supported by national and local planning policy and building standards legislation to incentivise developers to make properties and appliances as water efficient as possible, making

[36] Metropolitan Glasgow Strategic Drainage Partnership (MGSDP) - MGSDP
[37] vision-for-water-management-in-the-city-of-edinburgh
[38] Loch Katrine Land Management Plan | Forestry and Land Scotland

it easy for customers to be water efficient. We will engage our customers to make them more aware of their water use and how they can reduce it to help the environment and reduce their energy costs.

Society depends on a collection of infrastructure systems that are co-dependent. Local resilience partnerships and fora already support many aspects of this but will be increasingly impacted by climate change. To effectively and efficiently respond infrastructure operators must share knowledge and resources and work collaboratively towards climate resilience between dependent services. Along with Network Rail, Scottish Water is co-chair of the Climate Ready Infrastructure Scotland Forum[39] to foster collaboration between infrastructure operators in Scotland and to support effective adaptation. We will work collaboratively to develop and deliver adaptation and resilience initiatives to enable infrastructure operators in prepare for Scotland's changing climate.

Table 6 below sets out how we will be working with our partners to deliver our outcomes.

Table 6: SR27 partnership approach for climate change adaptation

Partner	How will we work with them in SR27?
Local Authorities	We will expand our strategic drainage partnerships to remove the volume of rainwater in our combined sewer system We will co-deliver landscape scale interventions in pioneer catchments to manage flood risk in communities
SEPA	We will expand our strategic drainage partnerships to remove the volume of rainwater in our combined sewer system We will co-deliver landscape scale interventions in pioneer catchments to provide resilient and regenerative catchments and urban spaces
NatureScot	We will co-deliver landscape scale interventions in pioneer catchments to provide resilient and regenerative catchments and urban spaces
Forestry and Land Scotland	We will co-deliver landscape scale interventions in pioneer catchments to provide resilient and regenerative catchments and urban spaces.
Landowners and tenants	We will collaborate to ensure landscape scale landscape scale interventions in pioneer catchments to provide resilient and regenerative catchments and urban spaces are sustainable for all. We will collaborate to ensure mutual benefit when delivering outcomes through our drainage partnerships. We will collaborate with our tenants to develop farm management plans to ensure regenerative and climate resilient catchments
Our customers and communities	We will encourage the national conversation around water and our ability to manage the entire cycle better within Scotland.

[39] Climate Ready Infrastructure Scotland Forum - Adaptation Scotland

Partner	How will we work with them in SR27?
	We will build on the findings of the household monitoring pilot to reduce per capita consumption through the provision of consumption information to customers. We will learn from the experience of the England and Wales companies and other behavioural insights to reduce demand in households where monitoring is unduly expensive or impractical. We will collaborate to ensure mutual benefit when delivering outcomes through our drainage partnerships.
Developers	We will collaborate to ensure mutual benefit when delivering outcomes through our drainage partnerships.
Renewable energy providers	We will collaborate to ensure that our landholdings being used to host renewable energy provision will be improved to become more resilient and regenerative.
Network Rail	We will co-develop, co-fund, and co-deliver tactical climate adaptation and resilience initiatives across infrastructure providers through the Climate Ready Infrastructure Scotland Forum.
Scottish Power Energy Networks	
Openreach	
Scottish and Southern Energy Networks	
Transport Scotland	
Scottish Government	We will collaborate on the development of policy for the future of the water industry in Scotland and contribute to the delivery of SNAP3.
UK Government	We will influence household appliance efficiency regulation and building regulations that mandate water efficient design

3.3 Demonstrating Customer and Stakeholder Support

Our customers are generally aware of the issue of climate change but are not aware of the significant challenge Scottish Water are facing because of climate change in meeting the long-term outcomes. **In SR27, we will invest in customer campaigns such as promoting water efficiency through our "Water is Always Worth Saving" campaign to encourage customers to be wearier of how they are using water. This will help customers help us to mitigate the impacts of climate change and increase their understanding of the potential impacts and consequences of climate change and how their behaviours can help.**

Our customers expect long-term solutions to be put in place to protect assets from the impacts of climate change. **In SR27, we will identify the potential impact and likelihood of impact climate change will have across our assets. We will fully integrate climate change into our Sustainable Investment Decision Making processes to ensure our natural and built assets are resilient. This will support long term investment planning and operation of water and waste water systems to deliver service resilience.**

Many of our customers believe they are already doing what they can to tackle the impacts of climate change and think that there is a shared responsibility to do this between the Scottish Government, Scottish Water, businesses and communities too. **In SR27, we will aim to invest £70m in drainage partnerships. We will work with local authorities and communities to remove rainwater from our networks and recover capacity and resilience. We will also work with our customers to increase the value placed on water and waste water services we provide.**

4 Our SR27 Investment Approach to Climate Change Adaptation

4.1 Our Management Approach Informing our SR27 Investments

Climate change is not new to Scottish Water; we completed our first climate change risk assessment in preparation for SR10 and have since enhanced our approach[40] [41]. In SR21, we developed our Management Approach for Climate Change Adaptation. Climate Change Adaptation is comprised of three central elements as shown in Figure 5, and described in the following sub-sections.

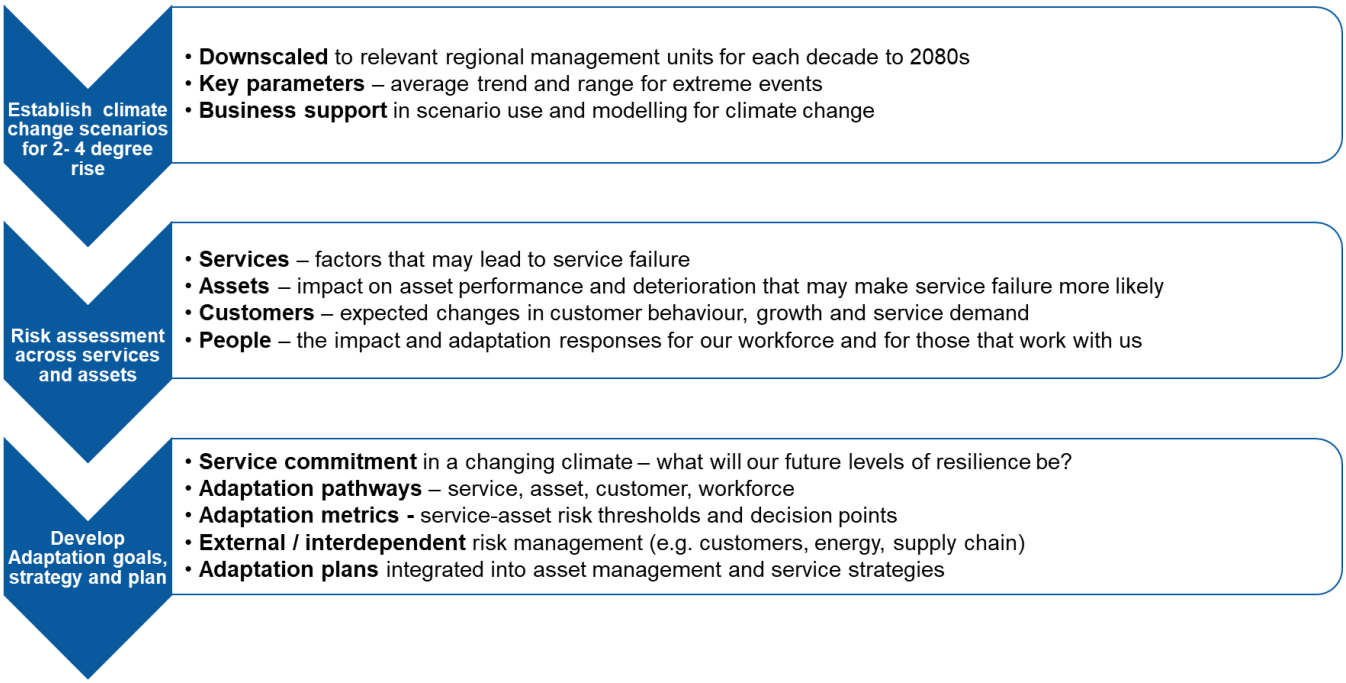

Figure 5: Summary of SR21 Climate Change Adaptation Management Approach (MA103)

4.1.1 Climate Change Pathways

Our approach is to plan for 2 degrees Celsius warming to 2050 but prepare for 4 degrees Celsius of warming by the 2080s and will be kept under review should the evidence change. Using the UK Climate Impact Programme 2018 projections we adopted "Relative Concentration Pathway" 6 (RCP6) to represent the 2-degree world and RCP8.5 to represent the 4-degree world[42] (Figure 6). RCP refers to the projected forcing of global heating by the concentration of greenhouse gas emissions and reflects the Intergovernmental Panel for Climate Change (IPCC) pathways for emissions. RCP6 assumes that globally we are on an emissions path to limit warming to below 2 degrees Celsius through international agreements, whilst RCP8.5 assumes less effective mitigation and a "business as usual" emissions pathway.

[40] Water Resources Plan 2015
[41] 2015 Sustainability Report
[42] ukcp18-guidance---representative-concentration-pathways.pdf

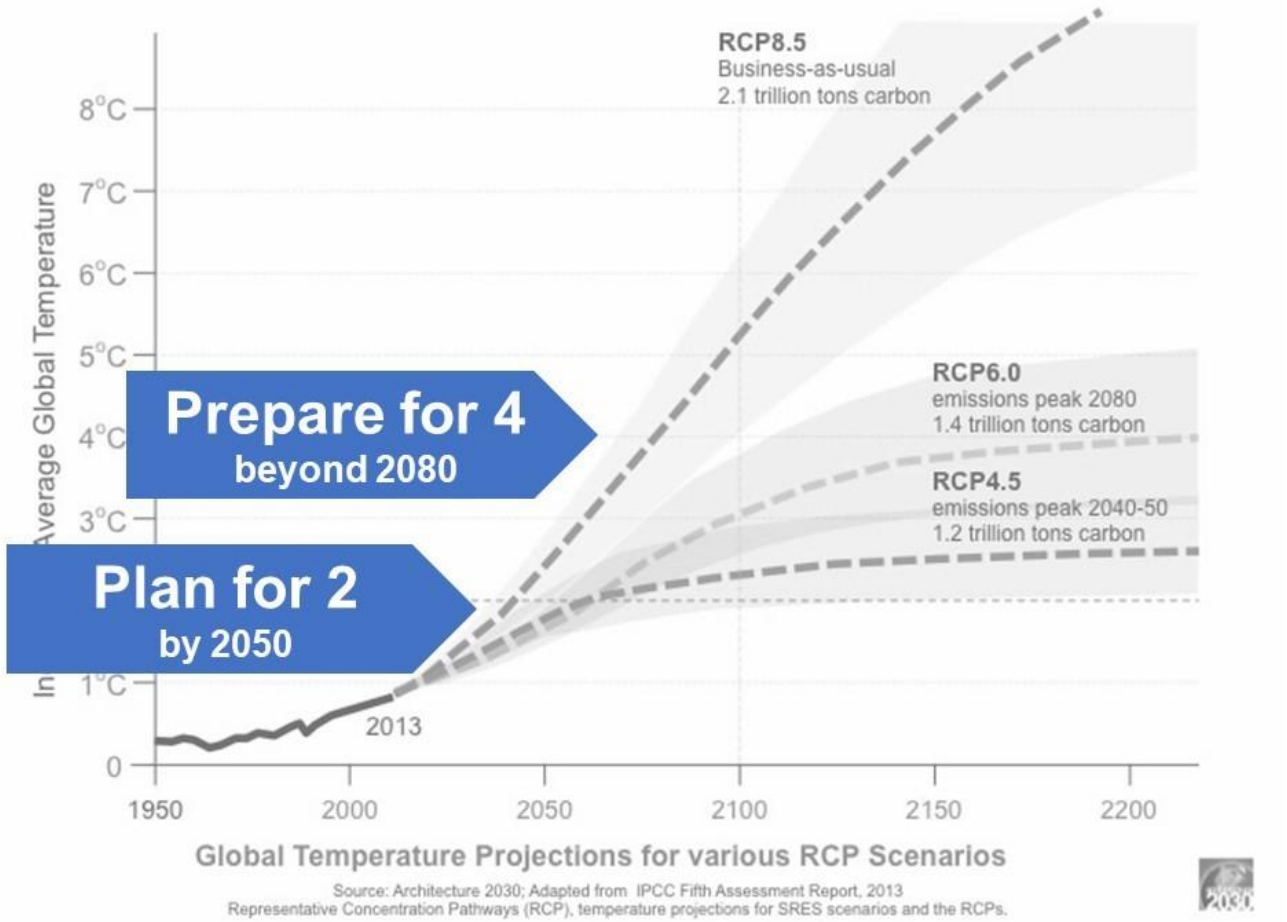

Figure 6: Climate Change Scenarios used in our CCRA, adapted from The Global Building Sector and the IPCC Fifth Assessment Report – Ed Mazria's Analysis – Architecture 2030

4.1.2 Risk Assessments

Scottish Water used the above scenarios to perform risk assessments to determine service impacts to our systems in terms of costs, regulatory compliance, customers, Safety, Health and Wellbeing and the environment. Assessments considered:

- **The likelihood of the climate driven risk to operations materialising** during the most recent period of observations, and in the future under the 2 and 4 degree Celsius climate scenarios. This refers to how likely is the asset to fail/operations to be disrupted due to weather events and/or other climatic trends;
- **The magnitude of service impacts associated with the risk materialising** during the most recent period of observations and in the future. This refers to the scale of service, financial, regulatory, environmental impacts (when the risk to operations is unmitigated).

We identified and assessed 126 different climate risks and compared the position today, with 2 degrees Celsius of warming by 2050 and 4 degrees Celsius of warming by 2080. The outputs are summarised in chapter 10 of our Climate Change Adaptation Plan[43], and informed sections 4.2.2, 4.2.3 and 4.2.4 of this Technical Appendix. This assessment will be repeated in SR27 to adopt

[43] Climate Change Adaptation - Scottish Water

newer data and projections as they arise, allow tracking of our adaptation progress, and inform SR33.

As well as Met Office projections, the analysis of risk drew on a range of technical and modelling approaches relevant to the key service areas as follows:

- **Drought risk:** During SR15, the earlier climate change projections (UKCP09[44]) were applied to water resource models for the 58 resources deemed vulnerable. In SR21 this was extended to 72 resources for the 4-degree pathway, to understand the implications for future water resource yields[45] and supply-demand balance risks.
- **Water Quality:** Using information from national assessments[46] of the implications of climate change on water quality, we worked with technical consultants to develop an approach[47] to estimate the impact of climate change uplifts (rainfall intensity, temperature, flow) on the deterioration of catchments across key parameters such as manganese, dissolved organic carbon, and algae. This enabled us to model future source water quality in our catchments and assess when catchment deterioration may exceed the capability of our assets to treat incoming water.
- **Flooding:** In SR15 we worked with UK Water Industry Research (UKWIR), Newcastle University and the UK Met Office to develop tools[48] to adjust future rainfall projections to reflect climate change. This enabled catchment level assessments of hydraulic exceedance under climate change to inform customer flood and environmental pollution risk. This was adjusted in SR21 to include uplifts for UKCP18 4 degree pathways, and work continues to improve catchment assessments.
- **Environmental Quality:** We assessed the vulnerability of waste water treatment assets to climate hazards in terms of their ability to deal with increasingly variable flows, and the potential reduction in environmental capacity to receive discharges because of increased periods of low flow and elevated temperatures during dry conditions. Further work is underway to integrate the outcome of the rainfall and catchment work to support flooding, and this will enable improved understanding of the likelihood of future quality risks to CSOs and waste water treatment standards; and
- **Asset Flood Risk:** We undertook a spatial analysis of our asset base against Scottish Environment Protection Agency (SEPA) flood maps[49]. For coastal erosion, we used outputs from the Dynamic Coast[50] assessment to determine the risk to our asset base.

4.2 Our Climate Change Adaptation SR27 Investments

4.2.1 How Investment in Climate Change Adaptation appears in our SR27 Plan

Our SR27 Final Business Plan will make a significant contribution to help the Scottish Government deliver SNAP3, and our Long-Term Strategy. The changes we have made to our asset management and investment planning processes will ensure that management approaches, system planning, and project appraisals increasingly draw from climate change impact pathways to inform investment demand.

[44] [ARCHIVED CONTENT] Met Office UKCP - Crown copyright
[45] Approach described in Water Continuity Technical Appendix
[46] Climate resilience strategies for upland drinking water sources (FREEDOM-BCCR) | UK Centre for Ecology & Hydrology
[47] Internal assessment, available on request (CCRA WQ Vulnerability Report)
[48] Red-Up Tool
[49] Flood Maps | SEPA - Flood Maps | SEPA
[50] Dynamic Coast

As noted in the Table 5 Commentary document, we are not yet able to provide fully disaggregated, project-by-project data on the proportion of investment spend that relates to climate change adaptation.

Climate Change Adaptation has become increasingly embedded within the way we plan for our assets. This means that only a relatively small proportion of our SR27 investment in adaptation appears as stand-alone investment. Most of the investment in this area is embedded within service lines (e.g. Water continuity). The investment demand and service outcomes associated with climate change adaptation can therefore be considered in three ways:

1. **Investments where climate change adaptation is the *key* driver:** Customer Experience and Flourishing Scotland investments and outcomes are focused solely on climate change. Primarily, this is climate change risk assessment work (captured in 4.2.3), Drainage Partnerships and Surface Water Removal (captured in 4.2.4) and Pioneer Catchment work (captured in 4.2.4). These investments are detailed in this document and associated Data Table.
2. **Service lines where climate change adaptation is an *embedded* investment:** The use of climate models to inform decisions is well established in Water Continuity and Managing Quantity of Flows, and outcomes have built climate change needs into core demands. A proportion of these investments are attributable to climate change adaptation, and this is reported here. Our changing climate is already causing our source water quality to deteriorate and some of the enhancements in Water Quality are because of this. These investments are not "additional" to the demand reported by these service areas but is reported here to clarify the financial impact of climate change. Water Quality (funding included in Transformation and Innovation Data Tables) and Environmental Quality have also identified climate change study needs for SR27. The full rationale for these investments is detailed in their respective Technical Appendices and Data Tables; and
3. **Service lines where climate change adaptation has been *retained* as a risk:** The impact and timing of climate change is inherently uncertain, and there are areas with too much uncertainty to promote further planned adaptation at this stage across several areas of investment. As climate science and our understanding of risk matures, we may identify additional investment demand in the SR27 period. Climate risk assessments are incorporated into our Sustainable Investment Decision Making (SIDM) processes for Management Approaches and Project Investment Appraisals, and we will ensure that the most relevant and up to date information is considered when making investment decisions during SR27, to ensure they are resilient. Any additional investment identified will be considered through our Investment Planning and Prioritisation Framework (IPPF). Throughout this Technical Appendix we refer to these potential investments as 'retained risks', and they are included in the Technical Appendix for Risk.

In the following sections, we will detail our aimed investments to provide Operational Resilience, Asset Resilience and Service Transformation in the following manner:

1. **SR27 Investment**: the known investments we are making in this period, across key drivers and embedded investment.
2. **Retained Investment Risk**: the potential scale of additional investments we might decide to undertake in this period; and
3. **Relevant SR27 Outcomes:** how our investments in SR27 address the climate risks we have identified in our CCRA.

4.2.2 Operational Resilience Investments

Our SR27 Investment

Table 7: SR27 investment for Operational Resilience

Key CCRA considerations	***Climate Driver***	***Risk***	***Impact***
	Extreme weather and storm events	Disruption of power network and power outages impacts pumping and treatment as well as communications	Operational disruptions, loss of customer service, increased emergency response
Key Driver or Embedded Investment?	Embedded		
SR27 Investments	Standby Generators: £6m		
Total Materiality	£6m		

Embedded

Increasingly frequent and extreme weather, driven by climate change, has the potential to increase deterioration of our assets whilst sustaining service excellence, or for Scottish Water to undertake additional activities to deal with extreme flood, drought or storm events. One of the biggest operational risks we face is loss of power from storm events and during SR21 we invested in standby generation for critical assets.

An additional £31m for 52 standby generators and mobile hookups is profiled in SR27 under the Water Continuity programme to further improve resilience, with 20% of this investment, or £6m, to provide additional resilience for regional power outages, driven by increasing extreme weather due to climate change.

Retained Investment Risk

Aside from loss of power from storms, increasingly frequent and extreme weather, driven by climate change, may mean increased energy usage for pumping and treatment, increased chemical usage or increased site visits and management of assets during events. It is difficult to project future costs owing to the natural variability of events and limited historical data and we will need to keep under review.

Excluding energy costs for elements such as pumping, which are difficult to directly link to climate variables and disaggregate from wider energy data, the operational response costs of weather events over the last 5 years is shown in Table *8*[51]. 2024/25 was a benign year, with the remaining years experiencing impacts such as severe winter weather, drought and storm recovery events.

[51] Source – Scottish Water financial assessment

Table 8: Operational response costs for weather extreme events from 2020 to 2025

	2020-21	2021-22	2022-23	2023-24	2024-25	5-year total	Annual average
Weather related cost (£m)	4.31	4.15	3.29	4.87	1.7	18.32	3.66

Scottish Water's Climate Change Adaptation Plan identifies several case studies of impacts and further information on past events, and key events that drive impact and cost include:

- **Drought resilience:** Significant additional costs may be incurred during drought events. Typical responses see increased pumping costs associated with moving water greater distances and tankering of supplies to some communities. Actual costs associated with drought will be location specific and the drought and supply-demand balance events of 2021-22, 2022-23 and 2023-24 were assessed to cost £1.6m, £1.8m and £2.6m respectively (excluding energy);
- **Recovery from weather extremes:** Between 2020-21 and 2024-25 Scottish Water dealt with a series of weather extremes ranging from severe winters (that climate change may exacerbate), to named storms leading to investment in the recovery of water and waste water services. Storm Arwen recovery cost ~£1m, whilst severe winter and snowfall in 2020-21 cost £3.7m. Attribution studies[52] [53] have shown that severe weather in the UK is more likely due to climate change and climate projections indicate an increase in severe weather can be expected in future, with resultant additional operational costs; and
- **Flooding – customer impacts and clean ups:** Climate change is projected to increase the risk to customers from internal and external sewer flooding, placing additional demands on sewer response teams and for further clean ups. Based on climate projections and risk assessment with the Flooding team, and with a strategy to ensure that customers are supported through incidents, it is anticipated that up to £16m in clean up response may be needed across SR27 to cover existing levels of support and accommodate further incidents associated with climate change uplifts.

It is reasonable to assume that the average £3.7m per annum costs (Table *8*) and associated increased operational carbon emissions, experienced over the last 5 years from weather incidents will increase across SR27, as weather is predicted to become more extreme, more frequently, due to climate change. However, the data on climate driven events and the uncertainty of how and when we will experience extreme events, means that we are unable to determine an uplift to be applied to this business plan, therefore we have included this as a financial risk within the Assurance Technical Appendix.

Relevant SR27 Outcomes

The investment in Operational Resilience will allow Scottish Water to demonstrate that we are fulfilling our Draft Ministerial Objective 2027-33 that we must 'continue to implement and evolve plans for adaption measures necessary to protect its services'. Our CCRA identified the increasing risk to service from extreme weather and storms disrupting the power supply. Investing in additional standby power generators will provide resilience to regional power outages and reduce the impact of this risk materialising.

[52] Climate change drives increase in storm rainfall - Met Office

[53] Climate change made 2022's UK heatwave 'at least 10 times more likely' - Carbon Brief

4.2.3 Asset Resilience Investments

Our SR27 Investment

Table 9: SR27 investment for Asset Resilience

Key CCRA Considerations	Climate Driver	Risk	Impact
	Drought conditions	Lower river flows and/or reservoir levels affect the ability to abstract from source waters	Local or regional water supply deficits lead to service disruption and loss of supply to customers
	More frequent / extreme rainfall	Drainage systems and sewers become overloaded with storm water and surface water flows entering the network	Increased flooding of customer properties; increased environmental impact
	Increased variability in weather; drier conditions followed by extreme rainfall events	Increased land runoff, erosion and flushing of organic matter and pollutants, impacts quality of source water	Water treatment is more difficult affecting quality and supply of water to customers
	High summer temperatures and lower rainfall	Algal blooms associated with warmer temperatures and lower flushing of source waters	Water treatment is more difficult, leading to quality taste and odour impacts to customers
		Low reservoir levels and warmer water lead to the release of chemicals such as iron and manganese from sediments impacting the quality of source waters	Water treatment is more difficult affecting quality and supply of water to customers
	Climate Driver	**Risk**	**Impact**
	Drought conditions	River levels fall reducing the ability of the environment to cope with waste water discharges without causing pollution during low flow events	Potential tighter standards for environmental discharges
		More concentrated sewage reaching waste water treatment works	Reduced performance of waste water treatment and

		during prolonged periods of dry weather	increased operational (e.g. chemical) costs
Key Driver or Embedded Investment?	Both		
Investments	Supply Demand Balance: £75m (embedded)		
	Water Quality £123m (embedded)		
	Managing Sewer Flood Risk: £45m (embedded)		
	Climate Change Risk Assessment: £2.0m (key driver)		
	Research and Development: £5m (embedded)		
	Waste Water Treatment Studies: £7m (key driver)		
Total Materiality	£256m		

Embedded Investments

The impact of climate projections of rainfall patterns has been built into our hydrological and hydraulic models and included in our planning for some time. This means that we are already planning for and adapting to climate change as business as usual for investment areas covering Water Continuity and Managing Quantity of Flows. The investment demand identified for these areas has been generated with a consideration of the future rainfall that we can expect with climate change.

In the generation of the investment demand for these areas, there was no separate consideration of climate change as an 'optional extra', it was fully embedded in the analysis. It is therefore not straightforward to attribute the proportion of the demand that is solely driven by climate change adaptation. However, we have used expert judgement to assess what portion of investment is likely driven by climate change adaptation in SR27.

The impacts of climate change are already being felt in our source water quality. Enhanced capability is required at several of our water treatment sites, for issues including algae, manganese, increased organic matter and cryptosporidium. Whilst we cannot fully attribute these enhancements to climate change, we do know that the warmer summer temperatures and dry periods followed by intense rainfall, that have already been experienced in Scotland, exacerbate these water quality issues. As such, we recognise that some of this enhancement is attributable to adapting to climate change. Again, we have used expert judgement to assess what portion of SR27 investment is likely driven by climate change adaptation.

The methodology we followed to identify climate change related demand for these areas is summarised below.

Water Continuity – Supply Demand Balance

- For the 72 Water Resource Zones deemed to be the most vulnerable to climate change, the impact of reduced rainfall, and increased evapotranspiration from a medium emissions scenario (RCP 6.0 UKCP18) on the hydrological yield was assessed.
- This follows Environment Agency guidance[54], consistent with the rest of the UK.
- The impact in 2080 was scaled back, linearly, to the present day, and used in our Supply Demand Balance model to determine the impact on water availability for customers.
- From this, we understand that our supply demand balance deficit will increase from 130Ml/d currently to 280Ml/d by 2050[55].

Analysis of the deficit in our supply demand balance in 2022 and 2047 shows a combination of existing deficit, growth and reduction in yield associated with climate change. In SR27 we will address this by reducing leakage through mains rehabilitation, non-domestic metering programmes and developing options for influencing customer demand. We estimate that 40% of the relevant investment demands for Supply Demand Balance in SR27, or £75m, is associated with adapting to climate change.

Managing Quantity of Flows – Managing Sewer Flood risk

- SEPA's guidance on Climate Change Allowances for Flood Risk Assessment in Land Use Planning[56] informed future rainfall when designing solutions for problems in our waste water network.
- An uplift to peak rainfall was applied, appropriate for the relevant river basin, between 35% and 48%, based on the CCRA, Met Office Projections and work undertaken with UKWIR to develop the RedUp tool[57] for sewer design for exceedance.
- From this, we ensure that investments we make today are climate resilient and that Scottish Water fulfils requirements under the adopted National Planning Framework 4[58], adopted in 2023.
- Further detailed work is finalising projected perturbations of time series rainfall to the 2080s to inform detailed catchment analysis of hydraulic exceedance for option development.

For a detailed view of the outputs that our customers will benefit from these investment areas, please refer to the Technical Appendices for Water Continuity and Managing Quantity of Flows.

Water Quality – treating deteriorated source water quality

Recognising that the climate change experienced in Scotland will have contributed to the experienced deterioration in our source water quality, it is considered that the current enhancement programme for our water treatment assets is already in part attributed to climate change adaptation. These enhancements are not primarily about reducing future climate change risks[59] but addressing the impacts already experienced. Adapting our water treatment works to ensure they continue to deliver high quality drinking water for customers helps Scottish Water to demonstrate compliance with delivery of objective P3 of the SNAP3.

[54] Climate change approaches in water resources planning: new methods - GOV.UK

[55] Update to figures presented in the Scottish Water Climate Change Adaptation Plan based on UKCP18 climate change projections.

[56] climate-change-allowances-guidance_v6.pdf

[57] Red-Up Tool

[58] National Planning Framework 4 - gov.scot

[59] Assessment of future climate change risks is considered during PIA process but doesn't currently drive the water quality enhancement programme

It is not possible to exactly quantify the climate change adaptation cost of each enhancement. We have reviewed investment decisions and will use the choice to install ceramic membranes as a proxy for climate change adaptation. Ceramic membranes provide two main climate change adaptation advantages compared with alternative clarification and filtration treatment; process robustness to cope with significant water quality events and modularity, allowing for phased investment decisions when current uncertainties become better understood.

Five projects in Table 5 have been reviewed to compare preferred options to install ceramic membrane technology, against alternative treatment solutions. On average, these options were 15% more expensive. It is therefore our estimate that 15% of the water quality enhancement programme (excluding lead) is attributed to adapting to climate change already experienced. This translates to £123m, out of a total investment (including lead) of £856.0m in Water Quality enhancements. For a detailed view of the outputs that our customers will benefit from this investment areas, please refer to the Technical Appendices for Water Quality.

This is inclusive of investments to deliver our Management Approach for Catchment Management. However, these approaches will be insufficient to provide catchments resilient to climate change. Further investments in transformative action in our catchments to deliver multiple benefits for climate resilience, carbon sequestration and biodiversity gains.

Research and Development

During SR27 we shall continue to develop our understanding of the impact of climate change on the quality of our raw water sources, particularly in relation to variations in rainfall patterns, increasingly extreme and frequent weather events and increasing temperatures. We will invest £26m in research and development, with an estimation that 20% of the investment is driven by climate change. For a detailed view of the outputs that our customers will benefit from these investment areas, please refer to the Technical Appendices for Transformation and Innovation.

Key Driver

Customer Experience & Flourishing Scotland

We will refresh our CCRA in SR27 to ensure that our projections, data sets and models reflect the latest projections, science, meteorological information and guidance, and to further develop the tools to support embedding adaptation in asset management. This will ensure the progress made in SR21 continues and SR33 fully reflects climate change demands. We made an allowance for this at the same level as for SR21 (£2.0m).

Water Environment

There is still much uncertainty over the resilience of our waste water treatment works to the impacts of climate change. Continuing from work undertaken in SR21, additional studies are required to understand future investment needs to ensure our works can adequately treat waste water flows to a water environment impacted by climate change. An allowance of £7m has been included.

Retained Investment Risk

Our retained risks identify additional potential operational costs and investment that may arise as the programme and projects develop. They reflect the outcome of the Scottish Water CCRA, but there is uncertainty on the extent of the need in SR27. In the absence of fully quantitative data, expert judgement was used to assess the percentage uplift of identified demand that may be needed as projects are developed to address climate risks (summarised below).

This covers investment areas such as Water Environment, Water Quality, Enabling Growth and AR3. As described in section 4.2.1 these needs will be developed through our SIDM processes and considered through our IPPF and are identified as retained risks in the Risks and Assurance Technical Appendix to the plan.

Water Quality and Water Environment

We expect that the guidance developed to include climate change risks[60] during the Project Investment Appraisal process will result in additional costs to the final solutions delivered. It is hard to quantify what additional costs there might be until the detailed optioneering, and design is undertaken through our SIDM processes, however an indicative figure of 7.5% has been identified. This might allow for increased sizing of tanks, flood protection, coastal defences, or additional treatment stages. This risk allocation equates to £64m for the Water Quality programme, and £42m for the Water Environment Programme across the SR27 period.

Enabling Growth

The SR27 demand is split across transmission (part 3) and treatment (part 4) assets. The investment required to upgrade part 4 assets is mature and no additional climate change adaptation investment is expected. For part 3 assets, there is a potential for a small uplift in demand to cope with future rainfall intensity. This is estimated to be 2% of the investment demand for SR27, or £1m, if Scottish Water chooses to enlarge pipes, or a larger percentage if the choice is made to remove surface water completely from the network.

AR3

For AR3, we expect to progressively increase the resilience of our assets to climate change. Future iterations of our Management Approaches will specifically appraise policies to increase flood protection for assets to maintain current service. In many instances it will not have an impact, and like for like replacement will suffice, however where deterioration may be exacerbated by climate change or if assets are in locations with greater vulnerability to climate change, then further guidance will be developed within SIDM processes to inform choices. As this has not yet been built into our deterioration models, we cannot quantify the cost impact for SR27 and have included an assessment of 0.025% of the total AR3 investment as an indication of the potential additional demand.

Relevant SR27 Outcomes

Updating our CCRA and undertaking water and waste water treatment vulnerability studies will allow us to demonstrate achievement of the Ministerial Objective to ‘identify the expected impacts of climate change on its assets and assess the risk and likelihood’.

The other investments in Asset Resilience will allow Scottish Water to demonstrate that we are fulfilling our Ministerial Objective that we must ‘continue to implement and evolve plans for adaption measures necessary to protect its services’.

Our CCRA identifies drought as the most significant climate change risk for Scottish Water. The SR27 investments proposed will reduce demand for water through leakage reduction, mains renewal, non-domestic smart metering and customer demand management by 88Ml/d, and improve drought resilience in key areas including Edinburgh, Lothian, Tayside and Fife. We will

[60] This is in addition to the climate change impacts, already being addressed in the water quality enhancement programme.

also continue to improve our drought management capability and develop our Strategic Drought Plan.

Our CCRA indicates a current, and increasing deterioration of raw water quality, due to increased temperature and variation in rainfall patterns. Our SR27 investments will improve our capability to treat poorer quality and more variable raw water, ensuring the supply of wholesome water to our customers.

Our current CCRA also highlights the increasing risk of our drainage systems and sewers becoming overloaded from increasingly extreme rainfall, resulting in increased flooding of customers properties. The SR27 investments proposed will ensure that when reducing the risk of, or mitigating the impacts of, sewer flooding to our customers, we are designing solutions that will be resilient to future rainfall patterns.

4.2.4 Service Transformation Investments

Our SR27 Investment

With respect to the CCRA presented in our published Adaptation Plan, transformational activities are required to support long term outcomes across all key risk areas – water resources, water quality, flooding and environmental quality. They reflect that we cannot rely on only operational and asset resilience approaches nor can deliver adaptation alone; we need to do things differently for long term resilience.

Table 10: SR27 investment for Service Transformation

Key CCRA considerations	*Climate driver*	*Risk*	*Impact*
	Increased variability in weather; drier conditions followed by extreme rainfall events	Increased land runoff, erosion and flushing of organic matter and pollutants, impacts quality of source water	Water treatment is more difficult affecting quality and supply of water to customers
	More frequent / extreme rainfall	Drainage systems and sewers become overloaded with storm water and surface water flows entering the network	Increased flooding of customer properties; increased environmental impact
	Drought conditions	Lower river flows and/or reservoir levels affect the ability to abstract from source waters	Local or regional water supply deficits lead to service disruption and loss of supply to customers
	More frequent / extreme rainfall	Increased frequency and magnitude of river and surface water flooding at water treatment sites	Operational impact leading to loss of supply for customers
		Increased frequency and magnitude of river and surface water flooding at waste water sites	Operational impact leading to loss of supply for customers, risk of environmental pollution and increase in repair/refurbishment costs of damaged equipment and structures
Key Driver or Embedded Investment?	Key Driver		
Investments	Pioneer Catchments & Biodiversity: £11m (key driver) Drainage Partnerships and Rainwater Management: £70m (key driver)		
Total Materiality	£81m		

Key Driver

Pioneer Catchments

We are developing pioneer catchments approaches at landscape scale to secure our future customer services. Our catchments are degenerative and will not be able to service our demands for water resources, quality and environmental capacity in a changing climate.

We need transformative action to make our natural landscapes resilient to climate change, ensuring they can continue to provide the natural capital on which we rely. Scottish Water cannot transform catchments alone – many sectors (industry, agriculture, and forestry) impact on water bodies. As such it is critical that all parties identify, contribute to and co-ordinate delivery of effective actions that will support future service.

In catchments with multiple landowners' landscape-scale work is challenging and needs to engage a range of public and private stakeholders to act, underpinned by robust governance, financing (public and private) and effective delivery mechanisms to build confidence and engagement of others.

Under the Public Services Reform initiative, the Environment and Economy Leaders Group (EELG[61]), a partnership of chief executives from a range of public bodies, is aligning policy and action in two pioneer catchments for climate, carbon, nature and societal benefits.

These pioneer catchments aim to deliver:

1. A collectively owned and well governed plan and framework for delivery, supported by policy, regulatory and planning agencies and mechanisms to deliver efficiently.
2. Landscape scale interventions for nature and ecosystem services which deliver water retention during flood events, reduced instances of low flows, stabilised riparian habitats to prevent erosion, improved water quality and environmental capacity and increased biodiversity across the landscape;
3. Greater amenity value for people and sustainable socio-economic benefits.

Scottish Water will work to support this multi-agency action in the two rural Pioneer Catchments identified, the River Dee in Aberdeenshire and the South Esk/Angus Glens. Both are important drinking water catchments under threat from climate change, with significant flooding challenges.

Scottish Water will also promote a third, urban Pioneer Catchment, the River Almond in the central belt, directly related to its challenges around environmental quality, flooding, greening the urban environment and enhancing the amenity and economic value of the catchment.

In SR27 we will aim to invest up to £6.9m to support (with others) the development of this multi-agency approach. We will promote pilot interventions, such as wetland restoration or creation, native woodland restoration or creation, including buffers, floodplain connectivity, riparian corridor restoration, peatland restoration, Sustainable Urban Drainage Solutions (SUDS), rain gardens, bio retention, regenerative agriculture and integrated constructed wetlands. We will monitor the efficacy of these approaches to determine cost-effectiveness compared with hard engineered solutions such as enhanced water treatment processes, artificial flood defenses and storage tanks.

Biodiversity

Climate change, carbon and nature are integrally linked across the 23,000 hectares of water catchments and landholdings we own. In SR21 we established a Biodiversity and Natural Capital Management Approach, baselines and methods to improve biodiversity on operational sites and through a capital programme. "Biodiversity Standard Products" were piloted to support operational and investment teams adopt measures for biodiversity gain.

[61] Scotland's Environment and Economy Leaders' Group - Tackling the climate emergency and sharing our stories - gov.scot

Our 2023 Biodiversity Report[62] outlined the natural capital, carbon and biodiversity baseline of our landholdings and how we are improving it. Restoring catchments through peatland restoration and woodland creation outlined in our Climate Mitigation Technical Appendix not only captures carbon but enhances biodiversity and contributes to Scotland's Biodiversity Strategy to 2045.

For example, our landholdings include the 9,500-hectare Katrine estate which encompasses the whole of the catchment for Glasgow's drinking water supply. This is leased to Forestry and Land Scotland and our investment with them in the 10 year land management plan (covered within the Climate Mitigation Technical Appendix) will see not only significant land carbon improvements, but a 40% increase in the biodiversity status of the landholdings, contribute to the tourism and amenity value of the estate, and make a major contribution to the resilience of water quality under a changing climate.

A further 13,000 hectares of Scottish Water's catchment land is under tenancy or lease for grazing, agriculture and other activities. These lands will be impacted by climate change, elevating the risk to the water draining through the catchments. We will work with NatureScot, tenants and others to develop larger scale land management plans, and support the scoping and delivery of agreed measures to improve biodiversity and secure the long term ability of the landscape to continue to support the rural economy, and become more resilient in terms of water quality and quantity.

In SR27, under the Biodiversity and Natural Capital Management Approach we will continue to meet the biodiversity duty and contribute to Scotland's 2045 Biodiversity goals in ways that also deliver service resilience and carbon benefit. We will invest £5m to:

- improve biodiversity and natural capital assessment and reporting;
- develop biodiversity across operational site and water catchments, including with our farming tenants for development of whole farm plans and delivery of key biodiversity elements (e.g. riparian management; improved upland management etc), and across our capital programme.

Biodiversity gain will be reported in SR27 in terms of "area of land improved for biodiversity", targeting up to 4,500 hectares of land being positively managed for nature and drawing from several areas including:

- Peatland and woodland programmes outlined in the Climate Mitigation Technical Appendix;
- Wider landholdings (e.g. embedding nature and climate sensitive farming on our catchments), where we have been working with NatureScot to pilot land categorisation as contributing to Scotland's Biodiversity Strategy and "Nature 30" goals;
- Operational sites where we are applying biodiversity gain through site management, reinstatement and expansion of "biodiversity standard products"; and
- Investment programme through areas of nature-based measures to meet service outcomes (e.g. blue-green sustainable drainage solutions).

Drainage Partnerships and Rainwater Management

As part of the approach to address chronic issues, begin building resilience and ensure we protect against the threat of climate change, the SR27 investment plan allows for an expansion and enhancement of partnership working with local authorities and local communities. This will allow

[62] 211223Biodiversityreport23FINAL.pdf

us to seize opportunities as they arise to remove rainwater from our networks and recover capacity and resilience, including through property level rainwater management investments. The total SR27 investment demand of £70m is determined to be fully attributable to the need to adapt to climate change and the increased intensity rainfall that it brings.

Relevant SR27 Outcomes

Our investments in Pioneer Catchments will allow Scottish Water to demonstrate to the Scottish Government that we are meeting our legislative duty to contribute to the delivery of SNAP3, through collaborative adaptation action with other public sector bodies. It may also deliver tangible benefits to reduce the risk of deteriorating raw water quality, flood risk to our assets and increased environmental impact from waste water discharges, as identified in our CCRA.

Our investments in Biodiversity Gain will allow Scottish Water to demonstrate to the Scottish Government that we are meeting our legislatives duties under the the Nature Conservation (Scotland) Act 2004 and Wildlife and Natural environment (Scotland) Act 2011.

The investments in Drainage Partnerships will allow Scottish Water to demonstrate that we are fulfilling our Ministerial Objective that we must 'continue to implement and evolve plans for adaption measures necessary to protect its services'. Our current CCRA identifies the increasing risk of our drainage systems and sewers becoming overloaded from increasingly extreme rainfall, resulting in increased flooding of customers properties. The SR27 investments proposed will result in rainwater being removed from our sewers and thus reducing the risk of sewers becoming overloaded and flooding our customers.

4.2.5 Summary of investments

A summary of our proposed investment on climate change adaptation for SR27 is outlined in

Table 11 below. In some areas climate change is embedded within the identified demand, and here we present the total demand, and the proportion estimated to be driven by or supporting climate resilience. For example, standby generators to support current operational need will also deliver climate resilience; 40% of the need for supply demand balance investment has been attributed to climate change uplifts, whilst the need for an updated climate risk assessment is wholly climate driven.

The table also presents "retained risks". These are potential demand driven by climate change but where there is insufficient evidence to include in the SR27 business plan at this time. These investment risks will be referenced in the Assurance Technical Appendix where we will also highlight the potential operational costs from climate change adaptation.

Table 11: SR27 Investment Summary for Climate Change Adaptation, including retained risks

Investment Category	Total SR27 Investment (£m)	Investment attributed to Climate Change Adaptation (£m)
SR27 Investments		
Standby Generators (nr)	31	6
Water Continuity (aligned to Supply Demand Balance)	187	75
Managing Sewer Flood Risk	298	45
Water quality	856	123

Investment Category	Total SR27 Investment (£m)	Investment attributed to Climate Change Adaptation (£m)
Climate Change Risk Assessment (Studies)	2.0	2.0
Waste water Treatment Studies	54	7
Research and Innovation	26	5
Pioneer Catchments and Biodiversity	11	11
Drainage Partnerships and Rainwater Management	70	70
Totals		344
SR27 – Retained investment risks		
ARRR	5128	**1**
Water Environment	559	42
Water Quality	856	64
Enabling Growth	69	1
Totals		109

4.3 Future Investment Requirements

In our Climate Change Adaptation Plan, we estimate that the additional cumulative cost to maintain current service levels in a changing climate to 2050, will be between £2bn and £5bn. Based on the prioritised investment in the SR27 business plan and expectations that climate change impacts will increase, we anticipate that investment in climate change adaptation will increase in each subsequent investment plan to reach this £2bn - £5bn range.

From SR33 onwards, we expect that all service areas will have climate change adaptation embedded in their investment demands. This will be achieved using climate change risk assessments to inform all investment decision making.

5 Interdependencies

5.1 Alignment with other Technical Appendices

Our approach to climate change adaptation in SR27 is aligned with our Climate Change Adaptation Plan, published in March 2024, our Long-Term Strategy and the Scottish Government's third National Adaptation Plan (SNAP3). As climate change impacts all areas of our organisation it cannot be viewed in isolation from the other investment demands detailed in this business plan. This document should therefore be read in conjunction with our Long-Term Strategy, overall Business Plan, Data Tables and Commentary, and the following Technical Appendices:

- **Water Continuity:** Climate change is embedded in our hydrological models such that all investments associated with reducing our supply demand deficit are taking account of our future climate.
- **Managing Quantity of Flows:** Climate change is embedded in our planning approach to design solutions taking account of future rainfall patterns.
- **AR3:** As we work to repair, refurbish and replace our ageing asset base we will adapt our Management Approaches to ensure that we progressively adapt our assets to a changing climate.
- **Water Environment:** When designing solutions to today's Water Environment problems, we will avoid 'locking in' investment decisions based on today's climate and technologies.
- **Water Quality:** When designing solutions to today's Water Quality problems, we will avoid 'locking in' investment decisions based on today's climate and technologies.
- **Enabling Growth:** When designing solutions to enable growth, we will avoid 'locking in' investment decisions based on today's climate and technologies.
- **Assurance:** in service areas where there is less certainty or confidence in the extent of climate driven investment, potential costs associated with climate change are not included in current demand but identified as a risk.
- **Climate Change Mitigation:** key investment areas associated with carbon capture will also support climate resilience, notably the commitment to restore between 500 and 1,000 hectares of peatland across our water catchments and to create up to 4,000 hectares of new woodland in our catchments (including at Loch Katrine).
- **Transformation and Innovation:** investment to improve our understanding of the impact of climate change on the quality of our raw water sources is detailed in our Transformation and Innovation technical appendix.

6 Conclusion

Climate change adaptation is required across all service areas. SR27 adaptation investment is largely integrated within other Technical Appendices of this SR27 Final Business Plan, such as Water Continuity, Managing Quantity of Flows and Water Quality. This Climate Change Adaptation Technical Appendix therefore reflects the planned investment and outcomes presented under the Working Reference Scenario (CPI+3.3%) as selected by these service areas.

This Technical Appendix is aligned to meeting the Draft Ministerial Objectives 2027-33 for climate change adaptation (*Table 1*) and contributing to the delivery of our Long-Term Strategy to 2050. This is based around our analysis of climate risk using the existing Climate Change Committee recommendations to plan for 2-4 degrees Celsius of warming by the end of the century.

The outcomes from COP30 suggest that without urgent action and based on current policies we will see 2.8 degrees Celsius of warming this century. Noting that this continues to rely on delivery of existing global policy commitments, it remains within range of temperature rise in our climate risk assessments that have informed this plan. We will be updating our Climate Risk Assessment with the latest scenarios and projections in early SR27 to inform future investment planning.

Across all service areas, adaptation to climate change in SR27 will require £344m of investment to deliver the following:

Operational Resilience

To sustain or recover services and assets during events which are projected to become more frequent and intense, we will:

- Provide additional standby generators to provide resilience to water supply assets, including during climate change driven events, from power outages;
- Continue to respond to increasingly frequent and extreme weather events to maintain customer service.

Asset resilience

To make our infrastructure more resilient to climate change, we will:

- Improve our Supply Demand Balance, taking account of climate change impacts to water availability;
- Enhance our water treatment capability to cope with increasingly variable source water quality;
- Maintain Customer Flooding, taking account of climate change impacts on rainfall intensity;
- Undertake research to better understand the resilience of our waste water treatment works to climate change risks and the impact of climate change on the quality of our raw water sources; and
- Update our CCRA with the latest climate projections and service impacts.

Service Transformation

We cannot rely on operational and asset resilience alone and need to develop transformative ways of working as we adapt to climate change. We will

- Collaborate in drainage partnerships with local authorities to efficiently deliver blue-green infrastructure to reduce high priority surface water flood risk;
- Transform three pioneer catchments to become more resilient to climate change through multi-disciplinary partnerships; and

- Restore peatland in our own and third-party catchments, increase woodland and develop farmland management plans to ensure regenerative, biodiverse catchments to support our water quality and resources.

There are wider benefits from the climate adaptation approach, particularly with respect to landscape, natural capital and biodiversity benefits from the Pioneer Catchment, peatland and blue-green infrastructure work. The benefits from this in terms of carbon capture and hectarage of land improved for nature will contribute directly to SR27 regulatory reporting outcomes, and to Scottish Water's land carbon inventory.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Climate Change Mitigation

February 2026

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1 Executive Summary

1.1 Carbon, Climate Change and Multiple Benefits

Climate change is an existential threat to Scottish Water's operations and ability to deliver services for our customers. We therefore have a responsibility to help Scotland mitigate its impact. This includes reducing the contribution all our operational and capital activities make to climate change by investing in technologies and processes that sustainably lower carbon and maximise the positive contribution we can make.

We have taken decisions in the final business plan which balance customer affordability and prioritise activities that improve service resilience and exploit innovation and partnership opportunities in SR27 and beyond so that we can maintain momentum for our net zero ambition by 2040The twin crises of climate change and biodiversity and their impact on the catchments and water bodies we rely on for our service is the single biggest challenge we face to our ability to provide sufficient high quality drinking water and protect customers from flooding in future. Additionally, energy and carbon cost pressures, represented through national and international measures such as carbon border adjustment taxes[1], are expected to increasingly penalise organisations and economies that do not decarbonise.

Delivering Net Zero Emissions is not only about reducing emissions and minimising future carbon and energy costs. The measures we take to support Scottish Water's net zero emissions pathway will deliver multiple benefits to customers and Scotland's wider economic, nature and wellbeing goals.

We will support energy security through renewables on our landholdings and invest in peatland restoration and woodland creation to restore nature, capture carbon and improve the resilience of our catchments to climate change. This will also increase their social value for tourism and wellbeing.

Research and innovation will help us find cost-effective means to reduce wastewater process emissions and operate our assets more efficiently, and we will work with delivery partners to decarbonise our capital investment programme and reduce our exposure to increased costs for high carbon materials in future.

This Technical Appendix sets out how Scottish Water will make progress in SR27 towards meeting its goals and the Draft Ministerial Objective 2027-33 for Net Zero Emissions by 2040. This goal is extremely challenging and carries significant risk. We will need to address this risk with further investment in SR33 and SR39, recognising the importance of affordability and overall bill impacts. Despite these challenges, Net Zero by 2040 could be achievable with further measures post-SR27 and remains the right target for us to pursue with maintained momentum.

1.2 Net Zero Emissions by 2040 Remains our Boldest Challenge

Scottish Water has statutory duties to support both the Scottish Government's Climate Change Plan[2] to deliver net zero emissions, and Scotland's National Adaptation Plan[3]. This Technical Appendix focuses on mitigating the emissions that cause climate change.

[1] Factsheet: Carbon border adjustment mechanism - GOV.UK
[2] Climate change - gov.scot (consultation draft issued 6 Nov 2025: Draft Climate Change Plan - Scottish Government consultations - Citizen Space)
[3] Climate change: Scottish National Adaptation Plan 2024-2029 - gov.scot

Global heating, driven by greenhouse gas (GHG) emissions, leads to climate change with particular implications for the water environment. It will significantly impact the ability of nature and water catchments to provide the water and environmental resources we rely on. Flooding, drought and water quality risks will increase, impacting our assets and their ability to perform, and disrupting services to our customers. The Scottish Government's declaration of a climate emergency in 2019 focussed attention on net zero emissions with a ministerial objective in place for Scottish Water since SR21 and Scottish Water needs to play its part in both mitigating and adapting to climate change.

Our proposed climate change investment in the SR27 period allows us to meet relevant statutory obligations and the Draft Ministerial Objectives 2027-33 (Table 1).

Table 1: Ministerial Objectives relevant to Climate Change

Climate Change Related Ministerial Objectives	
Climate Change Adaptation	Identify the expected impacts of climate change on its assets and assess the risk and likelihood;
	Continue to implement and evolve plans for adaption measures necessary to protect its services;
Climate Change Mitigation	Make substantive progress in the 2027-33 period towards climate change targets[4], and ensure it is on an appropriate trajectory to meet or exceed those targets.

Scope

Scottish Water's net zero goal covers operational, investment and land management activities:

- Operational - delivering services to customers relies on a large asset base with thousands of treatment works, pumping stations and over 100,000 kilometres of pipes and sewers requiring a lot of energy to treat and pump water and waste water. Waste water treatment also gives rise to methane and nitrous oxide emissions, potent GHGs that are hard to abate;
- Investment - we invest over £1bn[5] annually to maintain and improve our assets, with associated emissions from our supply chain; and
- Land Management - we own over 23,000 hectares of land across water catchments, comprising areas that are losing carbon, for example poor quality peatland, and areas that are capturing carbon such as woodland.

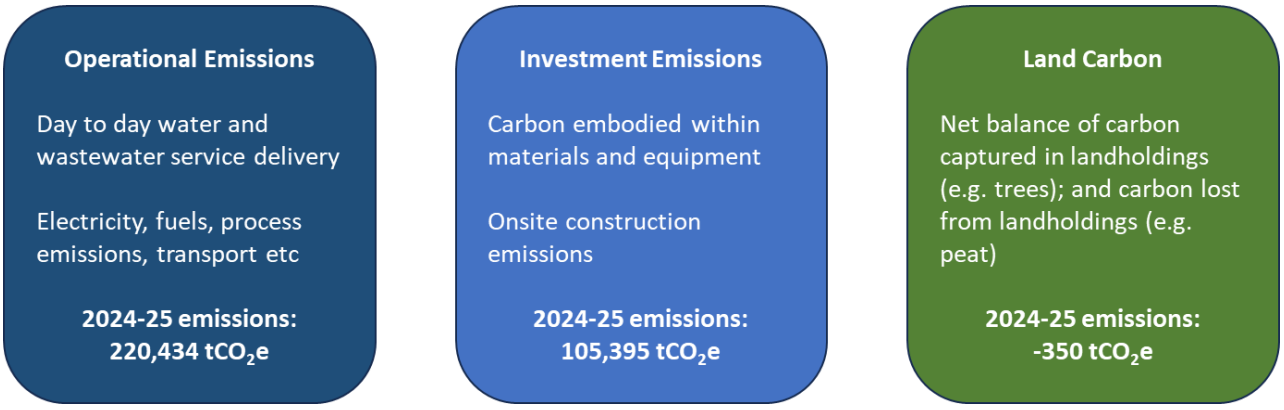

Figure 1: Scope of emissions (as submitted in Annual Return 2025)

Net emissions is the sum of operational and investment emissions minus carbon captured on our landholdings. Net Zero is achieved when residual emissions we cannot eliminate are balanced

[4] Climate change targets are defined in the SR21 Ministerial Objectives as "achieve net zero emissions by 2040" and "increase the renewable electricity generated or hosted on its land and assets to 300% of its annual usage by 2030"
[5] Annual return 23/24

or exceeded by carbon capture. Operational emissions have more than halved since our baseline year in 2006-7, through greening of the electricity grid, energy efficiency and renewables. Investment emissions are based on carbon assessments in our SR21 programme and are expected to rise as we go into SR27 because of improved accounting and an increase in the scale of the programme. Land carbon assessments show we are likely to be a weak carbon sink, that we sequestrate significant quantities in existing woodland, but that we lose an equivalent amount of carbon in degraded peatland.

Recent UK and Scottish Policy Development

In 2025 the water sector was identified for action in the UK Climate Change Committee's (CCC) advice to the UK government on the UK's Seventh Carbon budget[6] to support net zero. Specifically, it recommended the sector invests in monitoring, research and innovation to deal with wastewater processes emissions, noting these would require ~£100m capital investment per annum by 2040. More widely the CCC emphasised the need for the UK to significantly increase delivery of peatland restoration and woodland creation to support carbon capture.

The CCC published advice for the Scottish Government to inform Scotland's carbon budgets on 21 May 2025, mirroring the key messages for the UK Seventh Carbon Budget, and recommending further need and opportunity for Scotland to go further on land management, peatland forestry. This informed Scotland's Draft Climate Change Plan[7], published for consultation on 6 November 2025, which places a particular focus on the economic benefits of pursuing net zero emissions and the importance of investment in nature to support both emissions and the economy.

1.3 Our Climate Change Mitigation Strategy

Net zero is challenging with extensive risks and dependencies. We rely on the continued decarbonisation of grid electricity, development of new technologies to abate process emissions and the development and adoption of low carbon materials in the supply chain to support net zero. Additionally, there are uncertainties associated with the performance of landholdings to capture carbon. We are the only water company to include investment and land emissions within the scope of net zero, representing a leading ambition in the UK Water sector and the Scottish Public sector.

Our strategy is to achieve net zero emissions across operational activities, investment and land management by 2040. Our 2020 Net Zero Emissions Routemap[8] (NZER) explained how we will:

- **Reduce consumption of grid electricity and fuels** through energy efficiency, leakage management, renewable generation and lower carbon energy products;
- **Eliminate or minimise** waste water process emissions by developing and adopting new technologies;
- **Reduce the distance** we travel and transition to a lower carbon fleet;
- **Embrace low carbon** designs, materials and techniques in the assets we build; and
- **Store emissions** that cannot be avoided by improving our peatland, creating woodland and managing our land to sequestrate carbon.

We have made strong progress delivering these activities in SR21, significantly increasing renewables hosted on our sites, delivering energy efficiency (particularly for waste water), developing pathways to reduce emissions from investment, restoring significant areas of peatland and creating woodland. Progress is reported annually in our NZER[9] and work delivered in SR21

[6] The Seventh Carbon Budget
[7] scotlands-draft-climate-change-plan-20262040.pdf
[8] www.scottishwaternetzero.co.uk
[9] Annual Update - Net Zero

has informed our approach to SR27, which will focus primarily on carbon capture through sequestration in our landholdings and making progress on waste water process emissions.

The increased scale of the investment programme under a CPI+3.3% scenario has elevated our projections for emissions associated with investment above what was included in our original NZER. There are further increases in risk around land carbon compared with our initial NZER understanding, but land carbon sequestration is projected to increase significantly in the 2040s as trees mature and peatland fully recovers.

1.4 Pathway to Net Zero Emissions

In SR27 Scottish Water will invest in measures to meet statutory obligations to support the Scottish Government's climate change plans and strategies and make progress towards the Ministerial Objective to meet net zero by 2040, informed by the pathway set out in our NZER[10].

Achieving net zero emissions is extremely challenging. Compared with the Draft Business Plan the measures in this technical appendix as part of a CPI+3.3% investment plan suggest a lower confidence that we will meet Net Zero Emissions by 2040, with increased risk. We will need further measures in SR33 and SR39, particularly around wastewater process emissions and investment emissions to maintain a focus on the 2040 objective.

Net Zero operational emissions is projected in 2038. This is later than suggested in the Draft Business Plan owing to reduced investment in energy efficiency, onsite renewables, and process emissions, as well as reduced expectations around Fleet. This means in the near term (aside from hosted wind development) we will rely more on the greening of the electricity grid to support emission reduction from electricity use.

1.4.1 Operational Emissions and Carbon Sequestration Investment

In addition to assumptions around the greening of the grid, our operational emission pathway is based on several key investment areas that we are classing as:

- "*Climate Change Mitigation Investment*" – investment driven by this Technical Appendix specifically to support Net Zero (and other benefits);
- "*Enabling Investment*" – investment driven by other needs in SR27 that also deliver a key carbon benefit.

1.5 Climate Change Mitigation Investment

Through this Technical Appendix in SR27 we will invest in Process Emissions and Land Carbon Sequestration:

Table 2: Climate Change Mitigation Investments

Investment Category	Investment Summary	Proposed investment (£m 24/25)	Projected Benefit
Enhancement	Process Emissions	15	2,000 tCO_2e reduction by 2040

[10] ww.scottishwaternetzero.co.uk

Investment Category	Investment Summary	Proposed investment (£m 24/25)	Projected Benefit
	Implement monitoring, real time control and optimise existing waste water systems to reduce emissions. Invest in research and piloting of new technologies to capture methane and ammonia and to limit process emission production and release.		
Enhancement	Increase Carbon Sequestration Restore of 500-1000 hectares of actively eroding peatland; further measures to secure peatland recovery across wider estate; continued management and maintenance of existing peatland. Create up to 1,500 hectares of new woodland through active planting and natural regeneration; continued management and maintenance of existing woodland, with around.	29	500-1,000 Ha of peatland restoration Over 4,000 Ha of woodland creation by 2040 Montane and Moorland management for carbon (where trees or peat not suitable) Support net carbon capture of ~64,000 tCO_2e by 2040
Planned Maintenance	Fleet Decarbonisation Trial emerging alternative fuel vehicles and provision of refuelling infrastructure.	16	Support net zero travel and transport by 2040

We need to make progress on process emissions in SR27 as these will be the dominant form of operational emissions by 2040. They are difficult to manage and require monitoring and extensive research and innovation as well as pilot work with new technologies to help inform SR233 and SR39.

Investing in nature and landholdings will make a direct contribution to the ability of our water catchments to be more resilient to climate change. There is also a direct benefit to Scotland's Biodiversity Strategy.

Enabling Investment
In addition to direct investment through this Technical Appendix, our pathway is based on the expectation that SR27 and future periods support the following key outcomes:

Table 3: Enabling Investment in SR27 and future periods

Activity Area	Summary	Assumed Benefit
Bioresources and PFI Return	Advanced digestion and energy recovery at Allanfearn Waste water Treatment Works. Replace the sludge drying facilities at Daldowie Sludge Treatment Centre with an advanced	Up to 27,000 tCO2e benefit depending on option selected (cessation of drying, and

Activity Area	Summary	Assumed Benefit
	anaerobic digestion process with energy/resource recovery	burning sludge, with further energy recovery)
Property and Estates (AR3)	Adopt zero emission systems as heating, ventilation, and air conditioning (HVAC) and other building systems require renewal, with a focus on 2038 statutory deadlines for zero emission public buildings. Replace Juniper House laboratory, reducing gas and electricity demands	Zero emission public buildings post 2038
Reduce Water Demand	• Leakage enhancement 20 megalitres/day • Mains Renewal 3 megalitres/day • Non-domestic smart metering (improved leakage targeting) 25 megalitres / day in SR27, 15 in SR33[11] • Reduce non-domestic continuous use (through smart metering) 32 megalitres / day • General non-domestic customer demand from smart metering 8 megalitres / day	88 megalitres / day reduced demand 12.8 GWh energy reduction in water service in SR27
Energy Efficiency and Onsite Renewables	• Whilst no enhancement investment is allocated, energy efficiency and renewables offer wider benefits in terms of reduced energy costs and increased energy security. Within SR27 we will seek spend to save opportunities to improve energy and carbon.	
Improving Carbon Decision Tools	• Review and improve data, GIS, decision tools and carbon assessment across investment, operational and land based emissions (covered under ringfenced T&I innovation funding)	Enhanced capabilities to manage and report emissions across all business activities and support carbon and cost-effective decisions

Hosted Wind

In addition to the above, and out with the regulatory business plan, we will continue to maximise the amount of third-party renewable electricity generation hosted on our estate. Working in partnership with developers, the carbon benefits arising from the export of renewable generation will vest with Scottish Water. This will also support Scotland's decarbonisation and meet our SR21 Ministerial Objective to produce or host three times the amount of electricity we consume[12] and a further 650GWh is expected to be delivered by 2035.

1.6 Changes from Draft Business Plan

Since the Draft Business Plan Scottish Water have made several changes that affect the expected carbon profile of Scottish Water.

[11] Leakage is based on an in-year figure

[12] The Government's Programme for Scotland 2019-20

Energy
We have removed SR27 investment from energy efficiency and renewables. These offer potential wider benefits in terms of energy security and cost savings, and we will seek to progress these on a "spend to save" basis where it supports the reduction in operational costs. This will impact our operational emissions in the medium term – they will remain higher and push back the scope for operational net zero to the late 2030s. The longer term impact is dependent on whether the grid greens as projected.

Process Emissions
We have reduced the financing for the innovation pathways for process emissions. We will continue to work in partnership with the UK water sector and research providers to deliver collaborative research into process emission technologies and pathways. We have removed activities from the methane pathway and will seek to deliver benefits on methane where possible through continued work on the bioresources strategy.

We will instead focus efforts on the Nitrous Oxide pathway through site monitoring and control systems across 25 sites to optimise treatment and reduce emissions as well as piloting new technologies. This will help us to identify and plan interventions in SR33 and SR39. We anticipate this will deliver up to 2,000 tonnes savings by 2040, but more importantly guide future action and investment.

Fleet
Funding has been allocated to support the piloting and potential adoption of new low emission vehicles, noting we are dependent on innovation and technology development to provide suitable vehicles to replace our larger vans and HGV fleet. In addition, we will explore further stores of low carbon fuels such as Hydrotreated Vegetable Oil and progress the deployment of additional EV charging points across our assets.

Land Sequestration
There is an increased allocation for sequestration of carbon in our landholdings, as we now have a greater understanding of some of the wider activities, we will need to pursue to support land management.

- Peatland

Our overall goal remains the restoration to near natural of all Scottish Water peatland by 2040. Work with the James Hutton Institute to update our land carbon inventory, along with the outcomes of more extensive surveys and observations of recent restoration projects, has further informed what we will need to do in SR27.

We remain focussed, as per the draft business plan, on 500-1000 hectares of peatland restoration in SR27. This number focuses on the area of actual restoration – physical reprofiling, revegetation and rewetting of landscapes. Surveys show that these areas may be a relatively small part of a wider peatland that is also below the required quality.

Restoring peatland to near natural can take decades for full ecosystem restoration, but the carbon benefits can be realised more quickly as the water table is restored, in around 10 - 15 years[13] and requires wider land management to protect the areas of restoration, particularly in areas where there is grazing. We expect to invest further in measures to protect recovering peatland from further erosion and physical impact from sheep, deer and others. Measures may include providing alternative cattle waterings, stock fences, deer management, or wider habitat

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Evaluating the Effectiveness of Forest-to-Bog Restoration on Carbon Sequestration, Water Chemistry, and Biodiversity in Irish and British Peatlands - Fundira - 2025 - WIREs Climate Change - Wiley Online Library

management stabilise the peatland and secure recovery for both water quality and carbon. Funding associated with these activities is now included in SR27 requirements.

More extensive survey work will help us identify and plan these measures in SR27 for the areas we are actively restoring and for wider areas where there is a risk of degradation.

- Woodland

There is more uncertainty around the creation of woodland. This is principally a consequence of revised profiles for natural woodland regeneration at Loch Katrine. Revised forecasts from Forestry and Land Scotland show areas of this maturing in 2033-4 and 2034-5 rather than during SR27. However, the landscape scale work to establish natural regeneration is still required now and in SR27. In addition, there are some more conservative estimates of the area of woodland creation we may achieve in the Angus Glens, pending further environmental assessment and work to develop approaches and species assemblages that support water resource recovery. Woodland creation in this area will also need to form part of a wider landscape regeneration approach to support long term resilience in this water catchment and funding associated with these wider activities is now included in SR27 requirements.

We have therefore reduced the SR27 hectarage output (which reflects planted areas and naturally regenerating areas *that are confidently expected* to reach the required height by 2033), noting that significant further areas are expected to mature in 2034 and 2035 and that the longer term outcome of over 4,000 hectares of new woodland by 2040 is not affected.

Decision Support Tools

During SR21 Scottish Water invested to develop methods and approaches to assess carbon in operational, investment and land management emissions. These have enabled us to improve our understanding of where carbon is and the steps we might take. SR27 will see extensive scrutiny and reporting across all areas of carbon. We need to review and improve our tools with the latest science, policy and accounting methods, new carbon intelligence, market intelligence and data from our operations and landholdings. In particularly we need to integrate carbon, climate change and nature more fully into Scottish Water systems and processes, notably GIS and asset management systems and processes.

1.6.1 Investment Emissions

No additional investment is identified for embodied emissions in SR27.

The cost of decarbonising investment needs to be considered in the context of decarbonising the economy. The UK Climate Change Committee estimates the cost of net zero at ~0.2% per annum of GDP for the Seventh Carbon Budget[14] and global estimates of up to 3% GDP by 2050 have been suggested by others[15].

It is important to note that this is not an added cost to adopt low carbon materials. Mechanisms such as the EU and UK carbon border taxes[16], along with global measures will increasingly penalise high carbon products, incentivising development of low carbon alternatives. The key materials in our capital programme are directly targeted by these measures.

We expect the cost of not decarbonising will be reflected in base programme costs, with high carbon materials increasingly costly in future. Scottish Water's pathway targets adoption of low carbon products as they become cost effective. As such, we have not made an additional

[14] The Seventh Carbon Budget - Climate Change Committee
[15] the-net-zero-transition-what-it-would-cost-and-what-it-could-bring-final.pdf
[16] Draft legislation: carbon border adjustment mechanism - GOV.UK

allowance in the programme for decarbonising but expect that a focus on driving action within existing strategies and procurement frameworks will prove to be cost effective.

We will work with our supply chain to make choices that reduce the carbon intensity of our programme and avoid exposure to future carbon costs. We will:

- Reduce annual carbon in our investments through the carbon reduction hierarchy set in our PAS 2080:2023[17] accreditation, which will be monitored and incentivised in the SR27 Enterprise Model, adopting the following key steps:
  - **Avoid:** evaluating the basic need of the development by exploring alternative means for satisfying the need without a new construction or through blue-green or Nature based Solutions (NbS) or reusing and repurposing existing assets;
  - **Switch:** assess alternative solutions that would reduce whole life carbon emissions through initiatives such as alternative scope and design, alternative low carbon materials and technologies; and
  - **Improve**: identify and adopt solutions, materials and techniques that improve the use of resources and design life of assets, including applying circular economy principles, and low carbon construction techniques.

- This will be supported by investment carbon decision making and leadership where we will:
  - Continue to embed integrated carbon tracking systems within our procurement and costing processes such as BES (Benchmark Estimating Software);
  - Continue development and implementation of organisation-wide carbon literacy training programmes; and
  - Put in place a carbon procurement team to drive low carbon frameworks and specifications and Environmental Product Declaration (EPD) verification protocols.

We are already making progress in delivering this and have recently developed new frameworks for the supply of low carbon materials. One of the biggest sources of emissions in our capital programme is concrete and we expect to purchase almost 20,000 cubic metres of low carbon concrete over the next five years - around 30 per cent of our current annual concrete usage.

[17] PAS 2080:2023 Carbon Management in Infrastructure | BSI

2 Background

2.1 Scope of Net Zero

Greenhouse gases (GHG) is the collective term for a range of gases that drive global heating, including key emissions relevant to the water sector: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Further trace gases include refrigerants, flame retardants and insulating materials that are also reported by the water sector. Each gas has a different "global warming potential" – for example nitrous oxide has almost 300 times the global warming potential of carbon dioxide. This means that although we emit far more carbon dioxide, relatively small amounts of nitrous oxide from waste water processes can have a big impact. For reporting purposes carbon dioxide is the reference gas and emissions are reported as tonnes of carbon dioxide equivalents (tCO_2e).

The scope of Scottish Water's emissions is set out in our NZER and covers:

- **Operational emissions**: emissions associated with the day-to-day delivery of services through operating assets, waste water process emissions, travel and fuels;
- **Investment emissions:** the emissions associated with maintaining and improving assets, including the carbon embodied within the materials we use; and
- **Land Carbon:** losses or gains of carbon across our landholdings.

Net Zero Emissions is achieved when the balance of residual operational and investment emissions is matched or exceeded by the emissions captured by our landholdings (Figure 2).

Figure 2: Our net zero definition

2.1.1 Operational Emissions

Our annual operational emissions are calculated using the UK Water Industry Research (UKWIR) carbon accounting workbook[18] and are independently verified. The UKWIR workbook established the reporting boundary for the sector in terms of Scope 1, 2 and 3 emissions:

- **Scope 1:** Direct emissions - onsite combustion of fossil fuels; water, wastewater and sludge process emissions; emissions from vehicles owned or leased by Scottish Water and refrigerants
- **Scope 2:** Indirect emissions - use of grid electricity
- **Scope 3:** Indirect emissions - business travel by public transport and private vehicles; outsourced activities including sites operated by PFI companies.

Scottish Water has reported operational emissions annually since its baseline year 2006-7, where it reported 470,000 tCO_2e per annum. By 2024-25 operational emissions had fallen to 220,434 tCO_2e through the reduced carbon intensity of grid electricity (greening of the grid), along with energy efficiency and renewables projects delivered in SR10 - SR21. A breakdown of the current emissions by type is shown below in Figure 3 and further information can be found in the NZER[19],

[18] www.ukwir.org
[19] Annual Update - Net Zero

and Scottish Water's 2024-25 Annual Report[20]. Earlier footprint reports can be viewed in previous Sustainability Reports[21].

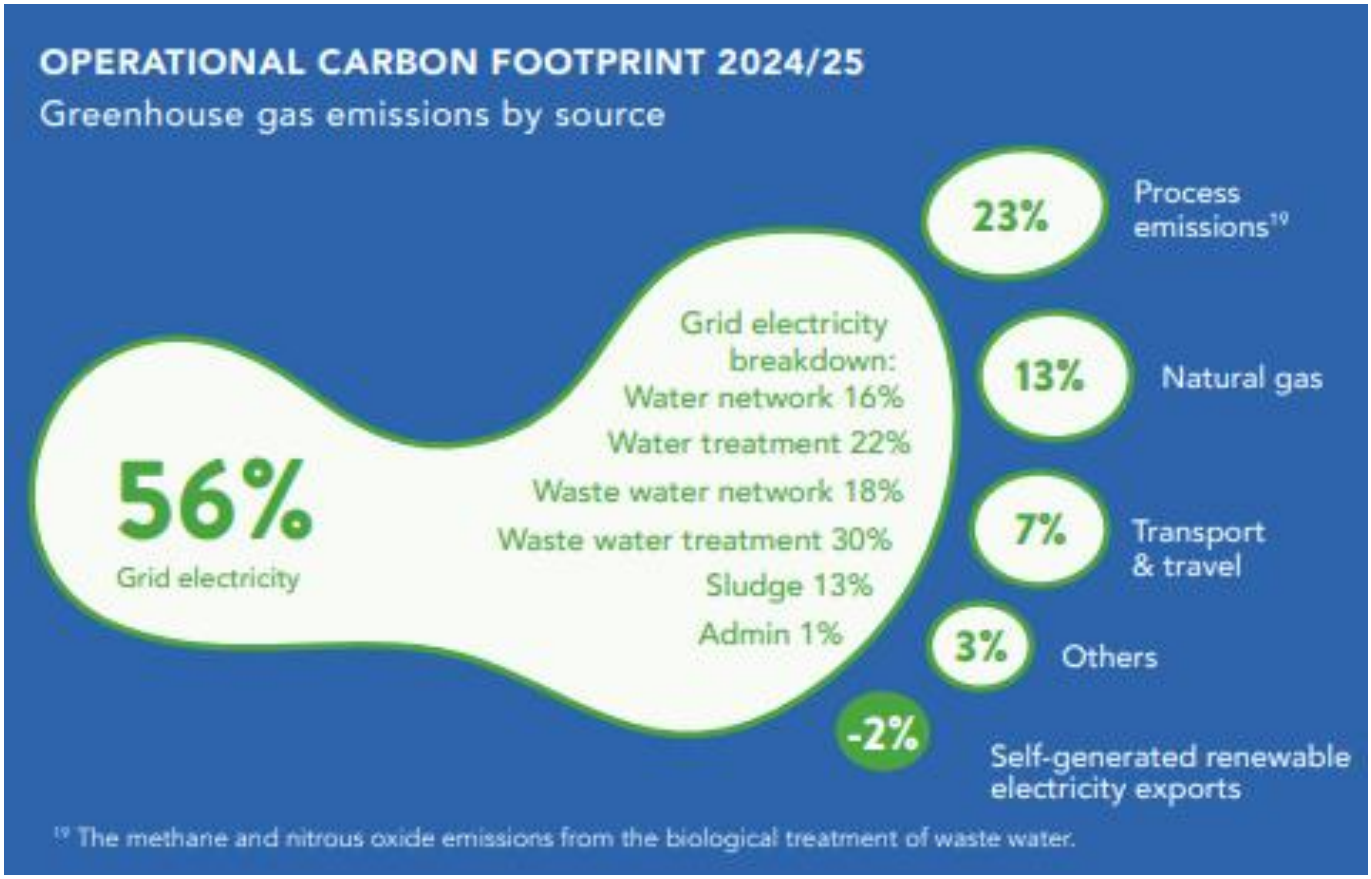

Figure 3: Breakdown by type of Scottish Water's Operational Carbon Footprint 2024/25 (220,434 tCO2e)

Electricity remains our principal source of operational emissions. Grid decarbonisation is progressing, albeit slowly, with current UK projections suggesting it will be mid-late 2030s before the carbon intensity of grid electricity reduces to ~0.015 tonnes CO_2e / GWh[22].

Process emissions arise from the breakdown processes to meet ammonia and biochemical oxygen demand (BOD) standards, which liberate nitrous oxide (N_2O) and methane (CH_4) respectively and make almost a quarter of our operational emissions. Natural gas emissions comprise 12% of Scottish Water's footprint, dominated by natural gas in sludge processes, notably the PFI facility at Daldowie.

Process emissions are a feature of the UK Climate Change Committee's (CCC) advice to the UK government for the Seventh Carbon Budget[23] to meet net zero. It notes that emissions from the treatment of wastewater and sludge are the most problematic for the sector with significant uncertainties and a need for new technologies to be developed. The CCC sets out the following water sector recommendations to the UK Government:

- Advanced anaerobic digestion is rolled out to all plants by 2030. Membrane aerated biofilm reactors are rolled out from 2030 to 10% of sites by 2045;
- Enhanced monitoring, real-time control and Digital Twins reduce process emissions through optimisation along with biomethane gas, covering and containment are rolled out from 2025 to 70% of sites.

[20] SCW2799-Annual-Report-2025_Interactive-FULL-V12-NOT-Signed-AG.pdf
[21] Energy and Sustainability - Scottish Water
[22] Valuation of energy use and greenhouse gas: background documentation
[23] The Seventh Carbon Budget

These recommendations informed our pathway to net zero and proposals for SR27, and in May 2025 the CCC published advice[24] to the Scottish Government, noting in particular the importance of land and process emissions for the development of the Scottish emissions pathway and updated Climate Change Plan, which the Scottish Government has recently published for consultation[25].

2.1.2 Investment Emissions

Investment emissions are associated with materials and activities to maintain or enhance our assets. Technically such emissions are "owned" by the supply chains and industries that produce them, but as Scottish Water has a significant annual investment programme, and the opportunity to influence the investment choices, options and materials, we include them within our net zero emissions goal. The boundary of investment emissions is set out in sectoral guidance through UK Water Industry research[26] and described in our NZER (Figure 4).

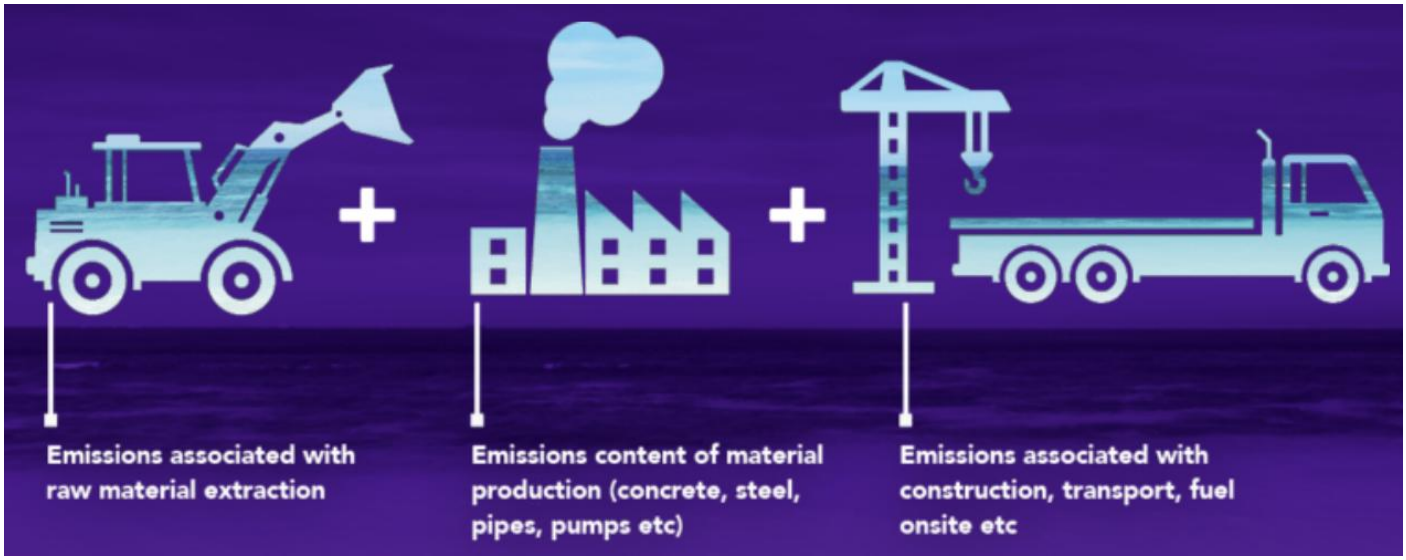

Figure 4: Scottish Water Investment Emissions

Data to support assessment and management of investment emissions is drawn from standard sources for materials[27], and from our supply chain partners. These are integrated into our investment cost and carbon databases that allow us to assess and report carbon associated with different projects in the delivery programme. Emissions are reported in absolute terms for projects and aggregated as the emissions per unit of spend across the programme.

When the NZER was published in 2020 we estimated 200-300 tonnes CO_2e were emitted for every £1m invested. Since then, data improvements and increasing adoption of lower carbon materials and techniques mean in 2024-25 we estimated 90 tCO_2e per £1m, or 105,000 tCO_2e were emitted across the programme. A breakdown of the sources of emissions across the programme in Figure 5 shows the highest carbon sources across concrete, steel, plastic, diesel and aggregate.

[24] Scotland's Carbon Budgets - Climate Change Committee
[25] Draft Climate Change Plan - Scottish Government consultations - Citizen Space
[26] www.ukwir.org
[27] Bath University / CESMM / Circular Ecology data

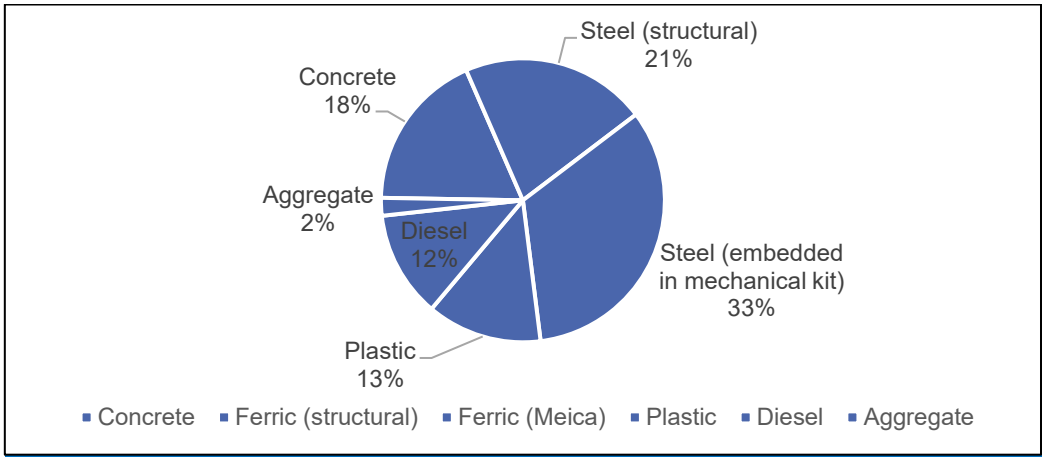

Figure 5: Carbon source breakdown across materials

Improving Carbon tools – impact on reported emissions

It is important to note that embodied carbon represents a complex area of emissions assessment and reporting. Since developing our routemap, Scottish Water has undertaken extensive work to improve the carbon assessments associated with the materials in our capital programme. This has seen updated carbon factors applied across thousands of materials and components that we purchase. These carbon data have been integrated within Scottish Water's new Benchmark Estimating Software, which has more detail on the elements of a project, and greater coverage across the programme. This will see improved confidence in reporting investment emissions, but it is important to note that as the system becomes embedded **the numbers will change because of this**.

We expect an increase in carbon intensity of investment compared with the values reported in the 2024-25 Annual Return because of improved data, greater material coverage and adoption of the Benchmark Estimating Software across projects in delivery during 2025-26 and 2026-27.

We expect the 90 tCO_2e/£m reported in 2024-25 will rise to around 150 tCO_2e/£m at the start of SR27 with overall emissions from investment rising to 175,000 tCO_2e per annum. This remains well below the 200-300 tCO_2e / £1m initial intensity range reported when we published our NZER.

Recognising the significant uncertainty and variability of this measure, to report performance in SR27 we have developed a methodology for embodied emissions that will support consistent reporting of performance independent of the size of the investment programme and the carbon tools and coverage. This is outlined in the Performance Reporting Technical Appendix.

2.1.3 Whole Life Carbon

All projects in SR27 are expected to target the lowest carbon outcomes in terms of the emissions associated with investment and the ongoing emissions for the operation of the asset.

Carbon needs to be integrated in decision making at all levels. Our asset management policies, approaches and outcomes must demonstrate they have considered embodied carbon associated with delivery and the impact on operational emissions across the life of the asset. Projects must set out this "whole life carbon" with options and show how the lowest carbon option has been selected or, if not, why (e.g. cost, service risk etc)?

The opportunity to reduce carbon must be considered at the start of a programme - opportunities to reduce carbon diminish as a project matures[28]. Working with our planning and delivery teams and supply chains we seek to:

- **Avoid Carbon:** The lowest carbon is where we do not have to invest. By reviewing needs, understanding performance, and if the outcome can be met in other ways, we only invest where there are a clear need and benefit;
- **Select Low Carbon Options:** Where a need is confirmed we seek low or no carbon options. This may include Nature based Solutions (NbS)[29] for example in natural drainage schemes or catchment management[30]; retaining as much of the existing infrastructure as possible and minimising construction;
- **Design Low Carbon**: switch to different materials - By engaging with supply chains and delivery partners we have been piloting new low carbon concrete, adopting recycled materials for roads and adopting new products utilising low carbon materials within our standard specifications; and
- **Construct Low Carbon:** With delivery partners we have increasingly adopted techniques such as offsite manufacture, designing out materials and use of low or zero emission plant. These reduce time on site, reduce cost, increase safety and reduce carbon.

In 2024 Scottish Water secured accreditation with the *PAS 2080: Carbon Management in Infrastructure*[31] standard and has retained its accreditation following our BSi audit in October 2025. This recognised the establishment of processes, tools and data to support carbon management, and its embedment within decision making, project delivery with supply chains and in reporting, and compliance with the PAS: 2080 carbon management process (Figure 6 below).

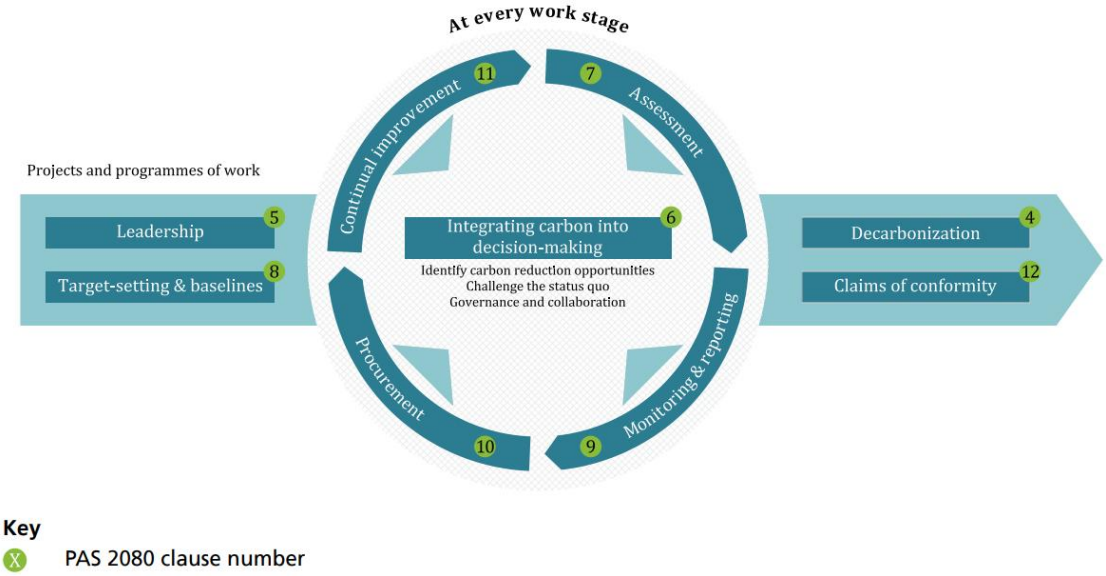

Figure 6: PAS 2080 carbon management process

With this accreditation in place, we will continue growing our capabilities in SR27 to support net zero across all activities.

[28] Infrastructure Carbon Review
[29] Scottish Water Turns to Nature to Create Rainproof Communities - Scottish Water
[30] Work Progressing on Scottish Water's Largest Peatland Restoration Project to Date - Scottish Water
[31] PAS 2080:2023 Carbon Management in Infrastructure | BSI

2.1.4 Land Carbon

Scottish Water owns over 23,000 hectares of land largely comprising rural and upland catchments around water sources. Much of this is open grass and moorland with ~13,000 hectares under agricultural tenancy (mainly rough grazing). We have/are developing substantial woodland which is likely to be capturing significant amounts of carbon, but this is balanced by peatland, which in poor condition is a net source of emissions.

Our 2023 Biodiversity Report[32] published our baseline assessment of the land carbon inventory produced by the James Hutton Institute which showed a range of losses and gains of carbon across landholdings. Using national data sets it estimated (within a very wide range) that Scottish Water landholdings are likely to be a source of emissions as a consequence of the state of its peatland. This was used to understand and target where and how we might improve carbon status – for example prioritising peatland restoration which will significantly improve the carbon balance of our land, whilst creating new woodland which will further ensure our land is a significant carbon sink.

In 2024-25 the James Hutton Institute undertook the first 3-yearly update to the inventory. This benefitted from improved site intelligence arising from field survey (particularly of peatland extent and condition), and woodland data. This showed that, again within broad ranges, Scottish Water land is now likely to be a modest carbon sink, but that there remains a significant amount of peatland to be restored along with further opportunities to create woodland and manage grassland to support carbon capture.

Table 4: 2025 updated estimated annual carbon released to or removed from the atmosphere by our land

	Annual Carbon Emissions (kt CO_2e/year)		
Land cover	**Area (hectares)**	**Minimum net emissions**	**Maximum net emissions**
Peatland	4,562	6.5	25
Woodland/ Forestry	3,860	-32	-16
Grassland	5,459	-8	-4.9
Other landcover types	7,621	12.8	13.6
Total	21,502	-21	18

The updated inventory reports a reduced total land cover. This is because we have removed approximately 1,500 hectares of woodland in the Loch Katrine catchment that was planted as part of a carbon project for a third party. Whilst the land remains owned by Scottish Water, we are not including this within our reported inventory figures owing to the risk of double counting of carbon benefit.

This update will be reported externally in our 2026 Biodiversity Report. We continue to develop the methods, data and approaches, and will update this inventory every three years to understand and report how our land is changing and how this is impacting the amount of carbon captured.

[32] Scottish Water Biodiversity Report 2023

In its advice to the UK Government on the UK pathway to net zero the UK Climate Change Committee highlighted the importance of reducing land-based emissions and improving carbon capture. Specifically, it recommended a "considerable ramp up" in peatland restoration with the proportion of natural or rewetted peatlands rising from 26% to 55% by 2040, and national tree planting rates doubling from 12,000 hectares per annum to 32,000 per annum by 2030[33].

As a significant landholder both are central to Scottish Water's net zero actions and also to improved climate resilience in water catchments.

2.2 Emissions Targets, Policy and Legislation

2.2.1 Global and National Goals

Globally the United Nations continues to pursue efforts to limit global temperature to below 2 degrees Celsius, with efforts to limit to 1.5 degrees Celsius in line with the Paris agreement. In keeping with this objective, the UK has a goal to achieve net zero by 2050, informed by the UK Climate Change Committee's advice[34] to UK and devolved administrations on a pathway to meet this.

The UK is expected to be net zero by 2050, and the CCC indicated Scotland could achieve net zero by 2045. In 2019 the Scottish Government declared a climate emergency[35] and committed Scotland to achieving this by 2045. This goal informed updates to the legally binding climate change targets set under the Climate Change (Scotland) Act 2009.

The Act places a duty on public bodies in Scotland to support the strategies and plans of the Scottish government to achieve its goals, and to report annually on progress. In 2020 Scottish Water published its Net Zero Emissions Routemap (NZER)[36] aiming to achieve net zero emissions across operational and investment activities by 2040.

2.2.2 Draft Ministerial Objectives 2027-33

The Scottish Government issued objectives for SR21 to "make substantive progress in the 2021-27 period towards the climate change targets", defining targets such as achieving net zero emissions by 2040 and that Scottish Water should increase hosted wind and on-site renewable generation to 300% of its electricity consumption by 2030[37].

The Scottish Government has recently (6 November 2025) published a revised Scottish Climate Change Plan for consultation, informed by advice from the UK Climate Change Committee[38].

The Draft Ministerial Objectives 2027-33 continue to set expectations on carbon and climate change, noting again that Scottish Water must "make substantive progress in the 2027-33 period towards the climate change targets, and ensure it is on an appropriate trajectory to meet or exceed those targets".

Scottish Water's NZER outlines the actions and pathways needed to deliver this outcome, noting the significant risks, challenges, dependencies (e.g. greening of the grid), and the need for further

[33] The Seventh Carbon Budget page 108
[34] The Seventh Carbon Budget - Climate Change Committee
[35] The Global Climate Emergency - Scotland's Response: Climate Change Secretary Roseanna Cunningham's statement - gov.scot
[36] Intro - Net Zero
[37] The Government's Programme for Scotland 2019-20
[38] Scotland's Carbon Budgets - Climate Change Committee

innovation and technology development to support the outcome in current and future regulatory periods.

2.2.3 Statutory Duties

Statutory duties on Scottish Water as they relate to climate change mitigation are presented in Table 5 below.

Table 5: statutory duties related to climate change mitigation

Statutory Duty/Regulatory Obligation	Summary
Climate Change (Scotland Act) 2009 (as amended)	• Scotland is targeting net zero emissions by 2045 in line with the guidance from the UK Climate Change Committee, and statutory climate change targets and budgets are set accordingly. • We await publication of the updated statutory climate change plan that will set carbon budgets in the Scottish economy, due for consultation in late 2025. • The Scottish Government expects public bodies to achieve net zero emissions and support delivery of its Climate Change plan. • Public bodies must seek to eliminate all emissions before netting off or offsetting and must report annually on progress • Further statutory guidance on compliance with the Act and the Public Body Duty is presently being consulted by the Scottish Government[39]
Nature Conservation Act 2004 Wildlife and Natural Environment Regulations 2011	Scottish Water has obligations under the 2004 Nature Conservation Act and the 2011 Wildlife and Natural Environment Regulations to further the conservation of biodiversity in Scotland, contribute to the Scottish Government's biodiversity goals and to report progress 3-yearly.
Streamlined Energy and Carbon Reporting Regulations	Scottish Water is captured under the UK Streamlined Energy and Carbon Reporting regulations (SECR), required to report energy and carbon across the Scottish Water group.
Circular Economy (Scotland) Act	Scotland has also enacted the Circular Economy (Scotland) Act 2024, a significant piece of legislation aimed at fostering a sustainable, circular economy. This Act mandates Scottish Ministers publish a comprehensive circular economy strategy, setting clear targets to reduce waste, enhance recycling, and promote the reuse of materials. It also empowers Ministers to implement measures that ensure businesses manage waste responsibly, thereby contributing to environmental conservation and the reduction of carbon emissions.

[39] Public Consultation Summary - Climate change duties - draft statutory guidance for public bodies: consultation - gov.scot

2.3 Strategic Enablers

Our NZER highlights that Scottish Water cannot deliver net zero on its own. We must work with academics, industry and wider partners to identify, develop and deploy new technologies in areas such as process emissions and low carbon materials. Our NZER identified key strategic enablers as:

- **People**: the skills, capabilities and behaviours needed to support net zero pathways is a priority and we will invest in training and recruitment to support the net zero skills we will need;
- **Procurement:** strong partnerships with delivery partners and supply chains, backed by procurement frameworks that require carbon plans for products, materials and services, backed by appropriate incentives are vital to support net zero;
- **Investment Planning / Governance**: the embedment of carbon within strategy, policy and project appraisals, a focus on "lowest whole life carbon" and the creation of a Net Present Cost and Carbon assessment for all projects is ensures low carbon is central to making low carbon choices; and
- **Innovation**: many of the technologies we will need are not yet available and we will continue to pursue research in waste water process emissions, digital and analytical tools and materials research for low carbon.

2.4 Wider Benefits to Customers and the Environment

Providing water and waste water services releases over 200,000 tonnes of carbon dioxide equivalent (tCO2e) annually. Failing to address emissions may lead to increased financial exposure to carbon prices. The UK Government currently projects that carbon prices will increase significantly towards 2040[40]. These costs will be reflected in the cost of carbon offsets to meet net zero should we fail to do so within our actions and will become more expensive as more organisations seek to purchase carbon credits.

Globally, carbon taxation, particularly measures such as the UK[41] and EU[42] Carbon Border Adjustment Mechanisms will make carbon intense materials (specifically concrete, iron, steel and aluminium) across the EU and UK more expensive. This will impact input prices across the economy and our investment programme.

Playing our part and making progress on net zero will help sustain our service and reduce our, and ultimately our customers, exposure to these risks. The way we propose to deliver net zero will also deliver wider benefits to society, the economy and the environment.

Enhancing our Environment
Scottish Water's latest Biodiversity Report[43] sets out the current biodiversity and natural capital status of our landholdings. Investing in land carbon capture through peatland restoration and woodland creation will have significant benefits to biodiversity and make a major contribution to Scotland's Biodiversity Strategy to 2045[44].

Climate Resilience
A major benefit to landscape scale restoration and woodland creation is to make nature, and hence the water we rely on, more resilient to climate change. The SR27 Adaptation Technical Appendix and our Climate Change Adaptation Plan note that most of our water sources are under

[40] Traded carbon values used for modelling purposes, 2024 - GOV.UK
[41] Carbon Border Adjustment Mechanism - House of Commons Library
[42] Carbon Border Adjustment Mechanism - European Commission
[43] 211223Biodiversityreport23FINAL.pdf
[44] Scottish Biodiversity Strategy to 2045 - gov.scot

pressure from climate change. Improving the carbon status of our lands will also deliver more resilience in our catchments.

In November 2025 the Scottish Government published for consultation a draft Climate Change Plan to support net zero emissions by 2045. The economic analysis of peatland restoration and woodland creation suggests this will provide a net financial benefit to Scotland through the social and economic value of tourism, forestry and notes that every £1 invested in peatland can yield £4.60 in wider value[45].

The majority of our water catchments, including peatlands are degrading in a changing climate. Investing in the resilience of our landscapes will deliver long term service and cost benefits to Scottish Water.

Rural Economy – Woodland
Planned woodland creation will be a mix of native, biodiverse woodlands and commercial woodlands where appropriate (excluding Sikta Spruce and related trees). Scotland is a net importer of timber, and our programmes will support future high grade materials for construction. Scotland's draft Climate Change Plan suggests the objectives to invest in this sector will benefit the economy of Scotland by some £2.1bn by 2045.

Access and Recreation
Scottish Water promotes responsible access to its sites for recreation and supports this through seasonal rangers and working with partners such as Forestry and Land Scotland to increase access and pathways. Landscape restoration and woodland creation will provide more opportunities.

Electricity Generation
Hosting more third-party wind on our land will make a significant positive contribution to the greening of the UK National Grid

Circular Economy and Resource Recovery
Adopting advanced anaerobic digestion technologies for managing bioresources will significantly increase the amount of value (energy, materials). The process emission methane and nitrous oxide pathway development will offer further resource recovery opportunities, particularly for ammonia.

Decarbonising investment will drive partners and supply chains to explore and develop innovative materials and techniques to reduce resources and emissions, including recovering and reusing materials wherever possible.

Innovation and Learning
Our NZER notes that innovation and research are critical to delivering net zero. We will build on the existing partnerships (e.g. Hydro Nation Chair[46]) with academia and research providers to stimulate innovation with a focus on piloting and deployment to support net zero.

[45] scotlands-draft-climate-change-plan-20262040.pdf (page 28)
[46] Hydro Nation Chair Research & Innovation Programme

3 Our Customers

3.1 What Our Customers Expect from Us

3.1.1 Our Approach

Climate change and the need for emission reduction, adaptation and energy/resource security continues to have a growing profile and impact. Frequent global weather events across the news cycle, impacts felt in Scotland through droughts, floods, and elevated energy costs have increased the visibility and awareness of our climate emergency amongst the public. Our customers expect us to:

- Provide an affordable, sustainable, low carbon service;
- For us to protect our services from the impacts of climate change; and
- To contribute to a Flourishing Scotland.

Customers are at the heart of our business, and their opinions are a key factor in our decision making process, as set out in our Customer Research Technical Appendix. Building these views into our plans is part of our ongoing customer research approach that allows us to ensure our customers' needs are at the centre of our service delivery. The SR27 customer research programme aimed to understand customer expectations for Scottish Water over the course of SR27. However, we also have a deep understanding of views on service issues from existing and ongoing research. Scottish Water's synthesis database contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers. These insights have been assessed and mapped into topics, and the highest quality insights have been gathered together into Key Insights which have been used to support the development of the Final Business Plan and Technical Appendices. The Research Synthesis Supporting Document sets out supporting evidence, scoring and referencing for these Key Insights.

3.1.2 Summary of Engagement

Climate change is a complex area in terms of the need to both mitigate our contribution to climate change (emissions) and the need to deal with the impact of climate change (adaptation). Climate change is acknowledged as an important issue by many customers, with future customers showing most concern however, many customers can be surprised by the scale of the issue and potential impact on Scottish Water's services.

Table 6 sets out our Key Insights alongside the relevant research questions on Climate Mitigation[47].

[47] Customer Research Technical Appendix

Table 6: Key Insights on Climate Change Mitigation

Research Question	Key Insight
What are **customer views** on climate change?	Climate change is acknowledged as an important issue by many customers, who can have concerns about the impact of climate change on the natural environment. A sense of urgency has been prompted for some by severe weather events, and younger people in particular can feel anger at the damage that has already been done. Customers look to governments and businesses to provide leadership and guidance on tackling climate change, and to lead by example. Many customers report that they are already doing what they can to address climate change, whilst other are less certain about what they can personally do to help.
What are customer **expectations** of Scottish Water's carbon footprint?	Many customers look to Governments and businesses to bear the most responsibility for reducing carbon emissions. Many customers also expect companies to act as good corporate citizens in this respect with environmental sustainability being a key factor in finding an organisation admirable. Customers are generally supportive of Scottish Water's Net Zero ambitions, resonating most with younger customers, but also with older customers who are concerned for future generations. Business customers support Scottish Water taking accountability for carbon neutrality and feel that the level of ambition is fair. Expectations for investment are more variable. Investing to adapt to effects of climate change (e.g. increased droughts), can be seen by some customers as addressing the symptom, rather than solving the root cause. Other customers accept that reducing carbon emissions is important but place a higher priority on Scottish Water's core services. Customers can also be uncertain about the need to invest solely to reach carbon targets, with our most recent research indicating that there may be signs of 'target' fatigue from some customers. However future customers, and those with a more environmental outlook, still see this as a priority and are wary of society in general not moving forward quick enough in this area.
What are customer **expectations** of Scottish Water protecting and improving the environment?	The natural environment in Scotland is perceived by customers to be one of Scotland's greatest assets, with rivers and coastlines particularly identified as an important part of Scotland's national character. Customers expect Scotland's natural environment to be protected for social and economic reasons, in addition to nature and ecosystems. As a publicly owned company, customers expect Scottish Water to care about the environment and to be sustainable. Customers are positive about Scottish Water objectives around enhancing the natural environment, with some customers pleased to see Scottish Water going 'above and beyond' their perception of standard water company operations. Some customers can be uncertain about how much responsibility Scottish Water can or should take in enhancing the natural environment. This uncertainty, combined with customers' perception that Scotland is already beautiful, can mean that this can be less of an immediate concern for customers in comparison to what are seen as core services. However, when customers are informed of the work that Scottish Water does in this area they respond positively and want Scottish Water to share information about these inherently interesting and impressive initiatives more widely.

Our SR27 approach to Climate Change Mitigation addresses customer feedback by:

- **Continuing to place Net Zero as one of the 3 key ambitions** for the business, but clearly linking mitigation and adaptation responses to climate change to longer term service benefits;
- **Focussing on land based emissions** through peatland restoration and woodland creation in ways that are cost effective and also deliver for climate resilient landscapes and biodiversity gain;
- **Working with industry and supply chains** to support decarbonising the materials we need and the wider economy; and
- **Being open around the challenges, our emissions and the importance of innovation** to identify and develop the technologies needed for net zero.

3.2 Partnership Working

Scottish Water cannot deliver net zero emissions in isolation – we must work in partnership with many stakeholders and sectors to find and deliver the changes and interventions to achieve net zero. A range of partnerships are essential to provide intellectual support to research, identify, pilot and develop newer approaches to managing carbon, and some of the more critical ones are:

3.2.1 Partnering for Capital Investment

Strong partnerships have been built with the existing delivery partners and major supply chain organisations. This is critical as whilst investment emissions are part of our net zero journey, they are "owned" by supply chains and industries, we need them to act.

Partnering is critical to building capacity and knowledge, and confidence in suppliers to invest in low carbon. Engagement and partnership at all levels is helping learning and knowledge sharing through tools and platforms such as the "Net Zero Network" (Net Zero Network) and delivery of low carbon concrete progress with Scotland's Low Carbon Concrete Collective (Cementing Sustainable Change - LCC).

More widely we are engaging the wider sector, such as Infrastructure Client Group, OFWAT Innovation projects (e.g. 3D Print infrastructure), UKWIR and Water UK to develop approaches to common problems. We also continue to strengthen our engagement in Scotland with the Supply Chain Sustainability School (Home - Supply Chain Sustainability School) to shape and share knowledge including finding and developing further innovative opportunities.

3.2.2 Partnering in Research - Process Emissions

UK Water Industry Research highlighted in its WWTWs' Process Emissions: Optimisation of Current Processes report that joint work across water companies, research providers and technical consultancies in the mitigation of process emissions is essential. We are members of the **U.K. and Irish Community of Practice for Process Emissions** and the **Process Emissions Action Community (PEAC).** Both groups support shared learning from UK, European and global partners to accelerate our understanding. This also supports collaborative projects and joint work to develop and pilot new technologies on the common and urgent problems of process emissions, driving progress at a water sector level.

3.2.3 Partnering for Land Management

To deliver land use change for carbon, biodiversity gain and climate resilience we need to work with communities, other land interests (tenants, neighbouring landowners), regulators and government. Partnerships are bespoke and geographically specific and current examples include Loch Katrine with our tenant, Forestry and Land Scotland. The Angus Glens Partnership comprises Angus Council, NatureScot, Forestry and Land Scotland and landowners focused on how we might improve the carbon, biodiversity and landscape resilience of that area, protecting key water sources from climate change and capturing carbon. Similar partnerships exist in Lothians and Borders.

Joint work is also critical with organisations such as Peatland Action[48], Scottish Forestry[49] and with researchers such as the James Hutton Institute to understand, plan and deliver land use change.

Strong partnerships for delivery will be further developed as set out in our Climate Change Adaptation Technical Appendix, where Pioneer Catchment work in the Dee, Angus Glens and Almond involving Scottish Government, Scottish Environment Protection Agency (SEPA), NatureScot, Local Authorities and others will focus on co-ordinated action. This will provide a model for further such work to support net zero, climate resilience and biodiversity at landscape scale.

3.3 Demonstrating Customer and Stakeholder Support

Our customers view climate change as an important issue to resolve, with some customers themselves doing what they can to help mitigate the effects of climate change, and others looking to government and leadership as they are unsure how to personally help. ***In SR27, we plan to invest in the right people: the skills, capabilities and behaviours needed to support net zero pathways is a priority and we will invest in training and recruitment to support the net zero skills we will need to resolve this important issue.***

Generally, both our household and business customers agree that more needs to be done to mitigate against the effects of climate change. However, it is a mixed view as to how to deliver this. Some customers believe we should be investing in the mitigation of the systems of climate change (e.g. drought) and others believe we should be investment in the cause which is reducing emissions. ***In SR27, our goal is to reduce annual carbon in our investments across a bigger programme through the carbon reduction hierarchy PAS 2080:2023 which will be monitored and incentivised in the SR27 Enterprise Model.***

Some of our customers are happy with the lengths we go to protect our environment whereas others believe that it is already beautiful and therefore should not be a priority. However, they are positive about the work that has been done already. ***In SR27, we plan to invest in land carbon capture through peatland restoration and woodland creation in line with our latest land carbon inventory.***

3.4 Our SR27 Investment Scenarios

The level of investment we require in SR27 reflects several investment planning scenario options. The first phase of optioneering involved creating a comprehensive range of overall investment scenarios, which encompassed potential outcomes and investment requirements across all areas of investment demand.

For climate change mitigation, this was informed by the NZER which set out all the activity areas we need to pursue to support net zero by 2040. There are limited pathways to net zero and Scottish Water considers it needs all measures to be deployed, along with innovation and further action in future periods to support this outcome.

At draft business plan, an investment option was developed from the bottom-up to incorporate the necessary investment demand needs to fulfil the long-term investment strategy, our net zero outcomes, and Draft SR27 Ministerial Objectives 2027-33. This was followed by the development

[48] Peatland ACTION | NatureScot
[49] Scottish Forestry - Home

of a series of top-down investment scenarios, which imposed constraints on the bottom up first pass demand needs. The effect of these constraints was to require certain investments to be reduced or eliminated.

Following further engagement and feedback from a broad range of our stakeholders on our draft business plan, we have further refined our SR27 investment to reflect feedback on:

- **Affordability:** ensuring we are not putting a disproportionate burden on the bills of current customers – and that we are doing everything we can to limit impacts on bills; and
- **Ambition:** responding to feedback on our investment focus and ensuring it is adequately ambitious in the areas that matter to our customers.

Responding to this feedback has meant that we need to make further trade-offs across our SR27 investment portfolio. We have done this by refining our reference scenarios, through careful rebalancing of investment across Asset Repair, Refurbish and Replacement (AR3), Regulatory Commitments and Service Choices. We have described, in further detail, the steps we took as part of this refinement, and the impacts on our Final Business Plan in the Investment Planning Technical Appendix .

4 Our SR27 Investment Approach to Climate Change Mitigation

4.1 Long-Term Outcomes and Pathways to Net Zero Emissions by 2040

Our Climate Mitigation Strategy to go "Beyond Net Zero Emissions" by 2040 as set out our Net Zero emissions Routemap (NZER)[50] drives activity across Operational Emissions, Investment Emissions, and Carbon Capture / Sequestration.

The Scottish Government's Guidance to Public Bodies[51] under the Climate Change (Scotland) Act draws requires public bodies to develop net zero pathways where "…*net zero carbon (or net zero) is intended to describe an approach which reduces an actor's emissions as far as possible, with only the remaining unavoidable residual emissions offset through credible and robust offsetting mechanisms*". Unavoidable emissions are further defined by as "…*those emissions which remain after a body has taken all reasonable steps to reduce or remove them*".

The NZER identified long-term outcomes below and we report progress annually through the NZER update, our Annual Report and our Annual Regulatory Returns to the WICS.

Table 3: Our routemap outcomes across all sources of emissions by 2040

Source Of Emissions	Outcome
Electricity	• We will reduce our consumption of electricity; • We will maximise the energy we generate from bioresources; and • We will generate or host all the energy we consume.
Process Emissions	• We will reduce our production of process emissions.
Gas & Fuel Oil	• We will maximise the energy we generate from bioresource; • We will reduce the consumption of fuel oil for standby generation; and • We will reduce the use of gas for heating buildings.
Transport & Travel	• We will reduce the miles travelled by our fleet; • We will reduce our business travel; and • We will replace our fleet with zero emission vehicles.
Investment	• We will select low emissions options and design for net zero; • We will procure low or zero emission construction materials; and • We will build using low or zero carbon construction techniques.
Storing Carbon	• We will store more carbon than we produce; • We will increase the amount of carbon dioxide stored on the land we own; and • We will increase biodiversity on the land we own.

[50] Intro - Net Zero
[51] Public Consultation Summary - Climate change duties - draft statutory guidance for public bodies: consultation - gov.scot

This set the strategic direction and activities we needed to pursue to support net zero. Some of this requires significant investment to deliver improvements (e.g. land management), or to research, develop and pilot new technologies (e.g. process emissions), whilst others will arise from building carbon into decision making across our business (e.g. investment carbon).

Whilst we do not propose specific investment in energy efficiency or renewables within SR27, we will continue to seek energy benefits from measures such as leakage reduction and water demand management and will continue to pursue energy efficiency or renewable opportunities where they are financially attractive (i.e. pay back through operational cost savings).

4.2 Net Zero Across Investment and Management Approaches

Carbon mitigation is promoted across all areas of investment in terms of the need to consider the "Whole life Carbon" in any choices we make, and its inclusion in Net Present Cost + Carbon calculations for investment appraisal. In addition, there are activities across the business driven by other needs, but may also support carbon outcome, summarised below.

Table 4: Management Approaches that may also support Net Zero

Management Approach	Strategic Elements Related to Net Zero
MA024 Waste water Bioresources Treatment and De-watering Centres	Establishes strategic investment choices and approaches to recover value (resources, energy etc) and minimise emissions across sludge and bioresources.
MA027 Energy Efficiency (Water and Waste water)	Reduce consumption of grid electricity by investing in energy efficiency where there is a positive payback.
MA028 Catchment Management	Establishes catchment assessment and management (including peatland restoration) to reduce risk to water quality, with associated carbon benefit.
MA029 Property and Estates	Promote planned and statutory maintenance of existing buildings and make progress towards carbon neutral buildings (2038 deadline for public bodies in Scotland), with carbon central to decision making.
MA077 We Enhance Scotland's Environment	Understand the status of Scottish Water landholdings and promote projects to improve carbon capture.
MA099 Water Demand Management	Manage and reduce losses of water (including leakage) across the water asset base, manage and reduce losses from customer supply pipes.
MA101 Renewable Energy Enhancement	Promote on site renewables at Scottish Water assets to displace the use of grid electricity, including the use of battery storage and export of excess power. Portfolio of projects developed and prioritised based on IRR of 4% and delivered through Scottish Water Horizons.
MA102 Biodiversity and Natural Capital	Establish the biodiversity and natural capital status of Scottish Water land, develop approaches to biodiversity gain and land management that supports services through investment in natural capital on Scottish Water estates, and embed in future investment planning to support biodiversity and carbon gain.
MA108 Private Finance initiative Return of Assets to Scottish Water	Manage the PFI contract expiry process and promote the return of assets (notably Daldowie sludge treatment centre) in ways that support carbon objectives.

4.2.1 *Strategic Pathways to Net Zero*

The adjustments to the SR27 allocation for activities directly related to achieving Net Zero Emissions by 2040 have put pressure on our ability to deliver Net Zero by 2040. We would now describe this as being challenging with a lower confidence in achieving the 2040 NZE target than we did at the Draft Business Plan submission stage in June 2025. However, with appropriate investment in SR33 and innovation developments, we are confident we can still achieve NZE by 2045.

We are now focusing investment on carbon capture (tree planting and peatland restoration) and mitigation of process emissions during SR27, which is more cost-effective than deferring action – land needs time to mature and we need to inform future wastewater investment. Furthermore, maintaining the focus and messaging on our 2040 trajectory is essential to sustaining momentum with supply chains and delivery partners for capital emissions reductions, which would be challenging to regain if disrupted.

In terms of operational net zero (operational emissions minus carbon capture), this is expected in 2038/39. The extended timeline compared with previous projections is explained by reduced SR27 financing around energy efficiency and on site renewables. Further work will be developed to explore how we invest further in these activities where they deliver financial as well as carbon benefit.

The key activities to support net zero emissions are informed by our original routemap and SR21 delivery experience. Our investment pathway and assumptions underpinning the carbon outcomes presented in Table 1 outcomes are summarised as follows:

Electricity Emissions

We continue to use the projections for the decarbonisation of grid electricity from the Department of Energy Security and Net Zero[52], noting that forecasts will be updated annually by actual grid carbon intensity figures. Working with developers to host and retain the export carbon benefit of up to 650GWh renewable generation will contribute to both the zero emissions pathway and wider Ministerial Objectives to generate or host 3x the grid electricity we consume.

We do not propose significant enhancement investment around energy efficiency or on site renewables in SR27. However we will develop further energy efficiency and renewable projects out with SR27 financing where they make economic sense in reducing future energy costs and improving energy security. We also expect energy efficiency gains from other programme areas, for example water demand and leakage management through SR27. We anticipate around 12GWh benefit per annum from these activities which principally support asset and service resilience.

Process Emissions

Working with partners across the UK water sector we will focus on the development of the nitrous oxide pathway in SR27, with extended onsite monitoring and piloting of technologies to optimise treatment and inform further activities in SR33 and SR27.

[52] Energy and emissions projections 2023 to 2050

Transport and Travel

We will continue to seek to minimise travel, pilot new technologies and seek to adopt alternative low carbon fuels to minimise transport emissions, noting the key challenge around transforming our large fleet vehicles.

Bioresources and PFI Return

Table 1 makes a key assumption that by the end of SR27 the current practice of drying sludge pellets for use in incineration has ceased, replaced by advanced digestion with energy/resource recovery.

Carbon Sequestration / Carbon Capture

We continue to work towards over 4000 hectares of new woodland by 2040 (including natural regeneration) and the restoration of all peatland in poor condition. SR27 has reduced expectations for woodland owing to more conservative estimates from our delivery partner at Loch Katrine (Forestry and Land Scotland) around the maturity rate of natural regeneration, however we remain confident in the longer term carbon sequestration projections. Peatland can take up to 15 years to fully restore, and we have included additional measures in SR27 for land management and site protection to secure the benefits of restoration.

Investment Emissions

We expect emissions at the start of SR27 to be around 175,000tCO2e (using the updated carbon data and coverage in our Benchmark Estimating Software) as reported in Table 1. If we, or the market, do nothing then emissions will rise owing to increased investment each year.

Investment carbon can be expressed as carbon intensity – the emissions per unit of spend (tCO_2e per £m), to allow ease of cross project analysis, and remove the conflicting priorities of carbon reduction and maintaining a level of investment expenditure per year.

Decarbonisation options are informed by industry analysis to target pathways for high carbon materials such as concrete, steel and plastics, and to understand when lower carbon products (e.g. electric arc furnace steel) might be available. Potential cost premia that might be applied for early adoption of low carbon materials and mechanisms such as the EU and UK Carbon Border Adjustments[53] [54] that will penalise high carbon materials.

We are focussed on activities and materials that drive our carbon intensity, moving from high carbon to low carbon materials at scale and in SR27 we will focus on actions aligned with our investment carbon measure reported in Table 1 by:

- Reducing the quantity of material, we use through optioneering, detailed design and site improvements;
- Increasing the use of refurbished products, minimising new material purchases;
- Adopting and substituting for lower carbon products, focussed on high carbon materials in our programme such as concrete and steel; and
- Reducing onsite emissions – increasingly adopting electric or hydrogen vehicles and switch to hydrotreated vegetable oil instead of diesel.

We are already making progress in delivering this and have recently developed new frameworks for the supply of low carbon materials. One of the biggest sources of emissions in our capital

[53] Carbon Border Adjustment Mechanism - European Commission
[54] Draft legislation: carbon border adjustment mechanism - GOV.UK

programme is concrete and we expect to purchase almost 20,000 cubic metres of low carbon concrete over the next five years - around 30 per cent of our current annual concrete usage.

In addition, we will continue to pursue lower carbon delivery opportunities developed already in SR21, such as offsite fabrication and material selection more widely across the programme and outwith the categories noted in the case studies below.

Case Studies – Investment Decarbonisation

We already deploy approaches to avoid / low carbon design; procure low carbon materials and build with low carbon techniques, across our programme, and will continue to drive this across the SR27 programme through the new Enterprise model:

Emergency Sewer collapse at St Andrews – our delivery partner implemented a low carbon site set up, no dig technologies, re-use of existing materials, zero emission plant and low carbon pipe. This reduced carbon and delivered work sensitively for the customers and the environment, keeping the golf course open throughout the works. Despite the urgency to complete 100tCO2e of carbon was saved.

Stanley Hollowhouse, sample point kiosk – our delivery partner trialled a net zero carbon site approach. Traditionally, constructing a standard kiosk produced ~3,150kgCO_2e in emissions. Through innovative design, construction methods (zero emission plant, zero offsite waste) and low-carbon materials (pre-cast cemfree concrete), this project achieved 83% reduction in emissions. This is being replicated across the sample point programme.

Across the programme we are increasingly seeing zero emission plant and alternative fuels being adopted to reduce site establishment emissions by up to 90%, and we are making progress in identifying and adopting low carbon concrete and green steel. Two of our partners in the manufacture of mechanical and electrical equipment such as treatment units have offsite manufacturing facilities around the country to support low carbon assembly and reduced time on site.

For pumps and valves one of our delivery partners is now offering a remanufacture service rather than replace. Depending on the size of the asset there can be carbon, cost and time savings associated with this approach rather than replacing.

As for operational emissions there will need to be additional interventions in SR33 and SR39 beyond those identified above to allow Scottish Water to remain on the pathway. Beyond SR27 we expect significant development of lower carbon materials and techniques, driven by the IPCC imperative to limit global heating. The global economy and supply chains must decarbonise, supported by national and international carbon taxation such as the Carbon Border Adjustment Mechanism, which will increasingly penalise high carbon materials. One of the challenges Scottish Water faces is that the wider construction supply chain and economy is generally working towards achieving net zero in 2050 in line with overall UK objectives. Through SR27 we will work with delivery partners and supply chains to support the development of these materials and to pilot their early adoption where it is cost effective.

Decarbonisation of capital investment is **not considered an additional cost to the programme** – no premium for low carbon choices has been applied under the CPI+3.3% scenario. Legally binding UK, European and global goals for decarbonisation remain, the costs of which are expected to be reflected in the wider economy and measures such as UK and EU carbon border

taxes due to commence in 2026[55] will target high carbon materials, principally those used withing our programme – concrete, iron, steel and aluminium.

4.3 SR27 Investment Summary

Considering our Management Approaches, Pathways, Emissions Hierarchy and Public Body Duty, the Target Scenario (CPI+3.3%) includes planned
In addition to direct investment through this Technical Appendix, our pathway is based on the expectation that SR27 and future periods support the following key outcomes, which are represented in other Technical Appendices:

Table 9: Wider Enabling Investment in SR27 and future periods that will also support net zero

Activity Area	Summary	Assumed Benefit
Bioresources and PFI Return	Advanced anaerobic digestion and energy recovery at Allanfearn Waste water Treatment Works. Replace the sludge drying facilities at Daldowie Sludge Treatment Centre with an advanced anaerobic digestion process with energy/resource recovery	Up to 27,000 tCO2e benefit depending on option selected (cessation of drying, and burning sludge, with further energy recovery)
Property and Estates (AR3)	Adopt zero emission systems as heating, ventilation, and air conditioning (HVAC) and other building systems require renewal, with a focus on 2038 statutory deadlines for zero emission public buildings. Replace Juniper House laboratory, reducing gas and electricity demands	Zero emission public buildings post 2038
Reduce Water Demand	• Leakage enhancement 20megalitres/day • Mains Renewal 3 megalitres/day • Non-domestic smart metering (improved leakage targeting) 25 megalitres / day in SR27, 15 in SR33 • Reduce non-domestic continuous use (through smart metering) 32 megalitres / day • General non-domestic customer demand from smart metering 8 megalitres / day	88 megalitres / day reduced demand 12.8GWh energy reduction in water service in SR27

Out with the regulatory business plan, we will continue to maximise the amount of third-party renewable electricity generation hosted on our estate. Working in partnership with developers, the carbon benefits arising from the export of renewable generation will vest with Scottish Water. This will also support Scotland's decarbonisation and meet our SR21 Ministerial Objective to produce or host three times the amount of electricity we consume by 2030 (up to 1320GWh) by 2030. A further 650GWh is expected to be delivered in SR27 to meet this objective[56].

[55] Draft legislation: carbon border adjustment mechanism - GOV.UK
[56] The Government's Programme for Scotland 2019-20

4.4 SR27 Planned Mitigation Investment

4.4.1 Process Emissions

Table 5: Process emissions investment summary

Investment Summary	Proposed investment (£m 24/25)	Projected Benefit	Investment Category
Process Emissions	£15m	2,000* tCO_2e	Enhancement

*SR27 outcome excludes 2,000 tCO2e benefit from process emissions at Daldowie (Bioresource)

Process emissions – nitrous oxide and methane form wastewater treatment – are our most problematic emissions to eliminate, requiring extensive research and development. The UK Climate Change Committee advice to government[57]" on pathways to net zero identified specific action for the water sector to deal with these emissions.

In SR21 we worked with the wider UK water sector and others to understand the source and fate of methane and nitrous oxide across the wastewater cycle through extensive monitoring, control systems and technologies to understand and model the conditions that give rise to emissions[58]. This enabled us to identify and prioritise the sites and types of process that may be the greater sources of emissions and to begin to trial operating under different conditions to minimise emissions targeting multiple benefits:

- Reduced process emissions;
- Optimised treatment and stable compliance; and
- Lower energy use.

There are further unquantified areas of innovation and technology development that we expect to support further emission reduction before 2040. These will be researched further in SR27 (dependent on funding) and SR33. In particular, we expect further progress around the methane pathway, although this may need to wait until SR33 due to funding availability in SR27.

Nitrous Oxide

In SR27 Scottish Water will focus investment for process emissions on nitrous oxide (N_2O) monitoring and reduction. We will deliver monitoring and interventions on our activated sludge assets, specifically the top 25 highest emitting sites that treat >70% of the total population equivalent in Scotland[59].

We will also improve understanding for smaller and non-activated sludge wastewater assets to enable cost effective monitoring and development of potential interventions for future deployment. Specifically, we will:

- Finish deployment of liquid sensors at 25 sites and establish baselines for each site, as per current industry best practice, and develop further monitoring techniques to other sites where liquid sensors are too costly to maximise coverage;
- Data analysis and modelling will help identify options to avoid or reduce process emissions and machine learning will be refined to support data interpretation and intervention options;
- Digital twins and machine learning will model operational performance to implement real time control (RTC) with artificial intelligence (AI) to support predictive control to prevent or minimise

[57] The Seventh Carbon Budget
[58] Wastewater treatment works' process emissions: optimisation of current processes
[59] Internal Analysis

emissions and implement interventions such as altering process controls and ammonia recovery/removal; and
- Identify future interventions - emerging technologies such as ammonia recovery, photocatalytic activated sludge process (ASP) covers, predictive real-time control (RTC), and alkalinity changes for consideration in SR33.

Methane

Reduced allocation since draft business plan means the methane pathway will be pursued, where possible, by other areas of the business. Specifically, Bioresources and by maximising Industrial Emissions Directive funding and drivers.

In SR21 research and innovation trialled site-wide monitoring for methane which has been shared with the Industrial Emissions Directive team, and this could be taken forward in SR27. The Bioresources team have identified three Anaerobic Digestion (AD) and Advanced Anaerobic Digestion (AAD) sites where methane capture could be implemented. This is being rolled out to one site (Nigg) at first to assess value of future applications.

Research and Innovation will need to continue research on additional monitoring and mitigation measures for other sites including sludge storage facilities, septic tanks etc and across our wider processes. This research and innovation will be essential to then allow the methane pathway to be progressed in SR33 to make meaningful reductions in that area.

Carbon Dioxide

The amount of carbon we can capture in our landholdings to balance residual emissions and support net zero has risks and uncertainties and will take time to develop (maximal carbon capture is projected to occur beyond 2040 as trees mature). There is a risk it will fall short so we will also focus on technological approaches to carbon dioxide capture from our wastewater treatment processes.

We will:
- Promote research and innovation and undertake trials on CO_2 capture technologies from our wastewater treatment processes;
- Seek to apply successful R&I trials at scale across the asset base as appropriate which will also support our other net zero aims, wider efficiency drivers and support wider business sustainability goals. This will also inform SR33 business planning.

Recognising the imperative that we make progress up to 2040 and noting the need to inform further investment in SR33 we propose to invest £15m in process emissions in SR27 to deliver the above activities. We will also be supporting research and innovation and other business areas to inform early activities to progress process emissions in addition to this £15m investment. We will prioritise the activities which will deliver the greatest benefit and anticipate the investment will be allocated as below, subject to amendments as we improve our understanding:

Table 6: Process Emissions Activities – estimated investment effort

Process Emissions Activities	% of £15m
N2O monitoring	14%
N2O data analysis and modelling	6%
N2O mitigations including process changes and new technologies i.e. digital twins	72%
Research and Innovation for monitoring and interventions	8%

4.4.2 Carbon Capture

Carbon sequestration and the management of our landholdings provides an opportunity for multiple benefits. Whilst this programme is focussed on the carbon balance of our land, the measures we need to take – peatland restoration, woodland creation and improved management will see wider benefits – for biodiversity, amenity and, critically, to improve the resilience of our landscapes to climate change. This will provide longer term benefit to water quality and environmental capacity.

Table 7: Carbon capture investment summary

Investment Summary	Proposed investment (£m 24/25)	Projected Benefit	Investment Category
Carbon Capture	£29m	500-1000Ha peatland during SR27 to ensure all peatland restored in good condition by 2040; 1,500 ha of new woodland by 2033 and over 4,000 Ha woodland by 2040 contributing to overall net carbon sink of 64,000 tonnes	Enhancement

Scottish Water owns over 23,000 hectares of land covering mostly upland catchments characterised by rough grazing, woodland, moorland and peatland. During SR21 Scottish Water worked with external experts to develop a "land carbon inventory" – a view of the carbon losses (e.g. from poor condition peatland) and gains (e.g. in growing woodland) within its land. This enabled Scottish Water to understand the carbon performance of its land, current land use and tenancy status, evaluate opportunities based on carbon benefit and develop a portfolio of peatland and woodland opportunities under the Carbon Capture Management Approach.

Currently Scottish Water is a modest carbon sink – significant carbon in woodlands is largely outweighed by carbon lost from peat. In SR21 Scottish Water has restored over 1,000 hectares of peatland on its land to support water quality and prevent losses of carbon and delivered over 1,000 hectares new woodland creation through planting and natural regeneration. Major projects included the commencement of the Loch Katrine Land Management Plan – a 10 year plan that will cross regulatory periods to 2034 and ultimately see over 4,000 hectares of new native woodland, and the restoration of peatland around major catchments such as Afton.

This is not yet included in our land carbon inventory – a minimum of 5 years post planting, and achievement of minimum growth height is required for land to be classed as woodland. This will be incorporated in future updates following review by the James Hutton Institute. Collectively, the restoration of peatland, creation of new woodland and the maintenance/enhancement of existing land is projected to enable Scottish Water to net off ~64,000 tonnes CO_2e by 2040, with further improvements in subsequent years as trees mature.

Most of the woodland needs to be created before 2030 to enable sufficient growth to the phase where they are capturing higher amounts of carbon by 2040 and beyond.

During SR27 we will continue working according to the Carbon Capture Management Approach and:

- Continue restoration and management of 500-1,000 hectares of Scottish Water's peatlands within water catchments (range reflects uncertainties in areas still to be fully surveyed);
- Continue delivery of the 10-year Loch Katrine Land Management Plan through our tenant Forestry and Land Scotland to deliver over 150 hectares of woodland through planting and over 500 hectares of natural regeneration reaching maturity by 2033, and which supports a collective outcome of over 4,000 hectares of new native woodland by 2040;
- Work with tenants, stakeholders and regulators to create a further 660 hectares of new woodland across our estate; and
- Continue to seek access to grants to part fund woodland and peatland activities as appropriate, noting that future changes to such schemes may impact costs.

We will also continue to invest in the management of estates to ensure the carbon gains are maintained, and in the further analysis of the carbon status of our land to inform annual reporting and net zero outcomes.

4.4.3 Fleet Decarbonisation

The transition of our fleet to low or zero carbon is a key element in reducing our controllable emissions and investment demand reflected in the AR3 programme for support services. We anticipate limited progress in SR27 under the Target scenario but will continue to work with Fleet and operational teams to identify and deliver opportunities where they are cost-effective.

4.4.4 Hosted Wind Generation

Whilst not an investment demand, a key assumption for the carbon profile in the medium term is that the work to continue to develop 650GWh[60] of new hosted wind on our estate will secure the export carbon benefits (i.e. they are not transferred or sold elsewhere, and SW retires any associated REGO).

Additionally, this is required to meet our SR21 Ministerial Directions where a target of delivering the equivalent of 300% of our electricity demand through onsite renewables and hosted wind by 2030[61].

4.4.5 Assumptions and Uncertainties

There are significant uncertainties associated with our programme:

- **Greening of the grid:** electricity remains our biggest source of operational emissions. The pace of grid greening has not followed government projections which directly impacts both the emissions profile for grid electricity and the carbon benefits we may get from energy efficiency and renewables;
- **Emission factors:** there is ongoing work globally to assess the science and emissions associated with waste water processes. There is a prospect that factors may increase, particularly for nitrous oxide making it even more important we improve our understanding and are better able to manage these emissions in future;
- **Embodied investment emissions:** capital investment emissions comprise assessments of carbon in materials and processes across a vast supply chain. Projections indicate these will green over time, supported by global carbon goals and taxes, but relies on continued

[60] Income generated from the hosting of wind generation has not been included in our financial model due to uncertainty.
[61] Scottish Water: directions 2020 - gov.scot

innovation and on suppliers, supply chains and delivery partners actively seeking and adopting low carbon;

- **Scale of investment programme:** further increases in capital investment, particularly in traditional investment (concrete, steel etc) will lead to increases in emissions simply owing to more money being spent;
- **Land based emissions:** the science around carbon in soils and vegetation continues to develop and over the last 2 years we have seen material adjustments to the Peatland and Woodland Carbon Codes. Soil carbon is a further area of development. We will need to review and update our land inventory to reflect changes 3-yearly;
- **Technology:**– areas such as Fleet rely on the market being able to deliver the requisite zero emission vehicles. The performance of smaller vehicles such as vans and cars is working well, and we are piloting larger vehicles. Progress on heavier plant remains uncertain and we will need to keep under review; and
- **PFI Return and Bioresources:** – the biggest single source of gas usage is at Daldowie sludge treatment centre PFI where the current technology of drying pellets for burning contributes significantly to gas and process emissions. Our pathway relies on this site ceasing and the installation of an alternative Bioresources Strategy to maximise energy recovery.

Our NZER highlights further uncertainties and emphasises the importance of further innovation and new technologies to support net zero. We will need to keep these under review during SR27.

5 Interdependencies

5.1 Net Zero Across All Areas

Net zero needs to be supported across the business but there are key dependencies in some areas:

- **Scale of the Investment Programme:** Scottish Water's investment profile is CPI+3.3%, above the level assumed at the time of the NZER development as is the level of progress already made on decarbonising key materials such as steel and concrete. We are confident in decarbonising investment and recognise that the whole construction sector will need to do more to secure net zero during the 2030s. Global goals and measures such as Carbon Border Taxes will support innovation. We will work with delivery partners and supply chains to explore how materials may achieve "net zero status" as part of the procurement process.
- **PFI Return (Daldowie) and Bioresources Strategy:** This Technical Appendix assumes that PFI return, and delivery of the West Central Bioresources Strategy is complete by 2031. If this does not occur it will have a material impact on the profile for emissions and pathway to net zero.

5.1.1 Innovation

We highlight there will be a potential shortfall in achieving net zero emissions by 2040 owing to increased scale of investment and increased risks around the scale of land carbon capture. Net Zero is a challenging ambition and Scottish Water's NZER highlights the importance of research and innovation to find ways to reduce emissions. Progress has been made during SR21, but there remain key areas of research and innovation that are vital to the net zero emissions pathway including:

- **Process emissions:** process emissions from waste water and sludge remain the most challenging area of emissions. More research and technology development is required to identify methods for treating waste water without liberating significant emissions and to monitor and reduce process emissions from our existing asset base;
- **Renewable energy**: greater diversity of renewable energy options are needed to de-risk delivery where appropriate and ensure renewable energy can be deployed across our asset base;
- **Materials science and capital investment**: progress has been made with the supply chain and with research partners to explore and develop materials such as low carbon concrete, alternative equipment fabrication and low carbon steel. Scottish Water and its partners will need to engage in finding and piloting new materials and products to reduce the carbon intensity of investment. This will also need to include the use of recycled materials and the refurbishment of assets – circular economy approaches;
- **Nature based solutions**: significant potential of reducing both our investment and operational emissions is from the implementation of nature based solutions. More research to confirm and optimise performance is required to increase uptake of nature based solutions and blue-green infrastructure;
- **Land based emissions and carbon capture:** work with the James Hutton Institute has established an approach and mechanism to target improved carbon capture, but this remains an area of intense research to support global efforts to increase carbon sinks. New information (e.g. from IUCN, or academic papers) is kept under review to inform Scottish Water's carbon inventory. More research is required to develop and scale wider non land based carbon capture approaches and continued research is required to ensure peatland and woodland carbon capture is optimised and effectively monitored.

Scottish Water will continue to keep science and guidance under review and actively seek innovative approaches to reduce carbon across our services and investments in SR27, in line with commitments in the NZER.

6 Conclusion

The CPI+3.3% Scenario for SR27 makes progress towards Draft Ministerial Objectives 2027-33, customers and stakeholders' expectations, our climate change adaptation plan and on meeting Scottish Water's Board expectations on progress towards our Long-Term Strategy and risk appetite.

For climate change mitigation it will deliver investment across a number of Management Approaches to support a profile for net zero emissions that enables Scottish Water to meet Minister's Objectives to "make substantive progress in the 2027-33 period towards the climate change targets" (net zero emissions by 2040).

There is significant risk and challenge around meeting this objective (currently it is projected to be met in circa 2042-43), and further work will be needed in SR33 and SR39 to realise the 2040 outcome.

A lot of carbon benefit is derived from "enabling" investment such as Bioresources and PFI return, Leakage, metering and mains renewal. They are driven by other statutory or asset maintenance needs and also makes a substantial contribution to the net zero pathway with the replacement of the current sludge treatment centre at Daldowie the biggest single contributor to carbon benefit in the period.

£44m of the investment is directly focussed on mitigating climate change covering:

- Process emissions (£15m) to implement measures to develop and deploy site control and optimisation, methane recovery and new processes to eliminate emissions
- Carbon sequestration in landholdings (£29m) to restore peatland and create woodland, contributing to the long-term carbon capture across Scottish water landholdings with further resilience benefits.

A further £16m is allocated for transitioning the fleet to electric vehicles and providing more access to chargers and low carbon fuelling. These are expected to provide more benefit in SR33 in terms of guiding investment in future EVs, particularly for the larger fleet.

Investment emission reduction is not specifically funded in SR27. Instead, we will continue to work with delivery partners and supply chains to promote low carbon options, develop low carbon designs, procure low carbon materials and deliver investment through low carbon construction techniques.

Further benefits will be realised from the hosting of windfarm developments on Scottish Water estates where the export benefits of electricity are retained by Scottish Water.

Net Zero remains a challenging goal with significant uncertainties around land, process and investment emissions, and key dependencies on the continued greening of the electricity grid and the development of new technologies for deployment.

The actions proposed in SR27, whilst not sufficient to deliver net zero by 2040, with further activity in SR33 and SR39 will keep Scottish Water on a pathway towards the 2040 net zero target.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Investment Planning

February 2026

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1 Executive Summary

This Investment Planning Technical Appendix outlines our approach to creating a Reference Investment Planning Scenario (IPS) and two Alternative Scenarios which is a core element of the SR27 Business Plan submission.

We are responsible for providing water and waste water services that are essential to everyday life for households and businesses across Scotland. Our activities make a critical contribution to the country's health, wellbeing, economic prosperity and the natural environment. Our customers expect us to provide affordable, sustainable, low carbon services and the changing climate is increasingly challenging our ability to do this.

To do this we must make the right investment decisions at the right time. The scale of these potential investments is significant, so we must relentlessly pursue efficiency opportunities in the management of our assets to deliver the best value for customers.

Over the last 5 years, we have enhanced our approaches to asset management, particularly in relation to investment planning and prioritisation to embrace the move to a more rigorous, dynamic and rolling investment planning process. This improved approach allows us to continually incorporate the latest evidence into our decision-making, collaborating with stakeholders to ensure the costs and benefits of competing investment priorities are balanced appropriately.

A visual representation of the over-arching stages to create the SR27 Reference Investment Planning Scenario in the SR27 Final Business Plan is shown in Figure 1.

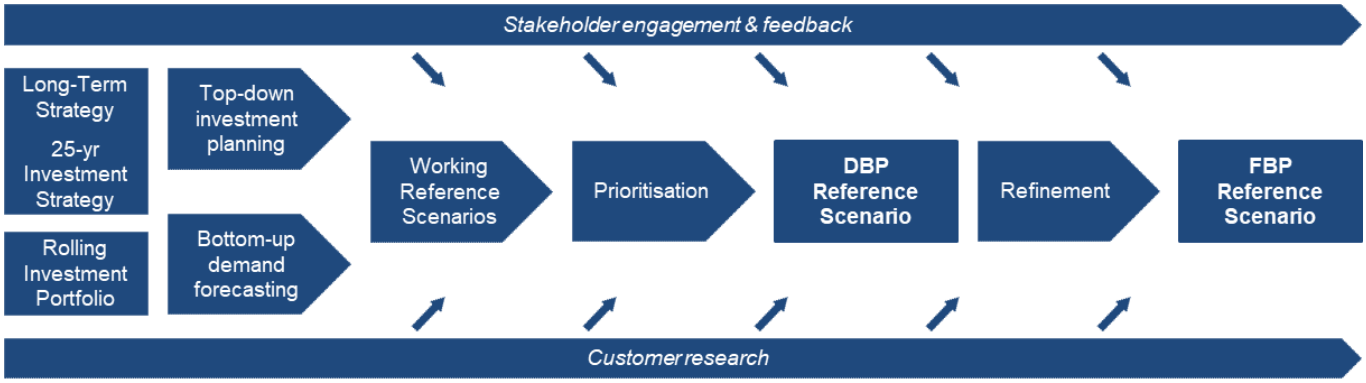


Figure 1: Overview of the Investment Planning process

Our process involved starting with unconstrained strategic analysis, then creating a broad range of potential investment planning scenarios, with a focus on homing in on what our Reference Scenario would be. This is underpinned by detailed bottom-up analysis and refinement phases and executive challenge that takes account of a broad array of tests and feedback cycles from customer research and stakeholder engagement. During this process we also recognise that there are very real concerns and considerations about the impacts of our charges, so we developed a "top-down" view of the upper and lower boundaries of what we considered to be an acceptable range of charges influencing total investment envelopes for SR27. All of this activity was completed with visibility and engagement (in line with Ethical Business Regulation and Practice) with our stakeholders and supported by robust customer research.

We are satisfied that the Reference Scenario is a well-evidenced, balanced plan that meets Draft Ministerial Objectives 2027-33 (MOs), and represents good value for customers, communities and benefits the environment that makes adequate progress towards the Water Sector Vision and our Long-Term Strategy.

The output of this investment planning process is our recommendation of a Reference Investment Planning Scenario of £8.1bn[1] in SR27. This, coupled with £5.3bn in operational costs, means that our SR27 Final Business Plan requires a total of £13.4bn of funding. With an assumed borrowing level of £170m per annum from Scottish Government, we will have to increase customer charges by CPI+3.3% per annum during the 6-year period from 2027 to 2033 to fund this plan.

We have laid out our projected performance levels against a set of existing and new outcome measures. We have also included two Alternative Scenarios and the impact they would have on the service offering.

[1] Post-efficiency adjustment in 2024/25 price base

2 Background

2.1 Scope of this Technical Appendix

This Technical Appendix describes our investment planning process for SR27. We will set out the overall stages we have gone through to create a single Reference Investment Planning Scenario and two alternative scenarios as required by the Water Industry Commission Scotland (WICS) Final Methodology. We will explain our process:

- Starting from our long-term strategic investment forecasts to 2050;
- To creating the unconstrained investment demand of what could be required to be done in the SR27 period;
- Then exploring a wide range of scenarios and introducing the concept of a "Zone of Acceptability" within that broad range to consider a number of key influencing factors;
- Detailing the approach taken to account for, and prioritise, feedback from stakeholders and customers; and,
- Explaining how we have narrowed and refined the proposal to a single Reference Scenario and two alternative scenarios for the purposes of this Business Plan.

This Technical Appendix also highlights the significant improvements we have made over the last 5 years in relation to how we make sustainable investment decisions from strategic planning to project planning and lays out further improvement commitments in the coming years.

2.2 Context

The Scottish Government Commissioning Letter, Draft Ministerial Objectives 2027-33 and the Water Industry Commission for Scotland (WICS) Final Methodology outline the strategic direction and regulatory framework for the water industry in Scotland for the period 2027-2033. The following section summarises these requirements:

2.2.1 Commissioning the Strategic Review of Charges: 2027-2033

Scottish Ministers have outlined several key requirements for the Strategic Review of Charges process in their letter[2] sent to WICS in April 2024. The strategic review for 2027 – 2033 aims to ensure that high-quality water services are delivered in Scotland by focusing on long-term planning, efficient investment, robust governance, and active customer engagement.

The process requires WICS to publish the Final Determination by 29 October 2026, preceded by a Draft Determination 30 June 2026. The determination should include a range of possible charge paths for both domestic and non-domestic sectors, considering progress towards objectives and the level of risk associated with different investment levels. It is assumed that lending levels will be similar to the 2021-2027 period, ~£1.03 billion. Consumers, communities, and the environment must be central to the review, with demonstrated customer support for the Final Determination.

The letter focuses on ensuring that Scottish Water aligns with the broader water industry vision, while achieving the Draft Ministerial Objectives 2027-33 within the framework provided by the Principles of Charging. Stating the need to demonstrate clear and demonstratable progress towards this vision and understanding the investment over the short, medium and long term. Ministers expect Scottish Water to continue the transition to a risk-based approach to maintaining

[2] 2027-33 Commissioning letter | WICS

the overall condition and performance of assets, ensuring no deterioration in service levels to customers over the long term.

Maintaining an efficient investment programme that addresses industry challenges and ensures the delivery of necessary outputs is a requirement from the Strategic Review. There is an expectation that average annual expenditure on the investment programme remain at a level that allows for efficient delivery.

Ministers require there to be a suitable governance structure to enable the delivery of objectives and outputs in a rolling programme. There is also an expectation that a monitoring framework is in place to track delivery.

Regarding the Principles of Charging, it is expected that the principles from the 2021-27 regulatory period will evolve with minor amendments. As in previous periods the Principles of Charging will indicate that lending will continue to be made available for the investment programme and WICS have been asked to consider measures which ensure a smooth transition of investment activity between and beyond regulatory periods.

Additionally, as set out in the Commissioning letter from Ministers, The Statement of Ministerial Objectives should also evolve from the 2021-27 regulatory period with minor amendments. Revisions will take into account the Water Sector Vision and the challenges facing the industry. The letter also stated that the Strategic Review must remain cognisant of Scottish Government's ongoing policy development and any resulting legislative changes. It highlighted that Ministers would confirm the extent of changes required in their final Ministerial Objectives.

Consultation on Draft Ministerial Objectives 2027-33 and Principles of Charging closes 30 March 2026, with finalisation in October 2026.

2.2.2 Ministerial Objectives & Principles of Charging

As stated above, the Ministerial Objectives 2027-33 are currently in draft form and will not be finalised until October 2026, therefore this SR27 Final Business Plan is based on the draft Ministerial Objectives provided alongside the Scottish Government's Commissioning Letter in March 2024. Scottish Water has supported WICS and Scottish Government on the development of the next version of the Draft Ministerial Objectives 2027-33 which are currently being consulted on, to provide a view of the implications of any changes proposed.

The initial Draft Ministerial Objectives 2027-33 for Scottish Water encompass 11 key areas aimed at enhancing the water sector and its services. These objectives are summarised in *Table 1* below:

Table 1: Draft Ministerial Objectives 2027-33

Ministerial Objective	Description
Long-term water sector vision	Involves collaboration with partners and communities to realise this vision, applying the place principle to ensure better resource impact and outcomes

Ministerial Objective	Description
Standards of service	Emphasises the importance of maintaining or improving service levels, engaging with stakeholders to set standards, reporting annually, and reviewing performance criteria
Asset maintenance	Development of an evidence-based strategy for asset replacement, consulting with regulators, and integrating maintenance with investment programmes
Supporting Sustainable Economic Growth	Focuses on providing strategic capacity for new housing and commercial developments, working with the industrial sector, and supporting reliable and sustainable rural services.
Circular Economy	Emphasis on assessing potential resource recovery from sewerage
Drinking Water	Quality standards must be complied with, and resilience must be addressed. The objectives also include removing lead pipes and working towards a lead-free Scotland
Environment	Includes improving compliance with environmental licenses, preparing delivery plans for infrastructure improvement, and supporting plastic and priority substance control
Flooding and surface water management	Sets an aim of collaborating on sustainable storm water management to reduce flooding and pollution, while creating natural spaces for communities.
Security and resilience	Focus on improving network security and systems resilience against malicious attacks, informed by government advice and best practice.
Climate change, adaption and mitigation	Expectation to assess climate change impacts, implementing adaptation plans, progressing towards climate targets, and promoting water use reduction. (*See separate note below on potential changes which have been discussed, and Scottish Water have taken into consideration in the development of the SR27 Final Business Plan*).
Private finance initiative funded projects	Prepare and implement plans to manage the remaining private finance initiative contracts which end in the 2027-33 period

Note on Climate change, adaption and mitigation: Scottish Water has considered changes to the climate change target made by the Scottish Government in the preparation of this SR27 Final Business Plan and planned on this basis. This is also in line with customer research which indicates investment should not be made in carbon reduction activities just to meet a target.

The draft Principles of Charging provides the statement of policy regarding charges and is intended to allow Scottish Water to achieve the Objectives set by Ministers. Scottish Water is supporting ongoing conversations with other statutory consultees (WICS, Consumer Scotland, and water and sewerage services providers) to explore modifications which could be made. As with the Draft Ministerial Objectives 2027-33, this SR27 Final Business Plan is prepared on the basis of the draft Principles of Charging provided alongside the Scottish Government's Commissioning Letter in March 2024. Table 2 outlines the draft Principles.

Table 2: Draft Principles of Charges

Principle	Description
Stable charges	Recognising the importance of stability and certainty, WICS will determine the maximum amounts of charges having regard for CPI
Full cost recovery	Charges should cover the full costs of providing services to customers
Harmonised charges	Charges should be the same for similar services provided to customers of a similar category regardless of location in Scotland
Cost-reflective charges	Charges should remain broadly cost-reflective, particularly charges for given services to particular customer groups
Fair, equitable and affordable charges	Scottish Water should be sustainably funded to play it's part in delivering the Water Sector Vision, and charges should be fair and affordable to present and future generations

The draft Principles of Charges also confirm continued collection of household unmeasured charges through Local Authorities, and that the Water Charges Reduction Scheme remains the primary means to provide support customers least able to pay. Both Household and Wholesale charges should continue to include appropriate elements to recover the cost to Scottish Water of dealing with rainwater that drains to its sewers from roofs and other permeable services, and public roads.

2.2.3 WICS Methodology

The WICS' Methodology[3] provides a detailed framework for how the Strategic Review of Charges will be conducted, to meet the requirements set by Scottish Government. This process will enable WICS to establish a cumulative charge cap[4] over the six-year period, allowing flexibility for adjusting the profiling of charges as required, while ensuring transparency and reflecting customer views as established from the comprehensive customer research programme established for SR27. The Methodology requires Scottish Water to submit a draft Business Plan with associated Data Tables and Commentary by 12 June 2025 and a final Business Plan to be published by 26 February 2026. Both SR27 Draft and Final Business Plans should include detailed financial forecasts, plans for investment and expected levels of service performance. This is to ensure that customers receive good value for money for essential water and waste water services while ensuring the maintenance of high standards of service, reliability, and sustainability.

The review is rooted in several foundational principles, including the embedding of Ethical Business Practice and Regulation (EBP&R). It emphasises the importance of high-quality evidence and analysis, accountability for performance, and maintaining flexibility to respond to emerging challenges. Moreover, it situates the Strategic Review within the broader context of the long-term sector vision and long-term investment strategy.

[3] SRC27-Final-Methodology.pdf
[4] Water Industry (Scotland) Act 2002

In terms of investment, Scottish Water is required to provide detailed, bottom-up evidence for future asset replacement needs, incorporating assumptions for maintenance interventions, unit costs, and overall expenditure. Investment proposals will be divided into asset maintenance, enhancement, and growth, with climate change adaptation recognised as a significant driver. There is an expectation that during the regulatory period there will be a governance process in place that will involve annual updates to the delivery plan to reflect changes in the investment baseline, ensuring transparency and accountability.

The Methodology expects Scottish Water to define outcome measures and annual targets to monitor progress towards the sector vision and Ministerial Objectives, including benchmarking against specific performance metrics in England and Wales. Additionally, Scottish Water is required to provide evidence of meeting efficiency challenges and detailing changes to expenditure during the regulatory period. Following on from providing their feedback on the SR27 Draft Business Plan, WICS have slightly amended their data tables guidance and the corresponding tables, this has been taken into consideration in the SR27 Final Business Plan.

Customer engagement is a key element of the Methodology and in response to the requirement for a Customer Challenge Group, Scottish Water, Consumer Scotland and WICS have signed a Memorandum of Understanding for the Independent Customer Group to fulfil this role. This group is there to offer independent assurance on the quality of customer engagement and the integration of customer views into Scottish Water's business plan. Further details are available in the Customer Research Technical Appendix.

The Board of Scottish Water has provided assurance on the business plan (additional information available in the Assurance Technical Appendix), with specific expectations for external assurance on key areas, including cost benchmarking and efficiency analysis.

These key components make up the framework for the Strategic Review so that Scottish Water can continue to deliver high-quality services, adapt to future challenges, and engage customers in its decision-making processes.

2.2.4 Legal Obligations

In conjunction with the Draft Ministerial Objectives 2027-33 and WICS Methodology, the SR27 Final Business Plan must also adhere to other obligations Scottish Water must fulfil, such as regulatory commitments and legislative requirements. These include enforcement notices, letters of commitment and persistent non-trivial failures. Legislative requirements and corresponding technical appendices can be found in *Table* 3 with links to the corresponding technical appendices where further details are provided.

Table 3: Legislative Requirements

Area	Technical Appendix	Legislative Requirement
Water Quality	Water Quality	The Water (Scotland) Act 1980, The Public Water Supplies (Scotland) Regulations 2014 (as amended)
Water Continuity	Water Continuity	The Water (Scotland) Act 1980, The Water Resources (Scotland) Act 2013, The Reservoirs (Scotland) Act 2011, The Security and Emergency Measures (Scottish Water) Directions (SEMD) 2019, The Security of

Area	Technical Appendix	Legislative Requirement
		Network and Information Systems (NIS) Regulations 2018, The Public Water Supplies (Scotland) Regulations 2014 (as amended), The Landfill (Scotland) Regulations 2001
Water Environment	Water Environment	Water Framework Directive (WFD) (2000), Water Environment and Water Services (Scotland) Act (WEWS) (2003), Urban Wastewater Treatment Directive (UWWTD) (1991) and Urban Wastewater Treatment (Scotland) Regulations (1994) , Bathing Water Directive (rBWD) and Bathing Water (Scotland) Regulations (2008), The Water Environment (Shellfish Water Protected Area) (Scotland) Regulations (2013), Environmental Authorisation (Scotland) Regulations (2018), The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021, The Environmental Authorisations (Scotland) Regulations 2018 (EASR) (amended 2025)
Managing Quantity of Flows	Managing Quantity of Flows	Sewerage (Scotland) Act 1968, Flood Risk Management Act 2009 (FRM Act), The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021
Enabling Growth	Enabling Growth	The Scottish Water (Objectives: 2021 to 2027) Directions 2020, The Water (Scotland) Act 1980, The Sewerage (Scotland) Act 1968, The Provision of Water and Sewerage Services (Reasonable Cost) (Scotland) Regulations 2015, The Principles of Charging for Water and Sewage Services 2021-27, The Urban Wastewater Treatment Directive (UWWTD)
Climate Change Adaption	Climate Change Adaptation	Climate Change (Scotland) Act (2009), Flood Risk Management Act (2009), The Water (Scotland) Act 1980, Sewerage (Scotland) Act 1968, SNAP3 policy
Climate Change Mitigation	Climate Change Mitigation	Climate Change (Scotland Act) 2009 (as amended), Nature Conservation Act 2004 , Wildlife and Natural Environment Regulations 2011, Streamlined Energy and Carbon Reporting Regulations, Circular Economy (Scotland) Act
Customer and Communities	Customer and Communities	Consumer Scotland Act 2020

2.2.5 Water Sector Stakeholders

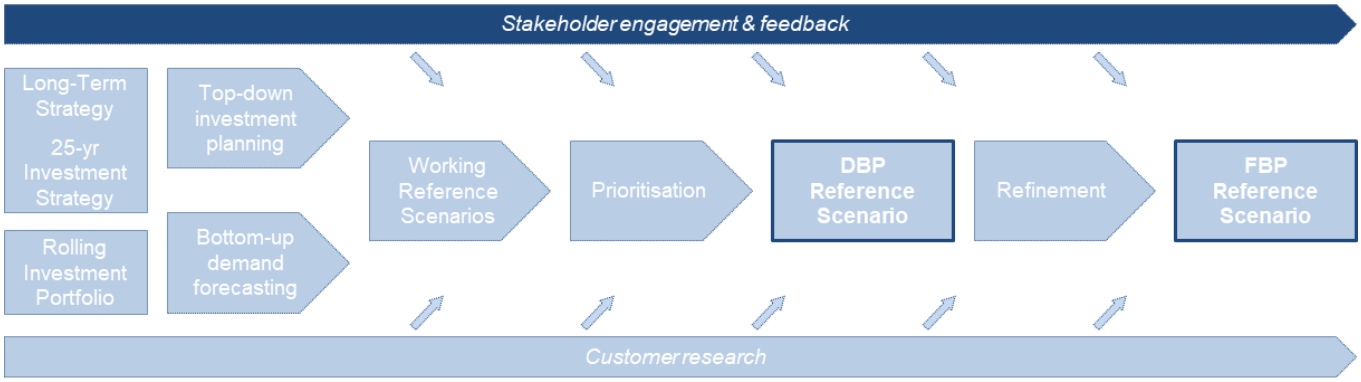


Figure 2: Position of this section within the overall Investment Planning process

Scottish Water operates within a framework of diligent oversight and collaboration, engaging with multiple stakeholders. The above section sets out the requirements from Scottish Government and WICS. The role of our key sector stakeholders within the context of the Strategic Review is set out as follows:

- The **Scottish Government** sets national policies and objectives for the water industry, and its role is pivotal in shaping the regulatory backdrop and ensuring that public health and environmental sustainability are at the forefront of water management practices.
- **WICS** is responsible for economic regulation, ensuring Scottish Water operates efficiently. The economic regulator sets charges and scrutinises financial and operational plans to guarantee that investments deliver value for money while maintaining and improving service quality.
- The **Drinking Water Quality Regulator** (DWQR) acts as quality regulator on behalf of customers to ensure that the water supply in Scotland meets regulatory standards and is considered safe to drink. Activities include regular auditing of our assets, reviewing our performance against regulatory standards, investigating water quality events and incidents, enforcing or seeking commitment to address areas of non-compliance and identifying investment requirements.
- **Scottish Environmental Protection Agency** (SEPA) are responsible for environmental monitoring, ensuring compliance with environmental regulations and sustainability goals. This oversight ensures that water and waste water treatment processes minimise environmental impact, safeguarding ecosystems and biodiversity.
- **Consumer Scotland** represents the interests of water customers, ensuring that their needs and concerns are prioritised. Consumer Scotland works in partnership with businesses, consumer bodies, the public and third sectors to promote the interests of consumers, understand consumer vulnerabilities and promote good business practice.

Stakeholders are engaged through a suite of stakeholder groups that are led by Scottish Government to oversee Water Industry investment. The interaction between these stakeholders and Scottish Water is collaborative and crucial to building the investment requirements for each regulatory period. All stakeholders provided feedback on the Draft Business Plan, detail can be found in 6.3.3 – Stakeholder and Board Engagement.

2.2.6 Integrating the Customer Voice

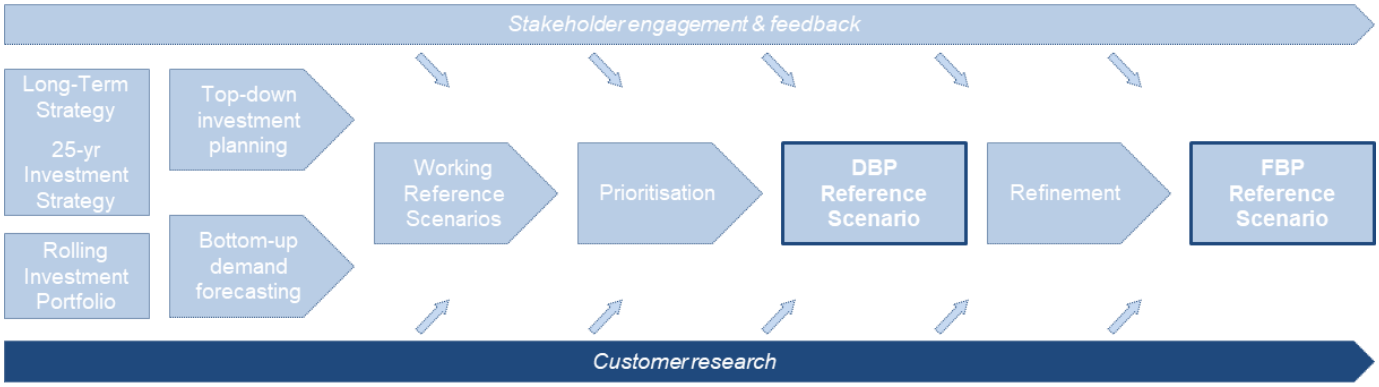


Figure 3: Position of this section within the overall Investment Planning process

The **Independent Customer Group** (ICG) which works closely with Scottish Water to provide independent insight and constructive challenge on strategic planning. The ICG supports and encourages Scottish Water to meet its commitment to take every decision as if the customer were in the room.

Scottish Water, Consumer Scotland and WICS agreed a Memorandum of Understand (MOU) for Customer Engagement for SR27 in November 2024. This set out the roles for Scottish Water, ICG, and Consumer Scotland in the process and put customers at the heart of the Business Plan. The Memorandum of Understanding was built on three pillars: Evidence, Challenge and Confirmation.

The Evidence pillar sought to establish customers' views of issues relating to the Business Plan through a co-ordinated and co-designed programme of research and analysis. The full programme of research continues to be overseen by a Research Advisory Group (RAG), consisting of representatives from Consumer Scotland, Scottish Water, the Independent Customer Group and more recently joined by WICS. The research programme has gathered customer perspectives on all aspects of our investment programme. We have also utilised customer research from the past ten years to synthesise insight on key topics and these can be found throughout our Business Plan and Technical Appendices. Please see the Customer Research Technical Appendix for full details.

The Challenge pillar agreed a role for the ICG to challenge Scottish Water to put customers' needs and expectations at the heart of the Business Plan. This was facilitated by a special terms of reference for the ICG for SR27 and culminates in the ICG's Assurance Report and Challenge Log which are published alongside this plan.

The Confirmation pillar is ongoing and will test whether the SR27 Final Business Plan commands customers' support. This pillar is being achieved through a longitudinal deliberative research project commissioned by Consumer Scotland.

Throughout development of the Business Plan, we have incorporated the recommendations coming from the customer research which has been conducted. We have reviewed investment scenarios to ensure they were delivering better value for customers – assessing both outcomes and costs; considered how we best communicate packages of investment to customers; protected

investment in areas that matter most; and taken the decision to have steady bill increases rather than have higher increases earlier.

3 Long-Term Strategy

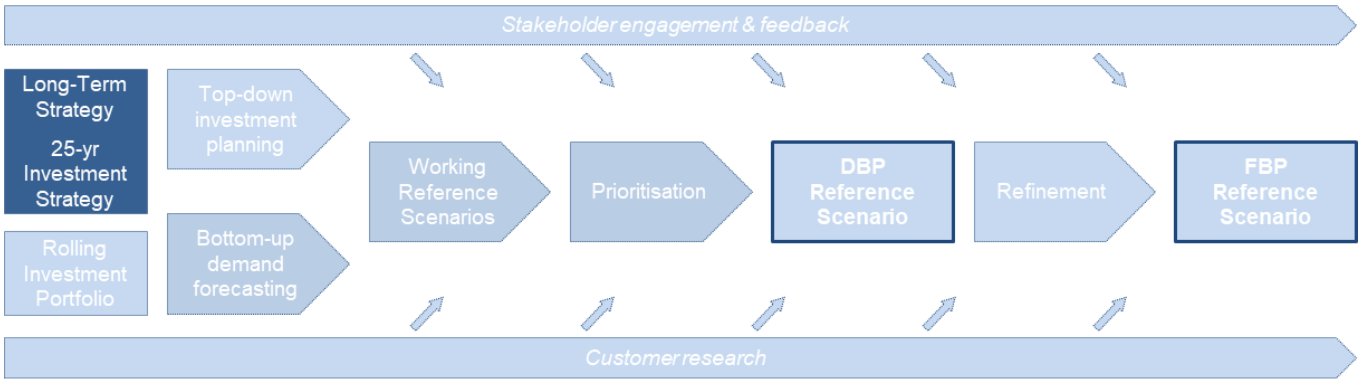


Figure 4: Position of this section within the overall Investment Planning process

A key expectation of the Commissioning Letter, WICS Methodology and the Draft Ministerial Objectives 2027-33 is that Scottish Water plans in the context of the longer term and that that charges should be affordable and set at a level that is fair and equitable to present and future generations.

Within the Minister's Letter to WICS to commission the Strategic Review of Charges process, Ministers stated that they would set their Objectives "*in the context of the water industry vision describing the longer-term nature of the industry and what it can achieve*". Their expectation being that the industry makes clear and demonstrable progress towards these outcomes.

This is reflected in the Final Methodology where WICS has set the key principles for the strategic review period. These are flexibility, evidence and analysis, accountability and long-term context. These principles are set around the Principles of EBP&R and the customer voice. The WICS recognised that SR21 adopted a long-term planning approach, which "*recognised the importance of looking beyond the regulatory period, given the long-term nature of the water industry*"[5]. WICS expects this period to maintain this focus and expects that Scottish Water should "*set out what it plans to deliver over the 2027-33 regulatory period as a step towards achieving the longer-term sector vision*."

Scottish Water has a considerable mix of short to long life assets – from IT equipment that may become obsolete after only a couple of years, right through to dams and sewers that are expected to last well over 100 years (considered to be "in perpetuity"). This means that we must plan over a range of different time horizons, including the long-term (see Figure 5).

[5] SRC27-Final-Methodology.pdf

The SR27 Business Plan deals with the medium-term to 2033 and sets out our plans and investments for the first of four significant steps (Strategic Review periods) towards our Long-Term Strategy planning horizon of 2050. We must consider this SR27 plan in the context of the longer term to ensure we build towards a sustainable future.

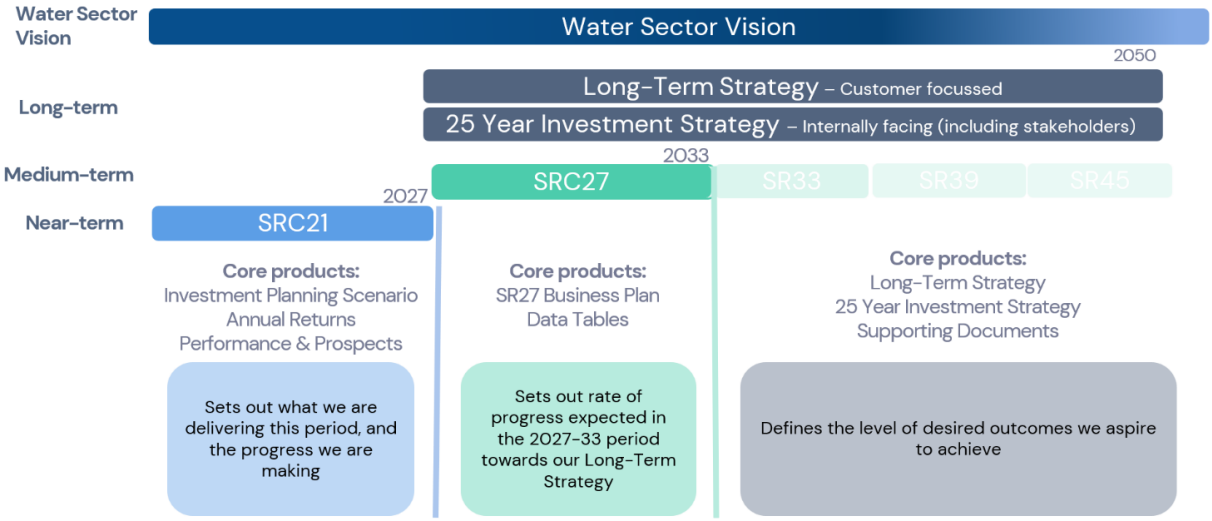


Figure 5: Overview of our planning horizons, with SR27 as the next step on the way to 2050, and the 25 Year Investment Strategy underpinning the Long-Term Strategy

3.1 Water Sector Vision

The Water Sector Vision[6] was collaboratively developed and agreed between the principal water sector stakeholders in 2019, reflecting our sector's long-term aspirations for delivering vital services to customers while leading the way in responding to the climate emergency. Minor amendments were made in agreement with all stakeholders in 2025 to reflect the significant impact of climate change on water resources.

3.2 Long-Term Strategy

In May 2025 we published our Long-Term Strategy[7] outlining how we will deliver our part in making the sector vision a reality. The three main challenges that will impact our ability to meet the three strategic ambitions (see Figure 6) in our Long-Term Strategy are the climate crisis, population change, and ageing assets.

Figure 6: The Long-Term Strategy is underpinned by these three strategic ambitions

[6] Water Sector Vision
[7] Our Sustainable Future Together: Scottish Water Long-Term Strategy

These ambitions require us to find and deliver solutions that always balance service, climate and cost for the benefit of customers, communities and the environment.

The high-level goals this strategy sets are to ensure:

- Scotland's tap water remains a source of national pride and is valued as a precious resource.
- The quality of our rivers and seas has improved, and our communities are protected from flooding, through collaboration with others.
- Scottish Water has played a key role in enabling Scotland's sustainable economic and housing growth.

3.3 25 Year Investment Strategy

Our 25 Year Investment Strategy is the detailed evidence base and investment forecast that underpins the Long-Term Strategy. The 25 Year Investment Strategy is the most comprehensive and quantified strategy we have produced, drawing together all internal strategies under one coherent umbrella structure. This overall strategy provides the context for SR27 planning. The 25 Year Investment Strategy will be reviewed periodically to ensure we reflect the most up to date evidence.

Our analysis and documentation is designed to support effective engagement with sector stakeholders. To fulfil its purpose our 25 Year Investment Strategy contains a significant level of detail and technical explanation, this includes demand analysis, approaches to meet the demands, cost, carbon, interdependencies, uncertainties, and areas for improvement.

3.3.1 The Investment Required to Deliver our Long-Term Strategy

As part of our 25 Year Investment Strategy development, we undertook a broad ranging and comprehensive review of the risks and opportunities across the next 25 years. The investment we have identified will secure our essential services by maintaining our existing asset base, allow us to adapt to climate change and meet our current legislative requirements. Without major changes to how we currently operate the water and waste water system and given the projected impact of climate change, we are currently forecasting that the funding needed to deliver sustainable services will need to almost double over the next 25 years.

Planning for this extended period amidst increasingly complex factors including climate change, population growth, raw water deterioration, improving abstraction and discharge compliance and new legislation, is inherently uncertain and there are both opportunities and risks ahead. We estimate that we will need to invest ~£51.6bn[8] to support our Long-Term Strategy over the next 25 years. Of this, ~£27.6bn will be invested in Asset Repair, Refurbishment and Replacement (AR3), and ~£24.0bn will be invested in Enhancements. We anticipate that both AR3 and Enhancement average annual investment will increase over time.

AR3 will grow incrementally whilst Enhancement will increase at a faster rate due to the need to invest to meet current legislation standards and tightening regulatory expectations (focus area for the first three investment periods). Additionally, there is a need to continually improve the quality

[8] 24/25 price base

and technical sophistication of the infrastructure to ensure that the same, or increasing, service levels are attained in the light of climate change (increasing in later periods).

As an indicator of potential impact on customer charges, investment of £51.6bn over the next 4 investment periods could equate to an annual increase in customer charges of ~CPI+3.3% for SR27 and then a potential equivalent to ~CPI + 3% per annum to 2051, if we assume a steady increase in charging profile and the same level of government borrowing. Whilst there are many uncertainties in this projection, and how we would raise the necessary revenue over such a long time period, this provides a useful indicator when considering the first step in the long-term journey (Figure 7: Projected Investment Profile over 25 Year Period).

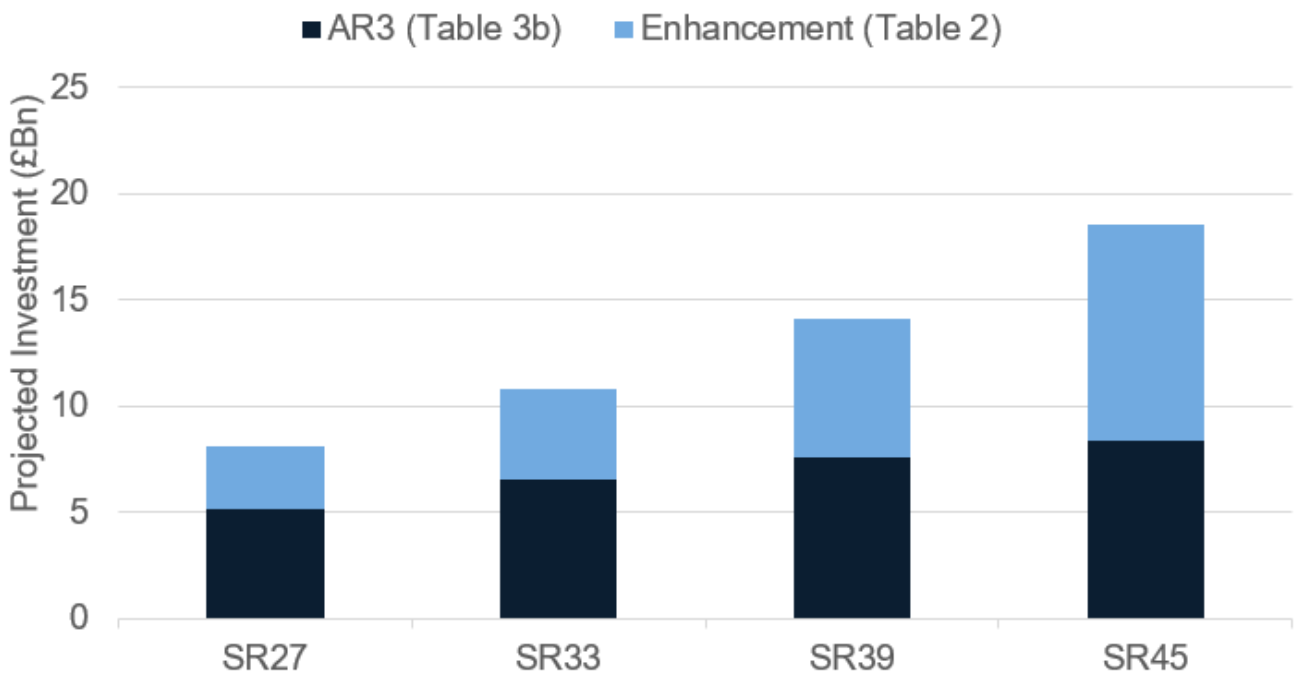


Figure 7: Projected Investment Profile over 25 Year Period

3.3.2 Application for SR27

It must be noted that the 25 Year Investment Strategy does not define or set the customer charge level at this stage for 25 years, this remains part of the strategic review of charges process. The 25 Year Investment Strategy enables Scottish Water to forecast the potential future outcomes expected such that the progress being made in the SR27 period can be put into the context of the long-term. This allows Scottish Water to determine the level of progress being made, and if this is at a reasonable rate, too fast or too slow in relation to what our current understanding of the long-term indicates.

The expected profiles of expenditure, outputs and outcomes are included in the relevant Data Tables and Commentary. The SR27 Data Tables are broken into annual forecasts for each of the years in the SR27 period, whilst those beyond 2033 are broken into 6-year forecasts for the end of the SR33, SR39 and SR45 periods, on the assumption that the 6-year regulatory period is retained. Future demand and investment profiling is first focussed on maintaining current assets, and legislative compliance. Further emphasis on managing risk to service is towards the last two 6-year periods.

4 Investment Planning and Prioritisation Framework

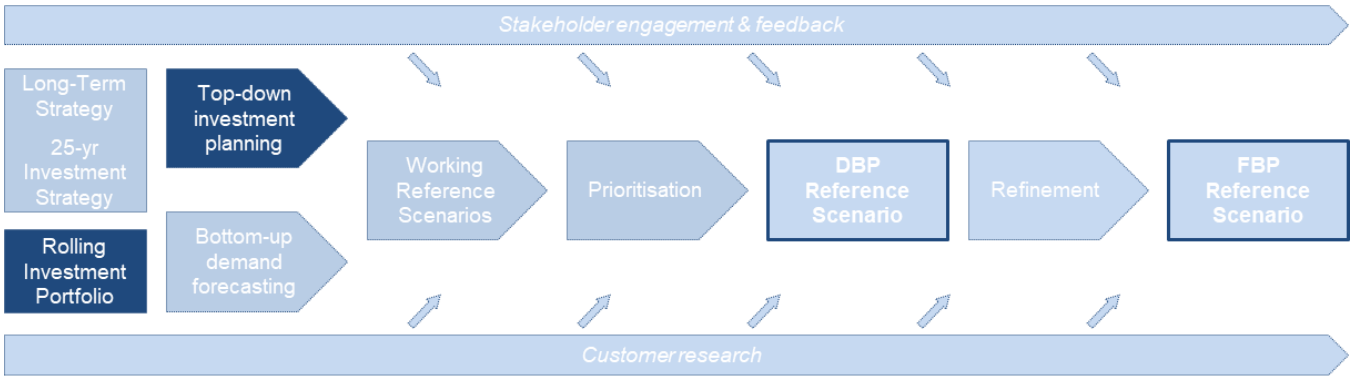


Figure 8: Position of this section within the overall Investment Planning process

4.1 The Framework

During the preparations for the last investment period, a joint working group was established with our sector stakeholders to co-create a new Investment Planning and Prioritisation Framework (IPPF). The overall process is owned by the Scottish Government as it required a significant governance interface with Scottish Ministers.

This approach featured a dynamic, rolling investment planning process which allows the sector to continually incorporate the latest evidence into our decision-making and to collaborate with stakeholders to ensure the costs and benefits of competing investment priorities are balanced appropriately.

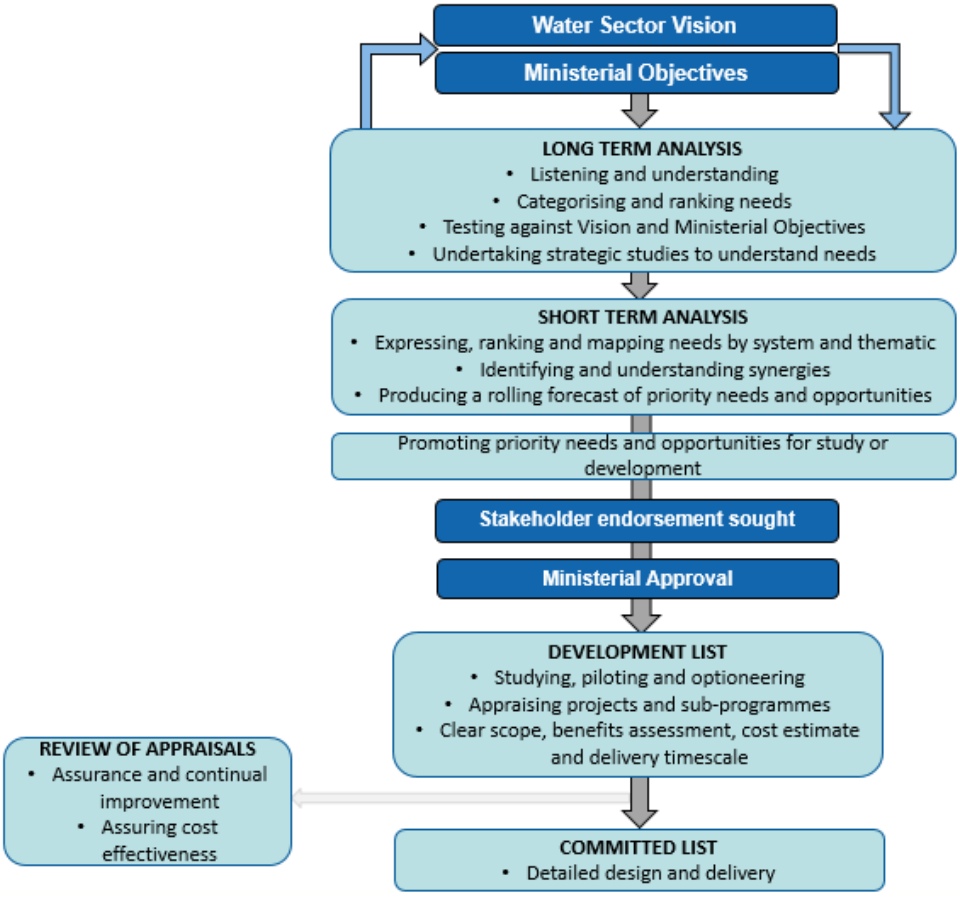


Figure 9: Overview of the Investment Planning and Prioritisation Framework

The primary objective of the IPPF is to "create a framework that builds trust and engagement in decision making to maximise the benefits of investment". Scottish Water and sector stakeholders agreed that the aims of the IPPF are;

To be transparent; provide visibility of the whole programme – so we make clear how decisions are made to invest resources in all types of investment, whether studies, enhancement, growth, planned repair and refurbishment, or planned or responsive replacement;

To be flexible and dynamic – so we ensure that, through dynamic monitoring, we can adjust our investment plan to deal with change, for example cost or demand shocks[9], or new legislation, or changing financial circumstances;

To be balanced – we will ensure that our investment programme will deliver the Ministerial Objectives, and be appropriately set in the longer-term context;

To ensure a shared understanding of risk and opportunities – we will make clear how risks and opportunities inform our decisions;

To ensure our customers and communities are engaged early in our decision making to maximise value;

To increase innovation – we will monitor and drive-up innovation, not just technology and engineering, but how we go about all aspects of our service provision;

To fully consider supply chain impacts – we will create a lean process that enables efficiency, continuity and flexibility of the supply chain;

To ensure appropriate levels of governance – we will ensure that our governance arrangements are sufficient to maintain control, whilst avoiding unnecessary delay.

Scottish Water operates a transparent dynamic investment planning process whereby the Investment Planning Scenario is formally updated and reported out to the Water Industry Investment Group[10] (WIIG) every 6 months.

The IPPF has been retained during the SR21 period. However, in preparation for commencement of the next regulatory period, SR27, the WIIG has created two Task and Finish Groups linked to the review of the IPPF process. The first of these groups, led by WICS is reviewing the existing IPPF with Scottish Water, the Scottish Government and Consumer Scotland, with other stakeholders regularly updated at the WIIG meetings. This review will further improve IPPF ahead of SR27. The key areas of review are:

- Process and timelines
- Delivery Plan
- Change control process
- Assurance and Performance

Progress on the updated draft IPPF will be presented to WIIG.

The second Task and Finish Group, which will follow behind the IPPF group, will consider any changes required to the remit of the WIIG group and the reporting provided to the group.

4.2 Rolling Investment Portfolio

Scottish Water operates a rolling investment portfolio as shown in Figure 10 below. This dynamic approach was implemented for SR15. It allows us to continually incorporate the latest evidence into our decision-making and ensures greater visibility and collaboration with stakeholders to ensure the costs and benefits of competing investment priorities are balanced appropriately.

Through this improved portfolio approach:

- Potential Needs are identified on a rolling basis.
- Investment proposals to address those Needs are developed through a stage & gate process tailored to the complexity of the need and the potential cost of the investment.
- The investment itself is sanctioned by officers authorised by Scottish Water's Board through an approved scheme for Delegated Level of Authority.

[10] The Water Industry Investment Group is chaired by Scottish Government and ensures that the water industry delivers on agreed investment objectives.

- These decisions are guided either through policy criteria defined in Management Approaches, or through the creation and consideration of Project Investment Appraisals.
- Control is maintained through the ongoing monitoring of an Investment Planning Scenario (IPS), which forecasts expenditure toward each Need against proposed allocations which, collectively, are affordable within the parameters of the relevant charge settlement.

The following figure illustrates the concept of the dynamic rolling programme. For SR21, the IPS is made up of demand that is either at the intervention development stage (pre-Gate 30) or the project initiation stage (post Gate 30). To define the SR27 IPS, a process set out in the Approach to SR27 Demand Forecasting chapter is conducted which assesses the current live & committed investment demand and forecasts the new demand that is pre-Gate 30. At the point of the SR27 Business Plan, we have a Reference IPS locked at a point in time. This will continue to be monitored to capture any live variations as a result of changes. This will then be updated during the production of the Delivery Plan for SR27.

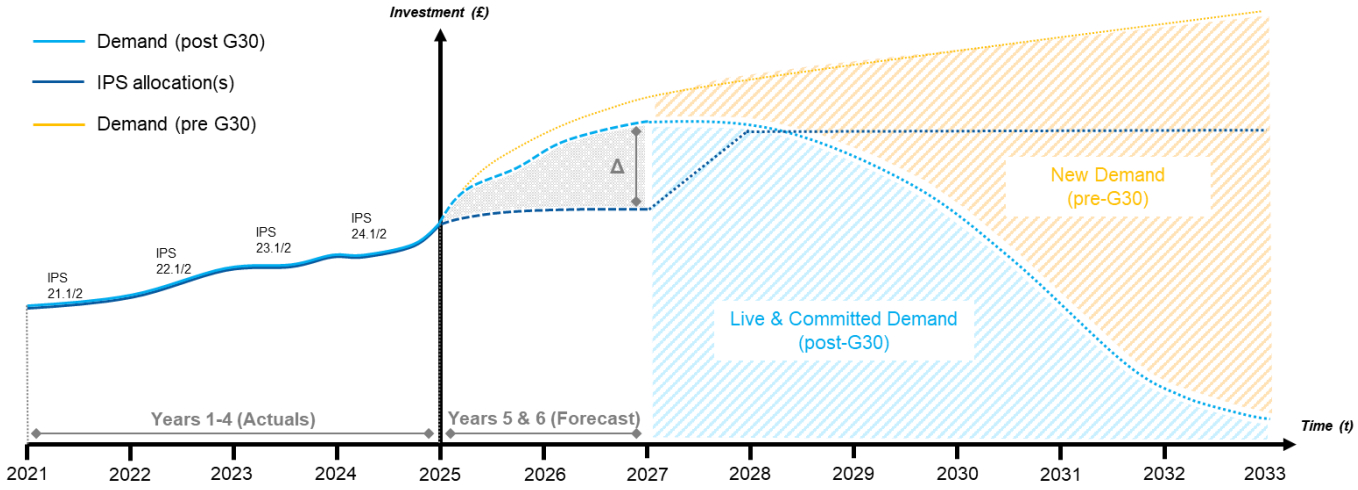
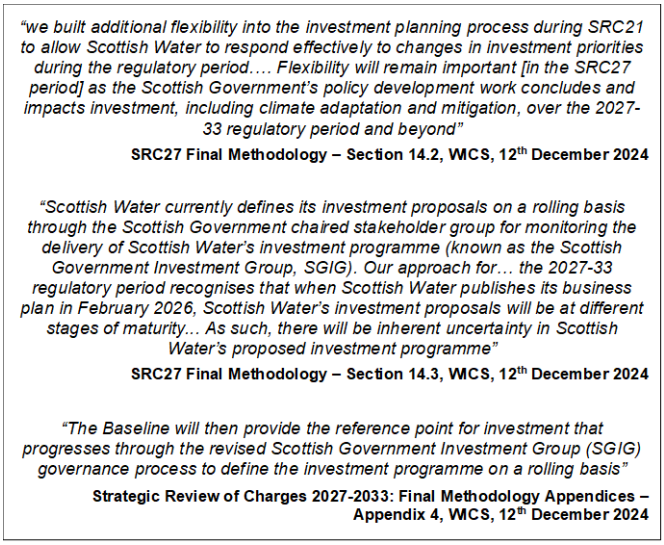


Figure 10: Illustration of the dynamic rolling Investment Planning Scenario (IPS)

In its SRC27 Final Methodology, as shown in Figure 11, the WICS recognises the continuing importance of the flexibility afforded by this approach, noting the implication for establishing an Investment Baseline for SR27 that the investment proposals contained within it will be at varying levels of maturity and so be uncertain. The timing of this Investment Baseline and how it is reflected in the SR27 Delivery Plan is being considered by the IPPF Task and Finish Group.



"we built additional flexibility into the investment planning process during SRC21 to allow Scottish Water to respond effectively to changes in investment priorities during the regulatory period.... Flexibility will remain important [in the SRC27 period] as the Scottish Government's policy development work concludes and impacts investment, including climate adaptation and mitigation, over the 2027-33 regulatory period and beyond"

SRC27 Final Methodology – Section 14.2, WICS, 12th December 2024

"Scottish Water currently defines its investment proposals on a rolling basis through the Scottish Government chaired stakeholder group for monitoring the delivery of Scottish Water's investment programme (known as the Scottish Government Investment Group, SGIG). Our approach for... the 2027-33 regulatory period recognises that when Scottish Water publishes its business plan in February 2026, Scottish Water's investment proposals will be at different stages of maturity... As such, there will be inherent uncertainty in Scottish Water's proposed investment programme"

SRC27 Final Methodology – Section 14.3, WICS, 12th December 2024

"The Baseline will then provide the reference point for investment that progresses through the revised Scottish Government Investment Group (SGIG) governance process to define the investment programme on a rolling basis"

Strategic Review of Charges 2027-2033: Final Methodology Appendices – Appendix 4, WICS, 12th December 2024

Figure 11: The relevant clauses from WICS' SRC27 Final Methodology[11]

4.3 Investment Planning Scenarios

As set out in the previous section the key documents that have guided our activity are the Commissioning Letter, the WICS Methodology and the Draft Ministerial Objectives 2027-33. Our plan must meet the requirements of the Draft Ministerial Objectives 2027-33, command the support of customers, ensure that it represents good value and is efficient and that the investment programme is deliverable (recognising the capacity within the supply chain).

To enable us to do this we have set out our Investment Planning Scenario (IPS) which is a key component of the overall SR27 Final Business Plan. WICS considers that it is in customers' interests for Scottish Water to have sufficient flexibility to plan and prioritise investment on a rolling basis, recognising that changes in risk or additional evidence impact investment priorities. WICS requires Scottish Water to set out what it plans to deliver over the period in terms of investment and outcomes.

If investment priorities change within the SR27 time frame (2027 to 2033), WICS expects Scottish Water to explain and document the changes through the industry governance arrangements, to ensure that Scottish Water remains fully accountable for its performance during the regulatory period. The change control process which will be used for this will be developed by the IPPF Task and Finish Group.

The following sections of this technical appendix focus on how the IPS has been built up and tested to ensure it meets the requirements of the WICS Methodology and the Draft Ministerial Objectives 2027-33.

[11] SGIG (Scottish Government Investment Group) is now known as the Water Industry Investment Group (WIIG)

5 Approach to SR27 Demand Forecasting

This section summarises the approach taken to forecasting investment demand for SR27 ensuring alignment with regulatory and strategic objectives. Further details can be found in Annex A.

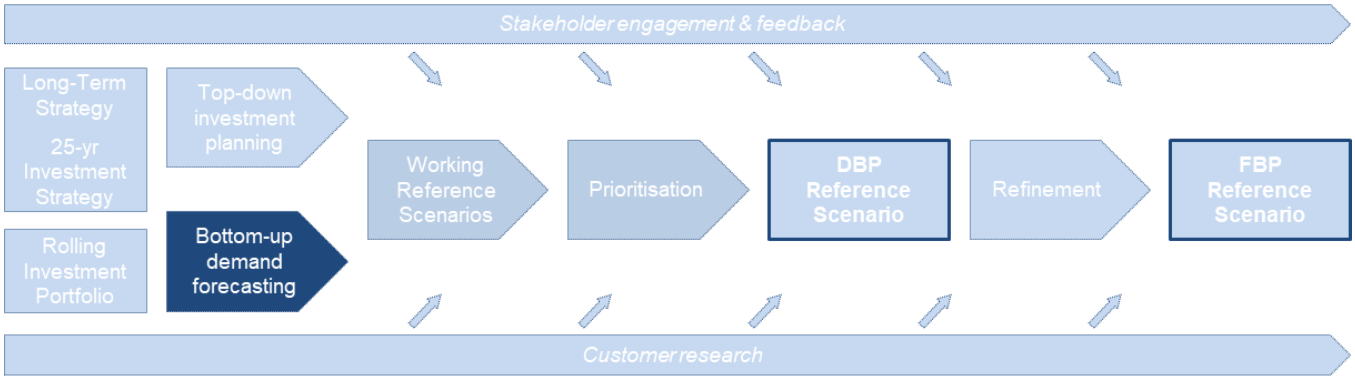


Figure 12: Position of this section within the overall Investment Planning process

5.1 Key Drivers of Demand

Scottish Water balances a number of differing drivers of investment demand. At a strategic level, the 25 Year Investment Strategy demand forecasts are shaped by the three major challenges identified in the Long-Term Strategy (LTS):

- the climate crisis,
- population change, and
- ageing assets.

These, alongside Scotland's Water Sector Vision, inform the high-level long-term outcomes and drive the assessment of long-term demand. A significant element of long-term investment is the need to reach a more sustainable level of AR3, ensuring sufficient progress in maintaining assets in the SR27 period.

The Draft Ministerial Objectives 2027-33, developed in consultation with stakeholders and based on government priorities, are essential in translating these strategic aims into robust demand forecasts that have informed the Business Plan. Legal obligations and regulations set by the Scottish Government, and overseen by SEPA and DWQR, have significantly influenced the demand forecasts for SR27. Alongside a robust understanding of customers' expectations through our research programme (see Customer Research Technical Appendix), which drives investment demand in both regulated and non-regulated service areas.

5.2 Investment Planning Scenario and Demand Grouping

Investment demand is grouped into four primary investment categories:

- Asset Maintenance (AR3): Encompasses asset repair, refurbishment, and replacement to ensure reliability and service continuity.
- Enhancement – Regulatory Compliance: Investments to meet current and consideration given to anticipated regulatory standards and commitments to communities.
- Enhancement – Further Service Choices: Additional service improvements driven by customer expectations and policy choices.

- Growth: Expansion of services to accommodate new customers and support sustainable economic and housing growth.

5.3 Forecasting Methodology and Demand Maturity

The demand forecasting process follows three categories of demand maturity:

- Committed Demand: Needs and solutions are well understood, with delivery already committed (post-Gate 90 in the approval process).
- Known Demand: Needs are confirmed but solutions are under development (post-Gate 30, pre-Gate 90).
- Future Demand: Allowances for expected but as-yet-unidentified needs based on historic trends and policy criteria.

Committed demand is supported by detailed investment appraisals, while known and future demand draws on policy guidance, historic investment run-rates, and scenario analysis to ensure the forecasts reflect both current priorities and anticipated future requirements. Further details are in Annex A: Approach to SR27 Demand Forecasting.

5.4 Investment Planning Systems

Investments are tracked and managed using the Copperleaf portfolio management system, which records all new SR27 investments and supports ongoing integration of long-term demand and live projects. More details on how Copperleaf is used can be found in Annex A: Approach to SR27 Demand Forecasting.

6 Establishing the SR27 Investment Baseline

This section explains how the Business Plan was developed, detailing the creation of the SR27 Investment Planning Scenario Baseline and its role in the Draft Business Plan. It describes the process for refining the SR27 Final Business Plan and alternative investment scenarios following the WICS Final Methodology, highlights stakeholder involvement, scenario development, and key outcomes. For further details of the approach taken to develop the SR27 Draft Business Plan Reference Scenario, see Section 6.2 Annex B: Establishing the SR27 Baseline for Draft Business Plan.

6.1 Investment Planning Scenario Expectations

The WICS Final Methodology requires that Scottish Water present a range of potential charge paths for both household and non-household customers, reflecting different approaches to achieving the Draft Ministerial Objectives 2027-33 and progressing towards the Water Sector Vision. For each charge path, Scottish Water must:

- Show proposed investment levels and associated risks
- Detail the impact on future service levels
- Compare sustainable economic depreciation with actual replacement expenditure cumulatively

The charge path scenarios are required to have one reference scenario and two alternatives. Scottish Water must identify the projects or programmes of work that would be subtracted and/or added to the reference scenario in each of the other charge path scenarios to allow WICS to set a baseline on any of the charge paths.

Investment proposals are divided into asset maintenance, enhancement, and growth categories, with detailed assumptions, forecast costs, and output measures required for each. Efficiency challenges are benchmarked against UK water companies, with adjustments for capital maintenance and PFI contracts. This approach ensures charge paths are feasible, affordable, and deliverable, aligning with Ministerial expectations and engaging a broad range of stakeholders, including DWQR, SEPA, and Consumer Scotland.

6.2 Developing the SR27 Draft Business Plan

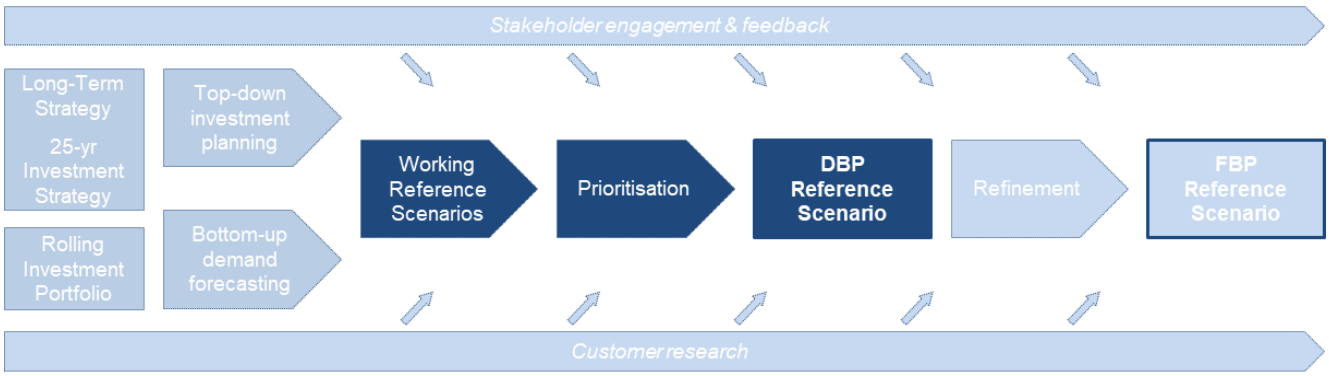


Figure 13: Position of this section within the overall Investment Planning process

When developing and reviewing the Investment Planning Scenarios for the Draft Business Plan the process was iterative, involving repeated reviews and refinements.

More details on the development of the Draft Business Plan can be found in Annex A: Approach to SR27 Demand Forecasting and Annex B: Establishing the SR27 Baseline for Draft Business Plan. The following sets out the high-level approach taken for the Draft Business Plan.

During the preparation stages of the Draft Business Plan, three main scenarios were considered:

- Scenario A ("High" Scenario): Maximum investment to fully meet Draft Ministerial Objectives 2027-33 and advance long-term strategy (CPI+6.5% pa charge increase).
- Scenario C ("Working Reference" Scenario): A balanced, mid-range scenario above previous investment levels but below the High Scenario (CPI+4% pa, £8.5bn investment).
- Scenario E ("Flat Charge" Scenario): Limited to inflation-only increases (CPI+0%), focusing on affordability but at risk of not maintaining services or meeting objectives.

Other scenarios were also considered, but these three formed the primary focus for stakeholder engagement. The scenarios helped define the upper and lower bounds of the "zone of acceptability," considering supply chain capacity, customer acceptance, intergenerational equity, climate change adaptability, asset maintenance, regulatory compliance, and deliverability.

The Technical Appendices for each key investment area step through the impact of this process on that particular area. This can be found in Water Quality, Water Continuity, Water Environment, Managing Wastewater Flows and Enabling Growth Technical Appendices.

6.2.1 Investment Hierarchy

The investment hierarchy[12] from the SR21 period was used to allocate priorities within each of the scenarios:

- Category 1: Asset maintenance (AR3), accounting for ~57% of the Reference Scenario (~£4.7bn – 2024/25 prices).
- Category 2: Legislative and regulatory compliance (~31%).
- Category 3: Service choices, including customer service improvements, growth, and long-life asset replacement (~12%).

Specific projects and programmes were selected using financial constraints, stakeholder input, and management expertise. The process aimed to balance current and future service needs, customer value, and deliverability.

6.2.2 Investment Profiling

Investment was profiled over six years, matching funding availability, legislative deadlines, and supply chain capacity. Major projects were prioritised, and investment profiles were adjusted to ensure efficient delivery.

[12] It aligns with the Scottish Government's Infrastructure Investment Plan (IIP) hierarchy—prioritising demand assessment, optimisation of existing assets, repurposing and co-location, and finally new build—has been embedded within SR27 and the 25-year investment strategy to ensure sustainable and value-driven decision-making. SR27 applies this hierarchy by emphasising asset maintenance and reuse before committing to major capital projects, aligning with long-term objectives to reduce carbon impact and maximise public value. Similarly, the 25-year strategy uses the hierarchy as a guiding principle for future-proofing infrastructure, promoting adaptability and resilience while minimising unnecessary expansion.

6.2.3 Refining the Draft Business Plan Reference Scenario

The “Working Reference” Scenario was further refined to a “Reference” Scenario of £8.75bn (pre-efficiency, 2023/24 price base; £8.3bn post-efficiency). Adjustments were made informed by stakeholder feedback, regulatory requirements, customer research, and Draft Ministerial Objectives 2027-33. Strategic options were considered to manage budget constraints, including reallocating investment between AR3, service choices, carbon capture, environmental compliance, and leakage reduction.

6.2.4 Key Outcomes of the Reference Scenario in the Draft Business Plan

The Reference Scenario at SR27 Draft Business Plan was designed to:

- Meet Draft Ministerial Objectives 2027-33 and statutory obligations (drinking water, environment).
- Maintain high service levels amid climate change and asset ageing.
- Support Net Zero carbon targets.
- Invest in climate adaptation, and asset condition monitoring.
- Reflect customer research and stakeholder engagement principles.

Key metrics forecast improvements in customer service, water quality, leakage, emissions, and environmental outcomes by 2032/33.

6.2.5 Draft Business Plan Alternative Scenarios

Two alternative scenarios were developed for the SR27 Draft Business Plan, each representing a CPI+1% change to annual customer charge levels from the Reference Scenario:

- Alternative Scenario B (“Delivering more for customers”): Adds ~£430m, enabling upgrades to water treatment, accelerated asset replacement, enhanced flood mitigation, and additional environmental improvements.
- Alternative Scenario C (“Address the problems that we can today”): Removes ~£420m, necessitating difficult choices such as reduced asset inspections, lower mains replacement rates, increased risk of service failures, and a reliance on future investment for Net Zero targets.

These scenarios illustrated the trade-offs between investment, service quality, affordability, and compliance, helping stakeholders and customers understand the implications of different funding paths.

6.2.6 Concluding the Draft Business Plan Process

The Draft Business Plan Investment Planning Scenario represented a robust, transparent, and collaborative process. The Reference Scenario, shaped by stakeholder engagement and customer input, balances affordability, deliverability, and long-term outcomes. This Draft Business Plan Reference Scenario was a crucial step in enabling formal feedback from stakeholders and further engagement with customers which has enabled the production of the investment scenario for the SR27 Final Business Plan. The following sections represent the steps taken to further develop the Business Plan investment scenario for the SR27 Final Business Plan.

6.3 Refinements for the SR27 Final Business Plan

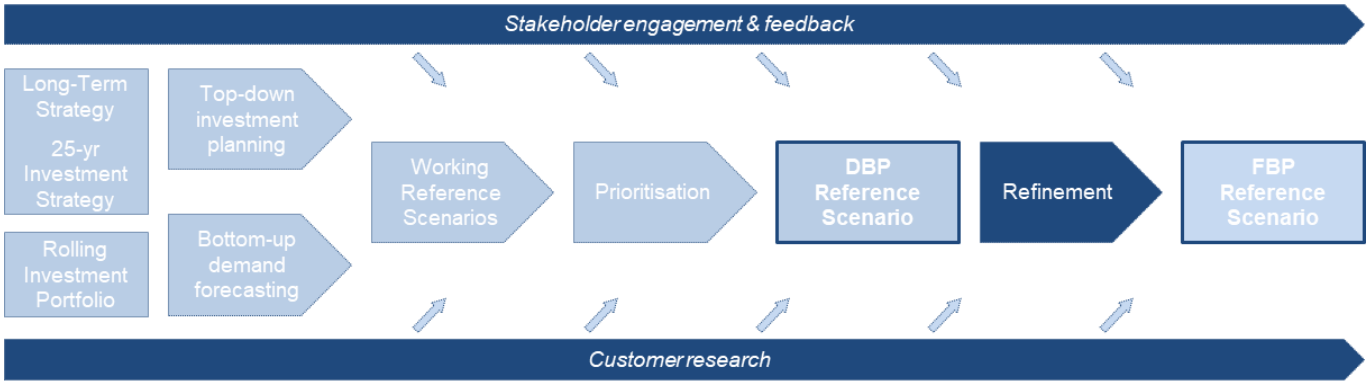


Figure 14: Position of this section within the overall Investment Planning process

In line with WICS Final Methodology, Scottish Water shared the Draft Business Plan with all sector stakeholders in June 2025, and formal feedback was received from WICS, Consumer Scotland, ICG, SEPA and DWQR in August 2025. Nationally representative customer research was also undertaken on the outcomes and costs of the Draft Business Plan (for further details see Customer Research Technical Appendix). Consideration of all these views, and ongoing engagement with sector stakeholders and the Board, have ensured this Business Plan has balanced the difficult trade-offs between outcomes and costs for customers, long- and short-term objectives and regulatory demands and customer expectations.

6.3.1 Stakeholder Feedback

A full record of stakeholder feedback and Scottish Water's response has been captured and discussed with the stakeholders. All stakeholders had elements of positive feedback on the Draft Business Plan submission, noting how comprehensive it is, the high standard of data tables and the clear lines from customer research to investment proposals.

Constructive feedback referenced a requirement to provide a greater explanation of the reasons of the change in assumed long-term charge forecast (CPI+2% pa) expressed in WICS SRC21[13] Final Determination[14]. There was also a desire to see an increase in the level of ambition across several outcomes, more emphasis on community engagement and the role customers can play in supporting the Water Sector Vision, balanced with a push to ensure the plan is affordable for customers (see Customer and Communities Technical Appendix for more detail). Several stakeholders provided feedback on efficiency and alternative financing options.

Specific feedback can be found in the relevant Technical Appendices and in the main Business Plan document. In response to feedback additional sections or revisions have been made and included in this technical appendix in relation to:

- Refining the SR27 Final Business Plan found within Establishing the SR27 Investment Baseline – Section 6.3
- Providing a Robust Evidence Base – Section 8
- Approach for Water Companies in England and Wales Our Milestone Commitments for Asset Maintenance and Asset Health – Section 9.3

[13] Strategic Review of Charges
[14] 2021-27 Final Determination.pdf

- Further analysis has been conducted in relation to the Draft Ministerial Objectives 2027-33, and this can be found in Annex E: Analysis of the Recommended Reference Scenario against the Draft Ministerial Objectives.
- The impact on Customer Charges – Annex F: Impact on Customer Charges.

6.3.2 Customer Research

The Customer Research Technical Appendix provides further detail on all the customer research which has been undertaken to inform both the SR27 Draft and Final Business Plans, including the national representative quantitative research undertaken on the Draft Business Plan. Findings from all research have led to several recommendations which have shaped the Business Plan, these recommendations were:

- Affordability is a concern for household customers, particularly household customers with lower incomes.
- The outcomes proposed in the Draft Business Plan are broadly acceptable to customers, although care is needed to ensure that outcomes related to internal and external sewer flooding are not eroded over SR27.
- Customers' personal views on the whether climate change is an urgent problem can impact the overall acceptability of Scottish Water's plans for SR27.
- Communicating plans for SR27 in the context of long-term outcomes and challenges has a significant impact on acceptability.

6.3.3 Stakeholder and Board Engagement

Further engagement to prepare this SR27 Final Business Plan has been undertaken with sector stakeholders through bi-lateral discussions, Strategic Review of Charges Group[15] meetings and the Water Industry Leaders Group[16], and through regular interactions with the Board. Scottish Water have provided a number of updates to the proposed Investment Planning Scenario to test significant changes and trade-offs that are required to respond to the material pressures identified through stakeholder and customer feedback and updated analysis. The Board's engagement in the development of the Investment Planning Scenario is set out in the Board Assurance Statement within the Main Business Plan document.

[15] The SRC (Strategic Review of Charges) Group is chaired by WICS and provides a platform for sector stakeholders to discuss key strategic topics which have an impact on WICS' SRC27 Final Determination, including the Final Business Plan and Draft Determination.

[16] The Water Industry Leaders Group is a forum for senior leaders from each of the main stakeholder organisations involved in the water industry in Scotland to provide oversight and ownership of priorities and challenges across the sector.

6.3.4 Refining the Draft Business Plan Investment Baseline

Following feedback from Scottish Water stakeholders and customers as well as the availability of additional and refined data underpinning the investment plan, the Reference Scenario contained in the Draft Business Plan was reviewed and revised:

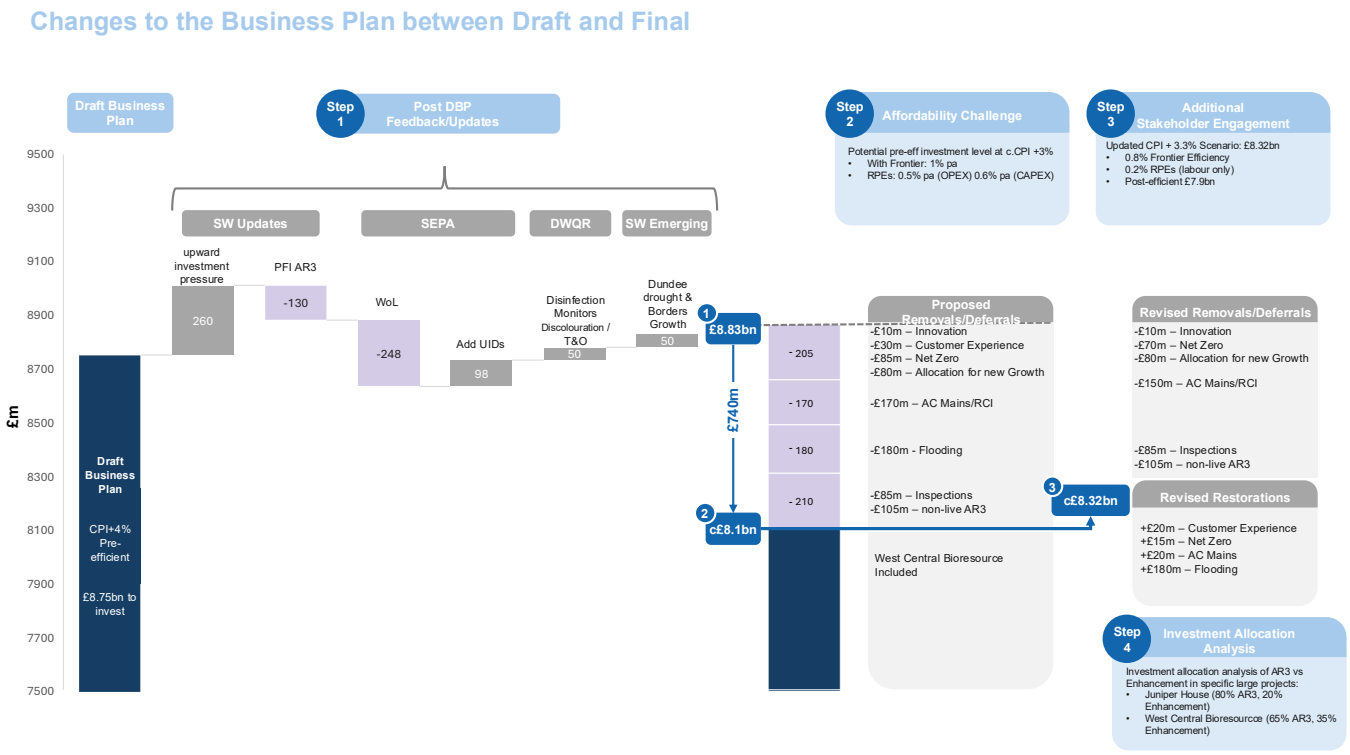


Figure 15: The steps taken to develop SR27 Final Business Plan from the Draft Business Plan

Step 1: Post Draft Business Plan Updates and Feedback Revisions

The first activities undertaken within this review and refinement process focused on updating needs and requirements. This included the refinement of investment numbers based on latest best estimates and incorporating feedback from stakeholders:

Scottish Water Updates

- **Latest best estimates of costs and SR21 investment deferrals were updated,** acknowledging that project scopes, options and costs continue to mature as the Business Plan is developed.
- **West Central Bioresources was confirmed for inclusion within the SR27 investment plan.** For the Business Plan it is the working assumption that West Central Bioresource will be pursued through Tier 2 funding (more information can be found in the West Central Bioresources Technical Appendix).

Regulatory Requirements

- Following receiving feedback from SEPA and DWQR we discussed with them **requirements, options and potential trade-offs.** This open discussion added new investment needs in line with regulatory priorities but also supported the deferral and replacement of a large named 'high priority' Unsatisfactory Intermittent Discharge (UID) scheme with disproportionate cost, with a greater number of more cost effective 'medium priority' UID schemes instead included. The Water of Leith (WOL) UID scheme is a large strategic scheme early in its development. It was agreed that this approach would provide

greater customer value and the deferral of the larger scheme would provide further time to explore and refine the scope and cost of the intervention. It will also enable us to continue to show progress to having no UIDs by 2050.

- **Emerging needs were included,** since the submission of the Draft Business Plan, Scottish Water has been made aware of a number of emerging needs which will also require funding in SR27, namely; to address water resources in Dundee, and a growth project in the Scottish Borders.

These adjustments resulted in £8.83bn of needs, £0.1bn greater than the Draft Business Plan.

Step 2: Affordability Challenge

The second set of activities then focused on addressing the feedback relating to customer affordability. Further funding constraints were applied, and investment trade-offs and choices were made to meet this constraint, including:

- **The funding envelope was initially constrained** to an equivalent charge level of CPI +3%pa. This required the removal or deferral of certain investments. This activity was undertaken utilising the principles of the current SR21 Investment Hierarchy to prioritise in a structured manner.
    - Hierarchy-Based deferrals: Amounting to £205m were deferred in line with the investment hierarchy.
    - Innovation expenditure was reduced by £10m (from an initial £40m).
    - Customer experience funding was decreased by £30m (from an initial £30m, effectively removing this allocation).
    - Net zero initiatives were scaled back by £85m (from an initial £110m).
    - Growth Funding Revisions: Growth funding was reduced by £80m, which would result in the removal of risk allocation for waste water growth and a strategic shift to reactive, needs-based prioritisation.
    - Asbestos-Cement (AC) Mains renewal was reduced by £170m, lowering the delivery target from 1,800km to 1,000km. This would constrain progress on the long-term AC challenge and maintains the Repeat Customer Interruptions outcome measures at existing (high) levels.
    - AR3 funding was reduced by £210m, including an £85m reduction in inspections (from £260m) and a £125m reduction in planned allocation (from £200m). This would limit advancement to a long-term sustainable asset management position.
    - Flooding and Partnership Funding: These investments were reduced by £180m, this would result in a narrowed focus on property-level protection and the deferral of broader localised flooding solutions. This would show significant deterioration in this service outcome measure.

As a result of these interventions the plan reduced in size to c.£8.1bn. This plan still largely met the expectations of the water quality and environmental regulators (these revisions were shared with stakeholders in October 2025). However, it had a detrimental impact on the outcomes that customers valued (as demonstrated in customer research) such as internal sewer flooding, interruptions to supply and customer and community experience.

Step 3: Additional Stakeholder Engagement

The final step undertaken was to engage our stakeholders at the Water Industry Leadership Group.

Although no decisions were made at this meeting, the discussions helped shape Scottish Water's considerations of what final adjustments should be made to the Reference Scenario as follows:

- Restoring base AR3 and inspection allocations (£185m).
- Increasing AC Mains replacements by 400km (£150m).
- Restoring the flooding allowance (£180m), with a strategic emphasis on surface water management and partnership-led solutions.
- Restoration of customer experience initiatives (£20m) and selected renewables and energy efficiency projects (£15m).
- Where investments were deferred, investments were then profiled over SR33-45 to ensure the Long-Term Strategy outcomes remained on track.

As part of this step financial assumptions were reviewed to confirm the investment envelope:

- **The Frontier Efficiency position was revised** down to 0.8% from 1%
- **Real Price Effects applied to labour only** (further information can be found in the Efficiency Technical Appendix).

Customer charge assumptions were increased from CPI +3% pa to CPI +3.3% pa.

In reviewing, and subsequently revising, the outcomes to meet the expectations of our stakeholders this increased the amount of investment, resulting in an increase in the required customer charge from CPI +3% p.a. to CPI +3.3% p.a. However, compared with the draft business plan this is a lower position than the proposed CPI +4% p.a. increase in customer charges.

Step 4: Investment Allocation Analysis

Following a review of the investment, Scottish Water recognised that two large projects had been allocated 100% to Enhancement which had been done initially for ease of tracking and communication to stakeholders. These projects were West Central Bioresources (see West Central Bioresource Technical Appendix) and Juniper House (the replacement of our scientific laboratory which carries out the majority of our sample testing). These were analysed further to determine how much of the project should be attributed to AR3, and how much to Enhancement. Due to the nature of both project replacing existing assets, whilst also providing an element of enhanced capability to address new demands as a result of changing legislative requirements. Through this analysis there was a reallocation of investment to AR3 for both projects resulting in the following change in the Investment Planning Scenario set out in the following table.

Table 4: AR3 and Enhancement Allocation Split

	AR3	Enhancement
West Central Bioresources	61%	39%
Juniper House	80%	20%

This results in a shift in AR3 from £4.65bn to £5.14bn and Regulatory Commitments from £2.47bn to £2.0bn. This represents a 24% increase in overall AR3 investment since SR21, of which 12% is due to like-for-like increases.

Figure 16: Proposed Investment in SR27 Final Business Plan – equates to CPI+ 3.3% per annum

Note: there is no change to the top line Investment Planning Scenario nor customer charge impacts – this is purely to more accurately represent the allocation to the categories shown in the diagram.

6.4 SR27 Final Business Plan Reference Scenario

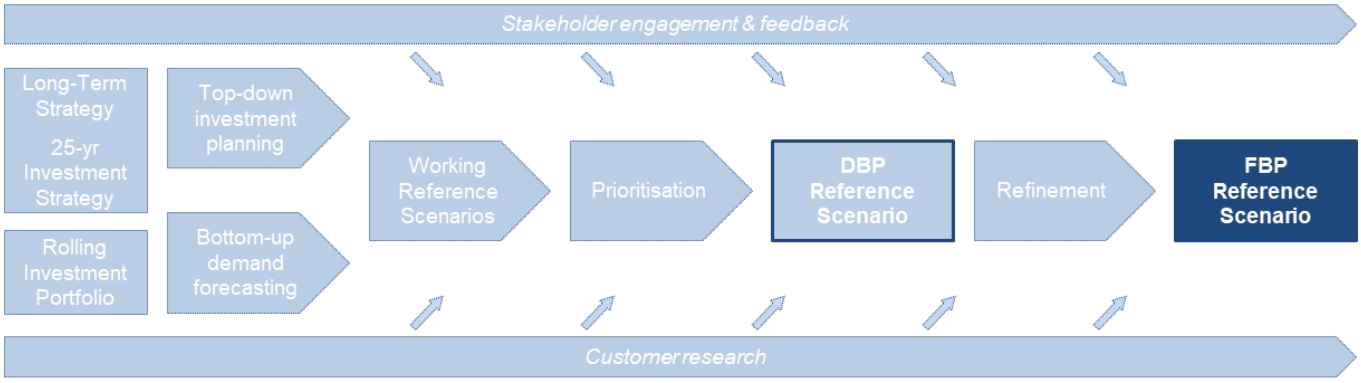


Figure 17: Position of this section within the overall Investment Planning process

6.4.1 Comparison of the Reference Scenarios

This SR27 Final Business Plan has required a balance to be reached across competing investment priorities. It represents a reduction in investment for AC mains replacement (which increases the risk of increased interruptions to supply) and a reduction in investment in AR3, posing an additional risk against the AR3 policy positions set out in Management Approaches (more responsive work rather than proactive replacement).

These changes have allowed the overall scenario to be reduced and to enable more investment to be allocated to addressing water quality commitments and expectations to meet legislative requirements and enforcement notices from DWQR (see Water Quality Technical Appendix). More investment has been allocated to Environmental studies (specifically to support RBMP3 & RBMP 4) in response to feedback from SEPA (Water Environment Technical Appendix). However, following pragmatic discussions with SEPA, there has been a rebalancing of increasing outputs for lower overall investment allocation for other SEPA requirements. A reduction in inspections has also been included within the scenario which will impact on the collation of asset information which will slow down our understanding of asset condition and health. Further risk has been taken in waste water growth which poses greater risk on the compliance at waste water treatment works. These risks are set out in each of the relevant key investment Technical Appendices.

6.5 Summary of the Business Plan Reference Scenario

In summary, the final version of the business plan is a measured response to the affordability challenge, regulatory compliance requirements, and business priorities. It focuses investment on core regulatory and compliance outcomes, defers or reduces funding for lower-priority areas, and provides a clear framework for the potential reinstatement of activities should additional funding be realised.

Whilst the refinement process for the SR27 Final Business Plan has led to difficult trade-off decisions, it reflects a balanced Reference Scenario that:

- protects the service package that our customers' support,
- addresses the need to complete West Central Bioresources in SR27, rather than delay to SR33.
- meets the requirements of the quality regulators, and
- responds to challenges to reduce the scale of bill increases and proposes a customer charge level which is reasonable and affordable for this generation of customers, is equitable in relation to customers in the future, and remains below the charge levels for customers in England and Wales.

The SR27 Final Business Plan Reference Scenario has been tested against the Draft Ministerial Objectives 2027-33 which is set out in Annex B.

The investment we set out in our SR27 Final Business Plan is summarised below. Further details of what is included within the investment is broken down in each of the relevant Technical Appendices.

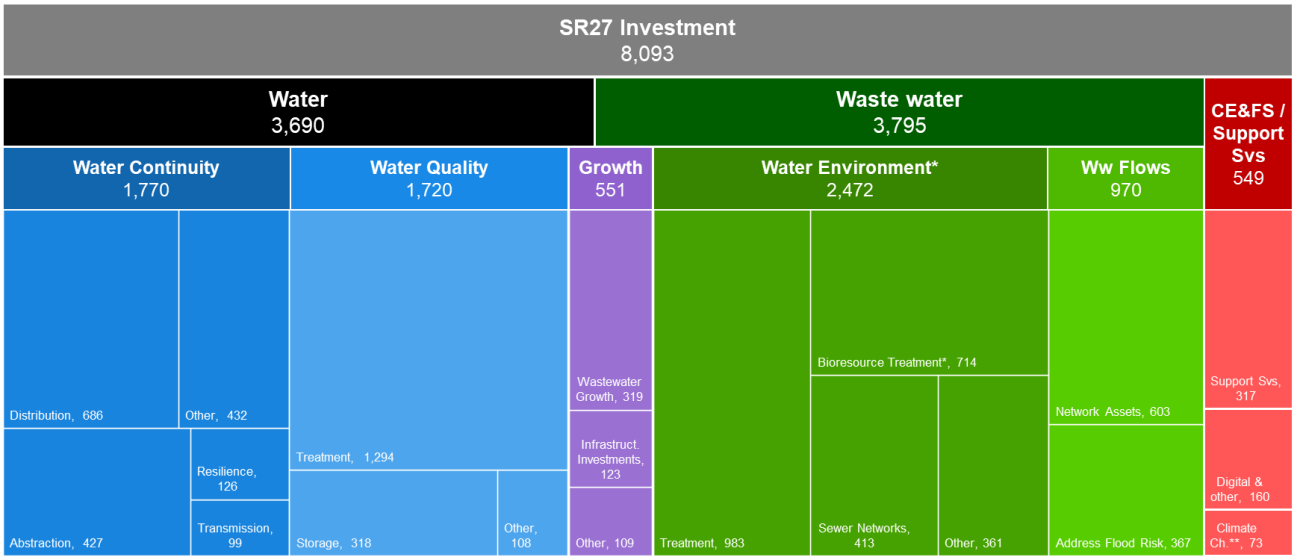


Figure 18: Investment in SR27 Business Plan (24/25 post efficiency)

Some investment sub-categories have been consolidated into an "Other" sub-category.

Further details of all investments can be found in the relevant Technical Appendices.

Total SR27 investment also includes a £60m RPE impact assumption.

** Includes West Central Bioresource investment (£557m)*

*** Includes £59m of Climate Change Mitigation and £13m of direct Climate Change Adaptation(CAA) investment. The rest of CCA investment is inherent throughout the programmes.*

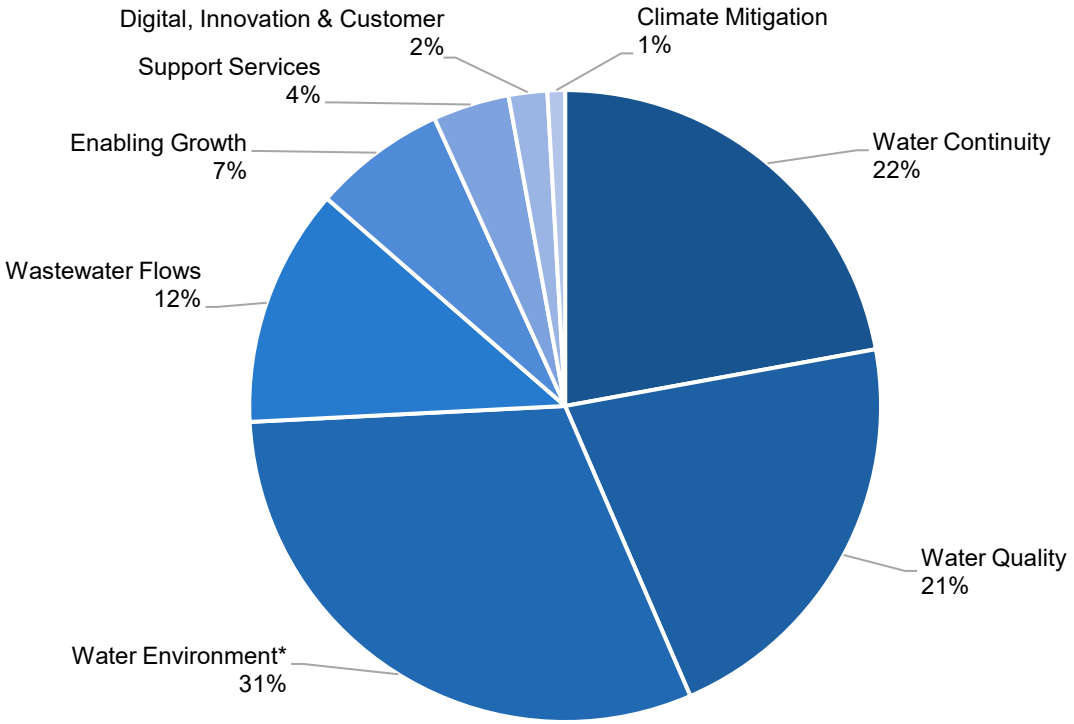


Figure 19: Share of SR27 investment across the Technical Appendices

** Includes West Central Bioresource investment*

The following Figure *20: Projected SR27 Final Business Plan Outcomes*sets out the impact on the outcomes which are represented in Table 1 of the Business Plan Tables. It also provides a comparison of what was included in the Draft Business Plan.

Further information can be found in Performance Monitoring Technical Appendix.

Customer Service

Metric description	DBP	FBP	Movement DBP- FBP
Developer customer experience measure	6%	6%	Unchanged
Non-household customer experience measure	6%	6%	Unchanged
R-MeX (wholesale services)	0%	0%	Unchanged
Household customer experience measure	6%	6%	Unchanged
UKCSI	0%	0%	Unchanged
Communities measure (ABC measure)	-	April 26	Descriptive update
Asset health	-	1%	New measure

Net Zero

Metric description	DBP	FBP	Movement DBP - FBP
Net Zero Emissions	67%	38%	Lower
Operational emissions (W)	96%	74%	Lower
Operational emissions (WW)	65%	49%	Lower
Baseline emissions	[77%]	-21%*	Lower
Operational emissions (net)	91%	68%	Lower
Embodied carbon	31%	5%	Lower
Carbon capture/sequestration	188%	204%	Improved
Biodiversity land-use	-	-	Descriptive Update
Biodiversity outcomes	-	April 26	Descriptive Update
Resource recovery	-	-	Descriptive Update

* Large change in this line impacted by a methodological improvement. Comparison to DBP is not like-for-like as a result.

Water

Metric description	DBP	FBP	Movement DBP – FBP
Total leakage	10%	10%	Unchanged
Zonal leakage in deficit zones	13%	13%	Unchanged
Business demand	16%	15%	Unchanged
Per capita consumption (PCC)	2%	2%	Unchanged
Low pressure	13%	13%	Unchanged
Unplanned interruptions	0%	0%	Unchanged
Minutes lost	0%	0%	Unchanged
Repeat ITS	17%	0%	Lower
Worst historic drought	21%	9%	Lower
Peak demand	47%	0%	Lower
Taste & odour	-4%	0%	Improved
Discoloration	2%	10%	Improved
Lead SW networks	39%	41%	Improved
Lead customer pipes	7%	7%	Unchanged
Drinking water compliance	29%	29%	Unchanged
WRAP	19%	12%	Lower
DWQR reported incidents	17%	17%	Unchanged

Environment

Metric description	DBP	FBP	Movement DBP – FBP
Annual internal sewer flooding	6%	6%	Unchanged
Internal sewer flooding register	0%	0%	Unchanged
Annual external sewer flooding	-7%	-7%	Unchanged
External sewer flooding register	-5%	-5%	Unchanged
WwTW discharge compliance	0%	0%	Unchanged
Serious pollution (EPI Cat 1/2)	38%	38%	Unchanged
Total pollution (all categories)	0%	0%	Unchanged
Sludge compliance	0%	0%	Unchanged
Network discharges (UIDs)	14%	17%	Improved
River water quality	-	-	Descriptive Update

Figure 20: Projected SR27 Final Business Plan Outcomes

7 Funding the Plan

7.1 Balance of Customer Charges and Borrowing

Scottish Water is funded through customer charges and borrowing from the Scottish Government. Currently, around 90% of the cost of providing water and waste water services is funded through customer charges.

The Scottish Government has indicated that it will continue to provide £170 million per annum (nominal) borrowing to Scottish Water across the SR27 period. As costs and the size of our investment programme increases, the proportion of total costs that is funded by this £170 million each year will fall. Therefore, the proportion of total costs which are covered by customer bills will increase from 90% to approximately 94%.

The following figure (Figure 21) sets out the proposed funding and financing that has been used as the basis for the SR27 Final Business Plan.

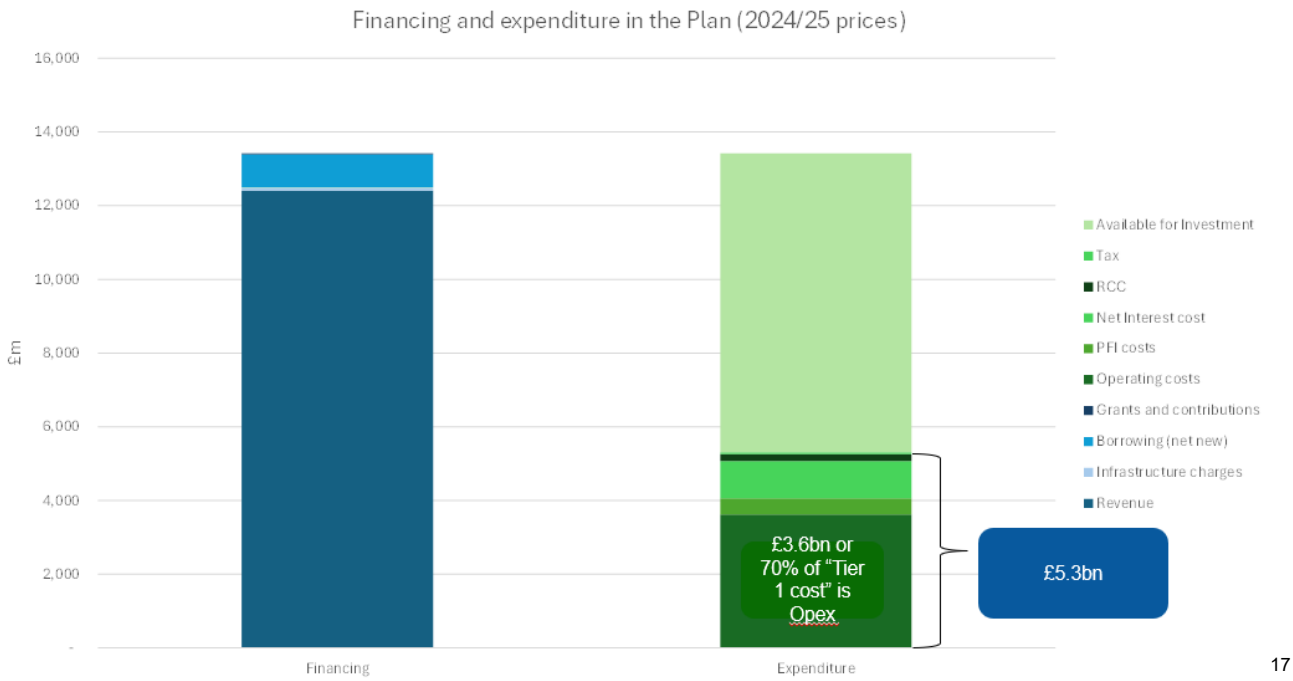


Figure 21: Scottish Water's proposed funding and expenditure 2027 – 2033

7.2 Impact of the Reference Scenario on Customer Charges

Scottish Water strives to keep charges, which are set out in the Principle of Charges, as low as possible whilst also delivering the outcomes that customers, regulators and stakeholders expect for customers, communities, the environment and Scotland as a whole.

Understanding the impact of charges on customers has been a central part of the SR27 research programme. We have tested affordability, reasonableness, and value for money, recognising the economic challenges some customers face. Early customer research found CPI +4% annual increases were deemed reasonable to maintain and improve services in light of the long-term

[17] RCC: Reasonable Cost Contribution

challenges Scottish Water face. Further quantitative customer research shows household customers are split evenly on whether this charge level is affordable. In response to this the final plan reduces price increases to CPI +3.3% annually, although this has not been retested with customers.

Customer research also highlighted concerns over protections for customers who were financially vulnerable. Over half of households receive affordability support through schemes like the Water Charges Reduction Scheme (up to 35% discount) and Single Person Discount. These measures represent about 20% of the average bill, however, analysis shows weak correlation between water poverty and current support eligibility, with many in water poverty not receiving aid and some receiving support despite not being in water poverty.

We have developed a reference scenario which we believe has the right balance between the outcomes customers expect, and the impact that this has on customers' charges recognising measures to support financially vulnerable customers will be set by the Scottish Government in their Principles of Charges.

7.3 Alternative Scenarios within the SR27 Final Business Plan

As per the WICS Final Methodology, Scottish Water is required to provide **two distinct options alongside the central Reference Scenario for the Business Plan**. Within the Draft Business Plan customer charge increments of CPI + 1% p.a. were used with one alternative above the Reference Scenario and one below.

For SR27 Final Business Plan it was decided to apply an increment of CPI+0.5% p.a. to represent a narrowing of the investment scenarios as the planning process has matured. The refinement process deferred or removed as much investment as possible from the plan whilst still achieving regulatory and statutory requirements and customer/stakeholder agreed priorities. Therefore, it was considered appropriate to present **two alternative scenarios representing increased investment plans (equivalent to customer charge increases of CPI + 3.8% p.a. and CPI + 4.3% p.a.)**. Taking any further reductions in the investment proposals below the Reference Scenario would not meet the Draft Ministerial Objectives 2027-33 (for example unable to support economic growth) and would pose a greater risk profile for Scottish Water.

The updated WICS Data Tables Guidance specifies an additional requirement for Scottish Water to **"examine whether it is feasible to deliver the Ministerial Objectives with a charge path increase of CPI + 2% p.a. and, if so, include it as one of the charge path scenarios (either replacing one of or in addition to the three charge paths in the draft business plan)."**. The CPI+2% charge path was not considered feasible as a plan of this size would not deliver the Draft Ministerial Objectives 2027-33. Therefore, this charge path has not been included in the SR27 Final Business Plan.

To develop the two alternative scenarios representing an increase investment plan size, the investment hierarchy was used and more investments, previously removed, were restored back into the plan in line with the structure of the investment hierarchy. Figure 22 describes the two alternative scenarios developed.

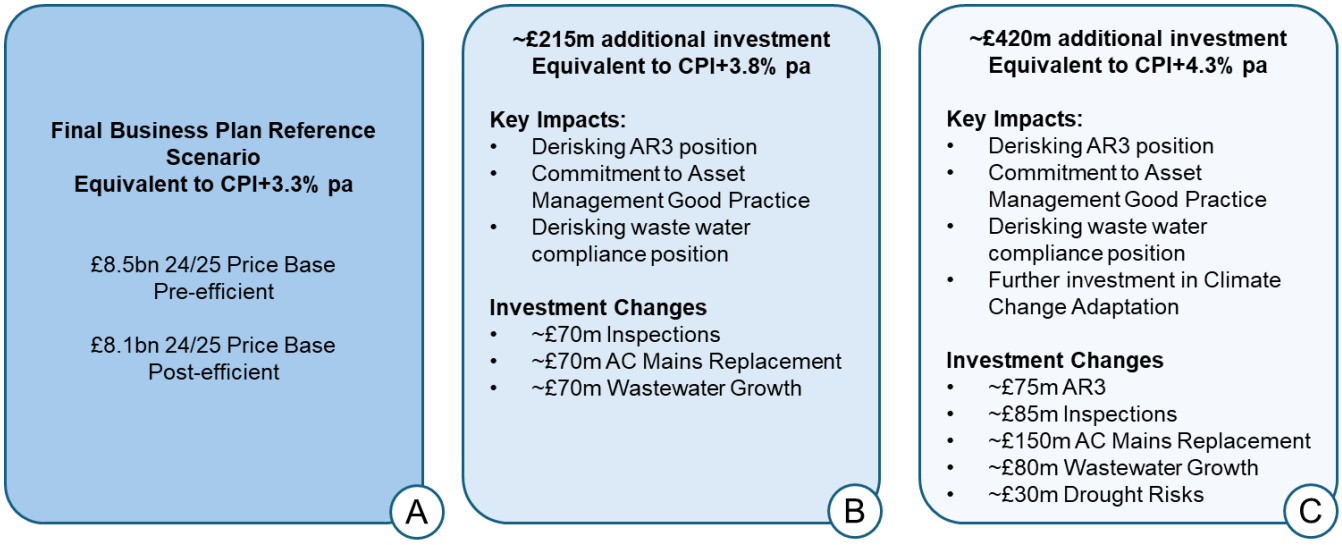


Figure 22: Business Plan Alternative Scenarios

7.4 Changes since the SRC21 Final Determination

The following section examines the key assumptions underpinning the WICS SRC21 Final Determination (FD) financial model when it established a long-term customer charge forecast of CPI+2% p.a.

Taking account of the upward and downward pressures on these key assumptions, we demonstrate what the equivalent charge profile would need to be for SR27 to maintain the same level of investment for the 12-year period from 2021 to 2033 (i.e. SR21 and SR27) as was forecast in WICS SRC21 Final Determination.

It draws on the latest modelling and financial updates, examining the underlying assumptions, external economic factors, and the effects of government policy and operational performance.

Further details are available to stakeholders in the supporting materials section of the Business Plan submission.

7.4.1 Background to SR21 Final Determination

The SRC21 Final Determination

The SRC21 Final Determination, published in December 2020, established a new long-term trajectory for Scottish Water's customer charges, moving from below-inflation increases to a planned average annual increase of CPI+2% p.a. from 2021 to 2027. This approach was designed to move towards a more sustainable funding for asset replacement (to achieve optimal asset replacement levels by around 2040). Taking this approach and increasing investment gradually was aimed at spreading investment costs more fairly across generations. It also recognised the investment pressures associated with climate change mitigation (Net Zero Emissions) and customer and regulatory expectations, but it did not recognise the level of pressures that we now know are associated with climate change adaptation.

The determination enabled Scottish Water to raise a maximum of £8.024 billion (in 2018/19 prices, equivalent to approximately £11 billion in 2024/25 prices), with a targeted investment of £4.507 billion and an annual 1% efficiency challenge on Tier 1 costs.

To support this the WICS also published its financial model to support the determination. The model shows the steady increase in investment over the period to 2045.

Amendments to the Final Determination

All Regulatory processes are "determined" using the best available information at a point in time. The draft and final determinations were published during the COVID-19 pandemic, at a time when the resultant economic impact was not fully understood.

In 2022/23, following the impacts of the COVID-19 Pandemic and in response to Scottish Water's reported performance, WICS opened an information request process which resulted in detailed analysis of Scottish Water's costs. This exercise resulted in a reclassification of operating costs to regulated investment – setting a firmer and more challenging target on Scottish Water's operating costs and maximising the amount available for investment from £4.507bn to £4.849bn over the 2021-27 period (2017/18 prices).

7.4.2 Upward Pressures on Funding

Three primary upward pressures have been identified:

Waterfall of Changes from SR21 FD financial model to secure equivalent funding for SR21 and SR27 periods

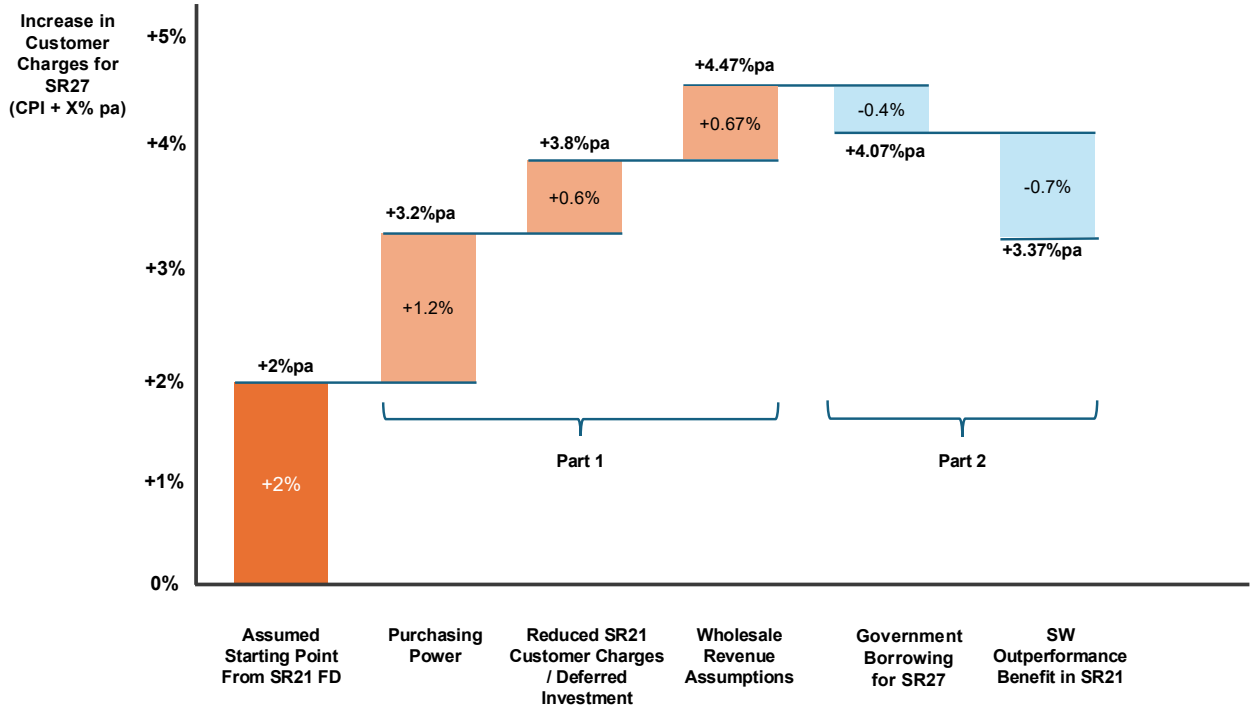


Figure 23: Waterfall of Changes from SR21 Final Determination Financial Model

1. **Purchasing Power:** The cost-of-living crisis and inflationary lag have eroded the purchasing power of customer charges. The lag between cost increases and price adjustments resulted in a £378 million decrease in available investment over the 2021-2033 period. To recover this lost potential, charges would need to increase by an additional 1.2% per annum, bringing the requirement to CPI+3.2% for SR27.

2. **Reduced SR21 Customer Charges/Deferred Investment:** Scottish Water maintained lower-than-planned charge increases during the cost-of-living crisis, under-recovering revenue by £251 million (reducing to £196 million over the investment horizon). This led to deferred investments, particularly in Enhancement, Flooding & Growth (EFG), which now

require catch-up funding in SR27, adding approximately 0.6% per annum to the charge path (CPI+3.8%).

3. **Wholesale Revenue Assumptions:** The SR21 FD assumed no reduction in wholesale consumption, but actual trends show a decline of about 1% per annum, further reducing revenue forecasts by £200 million over 12 years. This necessitates an additional 0.6% per annum increase in charges to maintain expected investment levels.

In total, these factors would require a customer charge increase of CPI+4.47% per annum for SR27 to match the original SR21 FD investment forecast.

7.4.3 Downward Funding Pressures and Mitigating Factors

Counterbalancing the upward pressures, two key downward factors reduce the required charge increase:

4. **Additional Government Borrowing:** The Scottish Government's SR27 commissioning letter provided a higher net new borrowing allowance (£170 million per annum) compared to forecast assumptions in the SR21 FD (which reduced borrowing by £10m per year down to £120 million per annum). After accounting for interest, this equates to a reduction of 0.4% per annum in required charge increases, lowering the profile to CPI+4.07%.

5. **Scottish Water's Operational Outperformance:** Efficiency gains and better-than-expected Tier 1 cost management delivered £226 million in additional regulated investment, enabling a further reduction of 0.7% per annum in charge increases. This brings the net requirement down to CPI+3.37% per annum for SR27.

7.5 Comparison of SR21 and Proposed SR27 Final Business Plan

Considering the above pressures, to maintain the investment levels originally forecast in the SR21 FD, Scottish Water would require an equivalent customer charge increase of CPI+3.37% per annum in SR27. Further work is ongoing with WICS to review the financial models.

The SR27 Final Business Plan Reference Scenario requires customer charge increases of CPI+3.3% per annum for the SR27 period.

Whilst these two charge profiles look remarkably close, we are satisfied that this is purely coincidence. One is an analysis of the SR21 FD financial model with updated macro-economic assumptions and the other (SR27 Final Business Plan) is a bottom up assessment of demand capped by an assessment of customer affordability.

8 Providing a Robust Evidence Base

To further support the justification of the proposed SR27 Final Business Plan investments WICS requires Scottish Water to provide more granular information for aggregated programmes of work and projects which are in development and post commitment, i.e. Scottish Water's internal Gate 50 onwards (following Figure 24 sets out the Plan Prepare Deliver Process used with the associated Gates and Project Investment Appraisal Stages).

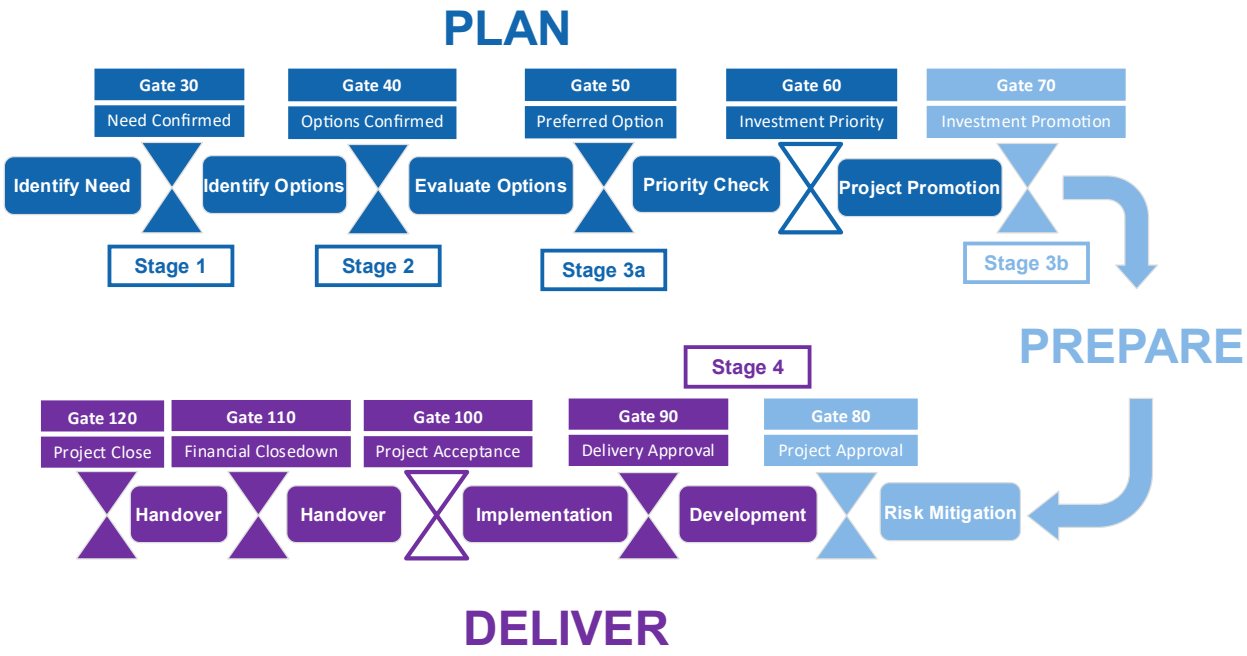


Figure 24: Plan, Prepare, Deliver Process with associated gates and Project Investment Appraisal Stages

WICS expects that standard information is provided for both projects and programmes of work which covers:

- the range of options considered (both traditional and non-traditional) to meet the need for an investment including the risk of not doing anything, recognising that a 'do nothing' option still has a cost associated with it. We also acknowledge that in some cases Scottish Water may have less flexibility in deciding how and when to deliver investment outcomes, particularly if the situation is urgent and/or poses high risk to public health;
- whether the investment has the support of the quality regulators, DWQR and SEPA;
- how the investment will support climate change adaptation and align with the Scottish Government's policy development work;
- the cost-benefit analysis undertaken to select the proposed solution, taking account of factors such as the level of risk associated with the different options and benefits in terms of what the investment is expected to achieve. Scottish Water should also consider non-financial costs and benefits such as the carbon impact (both operational and embodied carbon), natural and social capital;
- evidence that the proposed costs for the proposed solution are efficient, which could be evidenced through different methods such as comparisons to past projects or the use of industry cost benchmarks (efficiency is covered in more detail below) or external assurance on the robustness of the cost estimates;
- whether the investment involves partners, recognising that expectation in the Commissioning Letter for Scottish Water to continue working closely with partners to

identify more sustainable solutions (such as adoption of blue-green infrastructure and utilising existing legislation solutions such as Section 29e to explore innovative solutions) and, if so, how costs will be shared with the partners including the funding arrangements;

- if Scottish Water has already engaged with communities in terms of project design, how those community views have informed the choice of the proposed solution; and
- the output(s) and benefits that will be delivered from the proposed solution and the outcomes that the investment will contribute to in the context of the Objectives of the Scottish Ministers and Scottish Water's contribution to the sector vision.

Feedback provided at the Draft Business Plan stage also further reiterated that more information was required to support and evidence the need for investment.

8.1 Project Investment Appraisal Approach

There is a standard approach to the development of large projects, they follow the gated Scottish Water Project Investment Appraisal (PIA) process (Figure 24). They these PIAs ensuring that project investment decisions are based on whole-life costs and value which as a result drives consistent, robust and logical evidence-based investment decision making transparency and fosters more consistent and value-driven investment choices.

The PIA process focuses on correct identification of need, robust consideration of all possible options to meet the need (including a 'do nothing' option), costs and risks associated with the options considered, an assessment of options against each other, consideration of stakeholder engagement and feedback and next steps.

8.2 Management Approaches

To ensure that AR3 investments are also based on consistent decision making and are fully justified, all AR3 investments are based on Management Approaches[18]. The Management Approaches (particularly for Asset Repair, Refurbishment and Replacement (AR3)) support policy-led investment decision-making in Scottish Water in pursuit of over the long-term achieving a sustainable level of investment. These have been instrumental for how we run the business and have allowed us to become more efficient and consistent in how we promote work for delivery. The Management Approaches look at the costs of assets categories over their whole life, including operating costs, to find the optimal intervention strategy.

8.3 Meeting the WICS SR27 Evidential Bar

In line with WICS guidance and based on feedback on the submission of the Draft Business Plan, the SR27 Final Business Plan is underpinned by a robust evidence base, including strong investment cases.

Evidence to support the Business Plan has been provided in a number of ways – aligned to the WICS guidance and proportionate to the investment under consideration:

[18] The Management Approaches (particularly for Asset Repair, Refurbishment and Replacement (AR3)) support policy-led investment decision-making in Scottish Water in pursuit of over the long-term achieving a sustainable level of investment. These have been instrumental for how we run the business and have allowed us to become more efficient and consistent in how we promote work for delivery. The Management Approaches look at the costs of assets categories over their whole life, including operating costs, to find the optimal intervention strategy.

For Enhancement, Flooding and Growth and AR3 Projects which are in development (i.e. between Gate 50 and Gate 90) where total investment is equal to or greater than £6m, we have provided all relevant PIA documentation as well as a 'Project Bridging Document'. In providing all relevant PIA documentation we are providing transparency to our governed project decision making documentation. However, we recognise that there is a small delta (for instance around basis of costing) between the information provided in these PIA documents and the requirement within the SRC27 Final Methodology. Therefore, we have created a separate bridging document for each of these projects, which closes this delta and provides navigation to how each of the information requirements, as set out in the Final Methodology, is met within the PIA documentation provided.

Enhancement, Flooding and Growth Programmes of work and projects <£6m where these have been grouped together by investment needs, where they share the same or similar characteristics, deliver against the same group of outputs, where there is an element of repeatable work or comprises similar construction requirements or where risk profiles and the specific location of the investment is unknown. To provide further insight into these programmes of work and projects, we have provided 'Evidence Packs'. These documents are structured around the information requirements stipulated in the Final Methodology. Where appropriate they reference existing governed materials such as sub-outcome approaches and Management Approaches.

For Enhancement, Flooding and Growth Programmes or Projects which are pre-development (i.e. <Gate 50) but are >£6m we have provided a supplementary summary table, Table Y, which provides further information on costs and outputs (including assumptions), for each of these schemes.

For large projects with a value greater than £100m or investment in relation to the 4 PFI contracts maturing in 2027-33 there are additional requirements within the WICS methodology for external assurance. Further information is available in the Assurance Technical Appendix as to the approach taken.

For Asset Repair, Refurbishment and Replacement (AR3) we have been refreshing our Asset Management Approaches, developing appraised policy choices used to inform this Business Plan submission, considering long term forecasts of demand using bottom-up analytical approaches. These are the basis of the AR3 forecasts for the SR27 Investment Planning Scenarios by AR3 Programme Type[19].

The following table sets out the WICS evidential bar requirements and how our Management Approaches provide confidence around each, supporting the evidence case for our proposed AR3 investments.

[19] The Management Approaches (particularly for Asset Repair, Refurbishment and Replacement (AR3)) support policy-led investment decision-making in Scottish Water in pursuit of over the long-term achieving a sustainable level of investment. These have been instrumental for how we run the business and have allowed us to become more efficient and consistent in how we promote work for delivery. The Management Approaches look at the costs of assets categories over their whole life, including operating costs, to find the optimal intervention strategy.

Table 5: WICS requirements Mapped to Management Approach Sections

Requirement	How this requirement is met in development of Management Approaches
Options Considered	Management Approaches explicitly detail the different policy options considered and associated interventions expected to maintain the assets in scope and the service they provide. These range from fully responsive to highly planned intervention strategies, dependent upon the type of asset in question, and the expected impact of asset failures on legislative and regulatory compliance and Scottish Water's Risk Appetite definitions.
Regulatory Requirements	The intervention strategies considered in Management Approach policies are screened in order to ensure compliance with all relevant legislation. Key external stakeholder (WICS / DWQR / SEPA / Consumer Scotland) were consulted in development of the format and scope of the latest version of the Management Approaches, which include economic appraisal of policy options. The latest approved version of Management Approaches are made securely available to Stakeholders.
Climate Impact	Impact of Climate Change is considered and recorded in the updated format of the latest revision of Management Approach documents. Expenditure forecasts associated with the intervention strategies of approved policies do not typically account explicitly for either the impact of Climate Change on deterioration rates (and so intervention volumes), nor for the impact on unit costs of interventions from allowing for scope specifically related to Climate Change Adaptation. Initial scoping of next steps, including where explicit allowances for Climate Change would be most material, has begun with recommendations due to be presented before 31st March 2026 to inform future requirements for continuous improvement.
Costs-Benefit Analysis	The selected policy in each Management Approach has been subject to economic appraisal using Scottish Water's Benefits Framework. This appraisal considers quantitatively the cost and carbon impact of each option, and other benefits are considered qualitatively.
Efficient Costs	Unit costs are based upon the best available sources of information. This varies between and within MAs, with sources including directly from standard costs curves, via Scottish Water's detailed intervention models considering average run-rate costs, and from examples of specific relevant individual projects. These costs are indexed. No adjustment for efficiency are made in the forecasts from the Management Approach, rather this is applied directly to the business plan data tables.
Partnerships	Management Approaches cover AR3 investment, and these projects are not normally practicable to deliver in partnership with other water sector stakeholders.
Community Engagement	In selecting the policy options, community impacts are assessed in line with the Benefits Framework categories. In developing projects, community engagement is addressed according to the complexity of the work and sensitivity of local issues.
Outputs and Outcomes	Maintenance outputs (generally number or cumulative length of interventions) are forecast explicitly and combined with estimated unit costs to produce the demand forecasts. Outcomes are expressed qualitatively in terms of the benefits framework, and in the context of Scottish Water's risk appetite.

9 Improving Asset Management Capability

As custodian of the water and waste water systems across the length and breadth of Scotland, we work hard to continually improve the way we decide where and when to invest in the assets which make them up, so that they continue to deliver the vital services that customers expect for many years to come.

We benefit from the foresight of engineers and leaders of the past who built many of the assets we still rely on today. Since the early 2000s, the need to blend getting the most out of these structures and systems, with planning for the time when they will no longer be fit-for-purpose has become an ever more pressing issue. This has resulted in the emergence of a new, important discipline across a wide range of infrastructure-heavy sectors: "Asset Management", defined by the Institute of Asset Management as "the coordinated activity of an organisation to realise value from assets[20]". It is also reflected in the approach the Scottish Government have taken in establishing a new common investment hierarchy for their 2021 *Infrastructure Investment Plan for Scotland*[21], which prioritises maximising the use of existing assets before considering the creation of new. In our case, we realise value from our assets for the benefit of customers, communities and the environment. Hence in Scottish Water, we often refer to this discipline as "customer focused asset management".

In 2014, the International Standard Organisation (ISO) published the international standard for Asset Management, ISO55001:2014. Scottish Water became the joint first organisation globally to secure certification to it the same year. Since then, Scottish Water has continued to build on this foundation notably through its Asset Management Transformation Routemap (AMTR), developed and published as part of the SR21 process. That routemap focussed on building the asset management capabilities most relevant to decision making, and to date has been delivered through Scottish Water's Sustainable Investment Decision Making (SIDM) transformation programme.

The initiatives we have taken forward since then have relentlessly focussed on improving our decision quality across strategic, portfolio, and project application. In his external assessment report[22] in 2023/24, Prof Bryan Adey noted that Scottish Water was 'clearly positioning [itself] as a leader in asset management across the UK. In 2024/25 he expanded on this to assure that 'as Scottish Water prepares its submission for SR27, it has demonstrated that it has matured significantly as an infrastructure management organisation'.

Collectively, this work has allowed us and sector Stakeholders to continue to embrace EBP&R principles of transparency and openness, ensuring active engagement across many aspects of our investment decision making - building trust whilst maintaining essential flexibility to adapt to changing demands, always respecting the essential role of regulators and stakeholders to hold Scottish Water to account.

[20] iam-anatomy-version-4-final.pdf, Section 3.

[21] A National Mission With Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26

[22] Completed by Professor Bryan Adey, of the Institute of Construction and Infrastructure Management at the Eidgenössische Technische Hochschule Zürich (Swiss Federal Institute of Technology Zurich)

9.1 Background

An important success of our SIDM transformation programme to date has been to establish policy-led asset maintenance decision making, our "Management Approaches".

The first iteration of the Management Approaches documented judgement led promotion criteria and aimed for consistency and efficiency. This generated £11m forecast cost-avoidance in SR21 through productivity improvement and enabled the process to raise non-complex maintenance needs to be systemised.

Already the Management Approaches have been further developed into appraised policy choices used to inform this Business Plan submission, considering long term forecasts of demand using bottom-up analytical approaches. This work has been supported by background improvements to data and analytics, for example improving the accuracy of condition grades for civil assets by better use of the condition data collected from inspections of 7,600 assets.

As a result, our proposals represent an increase in investment to repair, refurbish, and replace our assets, compared with the SR21 period. This is an important step on our long-term transition to a sustainable level of investment on our asset base, and we want to do more both to evidence what the right long-term level of investment is, and to provide assurance that where we are investing today, it is in the right assets at the right time.

For both of these reasons, the WICS SRC27 methodology sets out that "*Scottish Water should, as far as possible, be able to translate the impact of our maintenance activities on asset condition into tangible consequences that customers will understand*" and it "*also require[s] Scottish Water's business plan to include an improvement plan to address the data and knowledge gaps in its asset condition reporting and forecasting"*

This section sets out milestones we commit to in response to these expectations, placing them in the context of potential wider investment decision making enhancements. It also indicates when we expect information from the associated data and analytics to be available through our Annual Return, if required by the WICS.

Annex D: Further Capability Improvements for SR27 outlines the activities we currently expect to be required, recognising that the detail of these activities will develop as we learn from the early stages of their delivery. We would welcome ongoing engagement from WICS as we do this work to provide assurance of progress.

9.2 Approach for Water Companies in England and Wales

Since early 2025, OFWAT have been delivering on their plan for "enhancing asset health understanding"[23] with water companies in England and Wales, as part of their work on operational resilience and asset management good practice. This plan covers the two calendar years 2025 and 2026 aiming to:

- Identify and develop health monitoring of priority asset classes
- Support a review of Base expenditure allowances for these asset classes in advance of, and to inform, PR29; and,

[23] Enhancing-asset-health-understanding-update-paper-May-2025.pdf

- Develop a further iterative plan from 2027 onward, learning from work on the priority asset classes.

WICS and Scottish Water have been engaged in OFWATs program to date, and we remain committed to continuing this mutually beneficial work. In June 2025, OFWAT published an update on the plan which confirmed that workshops with English and Welsh water companies had identified the following priority asset classes:

- Treated Water Storage and Chlorine Contact tanks.
- Water boreholes
- Civil assets at water and waste-water treatment works
- Gravity sewers

The update also outlines high level next steps to develop, with water companies, a method for the agreed asset classes and confirm the information to be requested from water companies. It also sets out a timeline for the provision of data, and its use by OFWAT.

The milestones set out in this document, and the activities outlined in order to meet them, take account of the approach by OFWAT for England and Wales and – where appropriate – will allow for relevant comparisons to be drawn.

9.3 Our Milestone Commitments for Asset Maintenance and Asset Health

This section identifies the key milestones, set out in Table 6: Our Milestone *Commitments*.

These are specifically in response to WICS request in their SRC27 Methodology for an "*improvement plan to address the data and knowledge gaps in its asset condition reporting and forecasting*". Annex D: Further Capability Improvements for SR27 outlines the activities we currently expect to be required, recognising that the detail of these activities will develop as we learn from the early stages of their delivery. The Milestones should be considered in the context of a planned wider review of potential investment decision making enhancements set out in Section 9.4 Broader Improvements to Asset Management Capability.

In feedback to our Draft Business Plan submission, the WICS also requested Scottish Water to provide *"expected milestones and due dates"*, and to indicate *"when information would be reported to WICS with reference to the annual return submission"*. Table 5 lists out the milestones of our plan with due dates. The final column of the table indicates the nature of additional information that could be reported as part of, or alongside, our Annual Return as a result of meeting the associated milestone, if required by the WICS.

Table 6: Our Milestone Commitments

Milestone	by when	New evidence
Management Approach documents aligned with SR27 allocations	26/27 Q3	*Delivery plan*
Data improvement processes & quality metrics in place (install date)	26/27 Q2	*Data quality*
Intermediate health measure defined & demonstrated	26/27 Q4	-

Milestone	by when	New evidence
Basic health measure in place for all replaceable assets	26/27 Q4	*Health measure*
Data improvement processes & quality metrics in place (data for target health measure)	27/28 Q4	*Data quality*
Target health measure in place for all replaceable assets	28/29	*Health measure*

9.4 Broader Improvements to Asset Management Capability

We remain committed to further improving our asset management capability throughout SR27 as we review and refresh our Transformation portfolio and implement Scottish Water's new Operating Model.

We plan to review our SIDM transformation programme in the first half of 2026. This timing allows us to ensure alignment of delivery accountabilities with the implementation of our new operating model, coincides with a refresh to the governance of our overall Transformation portfolio, and falls at the mid-point of the original 10-year route-map. It will inform how we deploy part of the resource outlined in Table 9 of our business plan submission, with £9m provisionally allocated to deliver these improvements.

Initial thinking around the overall objectives of this programme is that it will aim to address capability development across four interlinked themes. These themes are set out in Figure 25, along with brief descriptions of the reason for their pursuit.

In the previous section we have laid out the milestones associated with Asset Maintenance & Health, and we expect that activities to deliver against these milestones will be coordinated through the next phase of our SIDM transformation programme. The activities and milestones for the remaining 3 topics are under development with consideration being given to their priority, organisational capacity, and available resources. We would welcome further dialogue with WICS on this topic as they are developed and intend to lay these out as part of the Delivery Plan.

Asset Management Capability • Securing line-of-sight to the Long-Term Strategy through all levels of investment decision making. • Ensuring clear accountabilities and capability development, aligned to Scottish Water's Operating Model. • Alignment with approach in England and Wales.	**Portfolio Management** • Further focus on outcome-led investment decision making. • Support efficient use of Scottish Water's supply chain. • Ensure compliance with increased regulatory expectations on governance and reporting.
Asset Maintenance & Health • Improve the assessment of long term asset replacement demand, and its relation to refurbishment and operational maintenance. • Improve the articulation of the benefits of AR3 investment. • Alignment with approach in England and Wales.	**Systems Approaches** • Improve the allocation of maintenance expenditure, by considering asset systems. • Exploit opportunities to reduce demand on services, considering social & environmental systems, to reduce the need for enhancement expenditure.

Figure 25: Capability Development Themes

10 Conclusion

Scottish Water's Investment Planning Technical Appendix for SR27 presents a rigorous, evidence-based approach to preparing the Business Plan for the regulatory period 2027-2033. The process has been shaped by the strategic direction set by Scottish Government, the Water Industry Commission for Scotland (WICS) Final Methodology, and Draft Ministerial Objectives 2027-33, all of which emphasise long-term planning, robust governance, and active customer engagement. The plan is built on the foundation of the Water Sector Vision and Scottish Water's Long-Term Strategy, with the central aim of delivering sustainable, affordable, and high-quality water and wastewater services across Scotland.

Throughout the development of the Business Plan, Scottish Water has adopted a dynamic and transparent investment planning and prioritisation framework, co-created with stakeholders and underpinned by continuous evidence gathering and customer research. The process has involved the creation of a Reference Investment Planning Scenario and two alternative scenarios, each rigorously tested against financial constraints, regulatory requirements, and stakeholder feedback. Investment demand has been grouped into four key categories: asset maintenance (AR3), regulatory compliance enhancement, further service choices, and growth. Forecasting methodologies have matured to incorporate committed, known, and future demand, ensuring both current priorities and anticipated needs are addressed.

The output of this investment planning process is a Reference Investment Planning Scenario of £8.1bn[24] in SR27. This, coupled with £5.3bn in operational costs, means that our SR27 Final Business Plan requires a total of £13.4bn of funding. With an assumed borrowing level of £170m per annum from Scottish Government, we will have to increase customer charges by CPI+3.3% per annum during the 6-year period from 2027 to 2033 to fund this plan.

This scenario has been carefully balanced to meet Draft Ministerial Objectives 2027-33, maintain service levels in the face of climate change and ageing assets, support Net Zero carbon targets, and reflect the priorities identified through extensive customer engagement. Additionally, following on from the publication of the SR27 Draft Business Plan it takes account of the feedback and ongoing engagement with stakeholders and comprehensive nationally representative customer research. Alternative scenarios provide context for potential trade-offs, illustrating the impacts of increased investment on service quality, regulatory compliance, and affordability.

A cornerstone of the plan is the continual improvement in investment decision-making, driven by enhanced data and analytical capabilities, the development of Management Approaches for asset maintenance, and strategic cost-benefit assessment. The plan commits to further strengthening these capabilities in SR27, including improved asset health metrics. These improvements will support more efficient and transparent investment decisions, greater resilience to future challenges, and better outcomes for customers and the environment.

In conclusion, Scottish Water's SR27 Final Business Plan reflects a mature, collaborative, and forward-looking investment planning process. It balances the needs of customers, communities, and the environment, delivering a robust and well-evidenced plan that secures essential services, supports long-term sector vision, and makes demonstrable progress towards a sustainable future. The ongoing commitment to transparency, stakeholder engagement, and continuous improvement positions Scottish Water to respond effectively to evolving demands and to deliver best value for Scotland in the years ahead.

[24] Post-efficiency adjustment in 2024/25 price base

Annex A: Approach to SR27 Demand Forecasting

This section describes what drives the demand forecasts used within the SR27 Draft and Final Business Plans and how demand forecasts are structured and forecast.

Context: Strategic Documents that Influence the Investment Plan Demand

The following strategic documents influence the demand that shapes the SR27 investment plan:

- Draft Ministerial Objectives 2027-33
- Scotland's Water Sector Vision
- Long-Term Strategy
- 25 Year Investment Strategy

Draft Ministerial Objectives 2027-33

The Draft Ministerial Objectives 2027-33 outline what is expected of Scottish Water during the SR27 period. They have been developed over several previous strategic review periods and have been influenced by significant input from sector stakeholders, customer research and government priorities. They are therefore a critical basis for planning and represent investment demands in the SR27 Final Business Plan.

Long-Term Strategy and 25 Year Investment Strategy

Guided by Scottish Water's purpose and ambitions, and framed by Scotland's Water Sector Vision, the Long Term Strategy (LTS) sets out target outcomes to ensure:

- Scotland's tap water remains a source of national pride and is valued as a precious resource.
- The quality of our rivers and seas has improved, and our communities are protected from flooding, through collaboration with others.
- Scottish Water has played a key role in enabling Scotland's sustainable economic and housing growth

The 25 Year Investment Strategy presents Scottish Water's understanding of long-term investment needs to deliver the Long-Term Strategy in the face of sector-wide challenges of the climate crisis, population change, and ageing assets.

It provides the backdrop of the SR27 plan, and is based upon:

- **Sub-Outcome Demand Modelling**: Each service outcome (e.g. water quality, continuity, environment, waste water flows, climate change mitigation, AR3) was broken down into sub-outcomes, with demand quantified using study data, compliance requirements, and growth projections. This included scenarios for climate adaptation (e.g. 2°C worlds), legislative drivers and to make progress that customers and the business were seeking to achieve.
- **Strategic Costing Framework**: A costing methodology was applied to translate demand into indicative investment profiles. This framework linked asset repair, refurbishment, replacement, and enhancement needs to service risk improvements, ensuring transparency in how demand drives investment.
- **Supporting Evidence**: Detailed sub outcome approach documents were created to underpin headline figures, allowing assumptions to be traced back to raw data.

Grouping of Demand

The Investment Planning Scenario that has been developed and recommended includes all the investment associated with:

- Asset Maintenance – Asset Repair, Refurb and Replacement (AR3),
- Enhancement – Regulatory Compliance and commitments to communities
- Enhancement – Further service choices (including Sewer Flooding)
- Growth – providing services for new customers

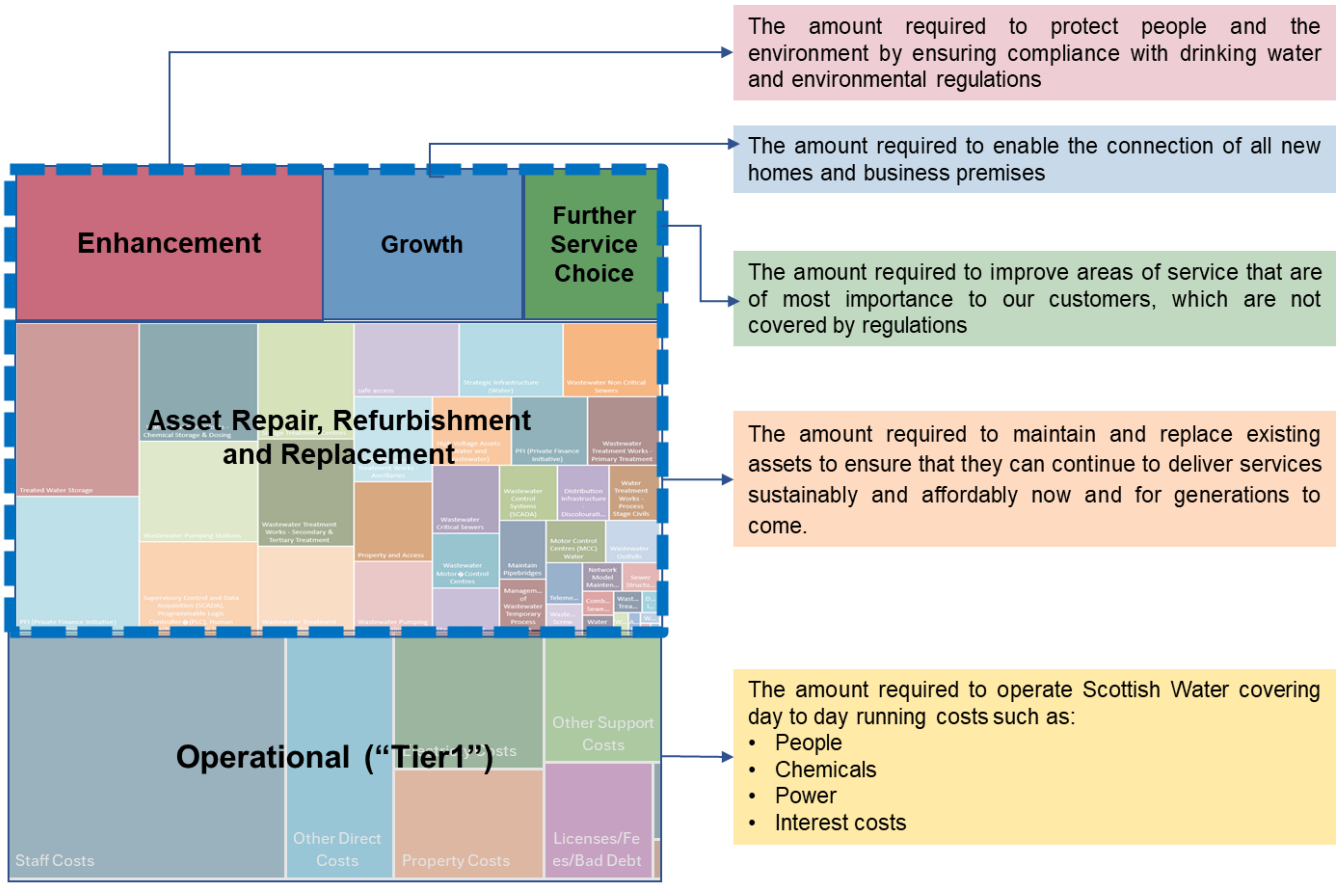


Figure 26: Overview of investment categories included in the investment planning scenarios

Unconstrained Demand Estimate

Initial work to establish an unconstrained view of the demand estimate (completed during the summer of 2024) used a combination of high-level, top down methods to estimate AR3, run rate estimates of growth investment and initial estimates of enhancement requirements for water and waste water legislative and regulatory expectations.

Since then, the estimates have been systematically improved to create more rigorous estimates of demand and cost estimates as the objectives and scenarios have been developed and refined over the last year.

For example:

- **AR3**: The high-level methods for forecasting AR3 investment requirements have been replaced with individual estimates derived from Management Approach development work (MAv2) that combine improved forecasts with known needs that already exist today (as described in section 8.2).

- **Growth**: Initial growth run rates have been replaced with more granular named schemes and direct alignment to domestic property connection estimates.
- **Enhancement**: Further work with DWQR and SEPA has helped establish high priority regulatory and legislative compliance expectations which have in turn created improved bottom-up estimates, particularly for enhancement demand.

This activity has helped refine the "unconstrained" demand and associated investment estimates which then fed into the prioritisation exercise.

Asset Repair, Refurbishment and Replacement (AR3) demand

This section provides an overview of how the 25 year investment projections link to the business plan AR3 investment shown in Table 3a and 3b.

Background

Asset maintenance refers to the set of activities carried out to preserve the functionality, reliability, and safety of physical assets throughout their lifecycle. The goal is to maintain the required level of service at the lowest sustainable whole life cost and carbon.

Asset maintenance spans interventions from operational maintenance (e.g. physical safety check, calibration, greasing), inspection, repair, and refurbishment, through to replacement and decommissioning of infrastructure components like pipes, pumps, tanks, and treatment facilities.

Asset Maintenance intervention types are outlined in *Table 7*. We further subdivide these intervention types as either "Planned" or "Responsive" depending upon the urgency of action, as outlined in *Table 8*.

Operational maintenance forms part of our operational expenditure forecasts (Tier 1).

The remaining aspects of maintenance are accounted for in our investment planning, under the term AR3 – for Asset Repair, Refurbishment, and Replacement.

As Scottish Water has a large existing asset base (modern equivalent asset replacement value of ~£120bn) and this means that a significant part of Scottish Water's current capital investment each year ~65% is spent on the repair, refurbishment and replacement interventions.

Table 7: Scottish Water Definitions for Intervention Types

Intervention Type	Description
Investigation	Activities focused on gathering asset information which is required in the decision-making process prior to one of the other asset intervention types. This includes inspection programmes to identify the condition of the assets.
Operational and Maintenance Activities	Responsive or planned processes and practices that support an asset to continue to operate and achieve its expected operational life that do not modify the asset itself.

Intervention Type	Description
Repair	Fixing an asset to ensure it can continue to operate and achieve its expected operational asset life (this includes replacement of component parts)
Refurbish	Renovation / overhaul of older or damaged equipment or replacement of parts of the asset to bring the asset back to a workable condition to extend the expected life of the asset
Replace	Replacement of an asset (equipment, unit, or process) when it is at the end of its serviceable life, or the asset has failed and cannot be repaired or refurbished (or it is not economic to do so), or when a change in performance or capacity is required.

Table 8: Scottish Water Definitions for Intervention Approaches

Intervention Approach	Definition
Responsive	The intervention is responsive when an asset has failed and is impacting service provision and/or it is identified that an immediate, no-choice intervention is required.
Planned	The intervention is planned when an asset has a historic service failure, or it is identified that an intervention is required, at Scottish Water's choice, to reduce the risk of asset failure.

Asset categorisation

Scottish Water has a diverse range of assets with different lifespans, from pipes, sewers and treatment works to office buildings, vehicles and IT infrastructure.

To develop a consistent approach to our AR3 investment forecasts, similar types of assets are grouped into categories based on their expected life. Within these three categories assets have further subdivided by common characteristics.

These categorisations are shown in *Table 9*.

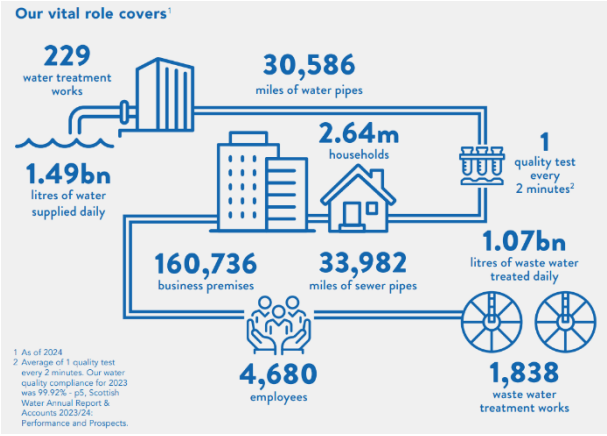


Figure 27: Scottish Water Network

Category 1 assets have particularly long lifetimes (significantly more than 100 years) for which we assume that they will be operated, repaired and refurbished in perpetuity. Around 69% of our assets (in terms of asset valuation) are Category 1 assets, which can be maintained and repaired / refurbished in perpetuity, meaning that we have allocated no investment to the replacement of these assets.

The Category 1 costs include repair costs for sewer, aqueduct and dam.

Category 2 assets have finite expected life and, therefore, cannot be repaired and refurbished indefinitely. Approximately a third of assets are Category 2 (30%; in terms of asset valuation), require operational maintenance, repairs, refurbishment and replacement at the end of their

useful life. This category includes assets recently returned to Scottish Water from PFI contracts, around which there is greater uncertainty in the forecast AR3 requirement.

Category 3 assets represent a stable investment need, such as business services (i.e., non-water or wastewater), offices, digital and logistics. The Category 3 support service assets tend to have a much shorter life (Vehicles, laptops, servers, scientific equipment) and so tend to have a simpler repair / replacement profile.

For the purposes of managing AR3 investment, further sub-categorisations are applied into and within our "Management Approach" documents.

Table 9: Asset categories used to create investment forecasts and total replacement costs

Category 1 **Long life** Require repair and refurbishment	**Category 2** **Finite assets** Require repair, refurbish and replacement	**Category 3** **Business services** Require repair, refurbish and replacement
Estimated replacement value MEAV ~£82.8bn	Estimated replacement value MEAV ~£40.8bn	Estimated replacement value MEAV ~£0.2bn
Sub categories • Sewers • Raw water aqueducts • Dams and impounding reservoirs	**Sub categories** • Water and wastewater treatment works • Treated water storage • Water and wastewater pumping stations • Water mains • Sewage and sludge pumping mains • Raw water mains • Long and short sea outfalls • Combined sewage and emergency overflows • Sludge treatment facilities • Other water and wastewater operational assets	**Sub categories** • Digital • Logistics (vehicles) • Scientific equipment • Renewables • Property • Other business assets
Expected life Greater than 150yrs	**Expected life** 5 to 150yrs	**Expected life** 3-25yrs (property 80yr)

Assessing Sustainable Levels of AR3 Expenditure

As part of the planning for SR21, WICS recognised underspend regarding the replacement of existing assets, potential implications for intergenerational fairness and the need for gradual real increases over time.

Scottish Water and WICS conducted joint analysis to support this view which was a key factor in the SR21 Final Determination, setting an above inflationary charge cap of CPI+2%.

Since then, further work to better evidence the extent of the requirement across all AR3 interventions has been taken forward at both strategic (top-down) and operational (bottom up) approaches.

Continued broad correlation between bottom-up asset Management Approaches together with top-down strategic and economic analysis supports the view that journey of increasing investment and charging to represent the cost of sustainably maintaining our asset base for now and future generations must be continued.

"Top down" assessment of *AR3* for the *25 Year Investment Strategy*

In the 2019 long term analysis that supported the SR21 planning process it was determined that the Long-Term Sustainable Level of Asset Replacement (which is considered to be equivalent to the *Economic Depreciation* level described in the WICS Final Methodology) for Cat 2&3 assets[25] was in a range £470m – £780m p.a. in 17/18 price base which was carried out in 2019 (equivalent to £620m to £1030m p.a. in 2024/25 price base).

A further update to this analysis was carried out in 2023 to improve the projection. This included:

- an improved method for uncertainty,
- a refresh of the asset register (March 2023)
- increased granularity between MEICA and Civil assets and
- updated cost models (version R2309)

This resulted in an updated wider range of £490m to £820m p.a. in 2017/18 prices, equating to a sustainable level of Replacement expenditure of £530m to £1080m p.a. in 2024/25 prices.

Forecasting of the Repair and Refurbishment element or AR3 is achieved in several ways within the 25 Year Investment Strategy to produce the projected investment ranges:

- Assessment of repairs to MEICA and Civils follow on work from inspections.
- Known run-rate repairs (bursts, sewer collapse, reservoir repairs).
- An assessment of backlog work that may not be completed in SR21.
- Interviews with the subject matter experts to look at what trends or issues are expected.
- Analytical modelling utilising historical failure rates for specific asset types.

Together, these approaches suggest a level of Repair and Refurbishment expenditure rising to of **£600m to £700m pa** in 2024/25 prices to 2050.

"Bottom up" assessment of *AR3 to support Management Approaches appraisal*

Management Approaches were established in 2020/21 to improve AR3 investment decision making in Scottish Water.

They contain policies setting out the criteria under which interventions can be 'triggered' and forecast types and volumes of AR3 interventions that can be expected under the chosen policy approach, following appraisal of the costs and benefits of different approaches to find the optimal intervention strategy. The Management Approaches provide direction on:

- **When to intervene** – this considers the point in an asset's life when an intervention should occur. This includes whether to intervene responsively or on a planned basis and - if planned - at what stage to intervene.

[25] Cat 1 assets were excluded from the analysis and included within the refurbishment & repair assumptions as these assets do not tend to fully replace these extremely long-life assets.

- **How to intervene –** this considers what intervention is used to restore asset condition / performance. This includes options for investigations and repairs, decisions on whether to refurbish or replace, assuming the solutions we use are the same as we use today

The policies are intentionally "unconstrained" – i.e. set out the best intervention strategy irrespective of its cost in any given period. They consider alignment with:

- The current Ministerial Objectives set by the Scottish Government
- Scottish Water Strategic Ambitions
- Legislative requirements (what we must do)
- Scottish Water Board risk appetite and the impact of asset problems on the service provided - translating this into the assessed criticality of the assets
- How a changing climate might affect our assets and when action may be required as a result
- Views of Scottish Water customers; informed by Customer Research programme

As such, the combination of all Management Approaches provides a ruleset which informs how investments should be made across our repair, refurbishment and replacement categories. They provide a consistent, policy led investment demand for all asset types in Scottish Water.

Transition to Sustainable Levels of AR3 Expenditure

Through the SR21 process it was recognised that the transition to this "economic" level of annual investment would necessitate a gradual progression toward it to minimise the impact it could have on customer charges.

This approach has been highlighted in the following extract from the recent Water Industry Commission interim report (June 2025) chaired by Sir Jon Cunliffe:

> *In Scotland, the economic regulator (Water Industry Commission for Scotland - WICS) has given priority and made significant progress in establishing an understanding of the sector's infrastructure to support a shift from short-term asset failure performance targets to long-term asset sustainability.*
>
> *Previously, the WICS followed a similar approach to assessing asset health to Ofwat. Approaches, however, have now diverged markedly, with WICS setting a whole-life cost of asset maintenance and replacement in order to fund a sustainable, long-term level of replacement and investment.*
>
> *WICS have observed that their previous backward looking approach – assessing infrastructure through failure performance monitoring – would not reveal 'cliff edges' in asset health. As part of this shift towards improved condition monitoring and understanding of expected lives of assets, Scottish Water is gathering an increasing amount of data.*

Figure 28: Independent Water Commission Report (Cunliffe, 2025)

Our SR27 Business Plan is placed firmly in the context of this continued sustainable transition, which is summarised in Figure 29. The figure is based upon SR15 actuals (indexed to 2024/25 prices) and is represented by a total sum (rather than split by intervention type) as information was not consistently captured in this manner at that time and reflects what would now be considered AR3.

Within the graph, SR21 is based on actuals for the first 4 years of the period with a forecast applied for the final 2 years of the period as reported in Annual Return (AR25) and adjusted to reflect the SR27 changes to AR3 investment.

- For Repair and Refurbishment interventions, initially a range of £220m - £324m p.a. was forecast within the SR21 period. The latest estimate is for £365m p.a., with the increase a result of a combination of factors, including increased inspection and repair activities at treated water storage tanks, follow-on work resulting from inspection programmes, and methodological improvements to the promotion and reporting of interventions.
- For Replacement interventions an initial £300m p.a. was forecast within the SR21 period. The latest estimate is £290m p.a.

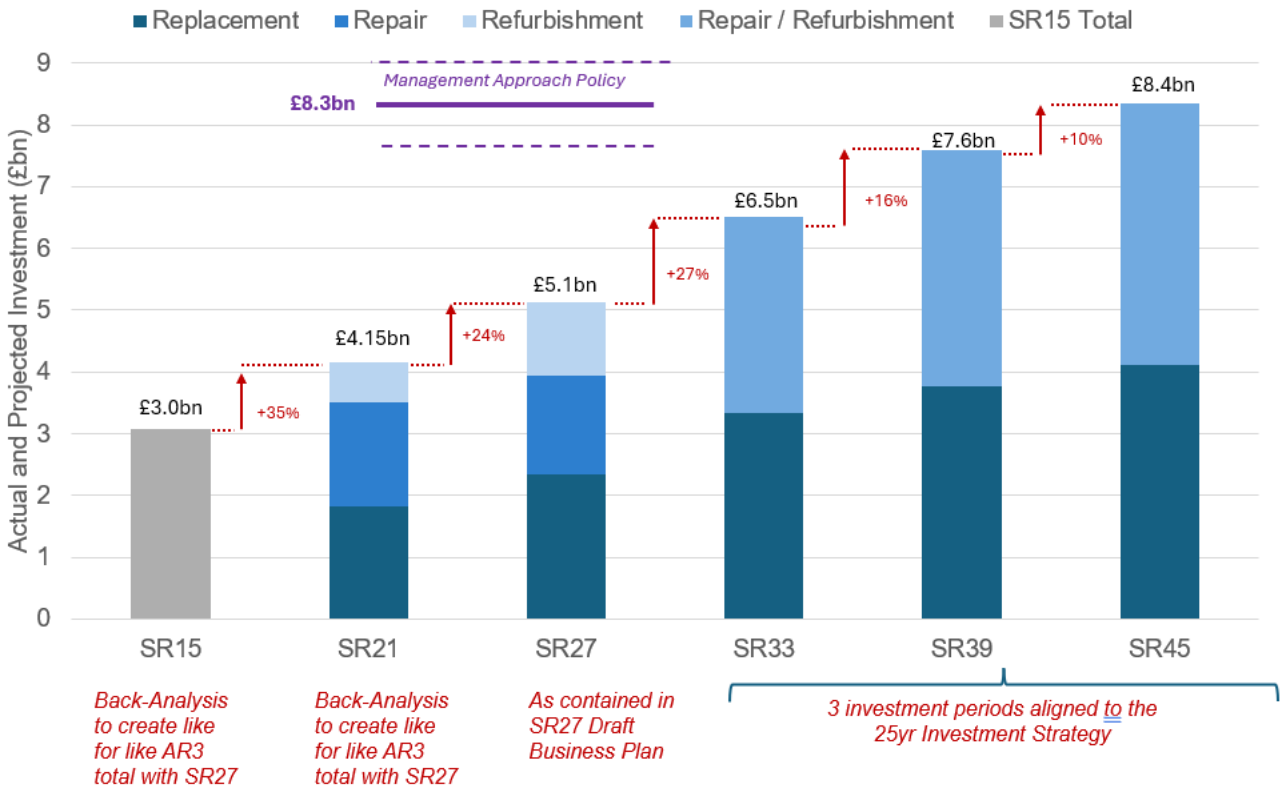


Figure 29: Transition to a sustainable level of AR3 expenditure

Enhancement, Flooding and Growth Demand

Enhancement – Delivering compliance and improvements for customers

Where outputs and service outcomes need to improve, or where there are additional external factors, such as increasing regulatory drivers or climate change, there may need to be investment into associated assets. Enhancement is the process by which the capacity and capability of our asset base is improved to ensure maintaining or improving service levels for our existing customers[26].

The requirements for enhancement investment during SR27 originate from a range of confirmed needs relating to non-compliance, or a high risk to compliance with regulatory standards which may have been escalated through regulatory enforcement or commitment to be addressed within an agreed timeframe.

[26] "relates to the incremental improvements in levels of service" WICS Methodology p109

Scottish Water has a duty to provide services as set out the **Water (Scotland) Act 1980** in addition to the duties included in the **Water Industry (Scotland) Act 2002**[27]. The latter includes ensuring that its resources are used economically, efficiently and effectively. To discharge these duties, it is important that assets are well designed to meet today's requirements. Please refer to the relevant water and waste water Technical Appendices for further details on the specific relevant legislation for each area of investment.

In addition, some investment requirements are associated with our policy positions to reduce risk or improve service where the current status is considered unacceptable from a customer service perspective, or where progress is required to achieve Long-Term Strategy objectives. For example, our water supply systems are assessed against a defined list of hazards to identify and prioritise improvements to resilience.

Specific Exclusions

It is known that there are significant amounts of future policy work that is under development within various stakeholder groups led by the Scottish Government. This could require significant investment over time to ensure Scottish Water is compliant if they come into force.

At this stage, investment for delivery of such future demands have been excluded from this plan as it is unclear if all aspects will achieve legislative status. If new legislation does come into force during SR27, it will be addressed within the dynamic IPPF process and be discussed and then prioritised against the existing Investment Planning Scenario in full transparency and discussion with sector stakeholders.

There are three main examples where there is currently no, or limited, specific planned enhancement investment in SRC27 or the 25 Year Investment Strategy:

- PFAS (per- and polyfluoroalkyl substances) remediation and removal
- New (recast) Urban waste water Treatment Directive (UWWTD)
- Wider Climate Change Policy changes (i.e. moving from SNAP3 to SNAP4 (in 2029) may place additional adaptation requirements on Scottish Water, or changes to official guidance on global warming levels to undertake risk assessments for, or revisions in UK Climate Projections (UKCPs) could all effect level of enhancement investment required).

It is likely that these will be drivers of future enhancement investment, so we have made provision for study / scoping work to understand the impact of this requirement.

Enhancement – Further Service Choices linked to Customer Expectations

Investment in asset repair, refurbishment, and replacement – along with enhancements to meet legislative and regulatory requirements provide the foundation upon which the core services which customers value most are delivered. Understandably, the majority of available financing is invested here.

Upon this foundation - and dependent on sufficient funds available to invest - we can choose to invest to maintain and further improve in areas that raise customers' overall experience of water services.

[27] Water Industry (Scotland) Act 2002

These investment areas include:

- Addressing sewer flooding (internal and external)
- Managing down the number of customers experiencing repeated water supply interruptions
- Improving drought resilience
- Improving the management of rainwater on the surface
- Delivering initiatives such as “Top up taps” in public places, and youth swimming programmes

These areas are deemed to have a higher degree of flexibility in how far and fast to progress in any regulatory period, and choices are directly informed by customer engagement and research.

Growth – Providing services for new customers

The long-term outcome of the Long-Term Strategy is to support development and sustainable economic growth across Scotland whilst maintaining our level of service to existing customers and to the environment.

This covers the provision of services, covering new domestic use and the domestic component of new commercial development, for a growing and changing population.

To maximise existing capacity availability for new customers initiatives such as reducing water demand and managing rainwater outside of sewer will be encouraged/implemented where appropriate and economical.

Development will be encouraged where there is available capacity by influencing decision makers in government, local authorities and developers.

These approaches will support new housing and business growth whilst supporting our net zero emissions commitment. Where feasible, they will normally represent the most cost-effective solution for customers.

Where required, and particularly in the short-term, an essential aspect of the Long-Term Strategy is to invest to provide increased water treatment works and waste water treatment works (Part 4) capability and capacity for all new domestic properties. We will work with the industrial sector to facilitate the provision of water treatment works capacity for new non-domestic customers.

In this way, Scottish Water will contribute to a prosperous and growing economy and continue to protect and support the water environment

The Enabling Growth Technical Appendix provides details on the planned levels of investment in SR27.

Demand Forecast Maturity

Our approach to evidencing the total investment demand likely to arise in the SR27 period has three categories of demand maturity:

- Committed Demand
- Known Demand
- Future Demand

These categories of demand maturity are initially assessed in an unconstrained approach. This means that the initial demand assessment includes the cost of all Committed and Known needs that meet the policy criteria in the Management Approaches (specifically, the cost of the current preferred option of needs subject to investment appraisal), and the level of allocation for Future Demand best judged to keep pace with these same policy criteria whilst making reasonable progress toward the Long-Term Strategy.

Committed demand

Committed demand is defined by Scottish Water as where both the Need and the solution are already well understood, and commitment to delivery has already been given

In the “Plan, Prepare, Deliver” stage & gate process for need development, these are the projects which have passed through Gate 90.

The estimated cost of these investment proposals is normally subject to a contract for delivery.

As only the largest projects which are already committed for delivery will result in expenditure falling after 31 March 2027, all proposed investments at this level of maturity have a Project Investment Appraisal (PIA) documenting the decision-making process, and the evidence upon which it was based.

Known demand

Known demand is defined by Scottish Water as where the Need is confirmed according to agreed organisational policies with options to address it under development, and so no commitment to delivery has yet been given.

In the “Plan, Prepare, Deliver” stage & gate process for need development, these are the projects which have passed through Gate 30, but which have not yet passed through Gate 90.

As such, there can be expected to be a diversity of investments in this category both in terms of maturity and scale, i.e. from those with little definition of scope to those where a detailed design has already been developed; relatively low-cost needs not prioritised for delivery in SR21; and individual projects costing >£100m.

These Needs will be following one of the existing 2, 3, or 5 step delivery runways which tailor the development effort to the complexity of the need and the potential cost of the investment. There is also a 1- step runway for the most standard of projects, which transitions directly from Future

Demand to Committed demand. The maturity of the estimated cost of these investments proposals is dependent upon the gate through which the project has most recently passed

Future demand

Future demand is defined by Scottish Water as where the Need does not yet exist, but an allowance is made for expected future needs reasonably expected to materialise within the SR27 period, according to agreed organisational policies.

In the "Plan, Prepare, Deliver" stage & gate process for need development, these Needs are not yet classified as projects and are known as pre-Gate 30.

Most commonly this Future Demand represents high-volume, low-value maintenance investment proposals that would follow the "1-step" delivery runway directly to commitment, and for which there is a significant recorded investment. On less frequent occasions, it may represent individually significant but uncertain future needs, for example the future need to enhance one additional Water Treatment Works to meet water quality standards, on basis that analysis of historic performance information supports the expectation that it is likely in the period to from 2027 to 2033 that at least one of these will emerge.

The assessment of Future Demand will ordinarily be based directly upon an assessment of these historic run-rates, or indirectly through a more sophisticated form of analysis.

Where a **run-rate** approach is used, evidence recorded will include:

- The source and scope of historic information used to inform the assessment
- Commentary on the completeness and quality of historic records
- Commentary on any factors that reasonably suggest future trends should differ from historic trends.
- A complete record of quantitative adjustments made to the level and/or trend in historic investment demand used to make the forward assessment of investment demand for the Allocation in the period 2027-2033.

Where a **more sophisticated form of analysis** is used, evidence recorded will include:

- A summary methodological document outlining the approach to the analysis, its intended purpose and limitations and references to artefacts that would allow a suitably skilled and experienced analyst to recreate the analysis.
- Documentation of the data required for the demand analysis (including model parameters where relevant).
- Copies of the data used in the analysis (including model parameters where relevant).
- Information, where available, to support an assessment of the calibration of the analysis to real-world observation

Capturing Detailed Investment Demand

In Scottish Water, Copperleaf is the portfolio management system used to record, track and develop the emerging SR27 investment demand[28]. Any new investments enter Scottish Water's

[28] Currently most of the investment in Copperleaf is SR27 demand. The system can also accommodate Long-tern investment demand and follow similar processes. As we further integrate the system we will use these wider capabilities.

systems through Copperleaf first. Downstream of Copperleaf, P3M is used to track existing live investments, i.e. those investments that have already been promoted into Scottish Water's Gateway Process.

There are ~40,000 investment lines in P3M (projects and programmes of work), with considerable data associated with each investment in the system, ranging from project details (such as primary need, funding need, investment hierarchy, intervention type, delivery vehicle), monthly financials (actual vs forecasted spend), to outputs (actuals, forecasts and date expected).

The steps followed to build up our bottom-up demand were as follows.

1. Management Approach (MA) owners took the overall demand (committed, known and future, as described above), and broke it down into more granular project/programme lines to be entered into Copperleaf (as bottom-up investment demand).
2. All (project/programme) investment lines identified in step 1 were then categorised to the agreed "Investment Need Codes" already used for all live P3M investments.
3. To help identify SR27 investment demand, Management Approaches owners were also provided a cut of P3M data that included post gate-30 investments that already had forecast SR27 expenditure (indicating these are required during SR27). The Management Approaches owners were also required to identify additional SR27 demand that was not yet promoted into P3M (new demand).
4. When identifying and specifying investment lines, Management Approaches owners considered;
    a. the cost of the investment (proposed in line with Project Investment Appraisal (PIA)[29] threshold at that time c£3m);
    b. the expectations and requirements outlined by regulators and industry stakeholders (e.g. phosphorus removal projects, sanitary tightened permit condition projects, storm overflows projects, or water resources projects);
    c. the type of choices and trade-offs expected to be made in the programme area;
    d. the gate stage of the investment proposal; and,
    e. the maturity of the needs at a site level.
5. Service Planners[30] then entered these bottom-up unconstrained project and programme investment lines into Copperleaf. These were a combination of new demand, and existing P3M demand with SR27 spend, and included the necessary meta data, e.g. investment line, alternatives, draft capital expenditure forecasts, and outputs. This is to create the initial bottom-up investment demand view.

[29] See Annex for further details of Project Investment Appraisals.
[30] Service Planners in Scottish Water are responsible for using Copperleaf and obtaining & managing Investment demand into the system.

Annex B: Establishing the SR27 Baseline for Draft Business Plan

This section outlines how the investment prioritisation activities were undertaken for the **Draft Business Plan** to create the Reference Investment Planning Scenario and two Alternative Scenarios as required by the Final Methodology. Section 7.3 Alternative Scenarios within the SR27 Final Business Plan within the body of this Technical Appendix sets out the steps then taken to get to the SR27 Final Business Plan. Unless otherwise stated **2023/24 price base** is used in this section.

Investment Planning Scenario Expectations

The WICS Final Methodology outlines the methodology for setting charge caps and evaluating investment proposals. This also sets out the requirements for developing a range of charging scenarios and demonstrating how its charge paths will meet the objectives of Scottish Ministers and how they will make progress towards the Water Sector Vision outcomes.

For each charge path Scottish Water is required to:

- show proposed investment levels and associated risks;
- detail the impact on future service levels; and,
- compare sustainable economic depreciation with actual replacement expenditure cumulatively (this is set out in the data tables).

As set out in the Methodology to determine the charge path scenarios the following requirements are to be met;

- that the charge path scenarios should have one **Reference Scenario**, with Scottish Water identifying the projects or programmes of work that would be subtracted and/or added to the reference scenario in each of the other charge path scenarios, to allow WICS to set a baseline on any of the charge paths; and,
- that other analysis may be required on alternative charge and investment scenarios to help inform the development of the Objectives of the Scottish Ministers through the Future Investment Group (FIG);

To do this Scottish Water is required to segment investment proposals into categories such as asset maintenance, enhancement, and growth investment. For each category, Scottish Water must provide;

- assumptions for indicative costings and outputs;
- forecast costs and outputs for projects in different stages of development;
- details on the proposed number of maintenance interventions, unit costs, and overall expenditure; and,

- measures of asset condition and the impact of maintenance activities.

Scottish Water should propose an efficiency challenge using established benchmarking techniques (please refer to the Efficiency Technical Appendix for details). The approach should include:

- benchmarking against UK water companies using Ofwat's models;
- adjustments for differences in capital maintenance and PFI contracts; and,
- an internal review of the scope for further efficiency improvements.

Work to identify and develop scenarios has been conducted in collaboration between WICS, Scottish Water and the Scottish Government to ensure the charge paths align with Ministers' expectations. Additionally, engagement has been conducted with other industry stakeholders, DWQR, SEPA and Consumer Scotland. This has enabled early transparent sharing of the range of investment scenarios as they evolved in a series of meetings and at the stakeholder joint group (FIG) from October 24 through to May 25.

Approach to Developing the Investment Planning Scenario

The main steps are outlined below (Figure 30), but it is important to note that they were not linear. Each of these steps was revisited to ensure all elements were rigorously tested and documented throughout the Business Plan development process.

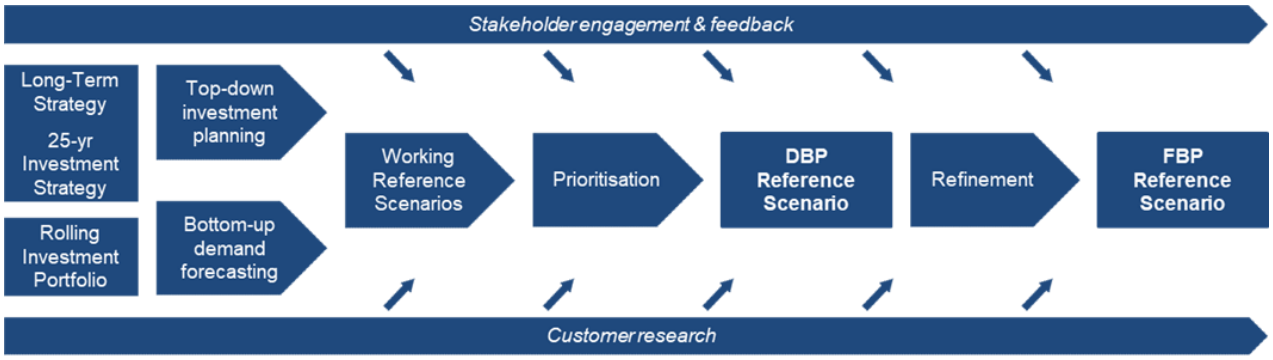


Figure 30: Investment Planning Scenario Development Process

The following sections describe the development of the Working Reference Scenarios and Prioritisation up to the Draft Business Plan.

Reviewing a Broad Range of Investment

During the initial stages of planning and discussions with stakeholders, using the demand captured, a broad set of investment planning scenarios was established so levels of internal and external appetite for these options could be assessed.

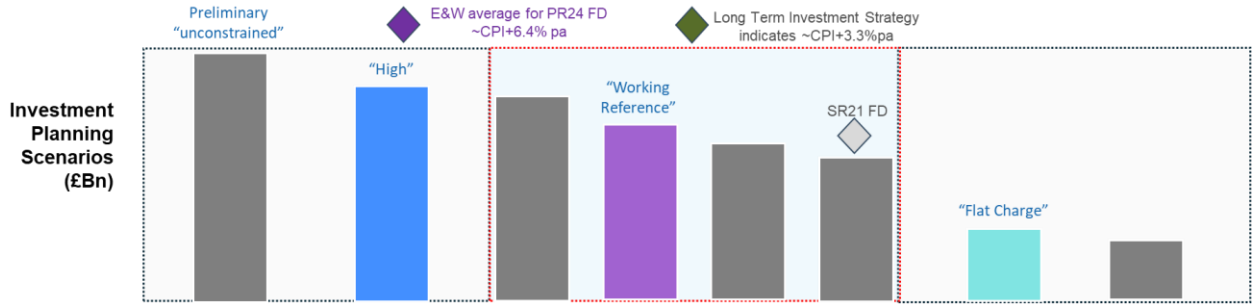
The three main scenarios at this stage were labelled:

Scenario A: "**High**" Scenario – our initial estimates of what would be required to meet Ministerial Objectives and make good progress against our Long-Term Strategy

Scenario C: "**Working Reference**" Scenario – a mid-range scenario above the previous SR21 Final Determination but lower than the High Scenario

Scenario E: "**Flat Charge**" Scenario that considered available investment and progress if customer charges were limited to inflationary-only increases on an annual basis

Other scenarios were also considered, but scenarios A, C and E described above were the primary focus for engagement with stakeholders (see Figure 31 below).



	Higher Scenarios		Zone of Potential Acceptability				Lower Scenarios	
Available investment (IPS) 23/24 price base (inc. efficiency)		£9.5bn		£8.5bn		£7.7bn	£7.0bn	
Annual Customer Charge increase	[CPI+10%]	[CPI+6.5%]	[CPI+5%]	[CPI+4%]	[CPI+3%]	[CPI+2%]	Flat (CPI +0%)	Frozen

Figure 31: Range of Investment Planning Scenarios considered

Establishing a Potential Zone of Acceptability

These broad scenarios and the high-level analysis enabled us to identify upper and lower bounds of *the potential zone of acceptability* to build a plan that is **Feasible**, **Affordable** and **Deliverable**.

We considered a range of external and internal factors including:

- The ability and capacity of our supply chain to deliver planned projects and programmes efficiently. This included any known supply chain constraints and other infrastructure schemes in other sectors that may compete for supply chain capacity. This enabled us to understand the upper limit of the supply chain's ability to deliver efficiently.
- The impact of changing customer charges and the associated customer acceptance of the differing levels of charges. We considered factors such as cost of living and what available analysis indicated regarding the effect of potential customer charge profiles have on available investment.
- The balance of intergenerational equity.

- The varying levels investment versus our ability to plan for, mitigate and successfully keep pace with climate change. We identified a likely level of investment below which we can no longer do this effectively.
- Our ability to maintain our assets (AR3).
- Our ability to meet legislative, statutory, regulatory obligations and other documented commitments (including Ministerial Objectives (MOs) against proposed investment levels.
- The investment required to be able to make progress in areas of service choices, considering what (if any) level of reduction would be acceptable.

Establishing the "Working Reference" Scenario

At the Draft Business Plan submission, the "Working Reference" Scenario equated to investment of £8.5bn (post-efficient in 23/24 prices), resulting in an increase in customer charges of Consumer Prices Index (CPI) + 4% per annum assuming an equal annual charge increase profile across the SR27 period.

The key data points on Figure 31 above were:

- "**Working Reference**" Scenario meets the MOs and will be critical as it forms the basis of the investment component of the SR27 Draft Business Plan submission.
- "**High**" Scenario - An upward drive in investment to reduce the risk of not meeting the MO's and making more progress towards the Long-Term Strategy goals (equivalent to **CPI+6.5%** pa).
- Scottish Water's Long-Term Strategy indication that the investment forecast required would result in a customer charge increase of **CPI+3.3%** per annum until 2050 (assuming the same balance of borrowing to customer charges and a steady smooth escalating increase).
- Ofwat's Final Determination for PR24 (equivalent to **CPI+6.4%** per annum for 5 years with significant Year 1 initial adjustments.
- Internal and external discussions on acceptable price increases (equivalent to **CPI+2 to 4%**). This is being validated through further customer research.
- The SR21 Final Determination long-term projection of **CPI+2%** although a number of factors changed since SR21 was assessed including a better understanding of PFI returns, higher Regulatory / legislative compliance requirements, follow on work from asset inspections, specific acceleration of AC mains replacements.
- "**Flat Charges**" Scenario – **CPI+0%** - developed on request from Scottish Government to enable ministers to assess a wide range of options.

Selecting the Priority Needs for the Scenarios

As an initial step, the Investment Hierarchy used within the current investment period (SR21) was used as a tool and consistent ruleset by which to develop a balanced investment portfolio and to dictate what comprised each of the scenarios considered.

Table *10* below sets out the categories within the hierarchy used for the development of the SR27 Business Plan and the following sub-sections unpack how a working reference scenario has been constructed to blend appropriately investment across these types.

Table 10: Our SR27 Investment Hierarchy

	Customer & performance centric investment needs	Examples	Investment allocation approach		
Deliver for existing customers	1 Maintain core service performance for existing customers	Essential works to maintain existing asset performance, customer experience and health & safety	Minimum needed to maintain service. Already prioritised significantly so budget reduced as a last resort, after all other non-discretionary expenditure reduced to minimum levels	AR3 – asset category 1,2&3	Core expenditure
	2a Meet current regulatory & community commitments	Meet undertakings, legislative (RBMP3), regulatory (water quality), Improving Urban Water (IUW), community (e.g., Seafield odour.)	Named sites agreed with regulators	Enhancement	
	2b Meet current regulatory & community expectations	Water Treatment: HAA at risk Developing schemes – improved disinfections, Run to Waste.	Allocated portion of Enhancement funding	Enhancement	Remaining allocation prioritised within these areas
	3a Improve service for existing customers	Investing in asset enhancement to strengthen resilience, reliability and sustainability of service	Allocated portion of Enhancement to support Customer service issues (internal flooding and low pressure, rainwater management partnerships)	Enhancement	
Support new connections	3b Provide a service for new customers	New development and connections, including temporary works	Adress know systems that has confirmed development.	Enhancement / matched funding*	
Consider future customers	3c Replace long-life assets for future customers	Proactively replacing aging assets to tackle back log and underlying issues; water mains (Asbestos cement pipes), civil infrastructure with remaining lifetime of 40-60 years). Aim to prevent unsustainable costs being passed on to future customers	Consequential allocation as there is high demand from existing assets that impact current service. FD & investment scenarios do specify investing in long-life asset replacement. Future customer needs re-prioritised	AR3 – category 2 Civils and water mains, pressurised sewers	Additional core expenditure

*Cat 3b Match funding Income received that is allocated for Part 3 infrastructure improvements to support new connections. In addition, service relocation allocation is required to move our assets when required by a 3rd party (part funded from external sources)

SR27 AR3 Draft Business Plan requirement

Since SR21, WICS and Scottish Water have recognised the need to transition to sustainable level of AR3 investment.

Combined with an assessment of the number, age, condition and deterioration profiles of our assets, using Management Approaches (as described in the previous section) a demand of £8.1bn is projected across the SR27 period. This breaks down into an estimated **Replacement** demand of £700m-£800m p.a. and a **Refurbishment & Replacement** demand of £550-£650m p.a., both over the next 6 years.

Choices were taken on the preliminary allocations for each of the Management Approaches through:

- Review of recent investment run rates in SR21;
- Full Management Approaches policy estimates; and,
- The views of subject matter experts to determine where to take more or less risk across the individual Management Approaches, with particular reference to where there is a significant element of backlog or deferral from SR21 (e.g. Matters in the Interest of Safety for the Reservoirs (Scotland) Act 2011, and to address obsolescence of. SCADA systems).

Figure 32 describes how this projection fits into the broader, sustainable transition to 2040 forecast by our Long-Term Investment Strategy.

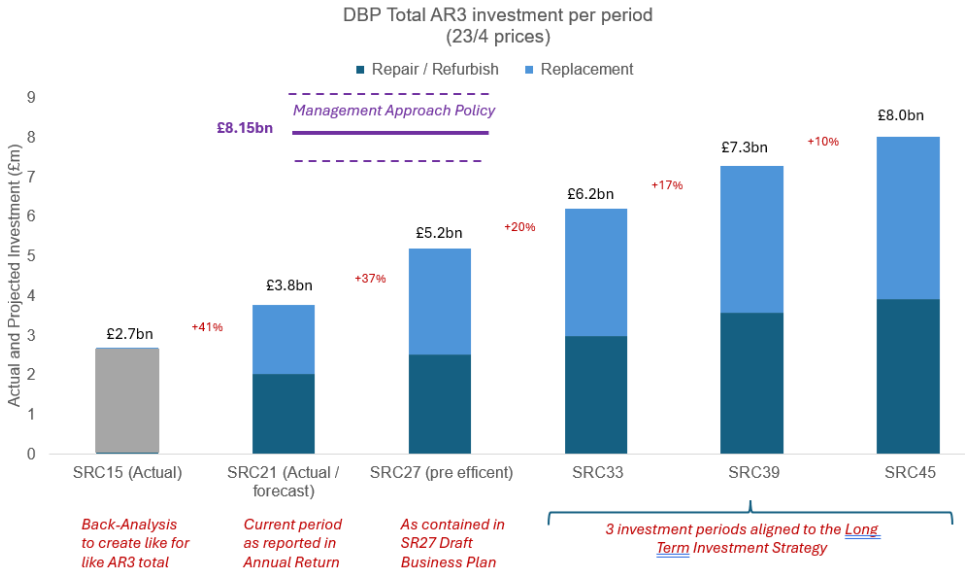


Figure 32: Total AR3 Investment Per Period at Draft Business Plan

Note for all graphs: We have used the post-efficiency adjusted figures for SR27 to align with business plan tables.

The breakdown of final AR3 demand used within the SR27 Final Business Plan can be found in Annex C.

Systemising the Scenarios

Having undertaken the initial investment planning exercise and established the zone of acceptability, the scale of the Working Reference Scenario, three main steps were followed to ascertain the specific projects and programmes within the scenarios:

1. **The overall financial constraint was translated into draft Need level allocations.** Service Planners and investment reviewers worked in Copperleaf to set up/input the scenarios and capital expenditure constraints. This involved splitting the investment across all the different funding Needs per the Investment Hierarchy and the AR3 scale of need described above.

2. **Identified an initial set of priority projects and programmes to be delivered for the proposed allocations from an assessment of total investment demand**. Informed by Management Approach owners and the detailed knowledge of stakeholder preferences held by Scottish Water people accountable for these stakeholder relationships to "tag" investments in Copperleaf to different scenarios. (i.e. which investments in a particular Management Approach would include if £x versus £y were available).

3. **Undertook a single adjustment of these selected projects and programmes, subject to executive approval, to form the SR27 Investment Baseline.** This step accounted for

the differences between known project and programme costs and those assumed in the 25 Year Investment Strategy, along with any known material risks and opportunities. It also considered the potential collective impact of the scheduling of individual large projects and programmes. The adjustments are set out below.

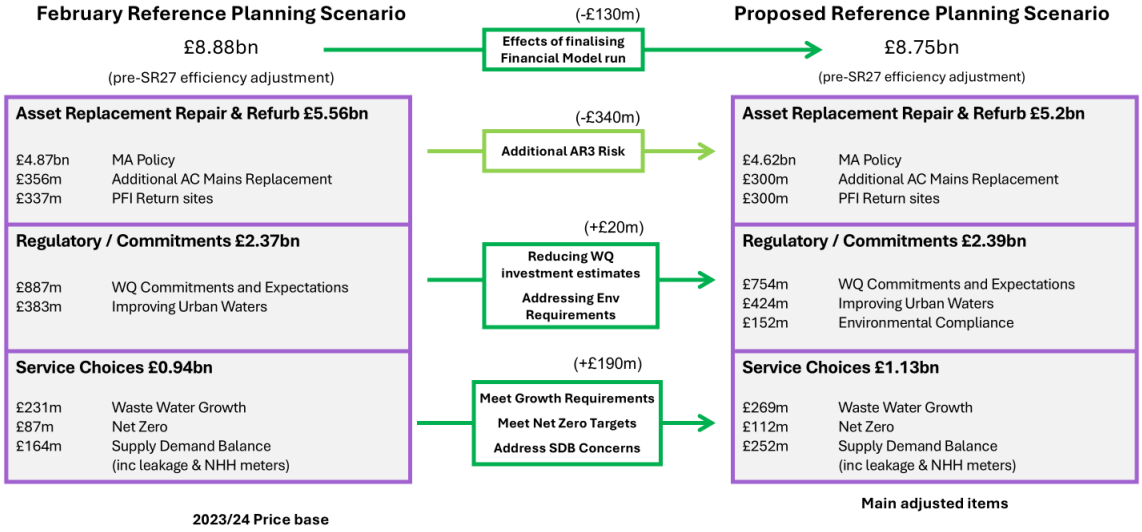


Figure 33: Draft Business Plan single adjustment of these selected projects and programmes

This delivered a dataset recorded in Copperleaf underpinning the draft business plan "Investment Baseline".

Checking for Overlaps

A number of features of the process followed to generate the SR27 Investment Baseline contributed to reducing the potential for it to include scope overlaps, notably:

- Many of the known and committed investment proposals represented significant levels of expenditure, require a Project Investment Appraisal. This process allows for the identification of the full scope of need at the site in question, and for this to be accounted for in the appraised project options.
- Where investment proposals related to projects already recorded in our project delivery system (P3M), information from it has been used to form the cost estimates in the Investment Baseline. Within P6, a facility exists to associate each project with a site level asset. This allows for a review of projects at the same asset to avoid planning clashes and, by the same measure, scope duplication. Where this is the case, the projects can be combined and reported with "split drivers" e.g. where some of the expenditure is forecast as AR3 demand, and others to different needs. This is particularly common in the case of investment to enable new connections to waste water treatment works already at capacity – commonly these upgrades also deliver asset maintenance benefits and are recorded as such.

- Through the process of excluding ~30% of the forecast AR3 demand required to meet the selected policy positions in our Management Approaches – much of which resulted in the exclusion of lower priority planned investment needs – the proportion of future demand (both planned and responsive) is increased, and so the potential for overlaps in known demand automatically reduced.

Profiling Investment

Profiling is the process of splitting and spreading the forecasted SR27 investment over the six years of the period. A number of factors were considered in order to forecast an accurate and acceptable profile that aims to deliver the planned work in an efficient and economic manner, within various constraints. Factors taken into consideration included:

- **Customer charging / billing profile:** Overall investment is profiled in line with the customer charge profile, with capital expenditure mirroring the steady growth of charges across the period and availability of funding. For maintenance AR3 programmes, investment for each Management Approach has been profiled to match the available funding profile
- **Legislative commitments:** Profiling of certain projects and programmes has been driven by the need to ensure achievement of legislative compliance dates (e.g. RBMP3) or commitment dates (e.g. DWQR Enforcements), wherever possible.
- **Cash flow and deliverability:** To take account of supply chain efficiency and sustainability considerations investment levels were smoothed within programmes to support efficient resourcing of delivery. At Draft Business Plan stage this was conducted at a strategic level.
- **Major project programmes:** The investment levels associated with some of our major projects such as West Central Bioresource, Juniper House replacement and the Water of Leith UID projects have meant that we have had to reprioritise a number of smaller projects from current live reported date to remain balance annual investment levels.

Outputs from the Analysis of the Broad Range of Scenarios

The following figure represents the balance of investments[31] across three categories for the broad range of investment scenarios used to inform the Draft Business Plan.

[31] Note: Figures quoted here are “pre-efficiency” – we apply a working assumption for the top-down efficiency factor to be applied to create the “post-efficient” investment. Therefore, when considering the reference scenario, £8.88bn equates to £8.5bn in post-efficient terms.

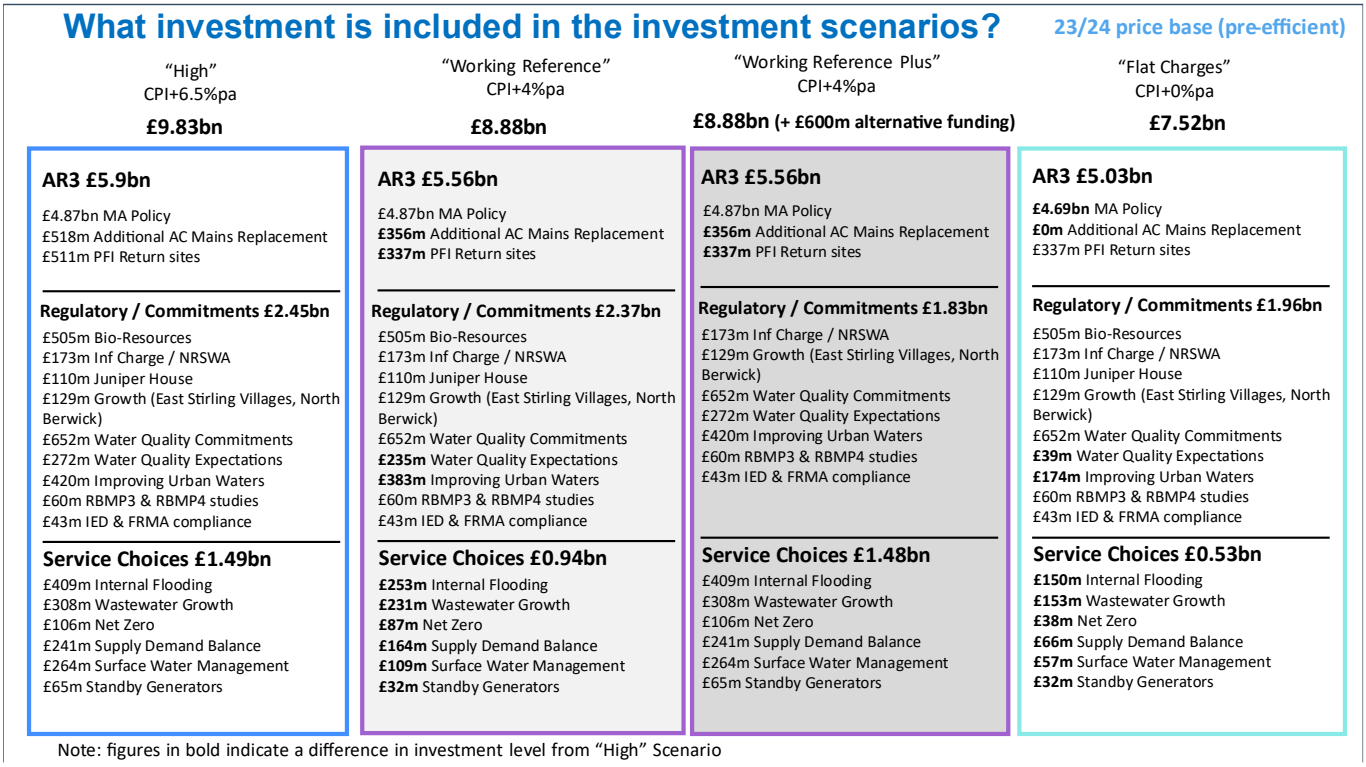


Figure 34: Balance of investments across the scenarios (during development, February 2025)

The "Working Reference" Scenario in Figure 34 assumes an available investment planning envelope using a customer charge cap at CPI+4% pa with Government borrowing as laid out in the Commissioning Letter. There are some large one-off investments such as the West Central Bioresources and the replacement of Juniper House laboratory facility contained within this funding envelope. There were significant reductions in investment levels (shown in bold) for certain line items compared to the "High" Scenario. These reductions create either an increase in risk or a reduction in service or outputs.

To illustrate the potential impact of alternative funding opportunities an additional Scenario (labelled "Working Reference Plus") was included. This scenario included an assumption that the ~£600m for West Central Bioresources and Juniper House was funded from additional borrowing or other form of financial arrangement (e.g. Mutual Investment Model). This resulted in less reductions to other investment lines and the outcomes associated with the "Working Reference Plus" Scenario were more closely matched to the "High" Scenario.

The table below describes the initial assessment of feasibility, affordability and deliverability of the scenarios that were developed.

		Higher Scenarios		Reference Scenario and Variations				Lower Scenarios	
Assessment Criteria									
Available investment (IPS) 23/24 price base (inc efficiency)			£9.5bn		£8.5bn		£7.7bn	£7.0bn	
Service	Meeting Legal duties		✓		✓			?	X
	Progress to Ministerial Objectives		✓		?			X	X
	Stakeholder / Customer priorities		✓		?			X	X
External Factors	Supply Chain		?		✓	✓		?	?
	Annual Customer Charge increase	[CPI+10%]	[CPI+6.5%]	[CPI+5%]	[CPI+4%]	[CPI+3%]	[CPI+2%]	Flat (CPI +0%)	Frozen

Figure 35: Overview of initial review of broad scenarios to understand what might be feasible, affordable, and deliverable

In Figure 35, the High Scenario would be feasible but could be impacted by the supply chain's capacity to deliver and were assessed as likely to be found unaffordable or unacceptable by customers.

Scenario E "Flat charge" would likely be more affordable to customers but would be unfeasible as it would not maintain services or meet ministerial objectives.

As the overall investment envelope decreases from left to right, so the risk to services increases, and the ability to meet Ministerial Objectives and maintain services decreases.

Stakeholder Engagement

In parallel to careful consideration of feasibility, affordability and deliverability, we undertook engagement with internal and external stakeholders and continued our programme of customer research. We presented detailed materials on the range of investment scenarios and their associated the outputs and outcomes to joint stakeholder sessions (Future Investment Group), the Independent Customer Group and to the Scottish Water Board in December 2024 and February 2025. In addition, there were specific meetings with DWQR and SEPA to better understand the expectations for progress for SR27.

These scenarios were used to inform the programme of ongoing customer research – both through direct research and the deliberative research group of informed customers. This is further explained in the Customer Research Technical Appendix.

Customer Voice

Scottish Water's programme for SR27 customer research (as detailed in the Customer Research Technical Appendix) has been central to the development of the Reference IPS. For SR27 we have for the first time involved customers in the development of investment planning scenarios from the earliest stages, being transparent about the impact of various levels of investment on the outcomes that Scottish Water will be able to deliver, and bill impact. All research undertaken with current household customers on this subject for SR27 has provided them with personalised information which reflects their own Council Tax Band, and the level of discount that they receive.

We first engaged with household and business customers on investment planning scenarios in early 2025, sharing outcomes that might be offered at three different levels of charging (increasing by CPI +2%, +4% and +6.5% per annum). Customers gave detailed feedback on choice areas and their comparative preference between scenarios. Their understanding and acceptance of the challenges presented by Scottish Water and their positive sentiment towards Scottish Water, led to customers wanting to protect both the company and its infrastructure, and generally accepting the need to pay more due to challenges and future-proofing efforts. However, none of the scenarios presented offered enough value for wholehearted endorsement from customers. This led to a recommendation to review the scenarios to offer more value – in terms of the outcomes on offer, and in how outcomes are communicated.

A rebalanced, high-level investment scenario representing bill increases of CPI+4% (on an incremental increase basis), with outcomes aligned with Scottish Waters thinking in the last stages of the development of the Draft Business Plan, was presented in early April 2025 to reconvened panel of customers who had participated in the earlier investment scenario research. In the context of their priorities and increased understanding of the investment areas, participants generally felt that the rebalanced investment scenario was well-balanced and offered clear, tangible outcomes. When invited to consider re-prioritising expenditure across investment areas, participants generally maintained the allocations presented in the rebalanced scenario. Where changes were suggested, they typically involved diverting funds to choice areas perceived to benefit a greater number of customers and deliver broader impact. In the post-group feedback, most participants agreed that Scottish Water listened to their feedback from the original research when designing the rebalanced investment scenario.

This extended research methodology enabled customers to give considered views of Scottish Water's plans and created a 'you said we did' engagement process. As a result, customers involved in these research activities developed an informed view of Scottish Water's operations, our long-term ambitions and strategy, and the challenges that Scottish Water faces. We could expect that a typical customer might hold a less well-informed view.

Refining the Reference Investment Planning Scenarios

The previous sections outlined the work up to the development of a broad range of scenarios and move towards on a "Working Reference" Scenario. The focus was then put on maturing and refining the "Working Refence" Scenario into a "Reference" Scenario.

The first step was to refine the available budget associated with a CPI+4% p.a. customer charge profile. The Financial Model was re-run using the latest modelling assumptions and the application of the most up to date top-down global efficiency factors to be applied. Working back from this figure resulted in a new "Reference" Scenario budget being set of £8.75bn (2023/24 price base before SR27 efficiency adjustments are applied). This equates to an £8.3bn post-efficiency budget.

The refinement process incorporated feedback from sector stakeholders, clarification of Regulator requirements, customer research feedback and further considering the requirements of the Draft Ministerial Objectives 2027-33. We excluded the use of additional government borrowing or alternative financing options (PFI or equivalent) or front-loading the customer bill profile as this requires further exploration with stakeholders that will not be concluded in time for incorporation

into the Draft Business Plan. Further efficiency was also excluded at this point as we have already built in a significant stretch to achieve the frontier efficiency challenge.

Several strategic options were considered to manage budgetary constraints and investment reallocation. These included potential further removal of demand in the AR3 programme areas or reduce outcomes where there is service choice. Service choice areas were reviewed, including allocations for internal flooding, waste water growth, net zero, supply-demand balance, and surface water management.

Upward adjustments included an additional allocation for carbon capture (woodland creation and peatland restoration) to achieve net zero emissions targets. A focus on environmental compliance resulted in increased allocations for regulatory requirements following clarifications of SEPA minimum expectations. Further allocations were targeted towards leakage reduction and non-domestic smart metering programme to improve the resilience in our water supply demand balance. Waste water growth allocations were also increased to ensure compliance risk can be managed whilst enabling all new domestic connections.

Downward adjustments included reductions in asset replacement allocations against the Management Approach policy estimates, PFI returns and reduction in how much additional AC Mains Replacement we are planning. There were opportunities to reduce the allocation for Water Quality investment allocation due to improved estimates.

Recommended Reference Scenario A for the Draft Business Plan

The Draft Business Plan presented Reference Scenario A, this scenario represented a carefully considered, balanced set of investment needs that:

- Met the Draft Ministerial Objectives 2027-33;
- Represented delivery against (established via engagement with SEPA and DWQR), the minimum levels of investment to meet our statutory and regulatory obligations in respect of drinking water quality and the environment. This included improvements in core areas of water quality compliance and risk, and significant progress in delivering improvements to storm overflows from sewers assessed by SEPA as high priority;
- Was adjusted to reflect the latest customer research available at this point (further research to be undertaken);
- Allowed us to maintain the existing high levels of service that customers across Scotland enjoy in the face of climate change and for customers affected by internal sewer flooding (we note that this will be challenging given increasing volatility both from the weather and our aging assets);
- Allowed us to play our part in addressing the causes of climate change by maintaining confidence in our target to reach Net Zero carbon by 2040;
- Considered the future (aligned with our Long-Term Strategy), making sure that we put future generations in a good position through investment in climate adaptation, replacing the parts of our drinking water network which are deteriorating the fastest,

and ensuring we maintain understanding of the condition of asset base for future decision making; and,

- Was developed with EBP&R principles of transparency with our sector stakeholders throughout the process.

Key Investments

Figure 36 sets out the key investments included within the proposed Reference Scenario for the Draft Business Plan.

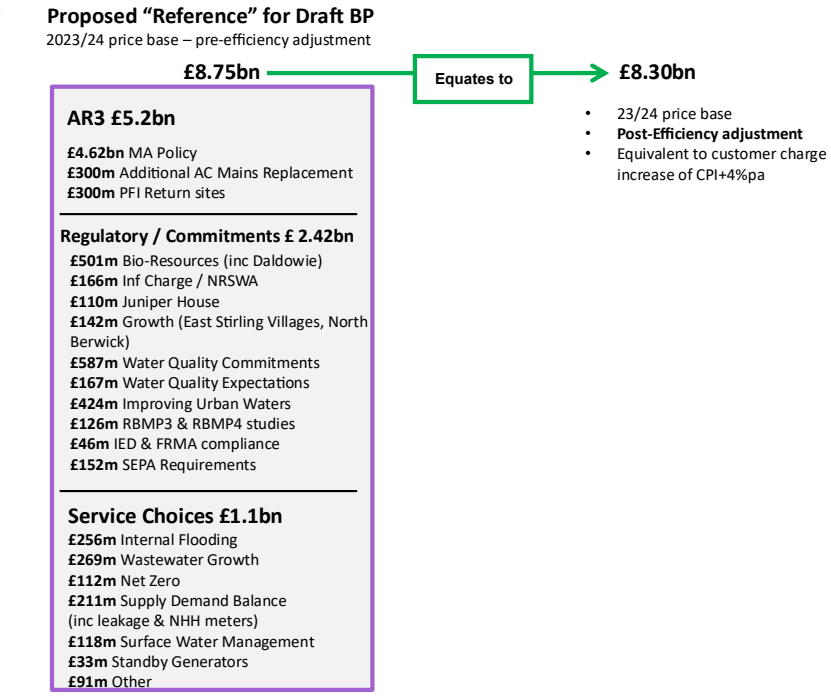


Figure 36: What investment is included in the Reference Investment Scenarios

Key Outcomes

The outcomes associated with the Reference Scenario for the Draft Business Plan are forecast in the Table 1 of the Data Tables in line with the WICS Guidance and definitions. The updated position for the SR27 Final Business Plan is set out in the Monitoring Performance Technical Appendix.

Customer Service Outcomes

	Metric description	Baseline	2032/33	Rounded %change
Existing	Developer customer experience measure	81.99	83.04	**6%**
	Non-household customer experience measure	88.78	89.43	**6%**
	Household customer experience measure	87.78	88.49	**6%**
New	R-MeX (wholesale service)	UQ	UQ	-
	UKCSI	> average	> average	-
	Asset health	In development		-
	Communities measure	not available		-

Note: Positive % change indicate improvement.

Water Service Outcomes

	Metric description	Baseline	2032/33	Rounded %change
Existing	Total leakage	455.9	411	**10%**
	Low pressure register	30	26	**13%**
	Unplanned interruptions greater than 6 hours	6750	6750	**0%**
	Total drinking water compliance	99.93%	99.95%	**29%**
New	Leakage in zones with supply demand deficit	233	203	**13%**
	Consumption of non-household premises	371.5	311.4	**16%**
	Per capita consumption (PCC)	177.3	174.3	**2%**
	Average minutes lost	15	15	**0%**
	Repeat interruptions to supply	240	200	**17%**
	Population at risk at worst historic drought	2,940,760	2,328,000	**21%**
	Population at risk at peak demand (very provisional)	654,860	346,000	**47%**
	Taste & odour contacts	0.51	0.53	**-4%**
	Discoloration contacts	2.11	2.08	**2%**
	Lead SW networks	45,550	27,550	**39%**
	Lead customer supply pipes	98.01	98.15	**7%**
	Water risk assessment planning	7,975	6,465	**19%**
	DWQR reported incidents	30	25	**16%**

Note: Positive % change indicate improvement. Leakage and NHH consumption figures quoted in Ml/d terms for clarity but reported as a percentage reduction in Data Table 1 and related documents to reflect WICS Guidance requirements.

Environment / waste water Service Outcomes

	Metric description	Baseline	2032/33	Rounded %change
Existing	Annual internal sewer flooding	1.57	1.48	**6%**
	WwTW discharge compliance	96.37%	96.37%	**0%**
	Serious pollution (EPI Cat 1/2)	8	5	**38%**
	Total pollution (all categories)	34.8	34.8	**0%**
	Sludge compliance	0	0	**0%**
New	Internal sewer flooding register	1.51	1.51	**0%**
	Annual external sewer flooding	10.50	11.24	**-7%**
	External sewer flooding register	11.35	11.88	**-5%**
	Unsatisfactory intermittent discharges (UIDs)	873	748	**14%**
	River water quality	not available		-

Note: Positive % change indicate improvement.

Net Zero Emissions and Biodiversity

	Metric description	Baseline	2032/33	Rounded %change
Existing	Net Zero Emissions	259,257	84,994	**67%**
	Operational emissions (W)	62,882	2,314	**96%**
	Operational emissions (WW)	102,219	35,717	**65%**
	Baseline emissions	35.74%	8.23%	**77%**
New	Operational emissions (net)	156,908	14,461	**91%**
	Embodied carbon	102,349	70,533	**31%**
	Carbon capture/sequestration	-8,193	-23,569	**188%**
	Biodiversity land-use	0	4,500	-
	Biodiversity outcomes	In development		-
	Resource recovery	In development		-

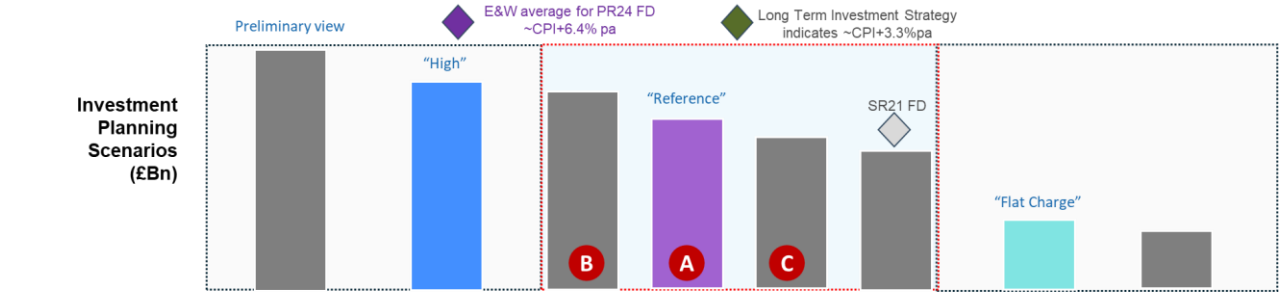
Note: Positive % change indicates improvement

Draft Business Plan Alternative Scenarios

In addition to providing a central “Reference Scenario” for our SR27 Business Plan submission, we are required to consider the impact on water and waste water services of alternative charge paths.

Following discussions with stakeholders, it was agreed that an incremental step of £400m was deemed to be a reasonable step when considering Alternative Scenarios for the Business Plan and Data Tables. It was considered that a larger increment risked undermining the principles of the SR27 Business Plan. This would require a comprehensive revision for each alternative. Conversely, a much smaller increment was unlikely to make any material differences to the

outcome measures. This was equivalent to a CPI + 1% per annum increment on customer charges. This is pictorially represented in Figure 37.



	Higher Scenarios		Reference Scenario and Variations				Lower Scenarios	
Assessment Criteria								
Available investment (IPS) 23/24 price base (inc efficiency)			£8.7bn	£8.3bn	£7.9bn			
Annual Customer Charge increase	[CPI+10%]	[CPI+6.5%]	[CPI+5%]	[CPI+4%]	[CPI+3%]	[CPI+2%]	Flat (CPI +0%)	Frozen

Figure 37: Reference Scenario (A) and Two Alternative Scenarios (B&C)

The two alternative scenarios are pictorially summarised below in Figure 38. The following sections go on to describe each of these alternatives in more detail.

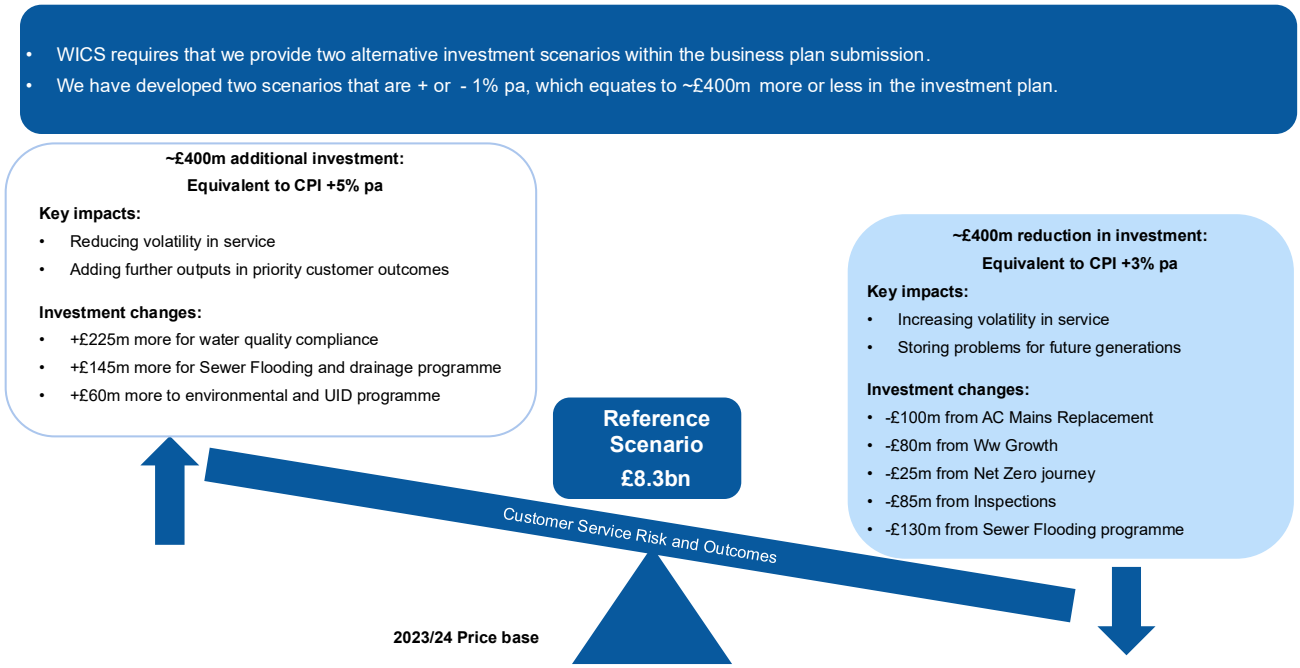


Figure 38: View of the two alternative scenarios

Alternative Scenario B

This scenario would enable ~£430m additional investment in water and waste water services when compared to the Reference Scenario.

It was forecast that his would enable;

- **A reduction in variation of water quality performance, securing safe, great-tasting water 24/7.** The additional investment available in this scenario would allow us to:
  - Upgrade an aging water treatment works supplying drinking water to 62,000 customers.
  - Accelerate programmes to modernise chemical dosing, monitoring, and control equipment at water treatment works across Scotland to reduce the number of problems we respond to - in turn reducing the number which escalate into customer events and regulatory incidents.
  - Replace aging water mains which result in customers receiving persistently discoloured water.
- **Better support for communities affected when our sewers are overloaded by rainwater.** The additional investment available in this scenario would allow us to:
  - Invest alongside communities, initially at a modest scale, to co-create schemes designed to keep rainwater on the surface. We would do this working with Local Authorities, establishing a "community fund" to promote community driven, place-based initiatives.
  - Allocate more money to directly resolve the pinch-points in our sewers that leave some customers vulnerable to internal sewer flooding. It was expected that this would see the register of such customers start to reduce during the SR27 period as early impacts of changed climate were dealt with.
- **Acceleration of investment to protect the health of our rivers, where it is impacted from storm overflows.** It was proposed in the Reference Scenario at Draft Business Plan to invest three times more than SR21 to address overflows from sewers assessed by SEPA as high priority. The additional investment available in this scenario would allow us to begin work on similar, but lower priority, issues where these are shown to have an environmental impact.

Recommendation	£430m	
Secure Water Quality compliance (including Water NIS compliance risk)	£225m	• AR3 expenditure on critical chemical dosing & control equipment and network interventions to avoid discoloration. • Replacement of Castle Moffatt WTW: AR3, HAA, and Disinfection needs • Improved water quality monitoring at WTW to improve assurance manage operational problems.
Protect internal sewer flooding performance in a changing climate	£80m	•Investment to de-risk central output profile and move messaging from "maintain" to "reduce".
Promote community-driven, place-based schemes that keep rainwater on the surface	£65m	•Community fund to seed partnership work, (inc. with Local Authorities). •Strong alignment with LTS outcomes and steps.
Further progress on UIDs with environmental impact	£60m	•Begin to deliver some improvements to medium priority UIDs.

Figure 39: Alternative Scenario B: Delivering more for customers into the future (23/24 price base, pre-SR27 efficiency adjustment)

Alternative Scenario C

This scenario removed c£420m of proposed investment in water and waste water services compared to the Reference Scenario at Draft Business Plan.

In this scenario, difficult choices would be expected.

It was judged that following the work to produce the Reference Scenario, no further reductions could be made regarding the delivery of regulatory duties, including the level of maintenance expenditure require to maintain essential services.

In this scenario it was assessed that today's concerns would ultimately be prioritised over the factors that we know will impact customers in the future (thus creating a bias regarding the burden on each generation of bill payers);

In this scenario it was forecast that:

- ***A material increase ~200 properties on the internal sewer flooding register.*** We would likely accept that the current approach always to provide underground pipes and tanks to be unsustainable even in the short term. Instead, our focus would shift to providing property-level mitigations (e.g. one-way valves to prevent sewage entering a property) and developing "traditional" solutions only where there was a high cost-benefit and no prospect of a catchment-wide solution in the long-run.

- ***A route to NZ by 2040 totally reliant on considerable investment in SR33.*** We would be relying on additional investment in renewable power after 2033. We are one of Scotland's biggest electricity users but would have to rely only on the results of others to create a "green" electricity supply.

- ***An upward trend in burst rates water supply interruptions.*** We would reduce the planned rate of water mains replacement by circa 20%. Without off-setting this reduction with additional investment in future years, this will result in a significant increase in customers experiencing repeated supply interruptions in the late-2030s.

- ***A higher risk of non-compliance with environmental discharge permits.*** Beyond the current list of known sites, we would continue to rely on temporary chemical dosing units to support emerging connections. These present a higher risk of failure compared to more permanent installations and require consent from SEPA.

- ***A weaker evidence base for decision making.*** We would reduce by 50% our planned investment in asset inspections, expecting limited capacity to deliver proactive maintenance strategies in the SR27 period, pausing some work until the mid-point of the period to support planning for SR33.

Recommendation	-£420m	
Delay addressing the causes of problems for future customers, introducing more volatility into today's service levels	-£100m	Reduce distribution mains renewal to 250km/yr • Full AC replacement extended by 5 years. • Recurring Customer Interruptions stable, not reducing. • ITS & burst rates volatile and continuing to trend upward.
	-£80m	No allocation for emerging demand on WWTW from future connections • Requires higher WLC temporary operational solutions or putting at risk future Environmental Compliance
	-£25m	No expenditure on new renewables • Requires significant investment in SR33 to hit Net Zero by 2040
Pause investment in intelligence for good - practice asset management	-£85m	Circa 50% reduction in planned non-statutory inspections • Weaker evidence base for future planning – remaining inspections later in the period. • Potential to miss some low-probability high-impact issues.
Different approach to internal sewer flooding	-£130m	Provide property-level mitigations, prioritising traditional solutions only where there is a high cost-benefit and no prospect of a strategic solution (inc. rainwater management). • Flooding register likely to rise by 200+ properties during SR27

Figure 40: Alternative Scenario C: Address the problems that we can today (23/24 price base, pre-SR27 efficiency adjustment

Testing against the Ministerial Objectives

As the Reference Scenario was refined there was analysis conducted as to what would be achieved in each of the Draft Ministerial Objectives 2027-33. Following the adjustments and refinements made to the Draft Business Plan Reference Scenario, it was confirmed that it would meet the Draft Ministerial Objectives 2027-33.

The below table provides analysis of scenarios considered at the Draft Business Plan against the Draft Ministerial Objectives 2027-33, detailing level of progress made under each scenario.

Table 11: Analysis of Scenarios against Draft MOs

Ministerial Objective	High scenario (CPI + 6.5%)	Working Reference scenario (CPI + 4%)	Flat Charges scenario (CPI + 0%)
Long-Term Water Sector Vision	Support for Hydro Nation Chair, customer and community involvement and benefits	Support for Hydro Nation Chair, customer and community involvement and benefits	Support for Hydro Nation Chair, and existing customer and community involvement and benefits
Standards of Service	Maintain service levels achieved at the exit of SR21	Maintain service levels achieved at the exit of SR21 – accepting more compliance risk in PFI returns and risk of burst frequency.	Provide reduced service levels compared to exit of SR21 - notable overall service impacts as measured by OPA and CEM
Asset Maintenance (long-term)	Continue inspection programme for critical assets. 70% of MA[32] demand delivered plus accelerated AC Mains replacement and provision for AR3 PFI returns	Continue inspection programme for critical assets. 70% of MA demand delivered. 70% of AC Mains requirement delivered. 65% of AR3 investment for PFI delivered	Continue inspection programme for critical assets. 65% of MA demand delivered. No accelerated AC Mains replacement delivered. 65% of AR3 investment for PFI delivered
Flooding and Surface Water Management	Recover to SR15 level of customer internal sewer flood register by removing properties from the flooding register	Maintain intended SR21 exit level of customer internal sewer flood risk performance to by removing properties from the flooding register.	Reduction in performance level leading to significant increase to customer internal sewer flood risk. Flooding register grows to over 600 properties. Policy changes to focus primarily on delivering mitigations and clean up only – limited resolution of hydraulic issues
	Make progress on reducing the top 200 external flooding sites of which 50% are blue green solutions. (likely a small proportion of total register)	Make progress on reducing the top 40 external flooding locations – primarily grey solutions	Make progress on reducing the top 20 external flooding locations - all grey infrastructure
	Existing 3 strategic drainage partnerships augmented with 5 new partnerships	Existing 3 strategic drainage partnerships augmented with 2 new partnerships	No progress on removing surface water from our networks and have passive role in existing partnerships with no new partnerships created.
Drinking Water	Address failures at 18 WTW[33] serving c1.45m customers and reduce risk of failures at 4 WTW serving 275k customers	Address failures at 18 WTW serving c1.45m customers and reduce risk of failures at 3 WTW serving 265k customers	Address failures at 18 WTW serving c1.45m customers. HAA[34] compliance risk is not addressed at 4 WTW serving 275k customers

[32] Management Approaches (MA)
[33] Water Treatment Works (WTW)
[34] Halo acetic Acid (HAA)

Ministerial Objective	High scenario (CPI + 6.5%)	Working Reference scenario (CPI + 4%)	Flat Charges scenario (CPI + 0%)
	Improved auto shut down / disinfections reliability at priority sites and development of other water quality failure risk sites	Improved auto shut down / disinfections reliability at priority sites and development of other water quality failure risk sites	Only address highest DWQR priority risks only. No development work on HAA and other water quality failure risk sites. Only 15% of required investment available to meet Quality expectations
	Ensure 2 water resilience schemes (Dundee & Edinburgh) are delivered		
Environment	Achieve RBMP3[35] compliance improving ~360km of waterbody, including 8 WWTW[36] sites covering 290k PE[37]. Monitoring PFF[38] compliance & solution development	Achieve compliance with RBMP3 measures improving ~360km of waterbody – including 8 WWTW sites covering 290k PE. Monitoring PFF compliance	Achieve compliance with a reduced proportion of RBMP3 measures by progressing all development work and delivery of ~8 WWTW and 10 UID enhancements.
	Achieve outcomes in Improving Urban Waters Route Map. Delivering remaining 108 High Priority UIDs[39], c57 Clyde UIDs and Almond Valley sites. Progress Water of Leith. Development of Medium Priority UIDs. 1000 new monitors roll out	Achieve outcomes in Improving Urban Waters Route Map. Delivering remaining 108 High Priority UIDs, c57 Clyde UIDs and Almond Valley sites. Progress Water of Leith. Development of Medium Priority UIDs. 1000 new monitors roll out	Do not achieve outcomes in Improving Urban Waters Route Map. Delivering remaining 108 High Priority UIDs only. No Clyde, Almond Valley or Water of Leith UIDs. No development of Medium Priority UIDs. 1000 new monitors roll out
	Deliver North Berwick & East Stirling Villages	Deliver North Berwick & East Stirling Villages	Deliver North Berwick & East Stirling Villages
	Bioresources – Deliver Daldowie and supporting STC[40] sites by 2031. Deliver IED[41] compliance	Bioresources – Deliver Daldowie and supporting STC sites by 2031. Deliver IED compliance	Bioresources – Deliver Daldowie and supporting STC sites by 2031. Deliver IED compliance
	Deliver 9 measures to support compensation flows or fish barriers		

[35] River Basin Management Plans version 3 (RBMP3)
[36] Waste Water Treatment Works
[37] Population Equivalent (PE)
[38] Pass Forward Flow (PFF) the instantaneous upstream flow that a Combined Sewer Overflow (CSO) or pumping station can accept
[39] Unsatisfactory Intermittent Discharges (UIDs)
[40] Sludge Treatment Centre (STC)
[41] Industrial emissions Directive (IED)

Ministerial Objective	High scenario (CPI + 6.5%)	Working Reference scenario (CPI + 4%)	Flat Charges scenario (CPI + 0%)
Supporting Sustainable Economic Growth	Provide capacity to enable all new domestic property connections, at reduced risk - WWTW confirmed need from SR21, for delivery in SR27, - 3 WTW (Tiree, Kenmore & Balmichael), - Seafield WWTW development, and - £78m emerging demand.	Provide capacity to enable all new domestic property connections, with increased risk - WWTW confirmed need from SR21, for delivery in SR27, - 3 WTW (Tiree, Kenmore & Balmichael), - Seafield WWTW development, and - Higher compliance risk at 14 WWTW	Reduced ability to provide capacity to enable all new domestic property connections - 50% of WWTW confirmed need from SR21, for delivery in SR27, being delivered, - 2 WTW (Tiree & Kenmore), - No investment in Seafield WWTW development, - High compliance risk at 34 WWTW, and - Impacted ability to provide the required capacity for all new domestic connections
Circular Economy	5 Lighthouse Projects – process emissions, blue green infrastructure and resource recovery	3 Lighthouse Projects will proceed – process emissions and resource recovery	1 Lighthouse Project will proceed – resource recovery
Security and resilience	We expect to comply with Government guidelines on cyber security (Networks & Information Systems – NIS)	We expect to comply with Government guidelines on cyber security (Networks & Information Systems – NIS)	We expect to comply with Government guidelines on cyber security (Networks & Information Systems – NIS)
Climate Change, Adaption and Mitigation	Deliver Net Zero Routemap including reduction of 225 ktCO2 from 2023/24 levels and operational Net Zero by c2032/33	Reduced progress on delivery of Net Zero Routemap (2050). Reduction of 198 ktCO2 and operational Net Zero moved out to c2040	Limited progress on delivery of Net Zero Routemap. Reduction of 176 kt CO2 but operational Net Zero cannot be achieved before 2050
Private Finance Initiative (PFI) funded projects	£505m allowance has been made for the return of PFIs and maintain compliance at all sites	£337m allowance been made for the return of PFIs. Assumes no investment at Seafield, Almond Valley and Esk PFI (return 2029) in SR27 or unknown risks not identified ahead of site handover	£337m allowance been made for the return of PFIs. Assumes no investment at Seafield, Almond Valley and Esk PFI (return 2029) in SR27 or unknown risks not identified ahead of site handover

Annex C: Finalising the AR3 Baseline for SR27 Final Business Plan

Investment in AR3

Since Scottish Water submitted its Draft Business Plan, further work to complete economic appraisal of asset maintenance policies has been completed, and some estimates already appraised at the time of the Draft Business Plan submission further refined and revised.

To allow for comparability with these appraised Management Approaches, all numbers in this annex are quoted in 2024/25 price base, **before** adjustment for efficiency – unless otherwise stated.

At the time of writing, granular bottom-up estimates of the investment demand across 52 Management Approaches to deliver the approved policy choices totalled £8.333bn, with a 90% confidence interval of +/-£1.05bn. The proposed allocation for equivalent AR3 expenditure (excluding Juniper and West Central Bioresource) in our SR27 Final Business Plan is £4.993bn, out of a total of £5.35bn[42].

The proposed SR27 allocations represent an increase compared to current expenditure and, as such, a positive step toward the long-term sustainable level. To manage this gap in the short term, we will develop an investment promotion ruleset to complement the policy choices, and which are aligned to these allocations, as outlined in Annex D – Further Capability Improvements.

Detailed Appraised AR3 Demand Forecasts

This is built up from 842 individual lines of forecast interventions and expenditure for specific asset classes within the scope of each management approach, based upon the deterioration & intervention modelling and intervention unit costs which informed the management approach appraisal. Each line represents a separate intervention type (repair, replacement, refurbishment, inspection, or decommission), and intervention approach (planned or responsive) for the asset class within the management approach. The structure of this data is shown in

Table 12.

Against each of these rows, expenditure and outputs are forecast, separated – where relevant – by Need Code for accounting purposes and to enable reporting and aggregation into the business plan data tables.

[42] 2024/25 pre efficient

Table 12: Structure of Intervention and Cost data in appraised Management Approaches

Management Approach	Asset Class	Intervention Approach	Intervention Type
MA001	Civil	Planned	Replacement
		Responsive	Replacement
			Repair
	MEICA	Planned	Refurbishment
		Responsive	Replacement
MA002	All Assets	Responsive	Replacement
Etc…			

Modelling Confidence

Further work on the confidence in these estimates was also undertaken. This work informs the Risk section of this Business Plan. It assigned to each row of data a confidence assessment of four key input values:

- Number of assets
- Starting state of assets
- Rate of deterioration of assets
- Unit cost of intervention

These values were then used in monte-carlo simulation to determine their aggregate effect, taking reasonable account of (and testing the sensitivity of the ranges to) likely correlation between input variables. For example, were the unit cost to be underestimated for replacement of an above-ground civil asset in one case, the likelihood is that the same costs would also be underestimated for other above-ground civil assets. Considering these real-world links results in a broadening of the 90% confidence interval compared to the case where every input variable is independent of the others.

The figure below shows the probability density function for the total forecast AR3 demand around its mean value, when assuming 50% correlation between the relevant variables for unit cost and asset life:

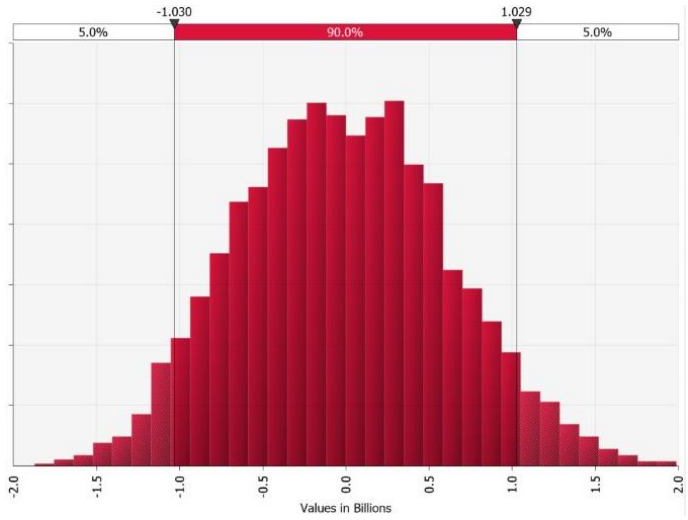


Figure 41: Probability density function for the total forecast AR3 demand

Revised Allocations Within the Draft Business Plan Envelope for AR3 Expenditure (July to September 2025)

The initial step to better incorporate in the SR27 Final Business Plan this detailed examination of AR3 demand of the appraised policies retained the same overall proposed allocation for AR3 expenditure as in the Draft Business Plan, and used this improved intelligence to redistribute the total between each management approach according to the following 4 stage approach:

1. Allow for anticipated responsive demand
2. Allow for known needs (existing live projects)
3. Protect priority planned allocations, including inspections
4. Distribute remaining available finance across unprotected planned allocations

Key considerations in each step are briefly outlined below.

Stage 1: Allow for anticipated responsive demand

The Management Approaches forecast responsive demand was used in the majority of cases for this aspect of the proposed SR27 allocations. These Management Approaches forecasts were compared with the current expected equivalent expenditure in SR21 (as of IPS25.2). Where updated information was not available the equivalent SR21 expenditure was used.

This yielded a total AR3 responsive demand forecast of £2,033m.

Stage 2: Allow for known needs

Live projects in Scottish Water's delivery systems were used as of the end of July (i.e. AR26 P4). Extracting all projects with forecast AR3 expenditure in the SR27 period at that time yielded a list of 1,566 projects with a total of £1,414m forecast AR3 expenditure in the SR27 period. The total forecast expenditure for these projects was higher, as a number of

them included non-AR3 expenditure in the project forecasts (e.g. the list included a number of projects promoted under the WW Growth programme).

Stage 3: Protect priority planned allocations

Within the planned allocations, a subset of these allocations was identified as to be "protected" from further deep prioritisation, as they significantly contribute toward statutory and regulatory compliance, or address key strategic or customer concerns. Significant examples of these included:

- Distribution mains renewal, required to address repeated customer supply interruptions and accelerate the strategic replacement of mains constructed from asbestos cement - £493m
- Planned refurbishment and replacement of treated water storage & chlorine contact tank assets to protect the public water supply from the risk of bacteriological ingress - £221m
- Allocations for essential planned remedial work to maintain the safety of dams and impounding reservoirs, as recommended by independent engineers – £185m
- Allocations for the planned replacement of filtration media (predominantly for sand and membrane filtration units), to ensure that water is properly disinfected and/or prepared for disinfection - £98m
- Allocations for future planned inspections, to ensure the safety of critical equipment, improve the targeting of AR3 expenditure in the short term, and improve the understanding of long-term AR3 requirements - £263m.

Stage 4: Distribute remaining available finance across unprotected planned allocations

Again, the starting point for this analysis was the Management Approaches demand forecasts.

A significant initial step was to revise downward the proposed allocation for the planned replacement of water trunk mains, aqueducts, and tunnels. Modelling shows that a sustainable level of replacement of this type of infrastructure would require the investment of over £2bn in the SR27 period. Given uncertainty about the required timing of these replacements - and the significant planning and disruption associated with this kind of work – only a nominal sum in addition to existing live projects was retained for the SR27 period, which represents a slowing of the rate of progress toward sustainable levels of Asset Replacement for these asset types.

Following this, the general approach applied was to:

- Assume that known needs (allowed for under 1 above) constitute part of the Management Approaches forecast planned demand and calculate the remaining "unallocated" planned forecast as the difference between the live demand and the original planned forecast.
- Sum the total of these allocations and find the ratio of this total to the remaining available financing, after steps 1-3 above. This ratio was 21%.

- Multiply each of the "unallocated" planned forecasts by this ratio, in order that all of the remaining financing is allocated to finalise the proposed Investment Baseline.

Importantly, as these reductions to planned allocations were applied, no reciprocal upward adjustments were made to the corresponding responsive intervention allocations which increases the likelihood that actual responsive demand will exceed these proposed allocations. The impact of any actual variance that materialises will be addressed through further dynamic prioritisation of the portfolio in -period.

Final adjustments to AR3 Allocations (October - December 2025)

In finalising the allocations for the SR27 Final Business Plan, a further seven adjustments were applied to the allocations for AR3 investment subject to appraised Management Approaches described above, in order to balance the plan across other areas of investment. The net result of these adjustments was to increase the allocation by £22m:

- Initially reducing it by £339m, as part of the overall rebalancing of investment having reconsidered the charge level for the SR27 Final Business Plan following extensive feedback, particularly around customer affordability.
- Latterly increasing it by £361m due to re-categorisation of parts of the investment for the West Central Bioresource Strategy into AR3 allocations under Management Approaches for Sludge Treatment Centres and Wastewater Pumping Mains.

The adjustments were:

(1) To reduce the volume of proposed planned, non-statutory inspections.
The net effect of this was to reduce the planned allocation from draft to final for inspections by £81m. This brings the overall total investment on inspections in line with that seen in the SR21 period. This will ensure we can continue to increase our knowledge of the condition of our asset base to support our work on understanding asset health and impact on service.

(2) To remove from the investment baseline allocation for known needs currently categorised at "Priority 4" (i.e. the lowest prioritisation for an AR3 need at Scottish Water, delivery of which is currently paused in the SR21 period).
The net effect of this was to reduce the allocation for known needs by £44m.

Should any of these needs further deteriorate to represent a higher priority before the end of the SR27 period, then these would be reconsidered for prioritisation within the overall asset portfolio of demand.

(3) To reduce the allocation for responsive demand (repair and refurbishment investments) by £81m.
As the definition of responsive demand is that it is urgent work that must be completed at the time it arises, there is no 'choice' that will reduce the expenditure Scottish Water makes in this case – rather the reduced allocation represents a higher risk of overspending in the period. In broad terms this moves the risk level from evens (it being equally likely that the actual expenditure for responsive needs will exceed the allocation in the investment baseline as be lower), to roughly 2:1 against (i.e. it is twice as likely to cost more than the allocation in the investment baseline as to come in 'under budget'). The impact of any

actual variance that materialises will be addressed through further dynamic prioritisation of the portfolio in-period.

(4) To reduce the allocation for additional replacement of Asbestos Cement water mains by £154m.
The replacement of distribution mains will still be prioritised considering their contribution toward causing recurrent customer interruptions This reduction in allocation corresponds to a deteriorated forecast in this outcome measure compared to the draft business plan. It is anticipated the impact on customers will be mitigated through additional operation responses to bursts.

(5) To increase the allocation for water quality instrumentation by £20m.
This investment is to ensure the ongoing operability of instrumentation to assure effective disinfection of water supplies.

(6) An update to the list and cost of known needs. An updated forecast following the completion of the IPS25.2 process was taken from data in our delivery systems in October (AR26 P6).

This changed the list of projects and – in some cases – the expenditure against each, compared to the original work undertaken using AR26 P4 data. Whilst this has a net effect of £0m on the total AR3 allocation, it changed the balance of allocation between live needs and forecast planned demand.

(7) A re-categorisation of parts of the investment for the West Central Bioresource Strategy to into AR3 allocations under Management Approaches for Sludge Treatment Centres and Wastewater Pumping Mains.

The net effect of this was to increase the allocation for known needs against these Management Approaches by £361m.

Resulting AR3 allocations for the Final Business Plan

Before adjustment for efficiency

The foregoing analysis supports allocation of £4.993bn of proposed AR3 expenditure equivalent (excluding Juniper House and West Central Bioresource), and Figure 42 shows its composition relative to the prioritisation method implemented.

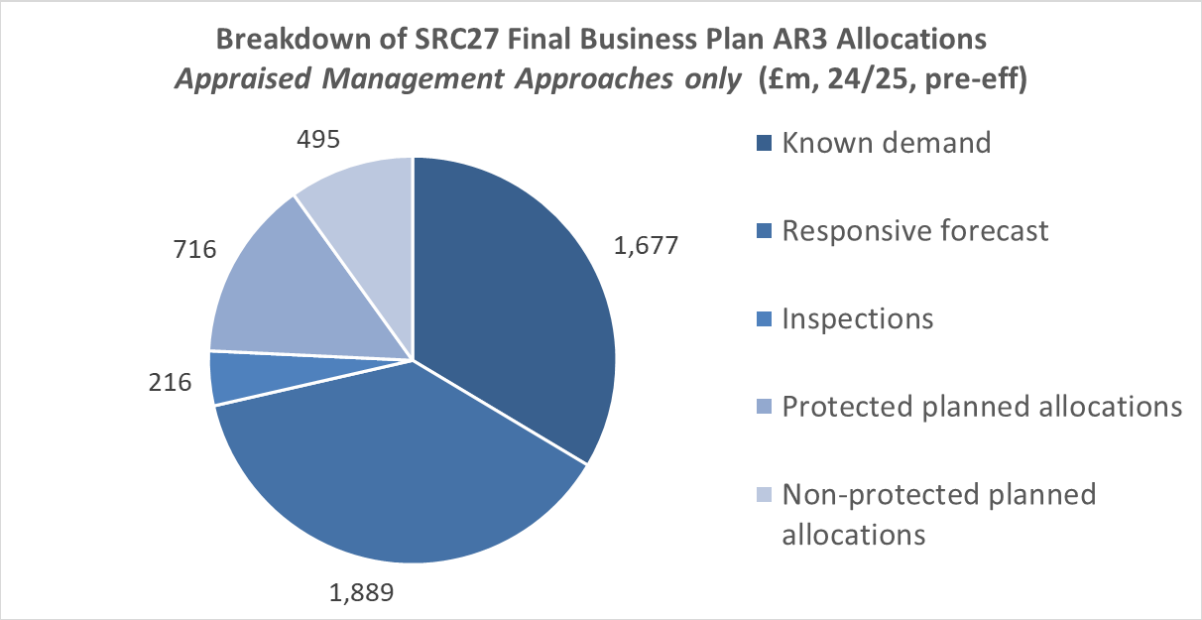


Figure 42: Breakdown of SR27 Final Business Plan AR3

Table 13 Proposed AR3 allocations by Management Approach, split to support prioritisation activity shows this in more detail by Management Approach.

Table 16 compares the result of this prioritisation method with expenditure levels forecast from the "unconstrained" demand by management approach

An additional £208m has been allocated for the maintenance of returning PFI assets.

A further £152m has been allocated to activity classified as AR3 expenditure, but not subject to appraised Management Approaches – for example the replacement element of removal of lead communication pipes.

Together, this results in a total proposed allocation of £5.35bn to AR3 expenditure before adjustments for efficiency.

Table 13: Proposed AR3 allocations by Management Approach, split to support prioritisation activity

Management Approach	Investment Baseline by Management Approach (£m, 24/25 prices, pre-efficiency adjustment)				
	Total	SR27 Live	Responsive	Inspections	Planned - not Live
MA003 Wastewater Pipebridges	**53**	19	7	4	22
MA004 Reservoir Safety	**318**	64	135	6	112
MA011 Wastewater MCCs	**35**	23	2	1	8
MA012 Wastewater Pumping Mains	**147**	45	68	-	35
MA013 Wastewater SCADA	**43**	27	4	1	12
MA016 Network Water Quality	**33**	10	-	-	22
MA017 WwTW - Inlet Works	**131**	59	72	-	-
MA018 Ironworks	**76**	-	76	-	-
MA022 Water SCADA	**138**	102	1	14	22
MA023 Wastewater Pump Stations	**151**	92	52	-	7
MA024 Sludge Treatment Centres	**469**	390	53	24	2
MA028 Catchment Management	**1**	-	0	0	1
MA029 Property and Estates	**69**	1	56	3	10
MA033 Water Filtration	**98**	28	-	-	70
MA034 Customer Meters	**14**	0	-	-	14
MA035 Wastewater Outfalls	**7**	-	7	-	-
MA036 Wastewater Screw Pumps	**28**	11	9	0	7
MA039 Combined Sewer Overflows	**25**	12	11	-	1
MA042 WwTW - Primary Treatment	**81**	58	20	-	3
MA043 Secondary & Tertiary	**216**	136	79	-	-
MA044 Telemetry	**25**	11	6	7	1
MA049 Wastewater Odour	**14**	4	5	-	5
MA052 WTW Sludge and Washwater Handling	**5**	- 13	9	9	-
MA053 Scientific Instrumentation Replacement	**7**	-	0	-	7
MA054 Network Model Maintenance	**29**	0	-	-	29
MA056 Renewable Energy Asset Maintenance	**19**	0	3	0	16
MA057 WW Ancillaries	**167**	27	140	-	-
MA058 Water Pump Stations	**51**	4	31	16	-
MA060 Water Distribution Infrastructure - Network Valves	**34**	3	4	27	-
MA062 Sewer Structures	**20**	1	10	9	-
MA063 Water Resources Environmental Monitoring & Compliance	**6**	1	0	-	4
MA066 Digital Policy	**112**	-	-	-	112
MA068 Statutory and Planned Maintenance	**100**	-	89	-	12
MA071 Logistics (Vehicles)	**137**	- 0	-	-	137
MA073 Metering and flow monitoring	**43**	4	16	5	16
MA080 Boreholes and Springs	**11**	3	4	4	-
MA081 Sample Points	**11**	0	2	-	9
MA089 Water Security	**7**	1	4	2	-
MA091 High Voltage Assets	**84**	67	2	6	9
MA093 Civil and Process Structures	**41**	4	33	3	-
MA094 WTW Process M&E	**62**	5	-	39	17
MA095 Water Quality Instrumentation	**60**	11	28	-	21
MA098 Emergency Response	**3**	-	1	1	2
MA111 Distribution Mains	**574**	120	230	-	224
MA113 WW Sewers	**317**	52	265	-	0
MA114 Chemical Storage and Dosing	**152**	48	62	4	38
MA115 Water Pipebridges	**16**	2	6	2	7
MA116 Water Strategic Infrastructure	**159**	100	46	8	6
MA117 Raw Water Intake and Storage	**14**	4	5	0	5
MA118 Low Voltage Electrical Systems	**31**	14	6	0	11
MA119 Treated Water Storage & Chlorine Contact Tanks	**450**	89	230	7	123
MA120 Site Buildings and Asset Access	**102**	36	-	12	53
TOTAL	**4,993**	***1,677***	***1,889***	***216***	***1,211***

Table 14: Proposed AR3 allocations by Management Approach, compared to unconstrained policy demand

Management Approach		ALL COSTS SHOWN AS 2024/25 PRICES, PRE- EFFICIENCY ADJUSTMENT												Summary Commentary on Material Variances >£10m and >10% and by exception
		Repair & Refurbish				Replace				TOTAL				
		MA Policy	SR27 Investment Baseline (Reference Scenario)	Variance		MA Policy	SR27 Investment Baseline (Reference Scenario)	Variance		MA Policy	SR27 Investment Baseline (Reference Scenario)	Variance		
		£m	£m	£m	%	£m	£m	£m	%	£m	£m	£m	%	
MA003 Wastewater Pipebridges	MA003	12.6	6.1	-6.5	-52%	143.6	46.6	-96.9	-68%	156.1	52.7	-103.5	-66%	Step toward sustainable levels from current expenditure
MA004 Reservoir Safety	MA004	262.5	317.9	55.4	21%	0.0	0.0	0.0	-	262.5	317.9	55.4	21%	Priority regulatory programme
MA011 Wastewater MCCs	MA011	7.1	2.8	-4.3	-61%	81.0	31.8	-49.2	-61%	88.2	34.6	-53.6	-61%	Step toward sustainable levels from current expenditure
MA012 Wastewater Pumping Mains	MA012	23.6	12.6	-11.0	-47%	251.5	134.4	-117.1	-47%	275.1	147.0	-128.1	-47%	Step toward sustainable levels from current expenditure
MA013 Wastewater SCADA	MA013	1.9	0.6	-1.3	-68%	134.9	42.6	-92.3	-68%	136.8	43.2	-93.6	-68%	Step toward sustainable levels from current expenditure
MA016 Network Water Quality	MA016	44.0	16.0	-28.1	-64%	21.8	16.7	-5.0	-23%	65.8	32.7	-33.1	-50%	This expenditure is supported with a further £30m allocation for enhancement under N897
MA017 WwTW - Inlet Works	MA017	29.2	51.3	22.1	76%	45.4	79.8	34.4	76%	74.5	131.0	56.5	76%	Consider WWTW AR3 together - Significant step toward sustainable levels, and addressing existing backlog of deferred work
MA018 Ironworks	MA018	0.0	76.0	76.0	-	78.9	0.0	-78.9	-100%	78.9	76.0	-2.9	-4%	
MA022 Water SCADA	MA022	15.4	8.5	-6.9	-45%	248.0	129.8	-118.2	-48%	263.4	138.3	-125.1	-48%	Significant step toward sustainable levels from current expenditure
MA023 Wastewater Pump Stations	MA023	58.9	70.4	11.4	19%	111.7	80.7	-31.0	-28%	170.7	151.1	-19.6	-11%	Significant step toward sustainable levels from current expenditure
MA024 Sludge Treatment Centres	MA024	43.3	204.1	160.9	372%	56.0	264.4	208.4	372%	99.3	468.5	369.3	372%	Expenditure above risk based policy to address backlog of planned work and including the AR3 element of WCB Strategy
MA028 Catchment Management	MA028	4.6	1.1	-3.5	-76%	0.0	0.0	0.0	-	4.6	1.1	-3.5	-76%	
MA029 Property and Estates	MA029	97.5	58.2	-39.3	-40%	16.1	11.1	-5.0	-31%	113.7	69.3	-44.4	-39%	Significant step toward sustainable levels from current expenditure
MA033 Water Filtration	MA033	0.0	1.2	1.2	-	98.4	96.5	-1.9	-2%	98.4	97.7	-0.7	-1%	
MA034 Customer Meters	MA034	6.2	4.5	-1.7	-27%	13.6	9.9	-3.7	-27%	19.9	14.4	-5.4	-27%	
MA035 Wastewater Outfalls	MA035	103.5	4.9	-98.6	-95%	43.6	2.1	-41.5	-95%	147.1	6.9	-140.2	-95%	Low criticality asset
MA036 Wastewater Screw Pumps	MA036	20.7	8.5	-12.2	-59%	45.6	19.1	-26.4	-58%	66.3	27.6	-38.6	-58%	Step toward sustainable levels from current expenditure
MA039 Combined Sewer Overflows	MA039	102.5	20.4	-82.1	-80%	35.7	4.1	-31.6	-88%	138.3	24.5	-113.7	-82%	Step toward sustainable levels from current expenditure
MA042 WwTW - Primary Treatment	MA042	34.2	49.0	14.7	43%	22.5	32.2	9.7	43%	56.8	81.2	24.4	43%	Consider WWTW AR3 together - Significant step toward sustainable levels, and addressing existing backlog of deferred work
MA043 Secondary & Tertiary	MA043	121.5	109.0	-12.5	-10%	117.3	88.6	-28.7	-24%	238.8	197.6	-41.2	-17%	Consider WWTW AR3 together - Significant step toward sustainable levels, and addressing existing backlog of deferred work
MA044 Telemetry	MA044	12.9	6.1	-6.8	-53%	39.3	18.5	-20.8	-53%	52.2	24.6	-27.6	-53%	No progress toward sustainable levels from current expenditure
MA049 Wastewater Odour	MA049	13.9	5.6	-8.3	-60%	21.5	8.7	-12.8	-60%	35.3	14.3	-21.1	-60%	Consider WWTW AR3 together - Significant step toward sustainable levels, and addressing existing backlog of deferred work
MA052 WTW Sludge and Washwater Handling	MA052	12.5	12.8	0.3	2%	17.9	10.4	-7.5	-42%	30.4	23.2	-7.2	-24%	
MA053 Scientific Instrumentation Replacement	MA053	0.2	0.2	0.0	-1%	6.9	6.8	-0.1	-1%	7.1	7.0	-0.1	-1%	
MA054 Network Model Maintenance	MA054	38.0	29.0	-9.0	-24%	0.0	0.0	0.0	-	38.0	29.0	-9.0	-24%	
MA056 Renewable Energy Asset Maintenance	MA056	7.0	19.3	12.3	174%	0.0	0.0	0.0	-	7.0	19.3	12.3	174%	Short life assets, and to account for new installations
MA057 WW Ancillaries	MA057	41.0	34.9	-6.1	-15%	155.0	132.1	-22.9	-15%	196.0	167.1	-29.0	-15%	Consider WWTW AR3 together - Significant step toward sustainable levels, and addressing existing backlog of deferred work
MA058 Water Pump Stations	MA058	55.5	28.9	-26.7	-48%	42.1	21.9	-20.2	-48%	97.6	50.8	-46.8	-48%	Step toward sustainable levels from current expenditure
MA060 Water Distribution Infrastructure - Network Valves	MA060	56.6	33.4	-23.2	-41%	0.8	0.5	-0.3	-41%	57.4	33.9	-23.6	-41%	Significant step toward sustainable levels from current expenditure
MA062 Sewer Structures	MA062	24.4	16.1	-8.3	-34%	8.9	4.0	-4.9	-55%	33.3	20.1	-13.2	-40%	Step toward sustainable levels from current expenditure
MA063 Water Resources Environmental Monitoring & Compliance	MA063	0.6	0.7	0.2	26%	4.1	5.2	1.1	26%	4.7	5.9	1.2	26%	
MA066 Digital Policy	MA066	0.0	0.0	0.0	-	264.1	111.7	-152.4	-58%	264.1	111.7	-152.4	-58%	Note: c£120m of this value is classified in the SR27 business plan as opex for Cloud Computing Arrangements.
MA068 Statutory and Planned Maintenance	MA068	40.4	100.4	60.0	148%	0.0	0.0	0.0	-	40.4	100.4	60.0	148%	Maintains SR21 run rate
MA071 Logistics (Vehicles)	MA071	0.0	0.0	0.0	-	226.2	136.6	-89.6	-40%	226.2	136.6	-89.6	-40%	MAv2 allows for decarbonisation of fleet
MA073 Metering and flow monitoring	MA073	23.3	18.5	-4.8	-21%	30.5	24.2	-6.3	-21%	53.8	42.6	-11.2	-21%	Current levels of expenditure maintained
MA080 Boreholes and Springs	MA080	35.2	10.2	-25.0	-71%	1.8	0.5	-1.3	-71%	37.0	10.8	-26.2	-71%	No progress toward sustainable levels from current expenditure
MA081 Sample Points	MA081	2.4	2.3	-0.1	-4%	8.7	8.4	-0.3	-4%	11.1	10.7	-0.4	-4%	
MA089 Water Security	MA089	8.5	6.0	-2.4	-29%	1.2	0.9	-0.4	-29%	9.7	6.9	-2.8	-29%	
MA091 High Voltage Assets	MA091	7.8	11.0	3.2	41%	124.2	72.7	-51.5	-41%	132.0	83.8	-48.3	-37%	Significant step toward sustainable levels from current expenditure
MA093 Civil and Process Structures	MA093	57.9	40.6	-17.4	-30%	0.0	0.0	0.0	-	57.9	40.6	-17.4	-30%	Significant step toward sustainable levels from current expenditure
MA094 WTW Process M&E	MA094	39.5	38.6	-1.0	-2%	23.7	23.1	-0.6	-2%	63.2	61.7	-1.6	-2%	
MA095 Water Quality Instrumentation	MA095	29.4	50.3	20.9	71%	7.2	9.4	2.2	31%	36.6	59.7	23.2	63%	Includes additional for disinfection monitoring
MA098 Emergency Response	MA098	1.7	1.6	0.0	-2%	1.9	1.8	0.0	-2%	3.6	3.5	-0.1	-2%	
MA111 Distribution Mains	MA111	246.0	251.8	5.8	2%	450.0	322.0	-128.0	-28%	696.0	573.8	-122.2	-18%	Step toward sustainable levels from current expenditure
MA113 WW Sewers	MA113	242.5	317.3	74.8	31%	0.0	0.0	0.0	-	242.5	317.3	74.8	31%	Maintain SR21 responsive run rate for sewer repairs
MA114 Chemical Storage and Dosing	MA114	118.8	116.3	-2.5	-2%	224.0	36.0	-187.9	-84%	342.7	152.3	-190.4	-56%	Maintains current expenditure levels, with recent inspections revealing good condition
MA115 Water Pipebridges	MA115	29.4	9.8	-19.6	-67%	18.5	6.2	-12.3	-67%	47.9	16.0	-31.9	-67%	No progress toward sustainable levels from current expenditure
MA116 Water Strategic Infrastructure	MA116	834.4	95.2	-739.2	-89%	1539.5	64.3	-1475.2	-96%	2373.9	159.5	-2214.4	-93%	Take risk on asset life pending inspection: No progress toward sustainable levels from current expenditure
MA117 Raw Water Intake and Storage	MA117	10.1	9.4	-0.7	-7%	5.0	4.6	-0.4	-7%	15.1	14.0	-1.1	-7%	
MA118 Low Voltage Electrical Systems	MA118	8.2	3.7	-4.5	-54%	75.8	27.7	-48.1	-63%	84.0	31.4	-52.6	-63%	Limited progress toward sustainable levels from current expenditure
MA119 Treated Water Storage & Chlorine Contact Tanks	MA119	319.3	379.4	60.1	19%	52.0	70.8	18.8	36%	371.3	450.2	78.9	21%	Priority regulatory programme
MA120 Site Buildings and Asset Access	MA120	89.7	80.3	-9.4	-10%	20.0	21.3	1.3	7%	109.7	101.6	-8.1	-7%	
GRAND TOTAL		3397	2753	-644	-19%	4936	2241	-2696	-55%	8333	4993	-3340	-40%	

After adjustment for efficiency

In this section, prices are indexed to 24/25 and quoted after adjustment for efficiency.

After adjustment for efficiency, the overall investment proposed for asset replacement, repair, and refurbishment is £5.14bn.

Figure 43, Figure 44 and Figure 45 show the SR27 AR3 investment split by service, intervention type, and asset category respectively as per the Business Plan Table 3a. Note refurbishment includes inspection investment.

Figure 43 shows investment by Service area. The majority of investment is proposed on the water and combined wastewater asset base to maintain service for customers. Work is on-going to improve data where we only have assets that only deal with foul sewage only. The longer-term focus on surface water management will see an increase in assets required to manage storm flows. Shared assets include our offices, depots, vehicles, tankers, scientific equipment in laboratories and our DIGITAL estate (laptops, servers, telemetry, cyber security etc).

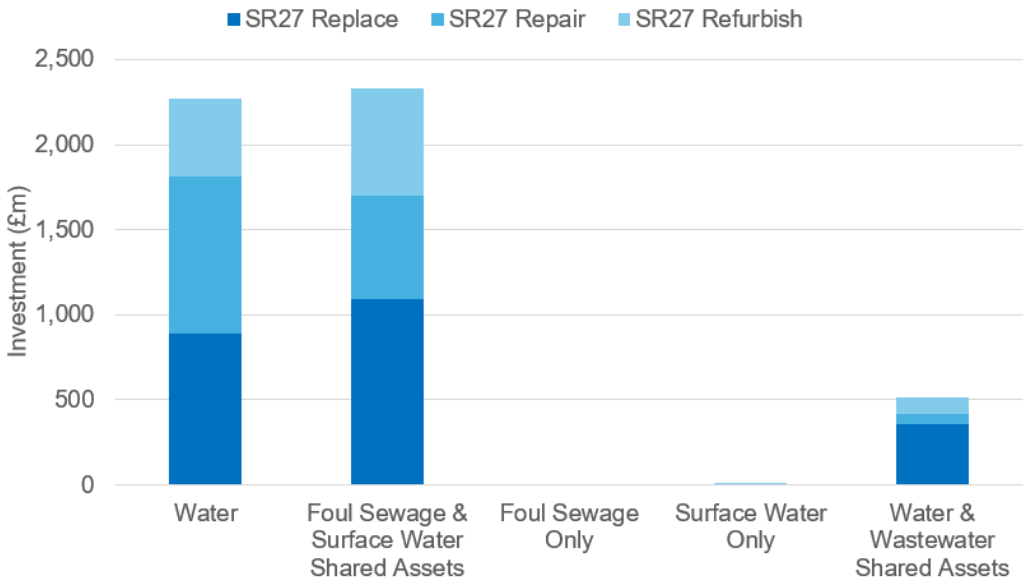


Figure 43: AR3 Investment Split by Service

Figure 44 provides a breakdown of our replacement, repair and refurbishment investment by the same service areas.

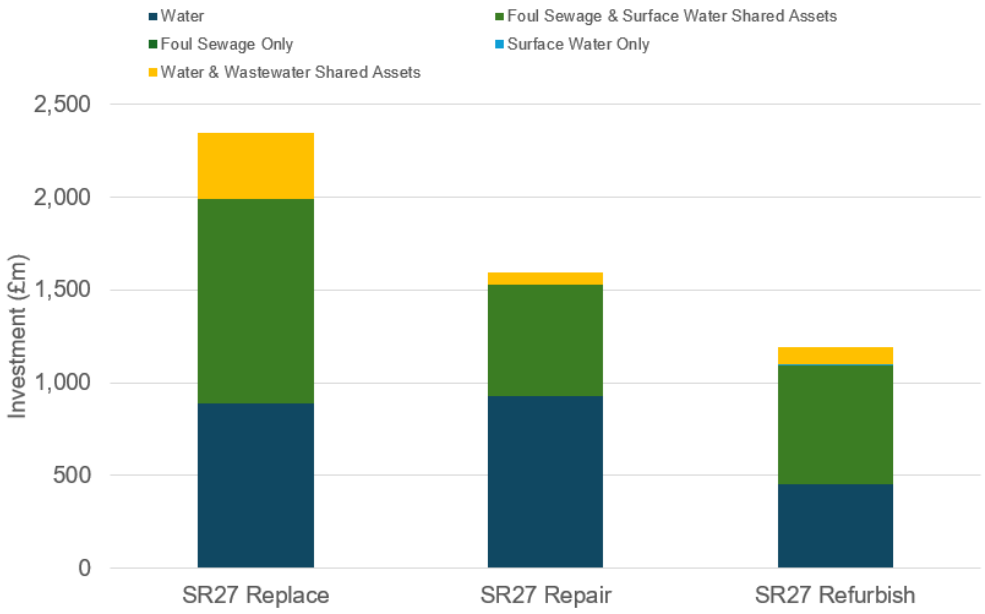


Figure 44: AR3 investment split by intervention type across each Service area

The following Figure 45 presents the investment distribution across our system from Source to Sea. As anticipated, there is a greater replacement requirement at our treatment works, where the majority of our electrical, mechanical, and civil assets are located, as well as increased repair needs within our water and wastewater networks.

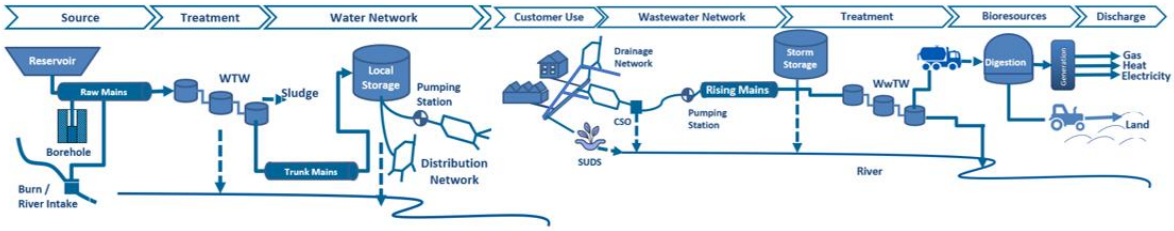


Figure 45: Water and waste water network schematic

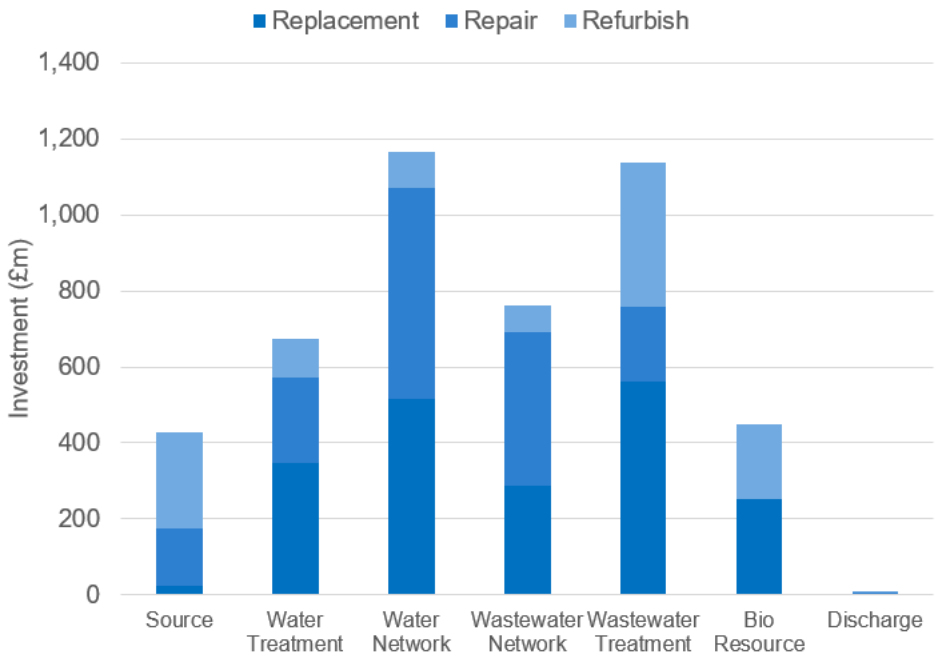


Figure 46: AR3 investment forecast across the water and waste water network

To develop a consistent approach to our investment forecasts, we have grouped similar types of assets into categories based on their expected life. Figure 47 shows the spread of investment forecasts across the asset categories. As would be expected the majority of investment is at our treatment works, network pumping stations, concrete structures, access roads, water mains bio resource facilities and outfalls.

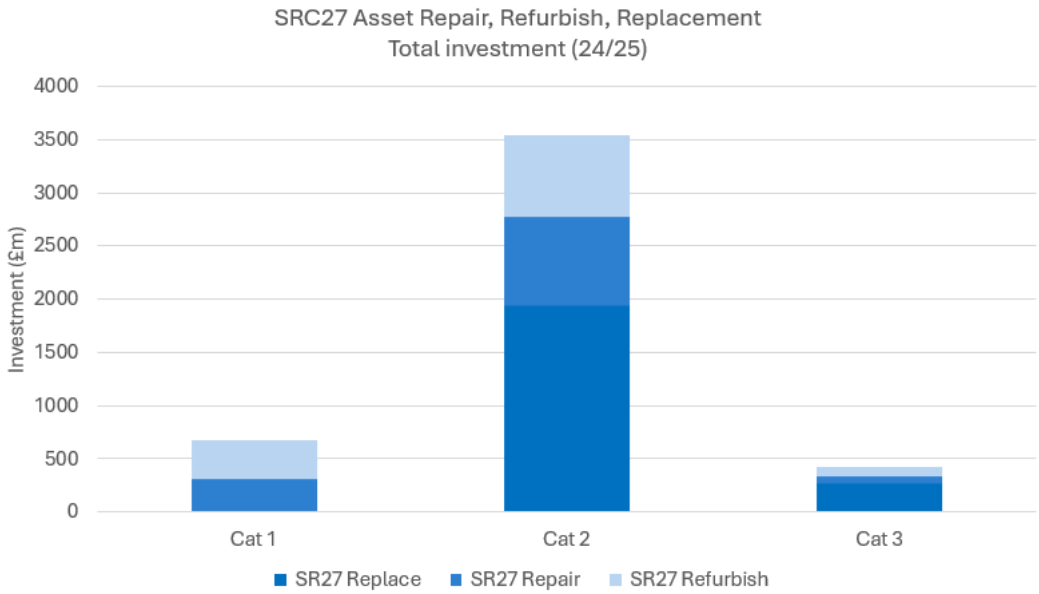


Figure 47: AR3 investment split by asset category

Figure 48 places the proposed total AR3 allocations for SR27 in the context of the historic and long-term journey to a more sustainable level of maintenance expenditure to 2050.

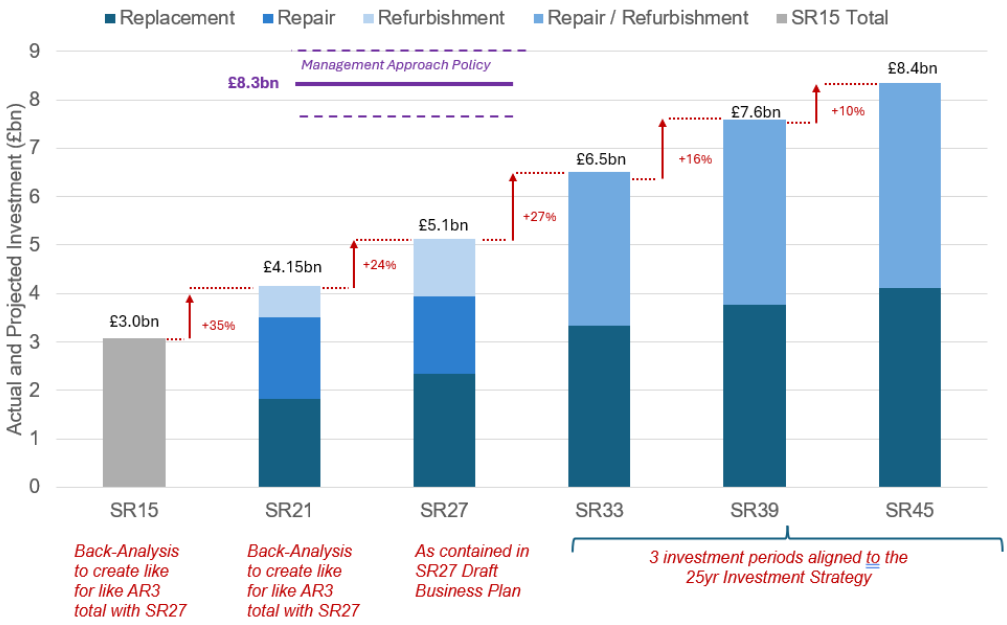


Figure 48: Total AR3 investment per period

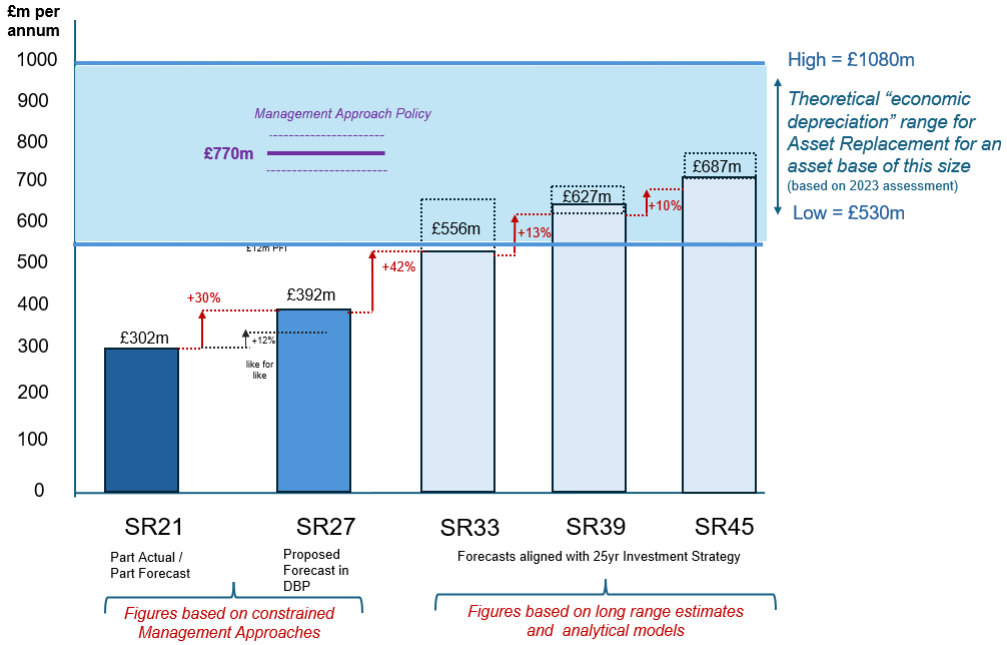


Figure 49: Asset Replacement Investment vs Theoretical "Economic Depreciation" range (2019) for Cat 2 & 3 Assets

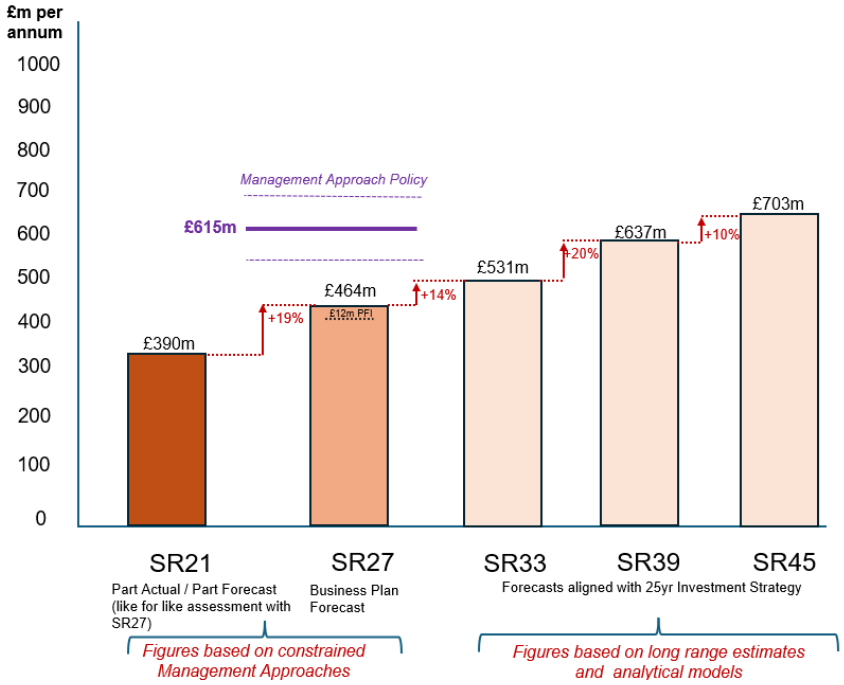


Figure 50: Actual and Forecast Asset Repair and Refurbishment Investment for All Assets (categories 1,2,3)

Annex D: Further Capability Improvements for SR27

In Section 9 of this Technical Appendix, we set out key milestones to improve assessment of the long-term maintenance demand, along with reporting and forecasting of the actual and expected impact of maintenance expenditure in the SRC27 period.

This section takes each of our milestone commitments and expands on it, setting out the key activities we currently expect to be required to achieve it.

The detail of these activities will develop as we learn from the early stages of their delivery, but the milestones will remain.

Management Approaches aligned with SR27 Allocations

Milestone	By when	AR evidence?
Management Approaches aligned with SCR27 allocations	26/27 Q2	Delivery plan

Our Management Approaches set target policies for AR3 expenditure based upon SW Board's risk appetite. Work to develop them has shown that - to deliver to the policies in SR27 - £7-9bn would be required.

This business plan sets out our intention to invest around £5.14bn, as an important step toward this long-term sustainable level.

This milestone sets out work required to effectively manage this transitional period, to inform our SR27 Delivery Plan.

We currently expect that this milestone will be met through activities to:

- Review allocations within each Management Approach between different asset subcategories (e.g. critical / non-critical), with a view to re-balance where required.
- Review allocations for responsive demand given updated planned allocations.
- Define need promotion criteria separate to project promotion criteria (to support management of demand separate to delivery).
- Record the above items in a new chapter of the Management Approaches document.

Basic Health Measure for All Replaceable Assets in Place

Milestone	By when	AR evidence?
Basic health measure in place for all replaceable assets	26/27 Q4	Health measure

Scottish Water has reported a 'basic' measure of asset health into Table 3b of the SRC27 Business Plan and further summarised this into an "Asset Health Tracker" metric in Table 1 to counter-balance the shorter-term focus of the other customer- and service- focussed measures.

It is forecast using modelling that has to date formed the basis of estimates of Scottish Water's long term asset replacement liability. As a result, this measure is directly linked to those projections. It is influenced explicitly by proposed levels of asset replacement and implicitly by refurbishment expenditure.

An important benefit of this type of modelling is its simplicity and agility which can allow us to examine more easily a wider range of investment scenarios. This will help us lead a more sophisticated conversation about the choices we face, their impacts and the uncertainties involved.

We currently expect that this milestone will be met through activities to:

- Standardise the approach to install data infill.
- Maximise the use of available installation date data currently held outside of corporate systems, making it available our new Analytic Platform[43].
- Put in place process improvements for collecting installation dates for new equipment.
- Review and update model parameters (including asset groupings & lifetime expectations).
- Explore the sensitivity of the health measure to model inputs & parameters.

Intermediate Health Measure Defined and Demonstrated

Milestone	By when	AR evidence?
Intermediate health measure defined & demonstrated	26/27 Q4	-

We are exploring options to develop beyond a "basic" measure of asset health introduce "effective age" as an improved measure of the state of a physical asset.

This would introduce more explicit consideration of a wider range of "wear and care" parameters - measured either directly (e.g. through maintenance & breakdown history, environment, and utilisation) or indirectly (e.g. through condition assessment).

In turn, this requires more advanced modelling techniques (referred to as "Level 2" models at Scottish Water) that have the benefit also of producing an estimate of equipment reliability and the associated responsive and planned work demand. This approach would more naturally align to the asset classes and intervention strategies set out in our Management Approaches.

[43] The Analytic Platform (TAP) is Scottish Water's central cloud data hub - foundational to enterprise-wide analytics, insights generation, and AI. It acts as a unified repository for data from various systems (operational telemetry, sensors, asset records, finance, etc.) by consolidating them into one secure, well-governed, accessible place.

The platform's value is especially evident in asset management: TAP supports Scottish Water's advanced asset deterioration models, which simulate asset ageing and failure patterns to forecast long-term replacement needs and maintenance interventions, covering the entire water and wastewater asset base. The centralisation supported by the platform's architecture means that information from strategic through operational levels can be seamlessly connected, allowing insights and decision-making to be aligned and connected.

However, these benefits come at the cost of also requiring the same work history to inform the starting point of the model and calibrate the modelling parameters.

For this reason, we have set out this milestone to pilot the approach (which we refer to as the "intermediate health measure") and expect it will be met through activities to:

- Develop 3x "proof of concept" measures of asset health, one each for Civil, MEICA, and water mains assets, considering:
  - How asset replacement would be forecast, based upon Level 2 modelling to inform EHI (future).
  - How EHI (current) would be measured in the current asset base.
  - Calibration to the existing "Basic" EHI measure.
  - Sensitivity to model inputs and parameters.
- Document what was learnt from the proofs of concept, including the effort required and the benefits achieved.

We will also keep under review methodological developments by OFWAT for their identified priority asset classes, aligning our work where appropriate to enable direct comparison with English and Welsh water companies.

Target Health Measure for all Replaceable Assets in Place

Milestone	By when	AR evidence?
Target health measure in place for all replaceable assets	28/29	Health measure

In many cases, the additional insight of an "intermediate" type of analysis - beyond simply to report a "health" measure - will justify the effort, but for some asset types, a basic measure of EHI may prove sufficient.

Therefore, this milestone aims to define and implement a "target" level of EHI measure for all replaceable asset classes. In many cases we would expect this target level to be an intermediate maturity EHI. In some, it is likely to remain the current basic measure. Occasionally, it may be that we chose to move faster and develop a more advanced measure.

Accepting the inherent uncertainty in work to deliver this milestone before the Intermediate maturity EHI is demonstrated, we currently expect it to be met through activities to:

- For each management approach, agree "target" asset health measures for each asset class within the Management Approaches scope
- Define specific work types, including operational maintenance, relevant to the agreed target health measure for each asset group.
- Set out expected care activities, and their impact on "effective life".
- Record the above items in a new chapter of the Management Approaches document.
- Identify any new or enhanced data and analytic requirements for the selected target EHI.

- Implement required analytics for each asset class.
- Calibrate each "target" health measure against the existing "basic" measure, and document justified variations in the measure value at the point of transition.

Data improvement processes & quality metrics in place (data for target health measure)

Milestone	By when	AR evidence?
Data improvement processes & quality metrics in place (install date)	26/27 Q2	Data quality
Data improvement processes & quality metrics in place (data for target health measure)	27/28 Q4	Data quality

Any measure of asset health is only as good as the data upon which it is calculated. Therefore, a key priority is to further develop how we capture and manage relevant work and inventory data across our Digital estate. This will enrich current reporting and allow us to refine and calibrate the expectations hard-wired into our forecast models.

Currently information is collected to varying degrees across multiple corporate applications, primarily Maximo, Salesforce, Youreka, NCSD, and Fulcrum. It is generated through a wide variety of asset-related processes including capital project delivery (via the asset scripting process), responsive work management, planned work management, and inspection delivery.

As such, accountability for whether this information is fit-for-purpose has historically been fragmented, and our experience has been that improvement activities are challenging to coordinate. Work to formalise Asset Management accountabilities will be taken forward as we implement our new Operating Model, and so proposed activities to meet this milestone relate to the practicalities of implementation:

- Refresh asset data definitions covering: asset age, hierarchy, lifetime, condition, fault and work types – and the relationships between these, as required to properly support Level 2 deterioration modelling.
- Review capability of current systems to support the required definitions - in particular across Maximo, Salesforce, Youreka, NCSD, and Fulcrum - to determine where new or enhanced people-led processes will be required and where existing systems can be readily reconfigured.
- [for *data for target health measure* only] Collate detailed data requirements for the "target" health measures as defined in each management approach.
- [for *data for target health measure* only] Develop the data model and meta-data required to support forecasting "target" asset health measures and implement it in TAP.
- Implement system re-configuration and/or people-led process changes as per the detailed requirements.

1. Implement data quality monitoring framework and reporting for required attributes – covering both input (effort) and output (quality) measures[44].

Beyond this milestone, in addition to reporting this data quality monitoring information, we would plan to use it:

- To improve management insight and action on data quality issues;
- As an input to support business cases for automation where this could be expected to improve compliance or lean processes; and,
- As a parameter in sensitivity analysis of current health measures.

[44] We have already examples of this, e.g. monitoring of the quality and completeness of inventory data returns for new assets, but would intend to develop these further.

Annex E: Analysis of the Recommended Reference Scenario against the Draft Ministerial Objectives 2027-33

Table 15: Analysis of recommended Reference Scenario against draft MOs Received with Scottish Government Commissioning Letter, with additional information on where the Ministerial Objectives would be impacted by the Alternative Scenarios

Ministerial Objective	What's included in our SR27 Final Business Plan	Key Business Plan documents	Outcome Alignment
Long-term Water Sector Vision	We have published our Long-Term Strategy which outlines how we will deliver our part in making the Water Sector Vision a reality. We have also developed our 25 Year Investment Strategy that sets out the investment projects over the long-term Provide support for Hydro Nation Chair, customer and community involvement and benefits, and introduce a community fund to support small-scale, localised initiatives. Continued engagement with the Scottish water industry stakeholders through the Investment Planning and Prioritisation Framework for dynamic, rolling investment planning and decision making that balances the costs and benefits of competing investment priorities.	Long-Term Strategy Business Plan Main Document Investment Planning Technical Appendix ***Additional Technical Appendices*** Managing Quantity of Flows Supply Chain Transformation & Innovation	All Business Plan Table 1 Outcome Measures
Standards of Service	Maintain or improve service levels from the projected SR21 exit position – accepting more compliance risk in PFI returns and risk of burst frequency. In Alternative Scenario B additional investment allocation would reduce the risk to service for customers particularly in Repeat Interruptions to Supply through additional AC Mains investment.	Performance Monitoring Technical Appendix	All targeted Business Plan Table 1 Outcome Measures
Asset Maintenance (Long Term)	Continue inspection programme for critical assets. Increased repair refurbishment and replacement in SR27 by c24% from SR21 and continue to improve our near- and long-term projections. Due to the reduction of investment allocation for inspections (down to SR21 levels) there will be reduced progress in the improvement of the confidence grade of the Asset Health Measure throughout SR27. Our commitment to development of our asset health index is set out in Annex D: Further Capability Improvements for SR27 In Alternative Scenarios B & C there are additional allocations for improving asset management capability with additional inspections.	Investment Planning Technical Appendix	1.44 - Asset health - Equipment/asset health index

Ministerial Objective	What's included in our SR27 Final Business Plan	Key Business Plan documents	Outcome Alignment
Flooding & Surface Water Management	Maintaining the number of properties on our Internal Sewer Flooding At Risk register and have in place initiatives (such as mitigations) to reduce the number of incidents of customers experiencing repeat sewer flooding. Continue on our journey to build on our existing three strategic drainage partnerships to ensure we build in more partnership opportunities to deliver surface water removal projects to reduce overall sewer flood risk. This will be a journey throughout SR27 as we seek opportunities where possible.	Managing Quantity of Flows Technical Appendix	1.24 - Internal sewer flooding - Number of internal sewer flooding incidents 1.25 - Internal sewer flooding - Number of properties at risk of internal flooding 1.26 - External sewer flooding - Number of external sewer flooding 1.27 - External sewer flooding - Number of areas at risk of external flooding
Drinking Water	**Water Quality** Address non-compliance or reduce risk at 18 WTW serving ~1.5m customers. Continue to remove lead from the Scottish Water network and support customers to remove private lead pipes. Delivering a net reduction in the number of risks above the long-term tolerable threshold (as determined by the WRAP process) from 5,625 in 2024/25 to 4,568 in 2032/33.Reduce the number of Significant Risks over the long-term (as per the ongoing process with DWQR due to be developed by March 2026). Improve auto shut down / disinfections reliability at priority sites and development of solutions for other water quality failure risk sites.	Water Quality Technical Appendix	1.17 - Drinking water aesthetics - Taste and odour contacts* 1.18 - Drinking water aesthetics - Discolouration and aeration contacts* 1.19 - Drinking water quality - Estimated number of lead pipes remaining in public network 1.20 - Drinking water quality - Indicator of lead in customers supply pipes 1.21 - Drinking water quality - Total drinking water compliance 1.22 - Drinking water quality - Drinking water quality risks across all systems above long-term tolerable threshold. 1.23 - Drinking water quality - Number of DWQR declared incidents
	Water Continuity (Resilience) Drive change in domestic customer demand by increasing awareness and supporting industry initiatives such as water efficiency labelling of domestic appliances. Addressing the supply-demand balance deficit (to 2033) in Dundee, Angus and parts of Perthshire. Developing options and prioritising investment to reduce the deficit gap in other areas not resilient to drought including Edinburgh & Lothians, Fife, Lanarkshire and Aberdeenshire/Morayshire. In Scenario C further allocation would support further climate change adaptation, including additional investment allocation to support water supply-demand measures.	Water Continuity Technical Appendix	1.07 - Leakage - Percentage reduction of three-year average leakage* 1.08 - Leakage - Leakage reduction in areas with supply-demand balance deficit* 1.09 - Business demand - Percentage reduction of consumption at non-household premises* 1.10 - Per capita consumption (PCC) - Three-year average per capita consumption* 1.11 - Customers receiving low pressure - Number of properties on the low pressure register 1.12 - Unplanned interruptions - Unplanned interruptions greater than 6 hours, excluding 3rd party 1.13 - Planned and unplanned interruptions - Average minutes lost due to water supply interruptions (over 3 hours)* 1.14 - Unplanned interruptions - Repeat interruptions to water supply

Ministerial Objective	What's included in our SR27 Final Business Plan	Key Business Plan documents	Outcome Alignment
			1.15 - Water availability - Customers supplied by systems not capable of meeting demand during a worst historic drought 1.16 - Water availability - Customers supplied by systems not capable of meeting peak demand
Environment	**Water Environment** Delivering all remaining RBMP3 objectives to enhance the water environment. Establishing our current final effluent and pass forward flow compliance position and developing an improvement plan, where we define and deliver first steps. Decreasing the number of Unsatisfactory Intermittent Discharges (UIDs) by addressing all remaining all remaining high priority UIDs (other than 16 in the Water of Leith where more development work is required in SR27) and 59 medium priority UIDs to make sustainable progress against our long-term ambition to address all UIDs by 2050. Installing monitors and sensors across our wastewater system to create an increasingly intelligent network and to bring new insight on performance, compliance and risk. Development of the West Central Bioresources to address the disposal of bioresources. In Alternative Scenario B additional investment allocation would be invested to further reduce the risk of waste water treatment works compliance.	Water Environment Technical Appendix	1.28 - Discharge Permit Compliance - Percentage compliance with SEPA discharge permits 1.29 - Serious pollution incidents (EPI Cat 1/2) - Number of serious pollution incidents* 1.30 - Total pollution incidents (all categories) - The total number of pollution incidents from a sewerage asset affecting the water environment* 1.31 - Sludge compliance - Percentage unsatisfactory sludge disposal
Supporting Sustainable Economic Growth	Provide strategic capacity for c175,000 population equivalent across Scotland. Deliver North Berwick, and East Stirling Villages.	Enabling Growth Technical Appendix	1.01 - CEM - dCEM Developer Customer Experience Measure
Circular Economy	Provision made for innovation "lighthouse" projects. Embedding circular economy principles working with supply chain and developers to better manage rainwater, surface water and waste water.	Transformation and Innovation Technical Appendix	1.43 - Resource recovery - Resource recovery
Security & Resilience	We will comply with Government guidelines on cyber security (Networks & Information Systems – NIS)	Digital Technical Appendix	
Climate Change,	Continue to progress delivery of our Net Zero Emissions Routemap across operational, investment and land management activities to meet the carbon pathways set out in Table 1 and to support the Scottish Government's Climate Change Plan, Biodiversity Strategy and National Adaptation Plan.	Climate Change Adaptation Technical Appendix	1.34 - Net Zero Emissions - Net Zero Emissions 1.35 - Operational emissions - Operational emissions (water) 1.36 - Operational emissions - Operational emissions (wastewater)

Ministerial Objective	What's included in our SR27 Final Business Plan	Key Business Plan documents	Outcome Alignment
Adaption and Mitigation [45]		Climate Change Mitigation Technical Appendix	1.37 - Operational emissions - Percentage reduction in operational emissions compared to 2006-07 baseline 1.38 - Operational emissions - Operational emissions (net emissions) 1.39 - Climate change mitigation - Investment emissions 1.40 - Climate change mitigation - Carbon capture/sequestration 1.41 - Climate change mitigation - Biodiversity and Nature Based Solutions (interim measure) 1.42 - Climate change mitigation - Biodiversity and Nature Based Solutions (final measure)
Private Finance Initiatives (PFIs)	Allowance has been made for the return of 4 PFIs serving a population of c1.7 million. This will allow us to maintain and enhance service from these sites as they return to Scottish Water ownership.	Water Environment Technical Appendix Financial Strength Technical Appendix West Central Bioresources Technical Appendix	

[45] Note on Climate change, adaption and mitigation: Scottish Water has considered changes to the climate change target made by the Scottish Government in the preparation of this Final Business Plan and planned on this basis. This is also in line with customer research which indicates investment should not be made in carbon reduction activities just to meet a target.

Annex F: Impact on Customer Charges

Scottish Water strives to keep charges as low as possible, whilst also delivering the outcomes that customers, regulators and stakeholders expect for customers, communities, the environment and Scotland as a whole.

Understanding the impact of charges on customers has been a central part of the SR27 research programme. Feedback from customers has been central to narrowing down the 'Zone of Acceptability', and identifying a reference scenario which we believe has the right balance between the outcomes that Scottish Water can credibly deliver, and the impact that this has on customers' charges.

Customer Views of Charging

Scottish Water actively engages with customers on a continual basis to understand how customers feel about what they pay in return for the services that they receive.

This involves:

- Tracking sentiment in our YouGov Survey, where we monitor:
  - Satisfaction with the cost of water and sewerage charges;
  - Satisfaction that the charges customers pay for the service they receive represents value for money; and
  - Concern about personal finances.
- Annual Charges research, where since 2021 we have explore the topic of annual charge setting in depth with household and non-household customers.

The Customer Research Technical Appendix contains a section on overall research findings in relation to current and future charges.

We know from our ongoing YouGov survey that 67% of customers in 2024/25 think that Scottish Water offers value for money. However, we are also aware that the current economic climate, ongoing media around the UK water industry, and ongoing cost-of living challenges mean that customer sentiment on water and waste water charges is heightened at this time. With this in mind, our plans for SR27 have been explored with customers to help us to understand the impact on them of the cost of our plans.

Scottish Water has worked with the ICG to develop two key areas to help understand customer sentiment around charges:

- **Affordability** is extremely subjective and highly dependent on personal circumstances, particularly disposable income. Household customers interpret 'affordability' at a personal level i.e. what they can themselves pay.
- **Reasonableness** is typically linked to more external factors, with customers anchoring against increases in inflation. Responses might also be influenced by understanding of what is needed by Scottish Water to provide their services.

These have been used to explore the charging impact of SR27 throughout the development of the plan, testing sentiment around varying investment scenarios to identify a final business plan proposal which is likely to command customer support.

In the earliest stages of plan development, qualitative research was carried out with customers in relation to three potential investment scenarios each associated with increasing levels of outcomes. Customers expressed dissatisfaction with the outcomes offered at in the lowest scenario and some also expressed a degree of discomfort with the charge impact offered at the highest scenario. Scottish Water acted on this feedback to develop a 'rebalanced' plan at CPI

+4% pa, which sought to deliver a set of outcomes which would largely either maintain or improve service levels. Customers generally considered the proposal to be reasonable with some concerns about affordability for those who might be least able to pay. Scottish Water then progressed this 'rebalanced plan', using it as a basis for the Draft Business Plan.

To fully explore the affordability of the plan, Scottish Water and ICG agreed there was a requirement to explore charging impact and outcomes with a less informed set of customers in a nationally representative, statistically robust quantitative study. Based on the content of the Draft Business Plan, this study was intended to help understand the overall reasonableness and affordability of the plan, and to understand which customers might be most affected by the charging impact of our plans.

Affordability of the Plan

This further group of customers was asked to consider the affordability of the Draft Business Plan early in the quantitative survey, before details had been provided on what the plan was seeking to delivery. They had been provided with an introduction to Scottish Water, the challenges the sector faced and had been provided with a personalised view of their current bill and been shown the cumulative impact of inflation and price rises visually. They were then shown the impact of a +4% price rise (excluding inflation) on their personal bill. Household customers were evenly split between whether they found it to be affordable or unaffordable (48% vs. 48%). Non-household customers were more positive, with 80% finding the plan to be affordable.

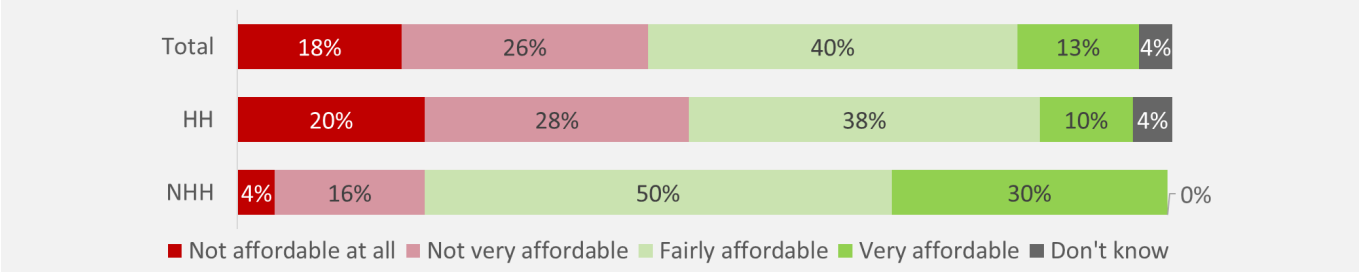


Figure 51: Reasonableness of plan when shown impact on their personal bill

When looking at which customer segments found the plan to be unaffordable, we found statistically significant differences in those who feel the price rise is 'not affordable at all' for customer who were financially vulnerable, and those age 45-54 (36% for financially vulnerable and 35% for age 45-54 vs 20% in the total household). There are no significant differences in customers' perception of affordability by council tax band or discount received.

Reasonableness of the plan

Customers were asked about whether they felt the plan was reasonable twice, once at the start of the survey, where they were only given information about the cost of Scottish Water's plans for SR27, and again at the end of the survey, by which point they should have established a more informed view about the outcomes offered by plan.

Comparing these pre and post scores (Figure 52) showed the significant impact that information about the plan has on customers, particularly household customers. 44% of household customers found the plan to be reasonable at the start of the survey, rising to 57% when asked again at the end, and 74% of non-household customers rising to 80%.

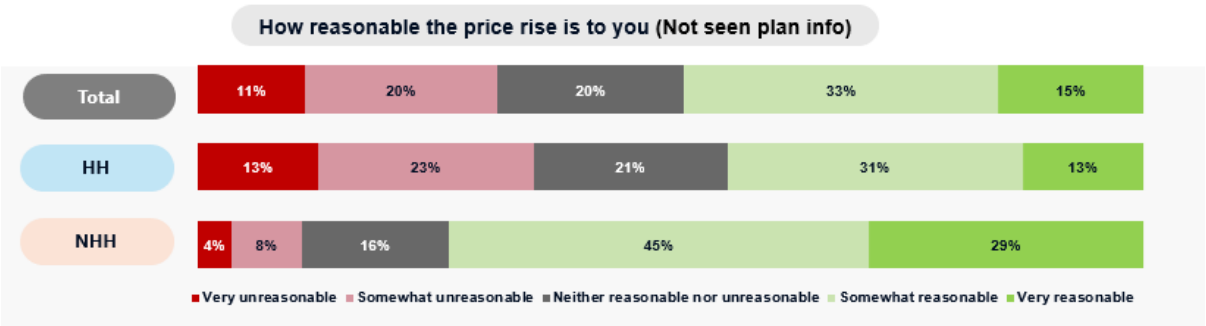


Figure 52: Reasonableness of the plan without detailed information

Figure 53: Reasonableness of the plan with detailed information

Those who are positive about the plan are more likely to see the price increase as reasonable, while financially vulnerable customers are significantly more likely to feel 'fairly negative' about the Draft Business Plan, that the plan provides 'very poor value for money' and that the price increase is 'very unreasonable'.

Value for Money

A key finding from our qualitative research was the importance of delivering value for money. Customers in the initial qualitative groups assessed value for money based on *the level of outcomes received for the price which would be paid.* This provides a helpful customer definition of value for money, and in the initial groups all three scenarios tested were not seen to get this balance right.

Within the quantitative research 59% of household and 82% of non-household customers felt the plan represented fairly or very good value for money. Only 14% of households and 7% of non-households felt it was fairly or very poor value for money, with the remainder saying it was neither good nor poor.

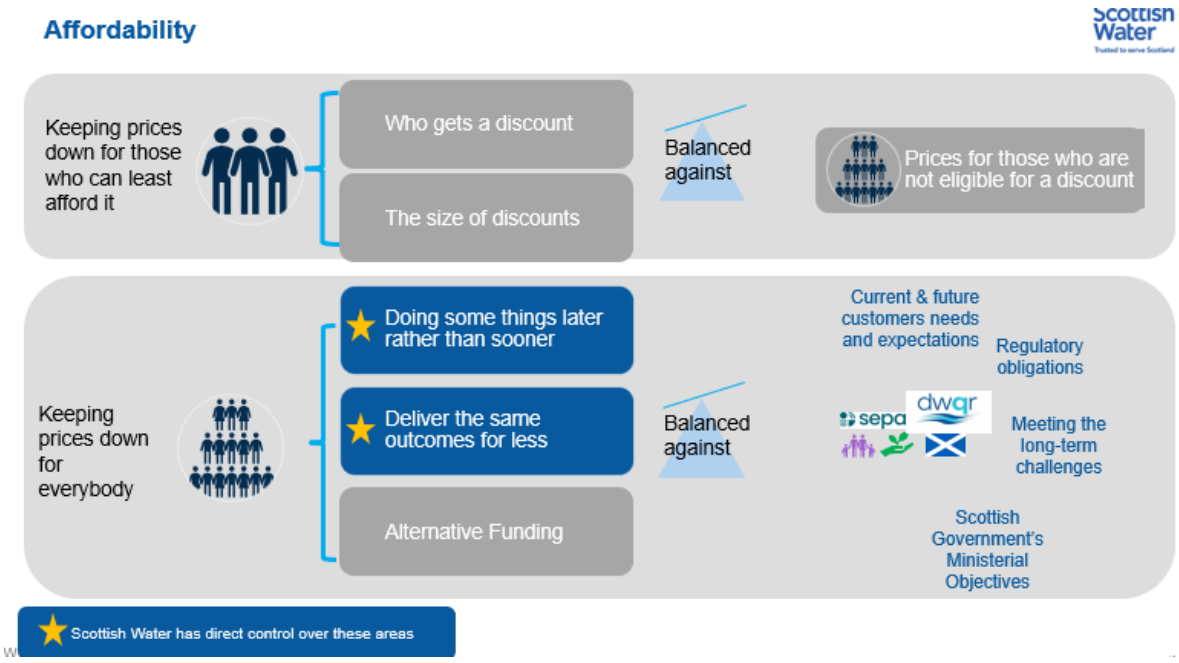
Scottish Water's response to findings

Balancing charges and outcomes

Scottish Water is almost entirely funded by customer charges. In SR27 94% of our costs will be covered directly by customer bills, with 6% covered by borrowing from the Scottish Government.

In order to keep prices down for all customers we must drive efficiency through innovation, transformation and smarter ways of working so that we can deliver the same outcomes for less. We have detailed our approach in the Efficiency and Innovation and Transformation Technical Appendices. To keep overall prices in SR27 low we can also choose to do some things later rather than in the next period, and we have outlined where these choices have been made within this Investment Planning Technical Appendix.

We also recognise the need to keep prices down for those who can least afford it. However Scottish Water's SR27 Final Business Plan must align with Ministers' statement of policy set out in the draft Principles of Charging provided by Scottish Government in March 2024.



Keeping Prices Down for Everybody

Customers' positive views on reasonableness and value for money of the Draft Business Plan, and generally positive sentiment about the proposals for investment areas gives Scottish Water confidence that the level of outcomes delivered in the Plan for the price which would be paid are broadly supported by customers.

However, the overall affordability finding from the quantitative study prompted Scottish Water to reconsider the Draft Business Plan position of CPI +4% p.a. price increases. This led to a review of financial assumptions and positions, and revisions to the investment planning scenario to consider what decisions could be taken which would decrease the overall investment level, whilst still preserving outcomes at a level similar to those explored with customers.

Decisions on efficiency, real price effects, and deferring some elements of investment have meant that the SR27 Final Business Plan will now cost customers CPI +3.3% pa over the period. We have not been able to retest this new price trajectory in quantitative research due to time constraints.

Keeping Prices Down for Those Who Can Least Afford it

Scottish Water's research identified that financially vulnerable customers are significantly more likely to find the plan unaffordable.

Scottish Water's SR27 Final Business Plan must align with Ministers' statement of policy set out in the draft Principles of Charging provided by Scottish Government in March 2024, including affordability measures. Updated Principles of Charging for SR27 are expected to be published in October 2026, taking account of consultation feedback.

The vast majority of households are unmeasured, with their charges linked to their council tax band. This means that households living in properties with lower council tax rates also pay lower water charges. There is a strong correlation between household income and council tax band of the property the household occupies. This improves the overall affordability of charges, even before specific affordability measures are introduced

Currently just over half of households served by Scottish Water are provided with some form of affordability support:

- Around 1 in 5 households are eligible for the Water Charges Reduction Scheme, with a maximum 35% discount
- Around 1 in 4 households are eligible only for Single Person Discount of 25%
- Around 1 in 10 households are eligible for both the Water Charges Reduction Scheme and the Single Person Discount. They get the higher of their WCRS entitlement or the Single Person Discount (not both).
- 100% exemptions provided for a range of situations including full-time students and disability. Around one in 20 households are eligible.

Analysis has shown that the total value of discounts and exemptions in Scotland is £254m per annum, representing approximately 20% of the average household bill before any affordability measures are applied.

The level of affordability support for customers who are least able to pay water and sewerage charges, including the Water Charges Reduction Scheme, is defined in Ministers' Principles of Charging. Scottish Government has convened a multi-stakeholder Future Charging Group since 2024 to inform Ministers' Principles of Charging for the 2027-33 period.

The Water Charges Reduction Scheme (WCRS) provides a reduction of up to 35% on water and sewerage bills based on households' eligibility for Council Tax Reduction which is means-tested and administered by Local Authorities.

Consumer Scotland have published analysis on the affordability of water and sewerage charges and the potential impact on water poverty of further real-terms increases in bills during 2027-2033. Households in water poverty are defined as those spending more than 3% of disposable income after housing costs on water and sewerage charges whilst those in severe water poverty are those spending more than 5%.

The report highlights that increases in water and sewerage charges would result in an increase in water poverty. Consumer Scotland make a number of recommendations to mitigate the impact including potentially increasing the WCRS to 50%, possibly combined with a reduction in Single Person Discount and investigating the feasibility of a hardship fund for customers who do not qualify for WCRS.

WCRS is automatically passported to customers who receive Council Tax Benefit, so it is means tested and underpinned by robust affordability checks by Local Authorities to ensure that support is directed to those on low incomes. Because it utilises existing eligibility processes for Council Tax, the cost to administer the scheme is low so that most of the value of the funding is directed to eligible customers.

The relationship between households in water poverty and those receiving WCRS is complex with Consumer Scotland's analysis highlighting a weak correlation between water poverty and WCRS eligibility. Much of the support of WCRS is directed to low income households in low Council Tax band properties which may not be in water poverty (as their bill is already relatively low) but who have low disposable income and therefore benefit from a bill reduction.

20% of each household's bill funds the current system of discounts, reductions and exemptions. Increasing the level of support for any customer group would require either:

- additional increases in all households' bills beyond the proposed CPI+3.3% to fund the further support with the same level of investment;
- a reduction in service and environmental outcomes; or
- corresponding reductions in support for other customers (meaning price increases above CPI+3.3%).

Any such changes would involve complex trade-offs between the benefit of additional support to some households and the cost of that support to other customers, combined with the impact on Ministers' objective for stable charges (Principle of Charging 1).

A 'by-application' scheme or hardship fund has also been investigated. Such a scheme would be outside Local Authorities' existing benefits and affordability processes so would require new dedicated processes to assess eligibility, raising challenges of high administration costs relative to the value of the support provided.

Any amendment to current affordability measures would be a matter for Ministers and no amendments are currently costed in this Business Plan. Consumer Scotland's research highlights challenges with take-up of existing support such as WCRS and we will explore how Scottish Water could help promote awareness of available support to those customers who are least able to pay for water and sewerage.

The current Council Tax system provides a level of cross subsidy, with those on the lowest Council Tax band A paying 67% of those on Council Tax band D, and those on the highest council tax band H paying 2 times higher than Band D. The Scottish Government is undertaking a review of Council Tax, considering a possible revaluation, adjustments to existing tax bands, and, for households most impacted, transitional arrangements and changes to affordability measures. This review may impact upon Scottish Water charges and is due to be complete in 2030.

Scottish Water recognises that current household charging and billing arrangements have both strengths and limitations and welcomes Consumer Scotland's proposal to further consider future options to improve automatic targeting of affordability support during the SR27 period, taking account of the impacts of potential reform of Council Tax.

Pricing Trajectories

Customer views on pricing trajectories can be difficult to explore, as preferences are shaped by the cost of living – which is difficult for customers to predict. Generally, customers prefer smooth and steady increases, although when supported with more detailed information, some may accept front-loading.

Based on customer feedback, Scottish Water propose a smooth price trajectory of CPI+3.3% per annum across the period.

Household Metering

Scottish Water is reviewing the positioning of its metered household charges, making metering more accessible to any customers who would prefer to pay based on what they use, aligning with our focus on increasing perceptions of the value of water and that 'water is always worth saving'. The review will work within the existing (SR21) Principles of Charging and recognises that the majority of customers will continue to be charged on an unmetered basis and that the subject is sensitive, requiring stakeholder support. Any longer-term change would be a matter for the Scottish Government's future Principles of Charging, would be informed by conclusions from the Household Monitoring Pilot and would need to mitigate against adverse revenue impacts, given existing upwards pressure on customer prices.

Debt Recovery

Scottish Water currently shares the cost of household billing and collection with local authorities, sharing resources across the public sector and helping to keep overall costs lower for both parties and their customers. We recognise the important role that council revenue and benefits teams play in supporting vulnerable customers with the available supports, and we value their ongoing commitment to this work. We will continue to work closely with local authorities to share and promote best practice in debt recovery.

Non-Household Customers

The Scottish Government's Future Charging Group has considered the level of affordability measures extended to non-households. Currently, the Principles of Charging provides exemptions for charities and Community Amateur Sports Clubs, funded by the generality of non-household customers. It is expected these arrangements will remain in place during SR27.

The Future Charging Group has also recognised the opportunities to simplify the non-household charging structure to strengthen water efficiency incentives and facilitate future tariff innovation.

Intergenerational Equity

The Principles of Charging set out by the Scottish Government require that water charges should be set at a level that is fair and equitable to present and future generations.

Broadly, we take intergenerational equity as meaning that assets are paid for by the people who benefit from the services those assets provide, and that each generation ensures that assets and service levels are resilient and sustainable over the longer term.

Typically, current customer charges are expected to pay for maintaining these long-life assets, such as dams, aqueducts and treatment works that are intended to last beyond the use of the current generation. This means that the current generation is paying for assets which will also be enjoyed by future generations.

In support of this, our proposed level of maintenance investment[46] during SR27 is approximately 24% higher than in SR21. While this remains below the long-term sustainable level identified in our Management Approaches, it represents a deliberate step towards a more sustainable level of investment and charging over the coming investment periods. This approach will allow us to balance the need to maintain our asset base over the long term with the need to consider intergenerational equity and short-term customer affordability.

Intergenerational equity must also be considered when one generation is asked to pay for a very large, new investment project, such as West Central Bioresources. Scottish Water has explored avenues for funding this large investment through means other than directly from customer charges in SR27.

[46] Asset repair, refurbishment and replacement

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Customer Research

February 2026

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1 Executive Summary

Customers are at the heart of our business, and their opinions are a key factor in our decision-making process. Building these views into our plans is part of our on-going customer research approach that allows us to ensure our customers' needs are at the centre of our service delivery. We also recognise that customers are pivotal to helping us solve some of the most complex challenges we face and so must be involved in our strategies and plans from the outset.

Scottish Water has a strong track record of understanding customers views through customer research. Scottish Water's SR27 research programme engaged with 1,166 household customers and 226 businesses on business planning issues and builds on our Long-Term Strategy research programme which involved more than 5,000 customers. This research programme is underpinned by Scottish Water's synthesis framework and database, which contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers over the past 10 years.

1.1 Collaborative Research Programme

The role of customers in Scottish Water's SR15 and SR21 review processes was strengthened by the Customer Forum. The Customer Forum was a body appointed to agree the Business Plan (SR15) and the Strategic Plan (SR21) with Scottish Water on behalf of customers, before the Water Industry Commission for Scotland (WICS) made its Final Determination.

We have built on this model for SR27 with the introduction of a Memorandum of Understanding (MOU) between the Water Industry Commission for Scotland (WICS), Consumer Scotland and Scottish Water. The MOU retains the Independent Customer Group (which replaced the Customer Forum on an ongoing basis) to support and challenge Scottish Water's understanding and incorporation of customers' needs and expectations in its Business Plan.

The MOU also defines Consumer Scotland's role in leading a longitudinal deliberative research study. This innovative study will ask customers' whether the SR27 Final Business Plan commands their support and ultimately helps determine whether the WICS' Final Determination commands consumers' support.

All SR27 research is fully collaborative and is co-ordinated through the Customer Research Co-ordination Group (CRCG), which is chaired by the Chair of the Independent Customer Group (ICG). Membership of the CRCG consists of representatives of Scottish Water, ICG, Consumer Scotland, DWQR, SEPA, WICS, and the Scottish Government. The day to day running and co-development of the SR27 research programme is delegated to a Research Advisory Group (RAG) consisting of nominated representatives from Scottish Water, Consumer Scotland and the ICG.

1.2 Research Activities and Findings

SR27 is the first step on the journey towards the outcomes set out in Scottish Water's Long-Term Strategy, which was shaped with the input of more than 5,000 customers. Customers expressed that they wanted to see standards across each service area maintained at the very least over the long-term, and they would not trade off deterioration in any service area to achieve greater improvements in another. Long-term objectives around ensuring a clean water supply and the local natural environment were seen as the most important, alongside ensuring that services are affordable for customers.

SR27 research commenced in December 2024 with a series of qualitative activities involving household and non-household customers, to establish customer expectations for Scottish Water over the course of SR27 and understand customer views and preferences around a set of draft charging and investment scenarios. Scottish Water experts explained our organisation, our performance and long-term challenges and ambitions, customers then gave detailed feedback on the choice areas and their comparative preference between scenarios. As is consistently the case in customer research, customers entered the research with a positive sentiment towards Scottish Water, and the quality of the drinking water that we provide. The national pride associated with water quality in Scotland plays a significant role in shaping customer expectations, especially in terms of quality, sustainability, and protection of the resource.

Customers' understanding and acceptance of the challenges faced by Scottish Water and their positive sentiment towards us, led to customers wanting to protect both the public ownership of the company and its infrastructure, and generally accepting the need to pay more due to challenges and future-proofing efforts. However, customers were seeking improved outcomes in exchange for any price rises, and none of the early scenarios presented offered enough value for money for wholehearted endorsement from customers.

Scottish Water took this feedback on board and prepared a rebalanced investment scenario to share with some research participants who had agreed to continue their involvement. In the context of both their own views and increased understanding of the investment areas, participants generally felt that this new investment scenario was well-balanced and offered clear, tangible outcomes. Most participants agreed that Scottish Water had listened to their feedback from the original research when designing the rebalanced investment scenario.

Research up to the development of the SR27 Draft Business Plan maximised the use of qualitative approaches, to ensure that customers had the time and information to give informed views. However, these views might not be representative of our wider customer base, for whom water industry issues might be less top of mind. With this in mind, for the final stage of our research programme, Scottish Water commissioned a nationally representative study, which was seeking a statistically robust view from customers of the outcomes offered by the SR27 Draft Business Plan and the associated increase in charges. This study found that although customers were largely accepting of the outcomes offered by the SR27 Draft Business Plan, there were concerns about the affordability of the plan. This, alongside feedback from our Stakeholders, led Scottish Water to develop a SR27 Final Business Plan which revised the charging impact on customers whilst also seeking to retain the outcomes which were most important to them.

1.3 Research Synthesis

The SR27 customer research programme aimed to understand customer expectations for Scottish Water over the course of SR27. However, Scottish Water also have a deep understanding of views on service issues from existing and ongoing research. Scottish Water's synthesis database contains c.2,000 insights drawn from more than 60 research projects involving more than 24,000 customers. These insights have been assessed and mapped into topics, and the highest quality insights have been gathered together into Key Insights which have been used to support the development of the SR27 Final Business Plan and Technical Appendices. The Research Synthesis Supporting Document sets out supporting evidence, scoring and referencing for these Key Insights.

Scottish Water's process for applying the Synthesis framework has been independently audited and received positive feedback, with the audit finding a strong, thorough and thoughtful approach

to evaluation and synthesis and strong evidence of structured evaluation. Scottish Water will continue to develop the use of synthesised insights to support broader activities and future Business Plans.

2 Background

2.1 Context

At Scottish Water customers are integral to everything we do, and we aim to place customers at the heart of every decision that we make – including the business planning process.

Scottish Water has a strong track record of commissioning high quality, independent research. In 2024/25 we spoke to c.40,000 customers through research. We use the customer insights drawn from this research to inform the way we work and the decisions we take, as well as to inform and shape our SR27 investments.

The full programme of customer research Scottish Water undertakes is ongoing and continuous. We are continually informed by transactional research, which gives us feedback from customers who have been in contact with us about a service issue or experience, and by our ongoing trackers such as such as the nationally representative Perception & Experience survey conducted by YouGov providing insights related to awareness, trust and satisfaction. We gathered views from over 23,000 and almost 9,000 customers respectively in 2024/25 through these approaches. Findings from these surveys are mentioned in our Customers and Community Excellence Technical Appendix. For SR27, we are additionally informed by:

- **Our research synthesis,** which gathers insights from topical research which inform a range of activity across the business. Much of this research is qualitative – and to make best use of the breadth and depth of insight in a robust and reliable way, we have developed a robust and audited 'Research Synthesis' process. This has enabled us to understand where views on topics have changed over time, if different customer groups might agree or diverge on issues – and also to fairly assess where our evidence base is strong, and where it needs strengthening.
- **Strategic investment research** which explores customers views and expectations in the long and medium term, informing the Long-Term Strategy and SR27.

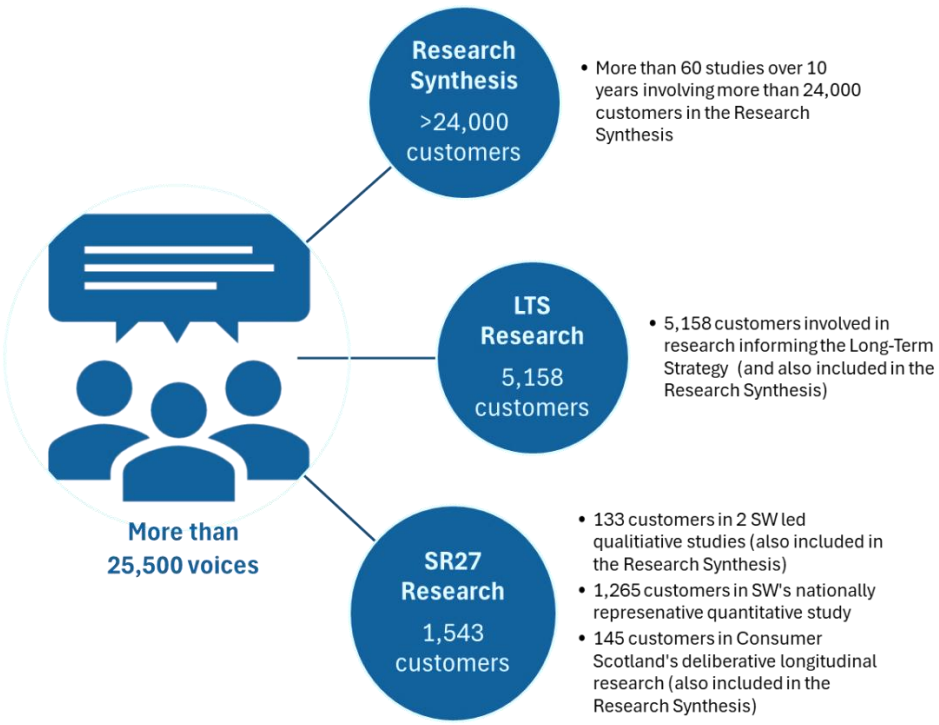


Figure 1: Customer voices informing the Long-Term Strategy and SR27 Plan.

All of Scottish Water's customer research is guided by six research principles (Figure 2).

Figure 2: Scottish Water's principles for customer research

Collaborative

The Scottish water industry is more than just Scottish Water. To maximise the value of our research activities, we give all our water industry stakeholders an opportunity to feed in and shape research, and on completion we share our research findings. This co-ordination and collaboration is facilitated by a Customer Research Co-ordination Group (CRCG), which is chaired by the Chair of the ICG. Membership of the CRCG consists of representatives of Scottish Water, ICG, Consumer Scotland, DWQR, SEPA, WICS, and the Scottish Government.

The day-to-day running and co-development of the SR27 research programme is delegated to a Research Advisory Group (RAG) consisting of nominated representatives from Scottish Water, Consumer Scotland and the ICG, recently joined by representatives from WICS. Establishing the RAG has been essential to reflect fast moving developments in the research programme and for the smooth running and integrity of the programme. Under this arrangement CRCG retains general oversight of the totality of the customer research programme and continues to receive progress reports.

Independent research

Independent agencies are used to conduct research on Scottish Water's behalf to ensure the insights we receive are well-designed, robust, unbiased, inclusive and independent. By providing feedback through independent agencies, customers can more openly share views on the water and waste water services we provide. Scottish Water and all independent research agencies we work alongside are members of the Market Research Society (MRS) - the world's leading research association - and adhere to the MRS Code of Conduct. This ensures all research conducted is transparent, robust and General Data Protection Regulation (GDPR) compliant.

Engaging and transparent

Scottish Water leverages our knowledge from past research to continually improve the ways that we communicate with our customers. Additionally, we often pre-test language and research materials with customers, using a range of methods including cognitive testing which aims to capture people's thought processes and understanding when responding to research materials and questions. This is designed into many of our research activities to be carried out independently by our research partners. We also regularly test materials with our online Water Matters community. Established in 2018, Water Matters is an online community of c.500 members used to gather feedback from customers across Scotland. It is fully moderated by an independent research agency, Explain, and allows Scottish Water to get swift feedback through polls, surveys and posts on the 'social media style' community page.

We recognise that many of our household customers are not aware of how much they pay for water and waste water services, as charges are paid alongside Council Tax. We wanted to be as transparent as we could be with customers about the potential bill impacts of our plans for SR27 in every stage of customer research. Whenever we engaged with customers about SR27 bill impacts, we showed them as personalised a view as possible, reflecting their own Council Tax Band or business rates and the level of discount that they receive. This approach has enabled customers to give us more fully informed views on charges.

Inclusive and representative

Our customers are not a single group, and their needs and expectations vary. Scottish Water's research is designed to engage effectively with a wide variety of different customers including those who find themselves in vulnerable circumstances. For national research activities Scottish Water involve customers across the length and breadth of Scotland, and in any work that we do we ensure that customers that are harder to reach (digitally excluded or remote locations) have opportunities to participate. The broad and representative range of customers that we seek to undertake research with is shown in Figure 3.

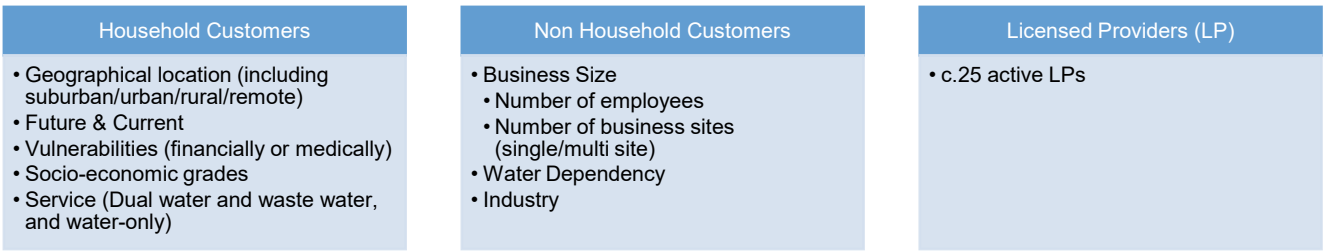


Figure 3: Customer groups and recruitment demographics

Building and learning

Scottish Water has been at the forefront of water industry customer research since SR15. In SR15 Scottish Water led the way in applying the water industry approach to Stated Preference and Willingness to Pay research, using a large-scale quantitative survey to understand the values that customers placed on different service areas. This methodology was statistically robust but required customers to think about probabilities of service failures, and to consider quite complex packages of service offerings.

For SR21, Scottish Water again led the way in developing a more engaging Stated Preference approach, this time asking customers to consider the impact of various service issues on their own personal circumstances. This led to a much more engaging research activity, the results of which could be combined with Scottish Water's performance data to understand where service

issues were causing the most impact to customers. This approach was extended in 2023 to understand impacts of service issues on communities.

Strategic issues raised by the Long-Term Strategy require customers to think long into the future and ask them to consider complex systems by thinking beyond immediate service issues and consider longer-term risk and resilience. To meet this research challenge, for SR27 Scottish Water has made more use of research approaches where customers are engaged in activities over sustained periods of time. These approaches give customers the time, space and information that they need to develop informed views on relevant topics and give deeper insights than can be gained by one-off research activities.

However, the reality is that water and waste water services are not top of mind for most of Scotland's population. This means that insight gathered which is more representative of the general public is also important. Scottish Water's SR27 research programme seeks to balance all of these issues and uses a mixture of approaches which involve both informed and less informed customers.

Objective driven

Objective-driven research focuses on clearly defined goals and objectives to guide the research process and helps us to find the most appropriate research methodologies to use, to achieve the aims Scottish Water have. Qualitative approaches are helpful to give customers the time and opportunity to learn about the subject, so that they can give us a considered view. Quantitative approaches are helpful to give us the chance to reach larger numbers of customers and therefore provide a representative and less-informed view. Online methodologies can help us to reach more customers in geographically isolated areas. Scottish Water work together with independent research agencies and are guided by the expertise of the CRCG, ICG and Scottish Water's own research expertise to find and develop the right methodologies which best help us to meet research objectives.

2.2 Long-Term Strategy

SR27 is the first step on our journey to the delivery of our long-term outcomes set out in our Long-Term Strategy. Our approach to SR27 business planning research strives to place near-term investment as part of this long-term context; setting out decisions in the context of the challenges that Scottish Water and the wider water industry is facing over the next 25 years. Sharing this context helps customers give us a balanced perspective on the choices and decisions that Scottish Water has made; balancing the needs of the short-term with the demands of the long-term; and ultimately helping to make sure that the contents of the plan are aligned with customer views.

The voice of our customers is woven through the Long-Term Strategy, with over 5,000 customers directly engaged in the development of the plan (Figure 4) and enhanced through a seven-week public consultation with customers, communities and stakeholders.

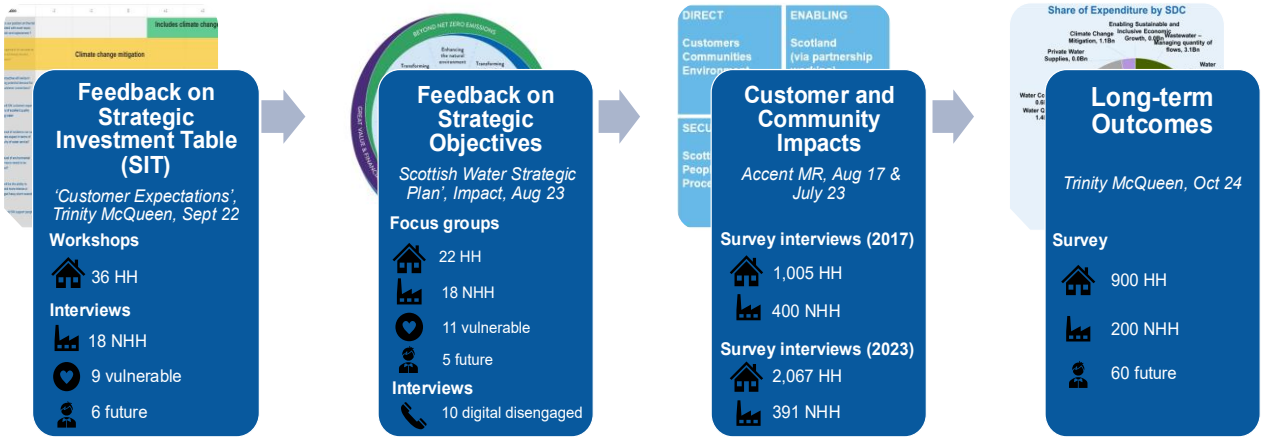


Figure 4: How we built our Long-Term Strategy using insight from our customers

The Long-Term Strategy research programme commenced with two qualitative studies which helped us to understand customer views on the role that Scottish Water should play in that future, and to think about the strategic issues that Scottish Water is facing over a 25-year time horizon.

Customers entered these studies with a consistently positive sentiment towards Scottish Water, expressing that Scottish Water provides a high quality, consistent service. Most have little reason to think about their water supply or waste water removal. There is a sense of pride in Scotland's water, and Scottish tap water is firmly associated with Scotland. Customers tend to trust Scottish Water to deliver and assume they have their best interests at heart. Many believe the water in Scotland is *"the best in the world"* when compared to water in other countries. The main surprise for some customers was simply how big Scottish Water is, and the scale of the service delivered.

We found that customers' general lack of awareness of Scottish Water and its activities meant that they underestimated the need for future investment. Once exposed to the topic, all could see its relevance, and we heard that customers wanted us to do more to communicate. We also learned valuable lessons on how to communicate to customers on these topics, and the information they were seeking.

As part of our SR21 research programme we commissioned a large scale Stated Preference study in August 2017, which helped us to understand the relative impact of service issues on customers own personal circumstances. We combined this with our service level data, and

customer information such as contact volumes, to understand where service issues had the greatest impact on individual customers and establish customer priorities for SR21. For the Long-Term Strategy, we extended this 'impact' dataset through commissioning a further Stated Preference study, this time focussing on environmental and community service issues, and understanding the relative impact from a community perspective. We were able to combine these datasets and bring them together with Scottish Water service and cost data, to carry out an analysis of where the pace and direction of strategic long-term investment would hold the most value for customers, bringing customer insights into the heart of our decision making.

Scottish Water checked the outcomes of this analysis with customers in the final stage of our Long-Term Strategy research programme in October 2024, giving customers an opportunity to feedback, validate and adjust the choices. All of the learning from previous stages of the Long-Term Strategy research programme was used to create a meaningful and accessible coin allocation exercise. Results confirmed that Scottish Water's analysis arrived at outcomes which were broadly consistent with customer's decision making, particularly when investment was constrained at lower levels. Significantly, we found that customers want to see standards across each service area maintained at the very least. They would not trade off deterioration in any service area to achieve greater improvements in another.

The final stage of the Long-Term Strategy conversation with customers took the form of a seven-week public consultation, from 4 February to 23 March 2025. We received 147 responses, 119 from individual respondents, across a mix of age ranges and geographical location, and 28 responding on behalf of an organisation. Overall sentiment towards the Long-Term Strategy was positive with 98% of respondents understanding the challenges we face and over 82% agreeing that they are right for Scottish Water to be focussing on. 82% also agreed with the outcomes we had identified and were supportive of the strategy overall.

Scottish Water's Long-Term Strategy has changed the way we speak to customers about investment, and the outcomes they might expect from that investment over the next 25 years. In previous reviews our focus was on understanding shorter-term customer priorities and expectations. The conversation in SR27 has now changed to become one of understanding how customers expect Scottish Water to respond to the three long-term challenges (Figure 5), to understand where they want to see progress made sooner rather than later, and to understand how Scottish Water should communicate on these topics.

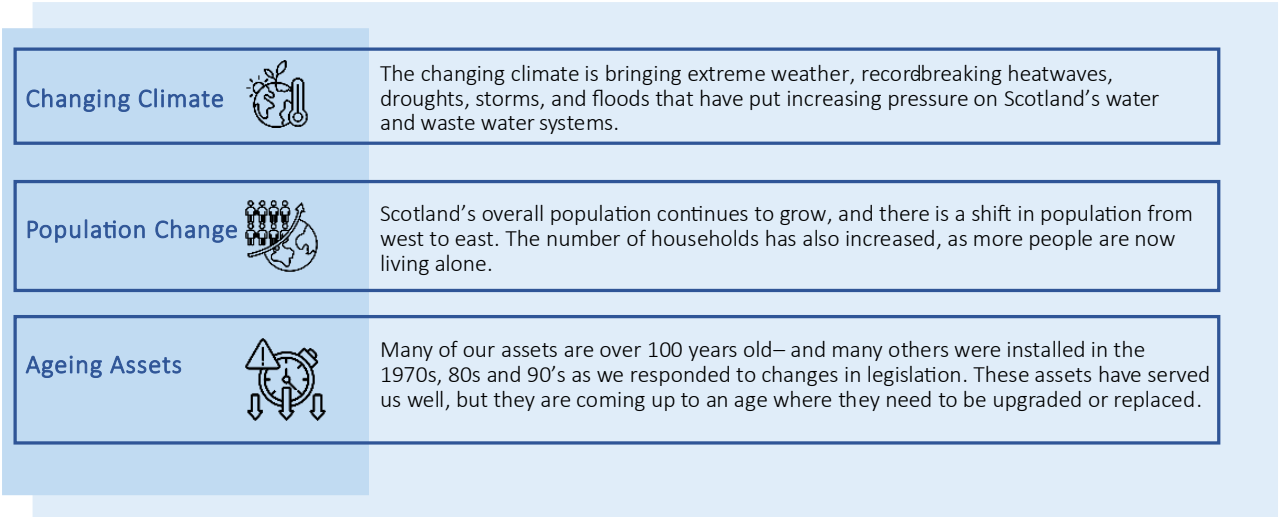


Figure 5: An example of how we have shaped the Long-Term Strategy challenges as part of our SR27 research

2.3 What has Changed Since SR21

Consumer Scotland was founded in April 2022 following the Consumer Scotland Act 2020. It is the new statutory, independent body for consumers in Scotland, and has a general function of providing consumer advocacy and advice to reduce harm, increase confidence and increase the extent to which consumer matters are considered.

Section 21 of the Consumer Scotland Act 2020 has introduced a duty ("the consumer duty") which Scottish Water and the WICS must take account of and evidence, on an annual basis, their clear focus on providing the best possible service and outcomes for consumers (as users of public services). The Consumer Duty aims to put consumer interests at the heart of strategic decision-making and will therefore apply to the SR27 process.

As part of its Commissioning Letter to WICS, the Cabinet Secretary for Wellbeing Economy, Net Zero and Energy set out a requirement that "consumers, communities and the environment are placed at the heart of this [SR27] Review." Ministers also expect that customers are engaged throughout the SR27 process and that the Draft Determination commands customers' support.

To fulfil these requirements and to make sure that their respective statutory duties and obligations relating to customers/consumers will be met, WICS, Consumer Scotland and Scottish Water have signed a Memorandum of Understanding (MOU).

Signatories to the MOU have agreed to build on the models for SR15 and SR21, where the innovative Customer Forum model was adopted to bring the voice of customers into the review. The Customer Forum was a body appointed to agree the Business Plan (SR15) and the Strategic Plan (SR21) with Scottish Water, on behalf of customers, before WICS made its Final Determination.

In SR27, the ICG (which replaced the Customer Forum on an ongoing basis) has been retained to challenge Scottish Water as we developed our Business Plan. Utilising its experience and expertise, the ICG has drawn upon evidence to challenge Scottish Water's understanding and incorporation of customers' needs and expectations in our Business Plan. It operates transparently and has reported to the Boards of Scottish Water and Consumer Scotland on its independent role in SR27[1]. The ICG is demonstrably operationally independent of Scottish Water and Consumer Scotland, taking responsibility for its challenge to the company. The ICG has ensured its challenge to Scottish Water reflects the evidence of the customer research and analysis available. The ICG has produced an Assurance Report which is published alongside this SR27 Final Business Plan together with a formal log of the challenges it has made to Scottish Water and the responses it has received. This collaborative approach has retained independent oversight of the ICG.

The MOU sets out four Principles for Customer Engagement in SR27 (Figure 6) which aim to empower customers and communities, ensure customer research is credible and unbiased, foster collaboration among water sector stakeholders, and provide independent challenge to Scottish Water's plans.

These principles have been embedded within three pillars of work (Figure 7) which have established customers' views on issues through collaborative research and analysis, facilitated

[1] As set out in their Special Terms of Reference for SR27

ICG's role of challenge to Scottish Water, and will confirm whether the SR27 Final Business Plan commands customer support through longitudinal deliberative research, commissioned by Consumer Scotland.

Building on previous strategic review periods, where the customer voice was brought into the review process, the Confirmation Pillar is a significant innovation from past processes and will provide a direct consumer view on Scottish Water's Business Plan as a whole and be used to inform WICS' Final Determination. Consumer Scotland's longitudinal deliberative research gathers consumers' considered views and understanding of Scottish Water's Long-Term Strategy and their perceptions of Scottish Water's Business Plan to ascertain whether we have met consumers' needs, priorities and expectations. The final phase of Consumer Scotland's research will test perceptions of Scottish Water's SR27 Final Business Plan to understand if it commands customers' support.

Deliberation is an approach to public policy and decision making that allows those taking part the opportunity to consider relevant and often complex or controversial information from multiple points of view. By providing the same group of participants with the time and space to learn about the issues so that they can discuss and debate in detail the issues and options available helps the group(s) to develop their thinking as a collective, before coming to a shared view, taking into account all of the information presented to them and the values and beliefs that inform people's opinions. Consumer Scotland's longitudinal deliberative methodological approach places public participation at the heart of the research process to allow participants to fully understand, explore and discuss the issues and options in detail.

Figure 6: Four Principles for Customer Engagement in SRC27 as set out in the MOU

1. Evidence	2. Challenge	3. Confirmation
Establish customers' views on issues relating to the Business Plan through a co-ordinated and co-designed programme of research and analysis	Requires the existing Independent Customer Group (ICG) to use evidence to challenge Scottish Water to put customers' needs and expectations at the heart of its Business Plan. To facilitate this role Scottish Water and Consumer Scotland will agree a Special Terms of Reference for the ICG for SR27. This will include a set of new asks of the ICG (in addition to their ongoing independent challenge role for Scottish Water) to help fulfil the expectation that both Scottish Water's Business Plan and the Commission's Determination will command customers' support.	Will ask customers' whether the SR27 Final Business Plan commands their support, in turn supporting the Commission to meet Ministers' expectations that the Final Determination will command customers' support. The Parties have agreed that longitudinal deliberative research will be commissioned by Consumer Scotland for this purpose, with the activity being co-designed with sector stakeholders.

Figure 7: The three pillars of work as set out within the MOU

3 Our Approach to Customer Research for SR27

3.1 How did we Design Customer Research for SR27?

Customer research for SR27 is fully aligned with the four Principles and three Pillars as set out in the MOU, and all Scottish Water led research is additionally aligned with our general principles for customer research as set out in in Section 2.1.

All research activity is co-ordinated through the CRCG, with day-to-day management of SR27 specific activity delegated to a Research Advisory Group (RAG) consisting of nominated representatives from Scottish Water, Consumer Scotland, and the ICG, recently joined by WICS.

SR27 customer research has two broad groupings of activities as set out in Figure 8 which helps Scottish Water to make best use of our existing high quality evidence base, and supplements this with activities specific to SR27 choices and decision making:

- A **synthesis of Scottish Water's ongoing research programme**; which gathers together and analyses insights and findings from our wide and rich evidence base to date;
- A **programme of SR27 research**, developed in collaboration with Consumer Scotland and ICG, where Scottish Water and Consumer Scotland have each committed to undertaking specific research projects to inform distinct stages of the SR27 process, reflecting each organisation's unique role within SR27:
    - Research commissioned and led by Scottish Water has established customers' views on issues relating to the Business Plan and acts as inputs to the SR27 Draft and Final Business Plans, shaping their content, in line with the **Evidence** Pillar of work as set out in the MOU.
    - Consumer Scotland has commissioned and led the longitudinal deliberative research that runs throughout the SR27 process and culminates in the **Confirmation** Pillar of work as set out in the MOU.

This approach supports Scottish Water, Consumer Scotland, WICS and the ICG in fulfilling their needs and obligations all the way from informing the content of the SR27 Draft Business Plan, to providing evidence that this SR27 Final Business Plan commands customer support ahead of WICS's Draft and Final Determinations.

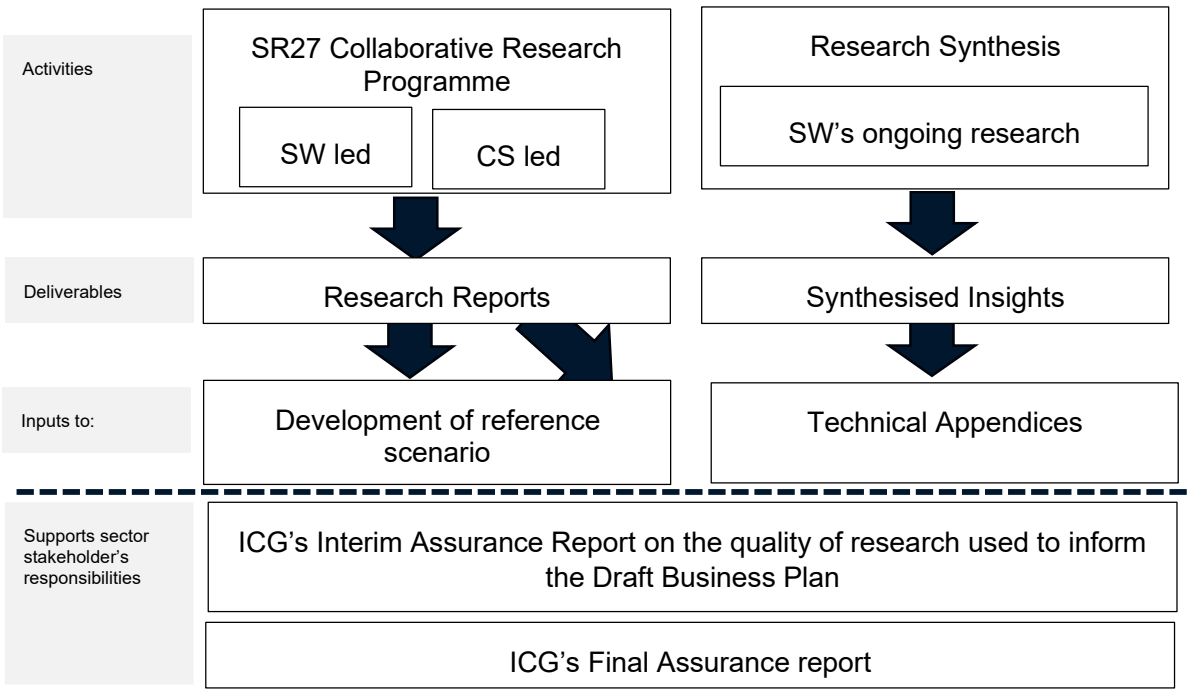


Figure 8: Approach to SR27 Research

3.1.1 A Collaborative SR27 Customer Research Programme

As set out by the MOU, the process of agreeing the research programme has been active and co-ordinated, with Scottish Water, Consumer Scotland and ICG able to contribute at all stages. The programme has been adaptive to research needs as they are identified throughout the process.

The SR27 research programme has had Scottish Water and Consumer Scotland led activities running in parallel. Both strands of activity have continually built on customer views to date as the programme progresses (Figure 9). Stages marked in dark blue below have been completed.

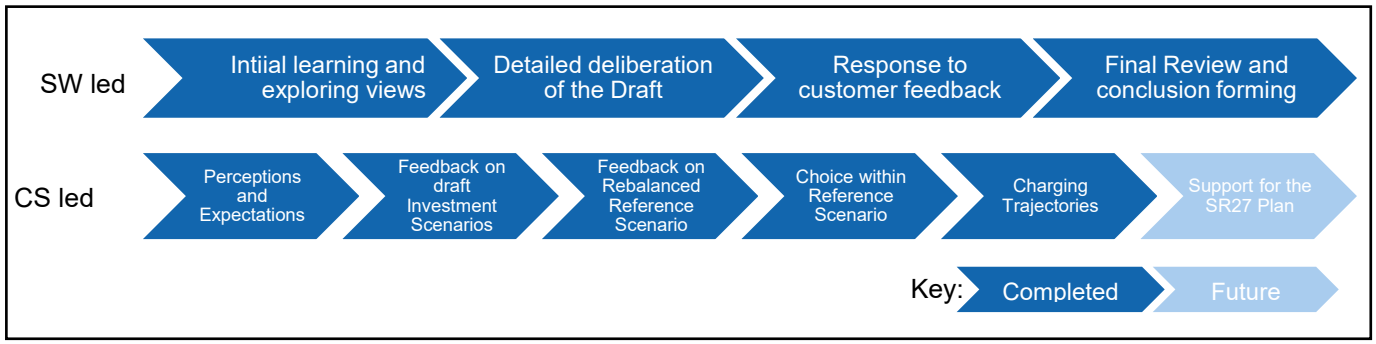


Figure 9: Progression of insights

The research activities and objectives which have contributed to the programme of research for SR27 are set out in the table below, with detailed methodologies set out in Annex A.

Table 1: Research activities, objectives and sample

Activity	Fieldwork dates	Objectives	Sample
1. Customer Expectations: Informing the SR27 Draft Business Plan scenarios	December 2024 February 2025	1. Establish customer expectations for Scottish Water over the course of SR27 2. Understand customer views and preferences around SR27 charging and investment scenarios	101 Households (including 31 vulnerable (financial or medical), 17 future, 4 water only, 6 as part of multigenerational groups) 26 Business (4 water only)
2. Customer Expectations: Licensed Providers (LPs)	March/April 2025	1. Understand the needs and expectations of LPs in relation to SR27 2. Sense checking business customer research outputs from previous stage 3. Understanding LP's own future business plans or areas of focus	6 Licensed Providers (all active market participants were invited to take part)
3. Reconvened groups: Updated investment scenarios and charging trajectories	Early April 2025	1. Gathering feedback from customers on an updated investment scenario 2.Understanding how customers might wish to make further changes to the investment scenarios when presented with choices as trade-offs 3. Understanding customer preferences around a front loaded and 'smooth and steady' charging trajectory	33 Household 15 Business 6 Future (Previously participants in Activity 1)
4. Support of investment scenarios	August 2025	1. Support for the outcomes set out in the Draft Plan, in the context of the associated impact on customers' charges 2. Impacts of levels of understanding and how should Scottish Water communicate the plan	1,065 household (965 online and 100 face-to-face, including harder-to-reach groups). 200 non-household, spanning different business sizes, sectors, and consumption levels

5. Consumer Scotland's Longitudinal Deliberative Research	Phase 1: Jan-March 2025 Phase 2: April-Aug 2025 Phase 3: Sept 2025 – May 2026	1. Explore understanding and knowledge of the long-term challenges facing Scotland's water sector and the strategies required to address these; 2. Assess the level of consumer support for the proposed SR27 Draft and Final Business Plans; 3. Gauge consumers' collective support for the proposed charging profile and the cumulative impact of price increases on customers' bills; and, 4. Understand views, expectations and tolerances for different service levels and/or pace of developments that would be associated with different pricing pathways	100 Household 40 Business
Key	Scottish Water led		
	Consumer Scotland led		

3.1.2 Our Ongoing Research Synthesis

Scottish Water has been carrying out high quality customer research over the last decade which has amassed a wealth of information across a wide range of topics. Much of this research is qualitative and is rich in insight; however, managing it in a way that ensures consistency and transparency can be difficult. It can be challenge for all users of customer research to reliably draw similar conclusions from a largely qualitative evidence base.

To help Scottish Water address this challenge, we worked with SIA partners in 2023 to develop a Research Synthesis framework (Figure 10) to manage and consistently analyse this wealth of information. Our research is now organised and stored in a way that enables us to generate Key Insights transparently and consistently. The framework also facilitates the sharing of Key Insights with internal users and external stakeholders, with sources completely and transparently referenced (such as in the SR27 Research Synthesis supporting document to the SR27 Final Business Plan).

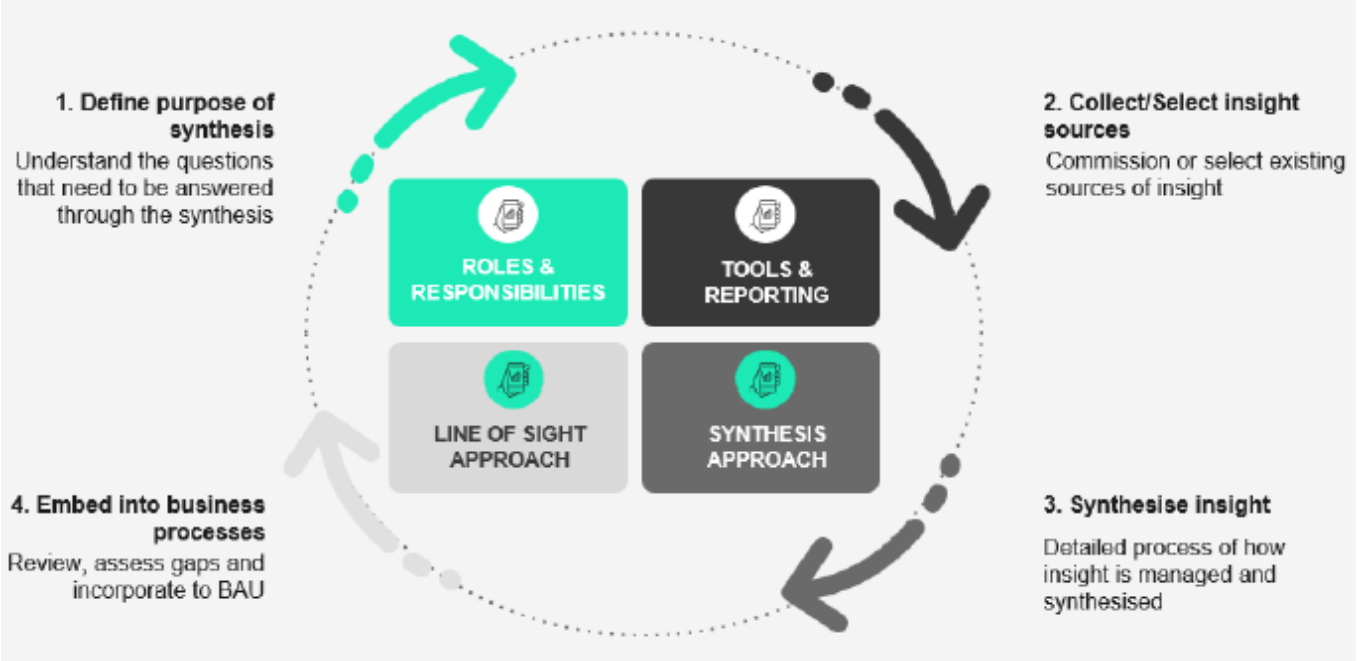


Figure 10: Synthesis Framework

The Research Synthesis methodology is closely aligned to thematic analysis, which focuses on integrating findings from primary studies to identify recurrent themes in relevant literature. Thematic analysis involves taking concepts from one study and recognising the same concepts in another study, though they may not be expressed using identical words. This allows us to identify themes, and whether views on those themes are similar or differing across different sources. It supports us in understanding where and if views have changed over time, identifying agreement or divergence among different customer groups.

The methodology also helps Scottish Water to avoid confirmation bias through a strong weighting and scoring mechanism which enables us to evaluate research insights in a transparent and consistent way (detailed in Annex B). The framework additionally supports a fair assessment where our evidence base is strong, and where it may need strengthening.

Scottish Water has been trialling and testing the Synthesis process and framework for around 2 years, developing our in-house analytic capability and searching for ways to use and apply synthesised insights. We invited SIA partners back in mid-2025 to review our processes and check that we have been appropriately applying the framework. Their assurance covered 2 core elements:

- Review of whether and how the business has implemented synthesis of customer research evidence, against CCWater's framework and wider best practice; and
- An assessment to establish whether insights have been appropriately recorded and weighted, and whether any insight tensions / divergence between insight sources or segments have been appropriately identified.

They found that Scottish Water:

- Has demonstrated a strong overall approach to evaluation and synthesis which is in line with CCWater's criteria;
- Is particularly strong in areas around being consistent, weighting and balanced decisions;

- Has demonstrated a thorough and thoughtful approach to synthesis of insights, effectively evaluating sources and using specific insights to address business needs; and
- Shows strong evidence of structured evaluation and a commitment to continuous improvement.

To date, more than 60 sources of customer research have been reviewed as part of the synthesis process. Studies cover a 10-year period between 2016-2025, involving more than 24,000 customers. The synthesis process is focussed on reviewing mostly qualitative research; engaging customers through methods such as workshops and focus groups, but some quantitative research (such as surveys) is also included. We have also included four studies by Consumer Scotland, and plan to extend the Synthesis to other external sources as we continue to develop our approach over the course of SR27.

Scottish Water is committed to continuing to use and develop the research synthesis process and framework. Insights from synthesis have been key to the development of the SR27 Business Plan, and we are finding further applications for the Research Synthesis on an ongoing basis. We intend to maintain and update the research synthesis on a continual basis to support the use of customer insights throughout our processes and decision making.

4 Outcomes of Our SR27 Customer Research Engagement

4.1 Collaborative SR27 Customer Research Outcomes

Activity 1

Activity	Fieldwork dates	Objectives	Sample
1. Customer Expectations: Informing the SR27 Draft Business Plan scenarios	December 2024 February 2025	1. Establish customer expectations for Scottish Water over the course of SR27 2. Understand customer views and preferences around SR27 charging and investment scenarios	101 Households (including 31 vulnerable (financial or medical), 17 future, 4 water only, 6 as part of multi-generational groups, 26 Business (4 water only)

The research approach involved customers developing an understanding of the challenges that Scottish Water faces, and the long-term context of investment decision making. Customers entered the research with positive baseline associations with Scottish Water. There was a widespread belief, regardless of sample type, that water quality was better in Scotland than in England. Participants referenced the taste of the water as well as its benefits for their hair and skin when washing. This higher quality was attributed to different factors such as the amount of rain, governance and ownership models in Scotland compared to England, proximity to hills and springs and the operational processes and structures in place in Scotland. Spontaneous ‘better than’ framing and belief of inferior English service drives some sense of fear and feeling that Scottish Water infrastructure needs to be maintained and future proofed.

The national pride associated with water quality in Scotland plays a significant role in shaping customer expectations. Participants often use patriotic language, viewing Scottish Water as a symbol of local pride, which adds a layer of responsibility in ensuring high standards are maintained. This perception makes customers more likely to hold Scottish Water to high expectations, especially in terms of quality, sustainability, and protection of the resource.

The invisibility of Scottish Water has both positive and negative implications. On the one hand, it means that Scottish Water is operating under the radar, with many customers feeling they don’t need to think about it—this is a sign of reliable service and satisfaction, as customers aren't faced with issues or disruptions.

The generally high quality of water and waste water services, non-metered billing, and reliance on Licensed Providers for non-household customers contribute to this perception of a seamless, low-maintenance service. However, the downside is that customers take the service for granted due to this lack of visibility.

The long-term view expressed by participants in the initial homework task underscores several key themes that align with the existing perceptions and expectations of Scottish Water's services. Customers are looking ahead with a clear set of priorities that reflect both continuity of service and a commitment to sustainability, balanced with a fair pricing structure. These themes are crucial when evaluating the long-term investment options, as they provide a lens through which different scenarios can be assessed and judged.

Customers were presented with three investment scenarios, each of which showed outcomes that might be offered at three different levels of charging (CPI +2, 4 and 6.5% pa). These were early draft investment scenarios, which reflected Scottish Water's thinking at this early stage of business plan development. Customers were also presented with the personalised SR27 bill impacts for each scenario, considering their Council Tax Band and discount level to inform their feedback.

Customers gave detailed feedback on the choice areas and their comparative preference between scenarios. Their understanding and acceptance of the challenges presented by Scottish Water and their positive sentiment towards Scottish Water, led to customers wanting to protect both the public ownership of the company and its infrastructure, and generally accepting the need to pay more due to challenges and future-proofing efforts. However, none of the scenarios presented offered enough value for wholehearted endorsement from customers.

Responses from customers were reflective of the extended and exploratory research approach and reflected their well-thought out and informed perspective which was invaluable to the early development of the SR27 Draft Business Plan. However, Scottish Water and stakeholders are mindful that these views are not representative of the general public, whom we would expect to be less informed.

These findings led to two broad recommendations:

i) Review the scenarios to offer more value, which could involve better explanations and improved offerings to increase acceptability; and

ii) Undertake further research on a more final version of investment scenarios, giving Scottish Water an opportunity to check how the reference scenario in the SR27 Draft Business Plan might be received by less informed customers, and reflect more broadly how the general public would view the charging impact and outcomes offered in the plan.

Activity 2

Activity	Fieldwork dates	Objectives	Sample
2. Customer Expectations: Licensed Providers (LPs)	March/April 2025	1. Understand the needs and expectations of LPs in relation to SR27 2. Sense checking business customer research outputs from previous stage 3. Understanding LP's own future business plans or areas of focus	6 Licensed Providers (all active market participants were invited to take part)

The research approach involved depth interviews with Licenced Providers (LPs), aimed at understanding the spontaneous priorities of LPs and their views on what they and their non-household customers need during SR27. The choice areas and investment scenario shared with customers as part of Activity 1 was shared with them, as were insights from non-household customers gathered as part of Activity 1.

As in Activity 1, participants communicated a positive sentiment towards Scottish Water, highlighting a number of areas of positivity around working as an LP with Scottish Water. They also felt that their non-household customers are happy with the operational service provided - often framed by comparison with English markets and water companies / regulators. A primary focus for spontaneous expectations for SR27 was water efficiency, where LPs wanted to see action through communications, collaboration and charges. Their spontaneous expectations for their customers were very consistent with what non-household customers mentioned in Activity 1 – with some additions such as water pressure (particularly at large sites or for use in industrial processes), resilience and back-up supplies, and efficiency and charging. Responses from non-household customers to the choice areas set out in Activity 1 were shared, and feedback from LPs was again that these were consistent with business insight, with some valuable contributions made around how the needs of larger or smaller businesses, or those in different sectors, might differ.

Response to the three investment scenarios was consistent with other business research; all scenarios were felt to be quite negative in terms of the balance between cost increases and speed of outcomes. However, LPs presented a pragmatic response and recognised the need to create a balanced plan, whilst also thinking more of the short term than non-household customers.

These findings led to 2 broad recommendations:

i) Review the scenarios to offer more value, which could involve better explanations and improved offerings to increase acceptability (as Activity 1); and

ii) Continue to engage with LPs as the SR27 plan develops.

Activity 3

Activity	Fieldwork dates	Objectives	Sample
3. Reconvened groups: Updated investment scenarios and charging trajectories	Early April 2025	1. Gathering feedback from customers on an updated investment scenario 2.Understanding how customers might wish to make further changes to the investment scenarios when presented with choices as trade-offs 3. Understanding customer preferences around a front loaded and ‘smooth and steady’ charging trajectory	33 Household 15 Business 6 Future (Previous participants in Activity 1)

The study was delivered using an extended qualitative methodology. Participants were drawn from a panel of customers who had participated in Activity 1, so they can be characterised as informed and engaged customers. As such, while this process ensured a well-informed audience capable of providing considered feedback on the evolved investment scenario, it is important to

note that these participants do not reflect the average knowledge levels of Scottish Water's broader customer base. The findings should therefore be interpreted within this context.

Customers were presented with a rebalanced, high-level investment scenario representing bill increases of CPI +4% pa (on a smooth and steady basis), with outcomes aligned with Scottish Water's thinking in the last stages of the development of the SR27 Draft Business Plan.

Initially, the scenario was shown with indicative spend levels across investment areas. This was then followed by illustrations of potential outcomes if spending in each area were adjusted by ±£50 million. At this initial stage, the potential impact on customer bills was intentionally withheld to encourage unbiased consideration of the investment priorities. The bill implications of the rebalanced scenario were introduced later in the discussion to allow for more reflective and informed responses.

In the context of their priorities and increased understanding of the investment areas, participants generally felt that the rebalanced investment scenario was well-balanced and offered clear, tangible outcomes. When invited to consider re-prioritising expenditure across investment areas, participants generally maintained the allocations presented in the rebalanced scenario. Where changes were suggested, they typically involved diverting funds to choice areas perceived to benefit a greater number of customers and deliver broader impact.

Customers were then shown two bill impact scenarios for discussion representing different charging trajectories, each of which would fund the rebalanced investment scenario they had just seen. One was a steady increase of CPI +4% each year over the period of SR27, the other was a front-loaded increase of CPI +11% in the first year followed by CPI +1.47% in subsequent years. Household (HH) and Business (NHH) participants were shown example bill impact trajectories and custom trajectories based on their own Council Tax band (HH) or water bill level (NHH). Future customers were shown example trajectories and the range of water bill levels across Council Tax bands.

Participants appeared generally more accepting of the need to increase bills to fund investment after two rounds of research and exposure to detailed information. However, the recent April 2025 rise in water bill and overall Council Tax that had happened around the time of this research had prompted some surprise and resentment. The steady increase is seen as a more acceptable way to introduce bill rises in the light of personal / business financial challenges and economic uncertainty. While the rationale for introducing higher bill increases earlier in the investment period was broadly understood and accepted, participants acknowledged that this would be challenging for customers to afford and for Scottish Water to communicate effectively.

In the post-group feedback, most participants agreed that Scottish Water listened to their feedback from the original research when designing the rebalanced investment scenario (Figure 11).

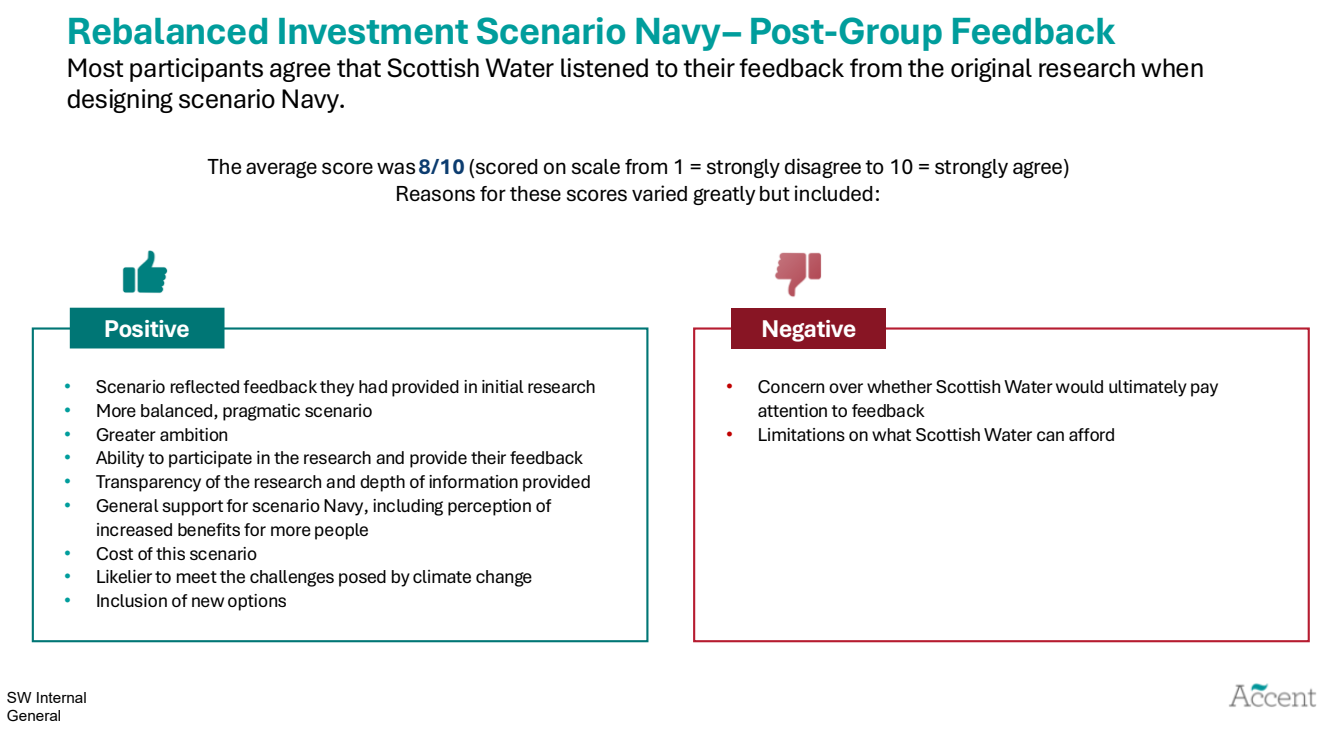


Figure 11: Post-Group feedback

These findings led to two broad recommendations:

i) To reflect customer's preference for a smooth and steady bill increase in the development of the SR27 business plan; and

ii) Undertake further research on a more final version of investment scenarios, giving Scottish Water an opportunity to check how the reference scenario in the SR27 Draft Business Plan might be received by less informed customers, and reflect more broadly how the general public would view the charging impact and outcomes offered in the plan (as Activity 1).

Activity 4

Activity	Fieldwork dates	Objectives	Sample
4. Support of investment scenarios	August 2025	1. Support for the outcomes set out in the Draft Plan, in the context of the associated impact on customers' charges. 2. Impacts of levels of understanding and how should Scottish Water communicate the plan	1,065 household (965 online and 100 face-to-face, including harder-to-reach groups). 200 non-household, spanning different business sizes, sectors, and consumption levels

This research activity was planned to meet the recommendations from Activity 1 and 3 to carry out further research on the content of the SR27 Draft Business Plan, giving Scottish Water an

opportunity to check how it might be received by less informed customers. Scottish Water commissioned Create Clarity to undertake the research, who developed a mixed-method nationally representative quantitative study to meet these objectives.

The information shared with customers was based on the content of Scottish Water's SR27 Draft Business Plan and the CPI +4% pa Reference Scenario. Information about outcomes was based on Table 1 Submission Outcomes.

Financial circumstances

As identified in previous stages of research, the current economic context and cost-of-living crisis inform customer views on levels of charging and potential price increases for SR27. To explore this wider context, a set of questions which had been developed by Create Clarity in partnership with Citizens Advice to ensure they assess customers' financial situations sensitively were used in the survey including:

- Household income
- Financial vulnerability, length of time
- Changes in circumstances making paying bills more difficult
- Lifestyle changes
- Confidence in future bill paying

Many customers reported that they were currently struggling to varying extents to pay their household or business bills (Council Tax, energy bills, water bills etc) (Figure 12).

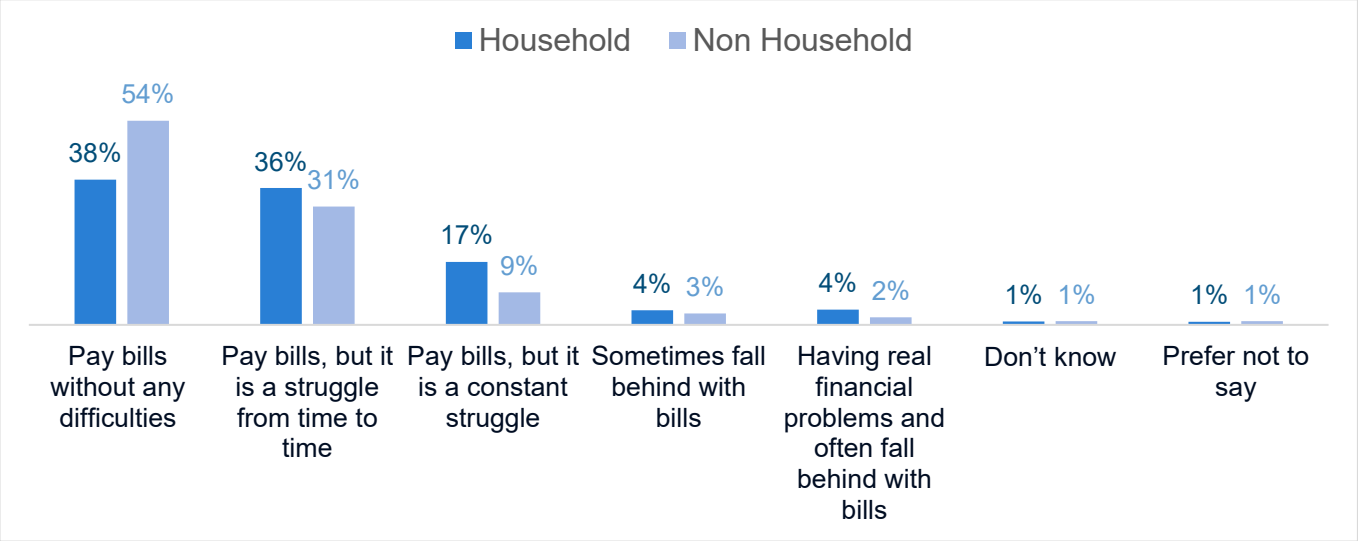


Figure 12: Ability to pay bills

Household customers who did not report that they could pay bills without any difficulties were asked if there had been any changes in circumstances to make paying bills more difficult, and if they had made any lifestyle changes due to bills being more difficult to pay. Customers predominately attributed the rising cost of living as a factor to their financial situation, with 71% indicating that they had cut back on non-essentials, and a sizeable minority (44%) indicating that they had cut back on essentials (Table 2).

Table 2: Factors impacting financial situation and Lifestyle changes

Factors negatively impacting financial situation (prompted)		Lifestyle changes made due to financial situation (prompted)	
Rising cost of living (e.g. food, energy, fuel)	72%	Cut back on non-essentials (e.g. holidays)	71%
Unexpected expenses (e.g. medical bills)	29%	Cut back on essentials (e.g. food, gas)	44%
Housing costs (e.g. increased rent / mortgage)	29%	Sought help or support (e.g. food bank)	16%
Debt or loan repayments	20%	Taken on more work (e.g. extra work hours)	15%
Job loss or reduced working	19%	Housing changes (e.g. moved house)	7%
Increased family or care responsibilities	11%	None of the above	5%
Benefit delays or changes	9%	Other	3%
Other	5%	Prefer not to say	3%
None of the above	2%		

The varying financial circumstances of customers form an important backdrop to understanding sentiment on the bill impact of Scottish Water's plans for SR27 as set out in the SR27 Draft Business Plan.

Affordability

Customers were presented with bill profiles at CPI +4% pa, personalised as far as possible to their Council Tax Band, and level of discount. They were also given background information about charges and how they are set, including:

- An explanation of inflation, including the current inflation rate and the Bank of England's 2% target.
- A graphic clearly setting out the cumulative impact of inflation and Scottish Water's price rise over the course of SR27 (Figure 13) on bills.
- A table setting out annual charges for SR27, excluding the impact of inflation.
- Their current annual charge.

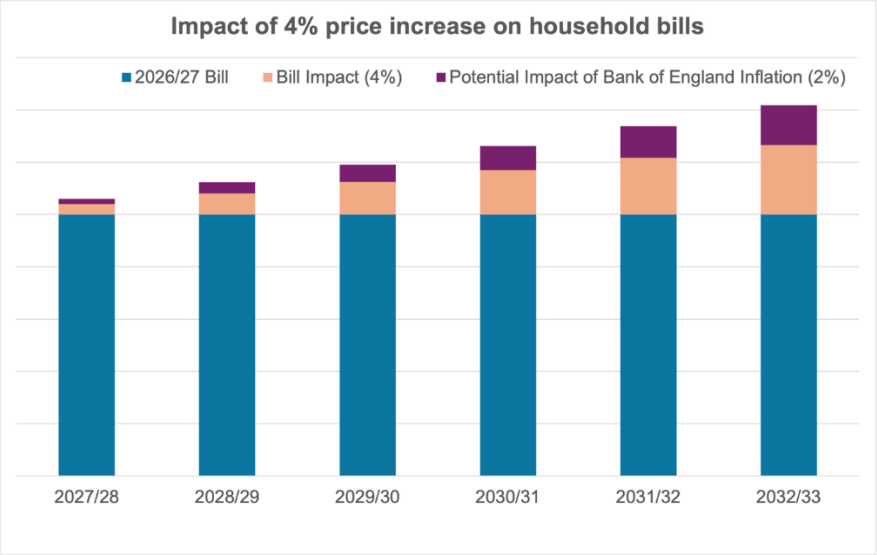
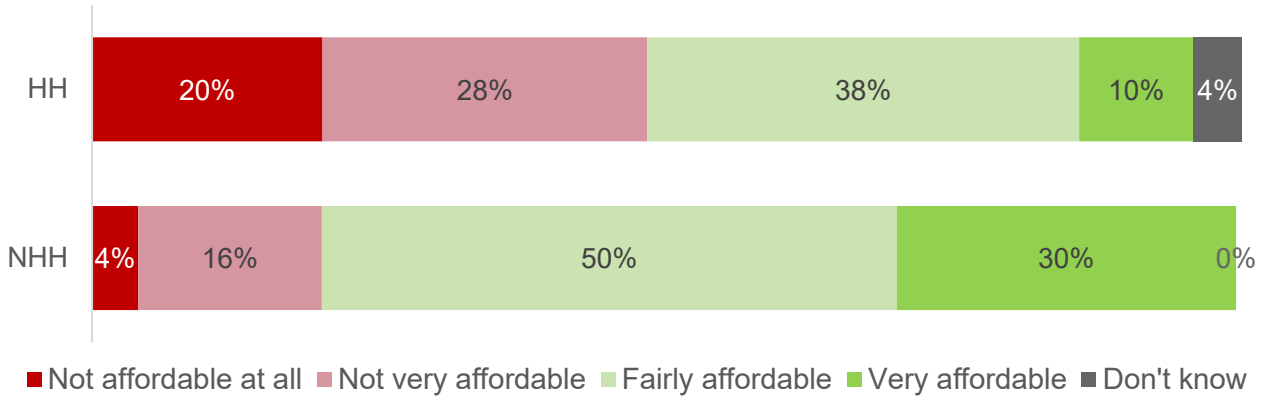


Figure 13: Proportional Cumulative impact of inflation and CPI

Responses indicated differences between household and non-household customers (Figure 14), with:

- 48% of household customers finding the charges to be affordable and 48% of household customers finding them unaffordable.
- 80% of non-household customers finding the charges to be affordable and 20% finding them unaffordable.



R2. Thinking about how [DOMESTIC: your income / BUSINESS: your business' financial situation] may change in the future, how affordable would this bill level be?
Total sample: 1265, HH: 1065, NHH: 200

Figure 14: Affordability of the SR27 Draft Business Plan

Affordability varied between customers groups:

- Financially vulnerable customers and those age 45-54 are more likely to feel the price rise is 'not affordable at all' (36% for financially vulnerable and 35% for age 45-54 vs 20% total HH sample).
- Those aged 65 plus are less likely to see the price rise is 'not affordable at all' (13% v 20% total HH sample).
- There are no significant differences by council tax band or discount received by customers perception of affordability.
- There were also no significant differences by urban / rural or household size.

Importance of Investment areas

The central part of the survey was aimed at understanding customers' perceptions of Scottish Water's plans for investment and commenced with an importance ranking exercise of seven areas of Scottish Water's business plan, where participants were asked to drag them into order from 'Most important' to 'Least important'.

Responses (Figure 15) indicated that two areas stood out as the most important: drinking water quality (HH 40%, NHH 39% first place ranking) and a reliable water supply (HH 32%, NHH 26% first place ranking). Carbon footprint was considered the least important investment area (HH 3%, NHH 6% first place ranking). The priority order of investment areas is consistent across HH and NHH customers. HH customers do rate reliable water supply as more important in comparison to NHH customers, whilst NHH customers rate reducing environmental pollution and spills and carbon footprint as more important than HH customers (looking at percentage ranking within top three priorities).

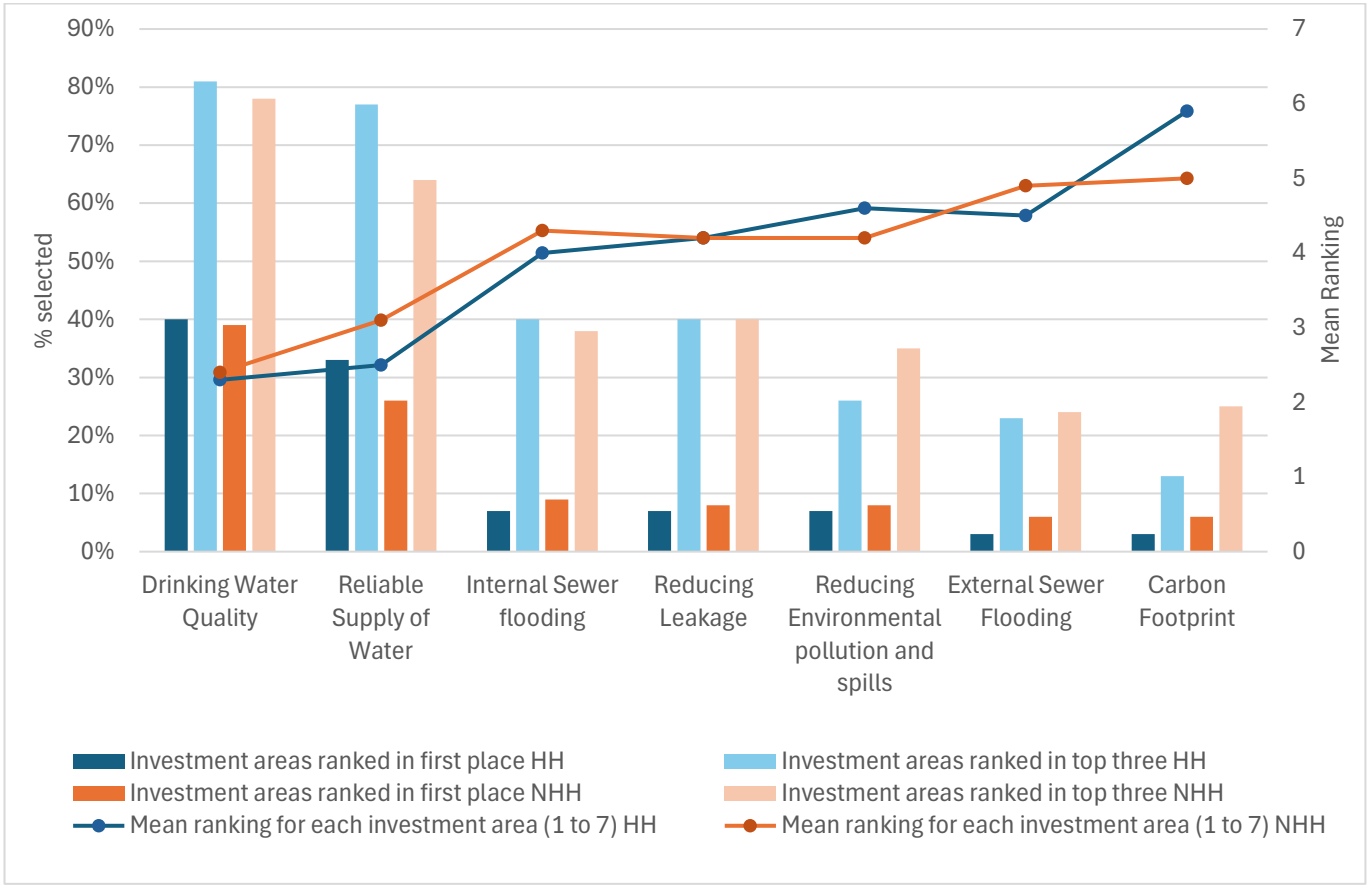


Figure 15: Importance of investment areas

There was some variability between customer groups:

- There are some significant differences by age. 16–44-year-olds rank 'Carbon footprint' significantly higher in importance in their rankings than older customers (Mean scores for 16-24 = 4.80 25-34 = 5.46, 35-44 = 5.53 v total HH sample 5.88).
- Older customers rank drinking water quality as significantly more important (55-64 = 2.05, 65+ = 2.09). 65+ year olds rank reducing leakage as significantly more important (65+ = 3.83 v total HH sample 4.21).
- Customers in small or rural village rank carbon footprint as significantly lower in importance than the total HH sample (small/ med town=6.01, village/rural/island = 5.97 v 5.88 total HH sample).
- Larger households rank carbon footprint more important (5.43 v 5.88 total HH sample).

Perceptions of current performance

Customers were asked to rate Scottish Water's performance over each of the seven investment areas on a 10-point scale. Household and non-household responses are shown overleaf in Figure 16 and Figure 17 respectively.

Overall, very few customers believe that Scottish Water is poorly performing in any area. Many household customers feel that they 'don't know' about Scottish Water's performance in many performance areas, with a higher proportion of 'Don't Know' responses than NHH customers for all areas.

This lack of understanding is a particular driver of perception for carbon footprint, which was seen as the least well performing area by both household and non-household customers, with more

than a quarter of HH and NHH respondents saying 'Don't know' in regard to Scottish Water's performance for Carbon Footprint

There are significant differences between household and non-household customers for 'reducing leakage', 'carbon footprint' and 'reducing environmental pollution and spills' which NHH perceive as performing significantly better than HH customers.

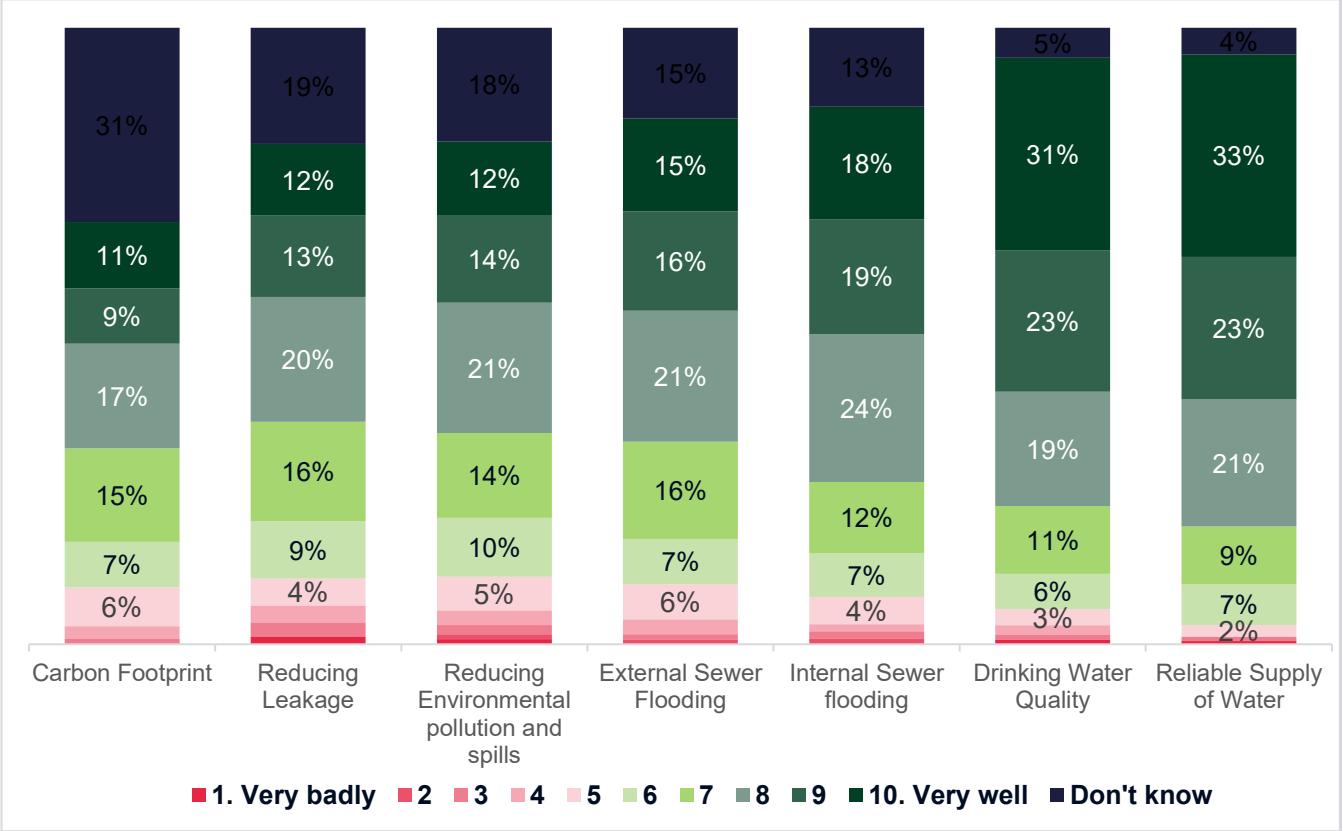


Figure 16: Household customer views on current performance (note that the smallest scores have been removed for legibility but are available in the full research report)

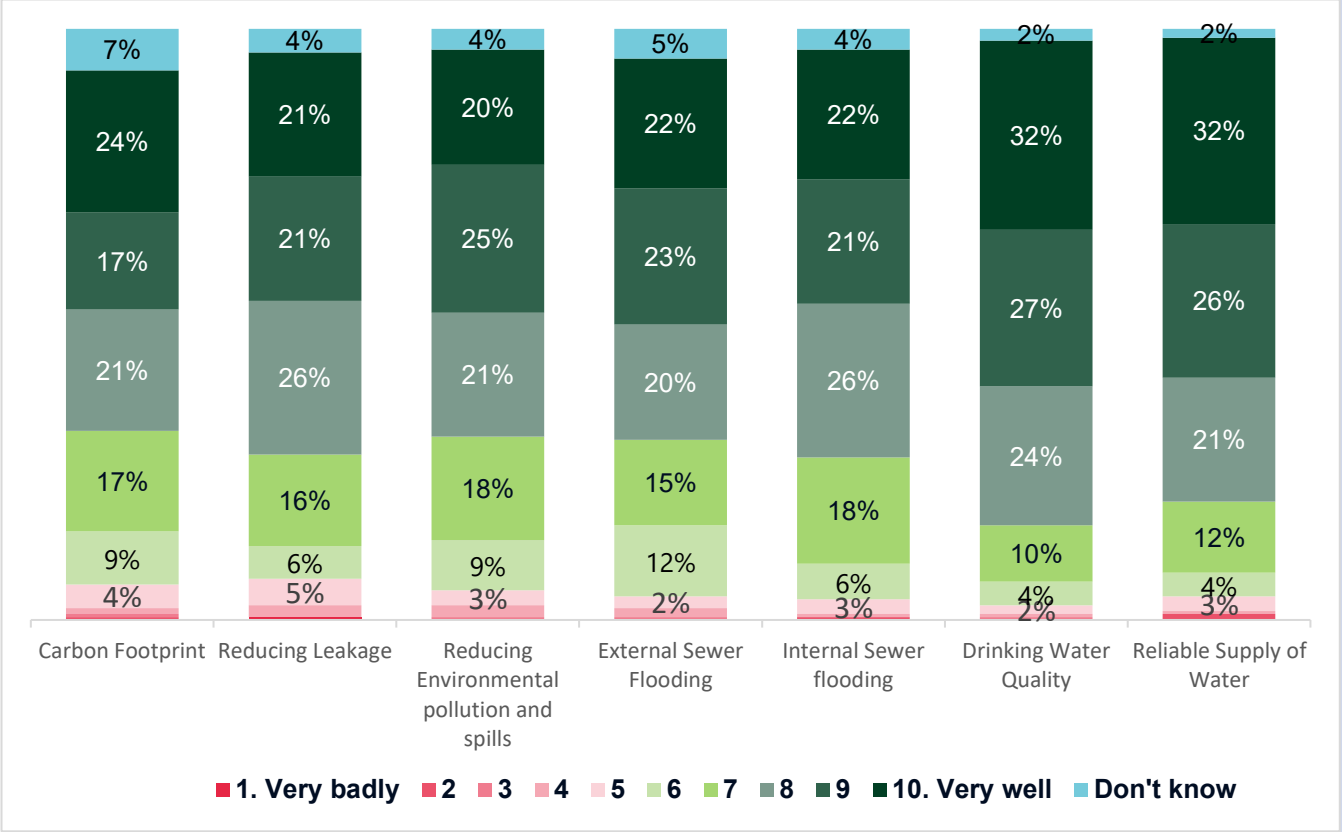
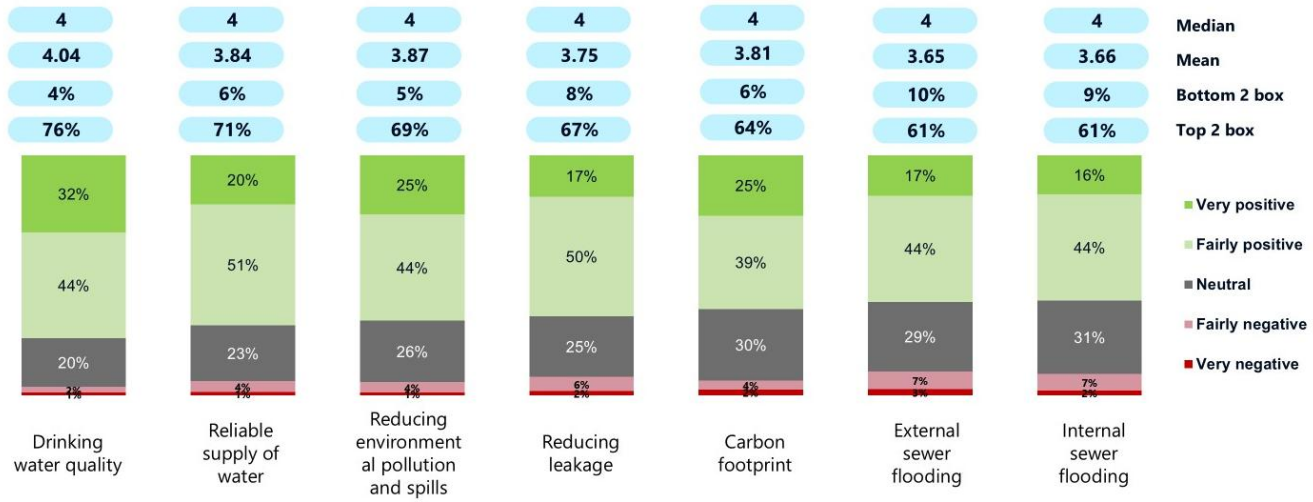


Figure 17: Non-household views on current performance (note that the smallest scores have been removed for legibility but are available in the full research report)

Views on Scottish Water's SR27 DBP Proposals across investment areas

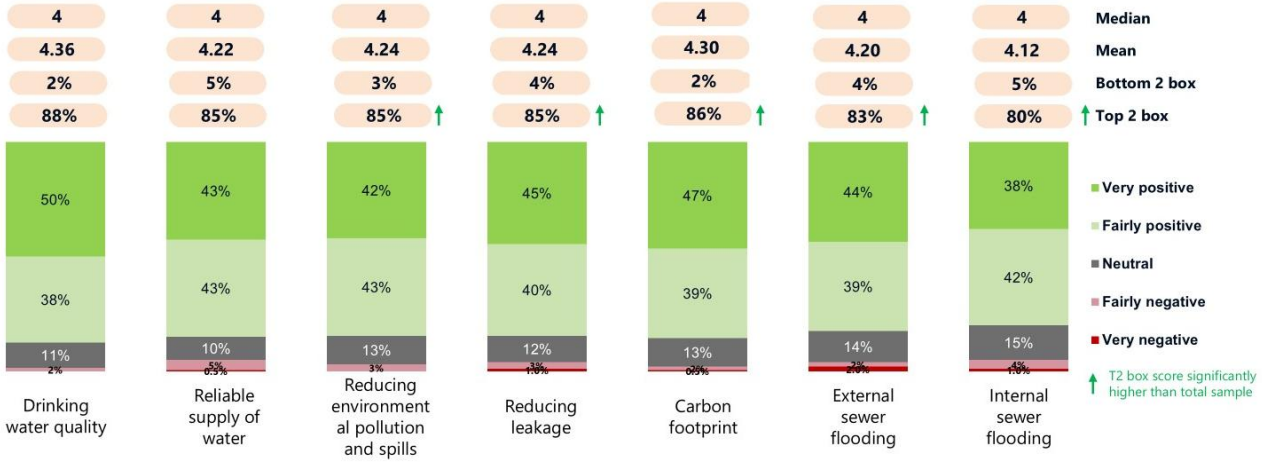
When shown details of each individual investment area, views were positive, especially among NHH customers (Figure 18 and Figure 19). The proposal for drinking water quality was rated most positively by both HH (76%) and NHH (88%) customers, while external (61% HH, 83% NHH) and internal sewer flooding (61% HH, 80% NHH) and carbon footprint (61% HH, 80% NHH) were least likely to receive a favourable response. Scores were driven by positive responses, although all areas showed around one in five customers feeling ambivalent. NHH customers viewed the proposals across all investment areas more positively than HHs, with less variance in their ratings.

It should be noted that the proposals that received the lowest level of positive response from customers, internal and external sewer flooding, were also the areas where the outcomes proposed by Scottish Water showed no improvement, and deterioration respectively.



B3. Thinking specifically about this investment area, overall, how do you feel about what Scottish Water is proposing for the period 2027-2032? HH: 1065

Figure 18: How Household customers feel about each investment area proposal



B3. Thinking specifically about this investment area, overall, how do you feel about what Scottish Water is proposing for the period 2027-2032? NHH:: 200

Figure 19: How Non-Household customers feel about each investment area proposal

Customer views on climate change

Analysis of the survey results showed that customers' views on climate change were significantly likely to shape responses towards Scottish Water's proposals for each investment area. Overall, just over half of survey respondents felt that climate change is an immediate and urgent problem. Just over a quarter feel that climate change is more of a problem for the future, and the remaining 23% don't know, are not convinced climate change is happening, or feel that climate change is not really a problem (Figure 20).

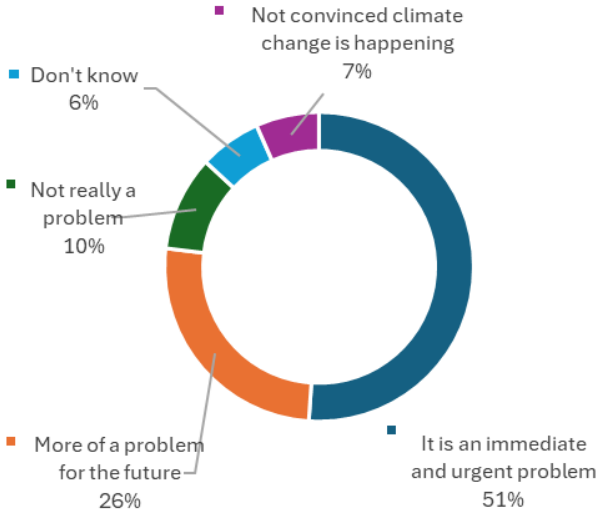


Figure 20: Views on climate change

In general, those who see climate change as an urgent problem view the investment areas more positively and those who are not convinced climate change is happening or who don't think climate change is a problem view all the investment areas more negatively (Figure 21). It is worth noting that the background information for all investment areas either referenced a changing climate directly (carbon footprint and leakage) or referenced weather when explaining why investment was needed.

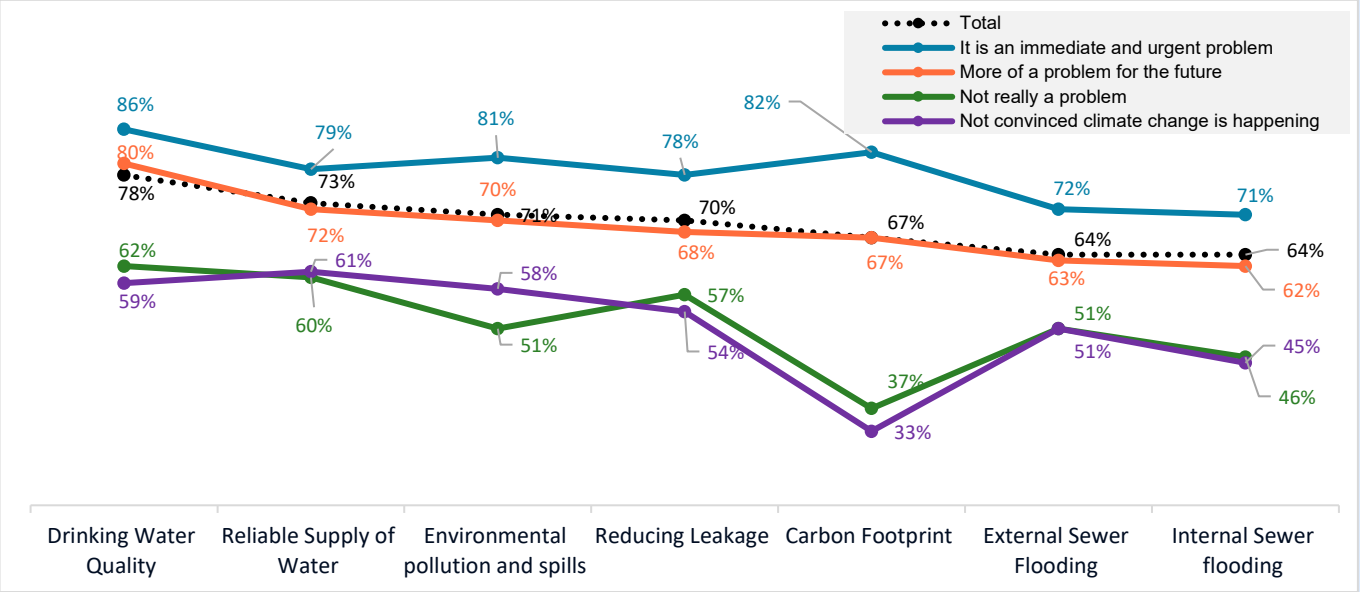


Figure 21: Views on Climate Change and Investment Proposals

Customer views on climate change have the most impact on sentiment around the need for investment to reduce Scottish Water's carbon footprint. Those who see climate change as an immediate and urgent problem view the climate change investment area as the second highest in terms of positivity (82%). As views about climate change differ, positivity towards this investment area changes with low positivity about this proposal from those who feel climate change is not really a problem (37%) and those who are not convinced climate change is happening (33%).

Balance of outcomes and impact on charges

The affordability question was asked of customers early in the survey to ensure that responses were not influenced by the content of the plan and were reflective of customers' financial circumstances. To understand more about customers' responses regarding the balance of outcomes in the plan in the context of consequential impact on charges, customers were asked three key questions towards the end of survey using five-point scales:

i) Sentiment
ii) Value for Money:
iii) Reasonableness:

A summary of Scottish Water's Draft 'Plan on a Page' was presented to customers prior to these questions, to supplement the information that had been shared with them about each investment area.

Overall, the majority of customers were positive about the plan, with non-households more positive (89%) than non-households (73%). Of the remainder, customers were mostly neutral with just 6% of household customers and 2% of non-household customers expressing negative sentiment (Figure 22).

Figure 22: Overall sentiment

The majority of customers also felt that the plan offered value for money, with non-household customers more likely than household customers to see the SR27 Draft Business Plan as value for money (59% household vs 82% non-household). Again, neutral scores were a significant factor, with only 14% of households and 7% of non-households feeling that the plan did not offer value for money (Figure 23).

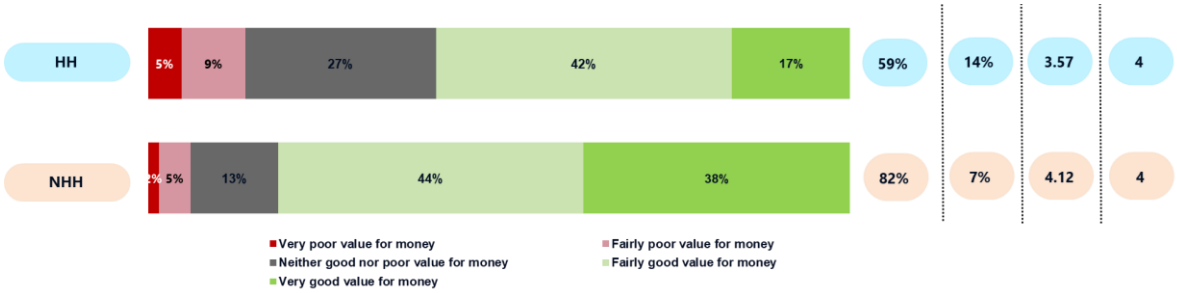


Figure 23: Value for Money

Customers were asked about whether they felt the plan was reasonable twice, once at the start of the survey, where they were only given information about the cost of Scottish Water's plans for SR27, and again at the end of the survey, by which point they should have established a more informed view about the outcomes offered by plan.

Comparing these pre and post scores (Figure 24) showed the significant impact that information about the plan on customers, particularly household customers. 44% of household customers found the plan to be reasonable at the start of the survey, rising to 57% when asked again at the end, and 74% of non-household customers rising to 80%. As seen with sentiment and value for money questions, 'neutral' views again emerged as a significant factor, although a significant proportion of households expressed that the plan was unreasonable to varying extents (36% at the start, reducing to 22% at the end). This indicates that information about the plan can be a key to shifting customer perceptions from the negative to either a neutral or positive view.

Figure 24: Reasonableness of the plan with and without detailed information

Recommendations

Activity 4 led to four broad findings and recommendations which have informed the development of the SR27 Final Business Plan:

i) Affordability is a concern for customers – particularly household customers with lower incomes.

ii) Outcome proposals are broadly acceptable to customers – although care is needed to ensure that outcomes around internal and external sewer flooding are not eroded during SR27.

iii) Communication of Scottish Water's plans for SR27 should recognise that not all customers are not convinced of the urgency of climate change, and that their personal views on the urgency of climate change can impact how they view the overall acceptability of Scottish Water's plans for SR27. The plan should be appealing to both customer viewpoints, to facilitate public support for the plan.

iv) Communicating SR27 plans in the context of long-term outcomes and the challenges that Scottish Water faces can have a significant impact on acceptability.

Activity 5

Activity	Fieldwork dates	Objectives	Sample
5. Consumer Scotland's Longitudinal Deliberative Research	Phase 1: Jan-March 2025 Phase 2: April-Aug 2025 Phase 3: Sept 2025 – May 2026	1. Explore understanding and knowledge of the long-term challenges facing Scotland's water sector and the strategies required to address these; 2. Assess the level of consumer support for the proposed SR27 Draft and Final Business Plans; 3. Gauge consumers' collective support for the proposed charging profile and the cumulative impact of price increases on customers' bills; and, 4. Understand views, expectations and tolerances for different service levels and/or pace of developments that would be associated with different pricing pathways.	100 Household 40 Business

Consumer Scotland have commissioned IPSOS to undertake a longitudinal deliberative research study which engages customers across three phases of research:

- **Phase one** focuses on household customers, exploring initial views and awareness of water and waste water services in Scotland, introduction to the topic, and gathering initial views on the key issues facing Scottish Water for its SR27 Draft Business Plan.
- **Phase two** engages both household and non-household customers, exploring Scottish Water's SR27 Draft Business Plan and pricing pathways in more detail.
- **Phase three** provides an opportunity for household and non-household customers to review any changes to Scottish Water's SR27 Final Business Plan and to form conclusions.

Research has been timed so that Phase two ends just before the SR27 Final Business Plan reaches the final stages of development ahead of assurance and sign-off process. Scottish Water has been involved throughout the study and has helped to review and confirm the overall design of the research alongside other stakeholders.

Scottish Water has also participated in three public engagement workshops across Phases one and two, sending senior subject matter experts to present various aspects of the SR27 Business Plan to research participants, and to respond to customer queries in live Q&A sessions following their presentations (Table 3).

Table 3: Topics covered by Scottish Water

Phase 1	
Public Dialogue Workshop 1	Presentation 1: Scottish Water and the services they provide in Scotland.
	Presentation 2: Scottish Water's key challenges and current performance
	Presentation 3: Looking ahead (Scottish Water's Long-Term Strategy)
Phase 2	
Public Dialogue Workshop 2	Presentation 1: Scottish Water' SR27 Draft Business Plan
	Presentation 2: Outcomes of Scottish Water's SR27 Draft Business Plan
Public Dialogue Workshop 3	Presentation 1: Feedback (from customers and stakeholders) on the SR27 Draft Business Plan
	Presentation 2: From Draft to Final. Clarifications and further information around: • Enabling Scotland's sustainable economic and housing growth • Drinking Water Quality • Woodland Creation • Differences between SR21 requirements and SR27 • Balancing stakeholder and customer needs • Balancing Affordability • Balancing Outcomes

Consumer Scotland will publish their findings on their website. Having contributed to the research, Scottish Water has had an ongoing understanding of the areas of interest for customers and has looked to reflect these in the development of the SR27 Final Business Plan.

4.2 Overall Research Findings

The research programme for SR27 was designed as a staged process to run alongside Scottish Water's development of SR27 Draft and Final Business Plans. Recommendations from each stage of the research were used to inform Plan development (Figure 25), and the following phases of research.

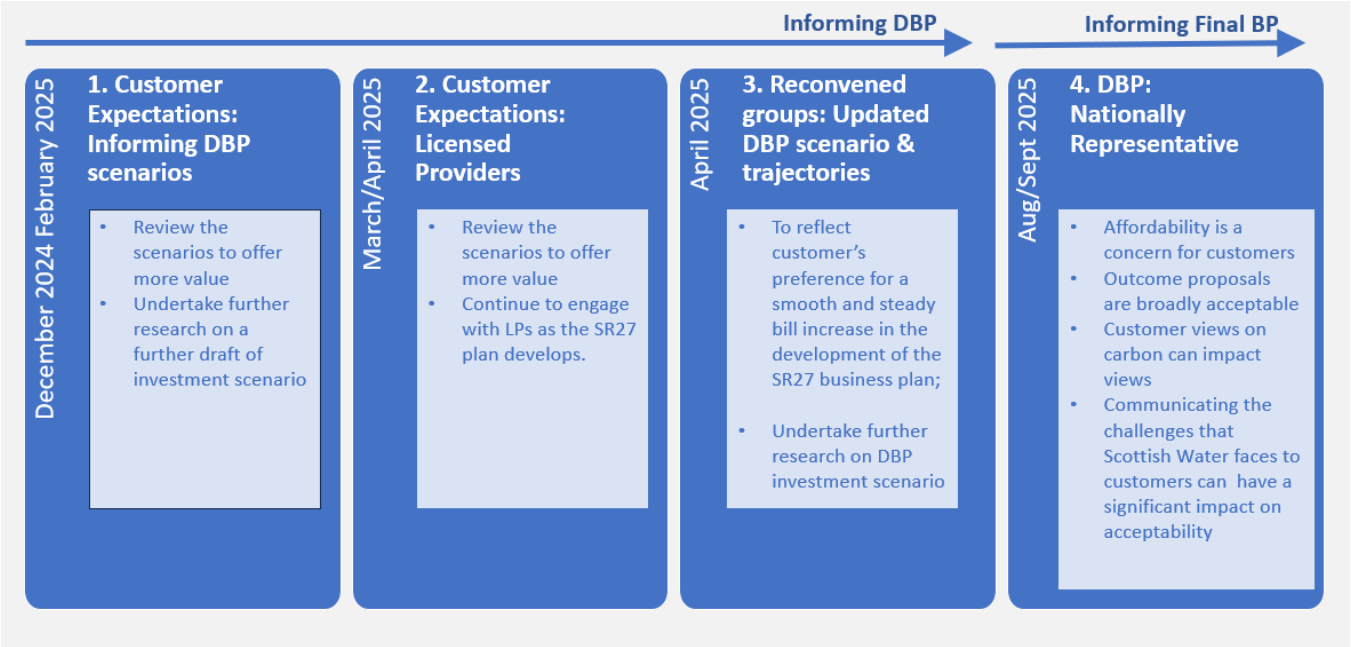


Figure 25: Research recommendations

This approach enabled Scottish Water to be responsive to findings from the SR27 research programme, where initial information shared with customers was largely directional, becoming more accurate and detailed throughout the course of the research programme as it was guided by stakeholder and customer feedback. Whilst the information shared with customers varied as the research programme progressed, there were some key themes that emerged consistently from the SR27 research programme, which are explored in this section.

Views on Scottish Water

Scottish Water has a deep understanding of how customers feel about us and the services that we provide. Ongoing trackers such as such as the nationally representative Perception and Experience Survey conducted by YouGov continually monitor awareness, trust and satisfaction, and insights are supplemented by Scottish Water's Research Synthesis which helps us apply thematic analysis to findings from qualitative research studies.

Awareness and Baseline Associations

Most customers began their participation in SR27 research activities with positive baseline associations. Customers entered Activity 1 talking positively about quality and freshness of water in Scotland, the consistency of supply and how the overall water service experience was superior to the rest of the UK. Scottish Water was felt to be a trusted, safe and reliable company and the public ownership model was reassuring – although some customers were surprised to learn this. Customers tended to initially focus on water services – although there was some discussion of Combined Sewer Overflows (CSOs), and interest in how Scottish Water is performing, with a desire for transparency around how they monitored and reported in Scotland. There was some discussion of Scottish Water's invisibility, and lack of relationship caused by the Council Tax charging process, but this was not felt to be a problem.

Most customers participating in Activity 4 were able to identify Scottish Water as their water provider, with 80% of HH customers and 74% of NHH customers aware that Scottish Water provides their drinking water. There was a little less clarity for waste water services with 68% of HH and 58% of NHH aware. Many believed it to be the Local Council / Authority or Scottish Government and 1 in 10 of HH customers didn't know.

There were very high levels of trust in Scottish Water, with a 91% of HH and 96% of NHH rating Scottish Water as 5 to 7 on a 1-7 rating scale. Customers were more likely to have heard something positive about Scottish Water than something negative in the last 6 months (HH customers 38% positive vs 20% negative, NHH customers 69% positive vs 19% negative). However, around a third are unsure. NHH customers are much more likely to have heard something positive about Scottish Water. Looking at the wider UK Water Sector, customers are far more likely to have heard something negative, particularly HH customers (36% wider Water sector vs 20% Scottish Water).

Licensed providers participating in Activity 2 had a highly positive view of Scottish Water, citing accurate billing, responsive Account Managers and proactive communications amongst their reasons. However, when discussing feedback from their own customers on Scottish Water, Licensed Providers noted that many businesses expressed 'neutral satisfaction.' Water was often taken for granted, and as a result, customers seldom provided feedback compared to other utilities. However, larger businesses that rely heavily on water for their operations tended to offer more positive feedback, citing consistent supply and good water quality. The only issue raised by these larger businesses was the decision to remove long-term charging agreements, which was viewed as 'a minor disruption to the relationship'. Suggestions from LPs for further improvements can be found in the full research report.

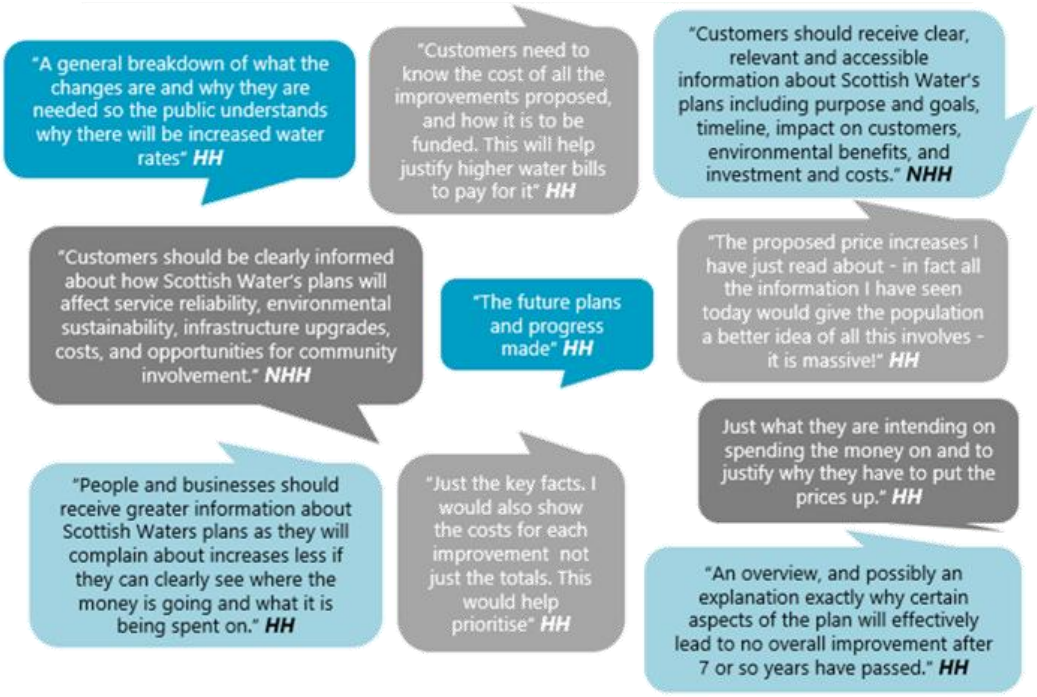
Enthusiasm to know more

A desire from customers for communication and education is a recurrent theme in much of the topical research that Scottish Water undertakes, and this was notable in the SR27 research programme. Almost all customer segments involved in Activity 1 cited educational campaigns and education in schools as part of their ‘icing on the cake’ spontaneous priorities for Scottish Water.

Additionally:

- Customers want Scottish Water to be transparent about waste water spills and the sustainability of water resources given that there were some concerns about these topics in Scotland and UK-wide.
- They wanted Scottish Water to share more about what we are doing to protect the environment, reduce carbon emissions, and manage waste water and waste water systems, to foster a more engaged and informed customer base.
- There were signs of a growing interest (but not yet considered essential by all participants) in water conservation topics. Some non-households are interested in advice on streamlining operations, and collaborative / partnership opportunities, and some households are interested in measuring their own usage and understanding ‘average’ information and trends.
- Customers in various groups involved in Activities 1 and 3 who had learned of the challenge posed by climate change on water availability discussed the importance of education around more careful use of water and suggested that Scottish Water needs to support homes and businesses with water saving tips and equipment.

Participants in Activity 4 were keen to receive more information on the SR27 Final Business Plan (63% yes, 31% maybe, 6% no), NHH are especially keen (80% yes). Many customers feel that understanding what Scottish Water is going to do, what it costs and marrying this cost to bill increases will make cost rises more palatable. Some related suggestions from Activity 4 are illustrated below in Figure 26.



C2 Thinking about what you've read today, what information do you feel customers should receive about Scottish Water's plans? Total sample: 702, HH: 613, NHH: 89

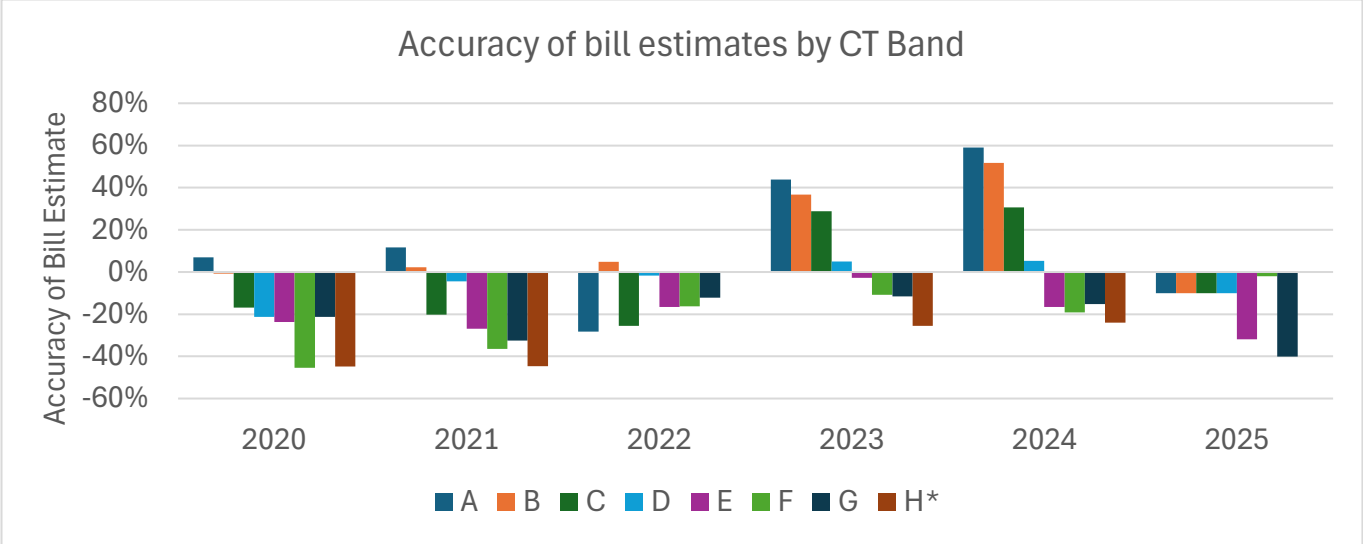
Figure 26: Suggestions for further information

4.2.1 Current & Future Charges

Activity 4 of the SR27 Research Programme formed the cornerstone of understanding the financial impact of the SR27 Draft Business Plan on customers, however Scottish Water has a more generalised ongoing understanding of the subject derived from our ongoing tracking surveys, and our Annual Charges research. This section brings together findings from these sources with the SR27 Research programme insights around current and future charges.

Current charges

As charges are collected from household customers together with Council Tax, it is perhaps unsurprising that household customers can struggle to identify how much they pay for water and waste water services. Customers tend to underestimate how much they are currently paying – often by a considerable margin. Bands A to D in 2023 and 2024 were the exception, instead overestimating their bills (Figure 27).



*Low sample Size

Figure 27: Accuracy of Bill estimates

This low awareness forms part of the background for considering household customers' sentiment towards their water and waste water charges, where the majority of customers indicate that they are satisfied with cost and value for money, in contexts where they have not been reminded of how much they currently pay (

Figure 28).

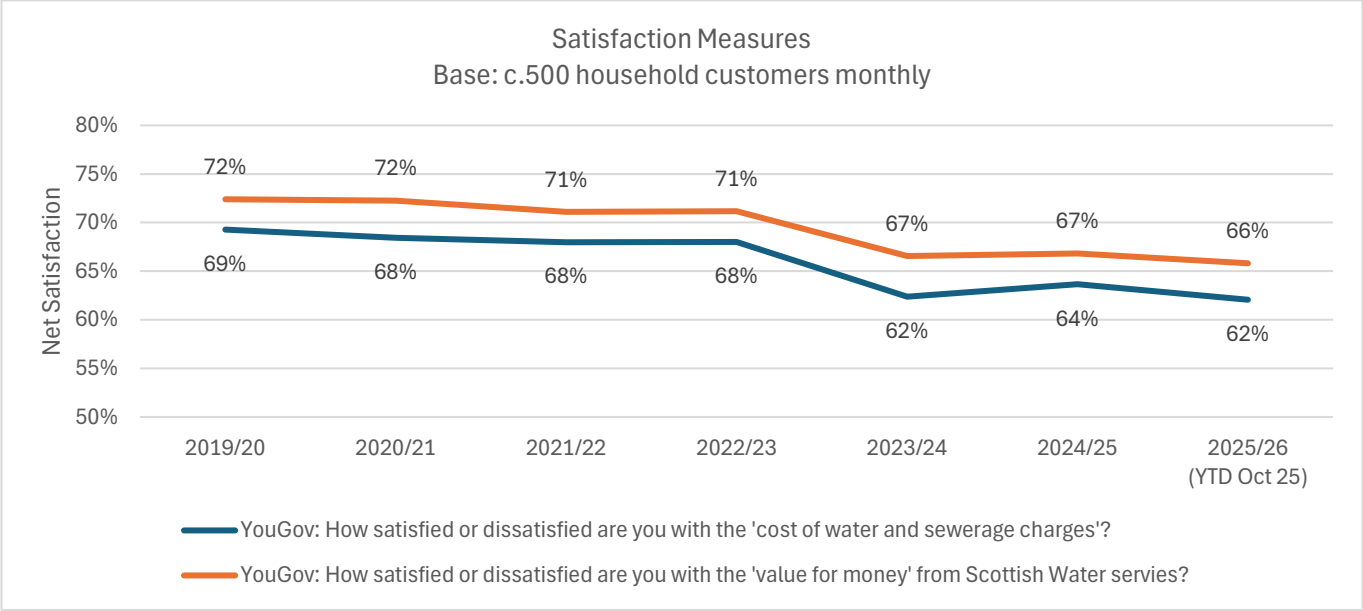


Figure 28: Satisfaction with charges and value for money

When reminded of how much they are currently paying for their water and waste water charges, household customers generally indicate satisfaction in Scottish Water's annual Charges research, with two thirds indicating that charges are 'about right' in 2022, rising to around three quarters in the most recent two years. However, in 2025 responses of 'too much' increased notably relative to the previous year (Attitudes towards current charges - Figure 29)

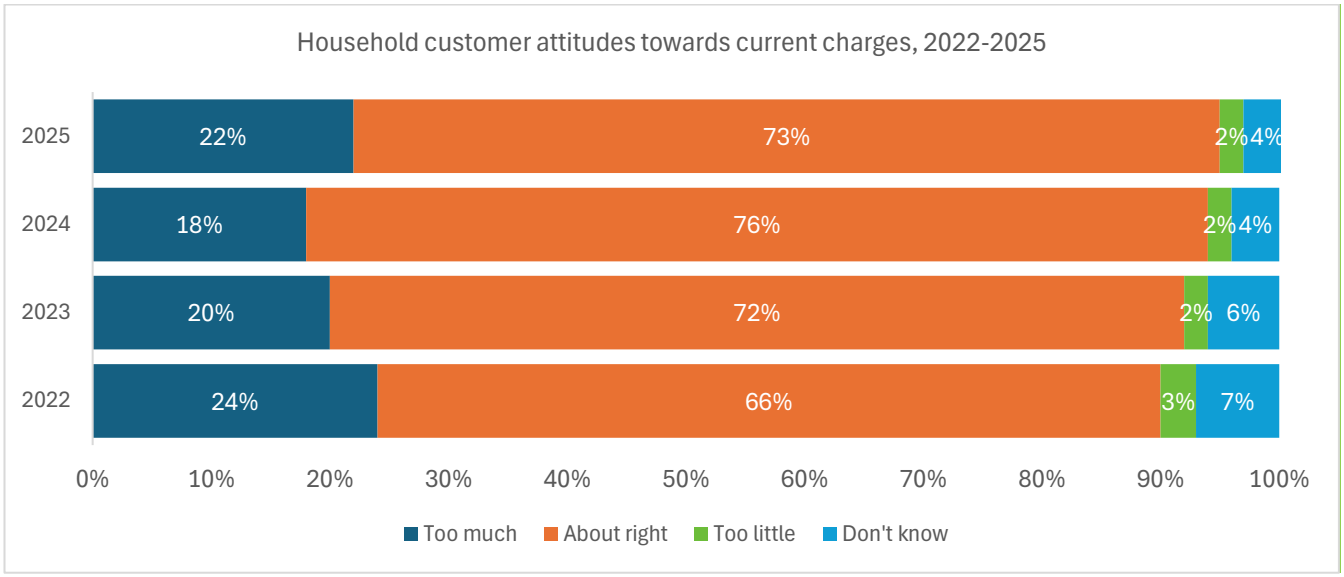


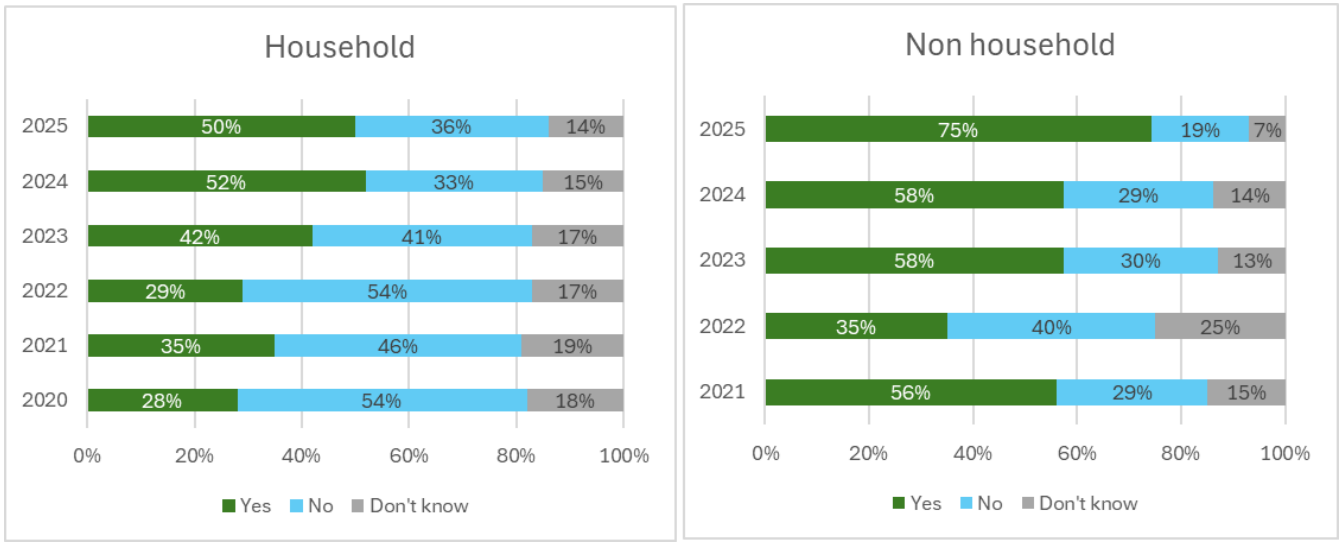
Figure 29: Attitudes towards current charges

Future Charges

Although these findings indicate that most household customers are generally satisfied with both perceived and actual charges, they are less positive about the prospect of future price rises.

Scottish Water's 2025 Annual Charges research indicated that 36% of households and 19% of non-household customers were not prepared to pay any more than their current charge in 2025 (Figure 30).

When a related question[2] was asked as part of Activity 4 of the SR27 Research programme, 27% of household customers and 18% of non-household customers said that they could not afford any increase or needed to pay less – however unlike the Charges research there was no 'don't know' option.



Q: Personally, would you be prepared to pay any more than you pay now, in order for Scottish Water to continue to deliver your current standards of service whilst meeting the challenges outlined above?

Figure 30: Willingness to increase charge

[2] R1. Scottish Water sets customer charges annually. In order to maintain services in light of the challenges you have heard about, customer charges will need to increase. Considering everything you have heard so far, and [QHIDDOMESTIC your own personal circumstances [QHIDBUSINESS: your businesses circumstances], what would be the highest total bill amount that you think [QHIDDOMESTIC you [QHIDBUSINESS: your business] could afford to pay per year? Total sample: 1264, HH: 1065, NHH: 199

The topic of price increases was also explored with customers in qualitative approaches as part of the SR27 Customer Research programme in Activities 1 and 3, where they were asked to engage and give feedback on various investment scenarios. There were three themes that emerged in customers' evaluation of these investment scenarios:

- Affordability of the charges, for themselves and for others.
- Value – the balance of cost and outcomes, and a desire for services not to deteriorate
- Long-term thinking – concerns about future costs and future service deteriorations.

Affordability and Acceptance

Understandably, customers are not keen to see price rises, especially in the context of the ongoing cost of living crisis – however they are not surprised by the idea either. They feel that bills should be kept low and affordable, which arose as a spontaneous basic expectation from all customer types in Activity 1, and have a particular sensitivity towards vulnerable populations and low water users. They want assurances that any investment in infrastructure or environmental initiatives will not lead to unjust price hikes.

However, customers can appreciate the need for increased investment and associated price rises when issues such as Scottish Water's long-term challenges are shared. Activity 1 involved sharing three investment scenarios with customers, and an acceptance of price rises did emerge in the light of this information, and again in Activity 3.

Table 4: Impact of long-term challenges on views

Activity	Context	Verbatim
Activity 1	CPI +4% High Level Investment Scenario	"Well, I just think with climate change, it's going to get worse every year, every month, every year. This is going to continue to be a growing problem, so we have to, like, stay on top of that." Urban/Suburban, HH, Edinburgh
	CPI +6.5% High Level Investment Scenario	"But in the context of the other stuff that's going to happen as a result of it, it feels like a cost that we'd be willing to bear" Urban/Suburban, HH, Edinburgh
Activity 3	Communications	"That rising water charges are unavoidable to ensure good service." Urban/Suburban

Value for money

Whilst customers were thinking of the affordability of bill increases (for themselves and for others) when evaluating the investment scenarios, many were also concerned with idea of value. Much of the feedback received from customers as part of Activity 1 on all of the investment scenarios were centred around notions of value – where customers were expecting to see improvements in return for any increase in charges (Table 5).

Table 5: Customers using value to inform their views

	Context	Verbatim
Activity 1	CPI+2%	"Not really anything good about this one. There's not going to be many changes and realistically, the cost will go up by each year. But I just feel that's basically trying to sweep it under the rug and it doesn't sound very good at all." Medically Vulnerable Customer
Activity 1	CPI+2%	"There could be greater cost implications via the lack of investment or progression in improving some of these facilities areas. This would probably be one I wouldn't be as amenable to. I'd probably prefer that increase in cost." NHH Customer
Activity 1	CPI+2%	"I can afford this. But do I want to pay it? No. I'm not getting anything that I want for this money and we're paying to go backwards" Household Customer, Aberdeen Group
Activity 1	CPI+4%	"I want to see more for the money I'm going to be paying. This doesn't feel like it's giving me what I want or the environment needs" Household customer, Edinburgh Group
Activity 1	CPI+6.5%	"It is the best level for everything included. It's the best value for money. It's the best investment in the future as well." Water Only
Activity 1	Observations on Charges	"I'm quite happy to pay more to at least maintain where we are today, and we're used to it with everything else going up." Medically Vulnerable Customer

Long-term thinking

Long-term consequences of under investment also emerged from customers as a decision making theme – both in terms of consequences for service, and in terms of passing costs to future customers. Although this was specifically probed as a topic in Activity 1 with the Intergenerational Family groups, it also emerged more spontaneously elsewhere (Table 6).

Table 6: Examples of long-term thinking

	Context	Verbatim
Activity 1	CPI+2%	"I mean to me. It just makes me think that it will cost us more in the future You know that that you that they're doing things slowly, but the work is still going to need done at some point" NHH, SME
	CPI+2%	"There could be greater cost implications via the lack of investment or progression in improving some of these facilities areas. This would probably be one I wouldn't be as amenable to. I'd probably prefer that increase in cost." NHH, Large

	Context	Verbatim
	CPI+4%	"Any increase is a hard pill to swallow but they are not a new business so aware of the risks of not investing e.g. flooding. As a mature business, we would be prepared to take CPI +4% increase if they can deliver these to high standard as we want our business to exist in another 20 years." NHH, Large
	CPI+6.5%	"I'm just being blatantly honest here to have a less increase, but a less job done that is actually going to cost more in the future. It's a no brainer invest now before it becomes a major problem. There's an old saying, Buy cheap, buy twice. NHH, SME
	Intergen	"I don't think we should just dump it all on (daughter's names) generation, and obviously myself as well. But I don't think that would be fair, so I do think there needs to be some investment now" Intergenerational Families
Activity 3	Future Comms	"The reasoning for cost rises, really help people understand that neglecting this will cost us all more in the long term if left untreated" NHH
	Future Comms	"That these are very necessary improvements to the infrastructure that will save the taxpayer money long-term and also improve the service." Urban/Suburban

4.2.2 Customer Expectations

Scottish Water has a long-term understanding of customer expectations from our Research Synthesis, and the topic of outcomes was explored in some depth with customers through the SR27 Research programme. Discussion with customers on service area was largely aligned to Long-Term Strategy themes, this section sets out findings.

Prioritisation of Investment Areas

As outlined previously research Activity 4 asked customers to rank investment areas in terms of importance. Both household and non-household customers predominately selected either Drinking Water Quality or Water Continuity as their first-place choice, with a tendency to select Drinking Water Quality. There was less distinction in terms of first place choice for the remaining service areas, with greater differences being seen in terms of top three ranking and mean ranking.

The ordering of investment areas shows some similarities to an exercise undertaken as part of Scottish Water's long-term strategy research programme undertaken in 2022 (Figure 31). In this study, customers drew distinctions between activities that they saw as Scottish Water's core business functions – continual investment in asset maintenance, water quality and water supply resilience – and other areas which were also seen as important but were not perceived to be Scottish Water's sole responsibility. Looking at prioritisation of investment through this lens may start to explain why customers' predominant choices were centred on provision of water services – even though we know from qualitative SR27 research activities that customers can have strong opinions across all areas in Activity 4.

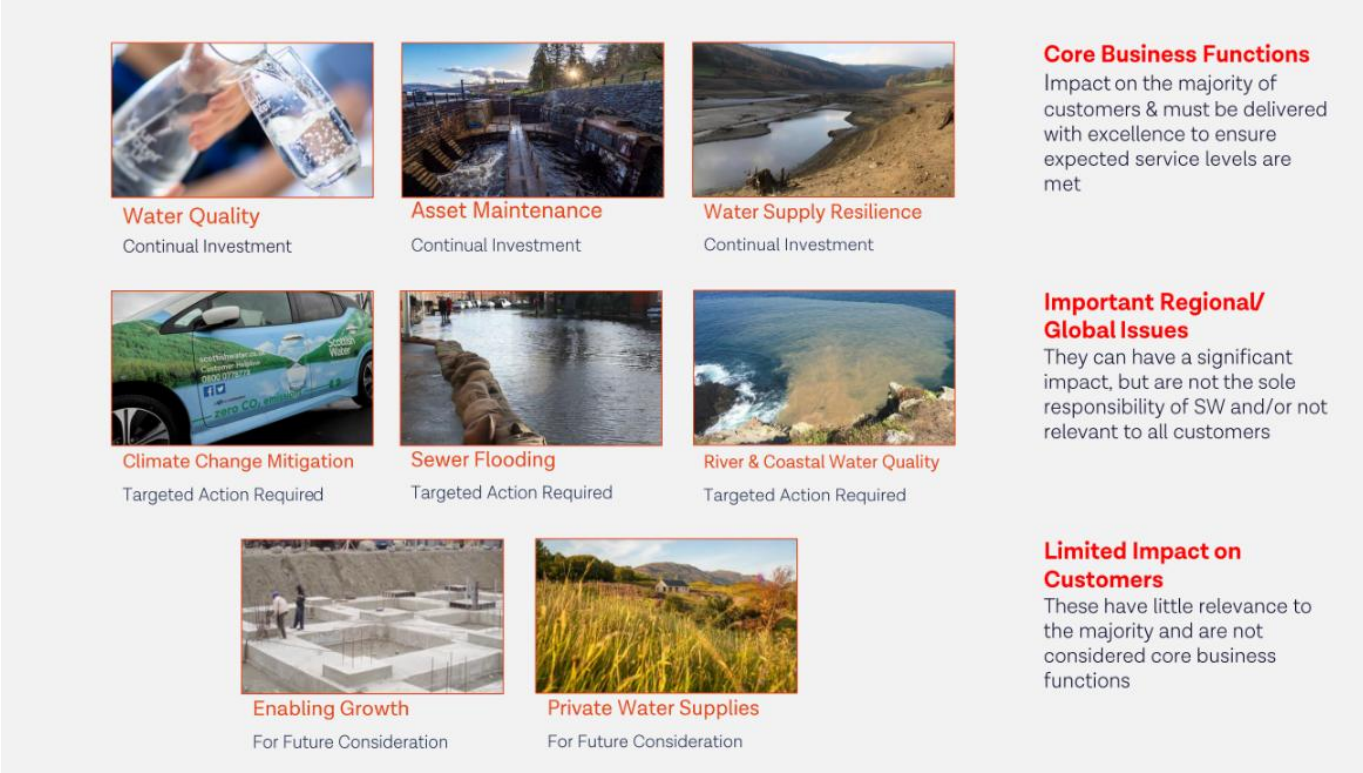


Figure 31: Customer categorisation of investment areas (Long-Term Strategy Research Programme)

We have built on this categorisation as illustrated below in Figure 32. We have drawn on SR27 research programme findings and deeper insights from the Research Synthesis to inform our overall view of customer expectations of service areas. We have expanded the concept to recognise that these expectations sit within a wider context of affordability of charges and longer-term responsibilities, as explained in the following sections.

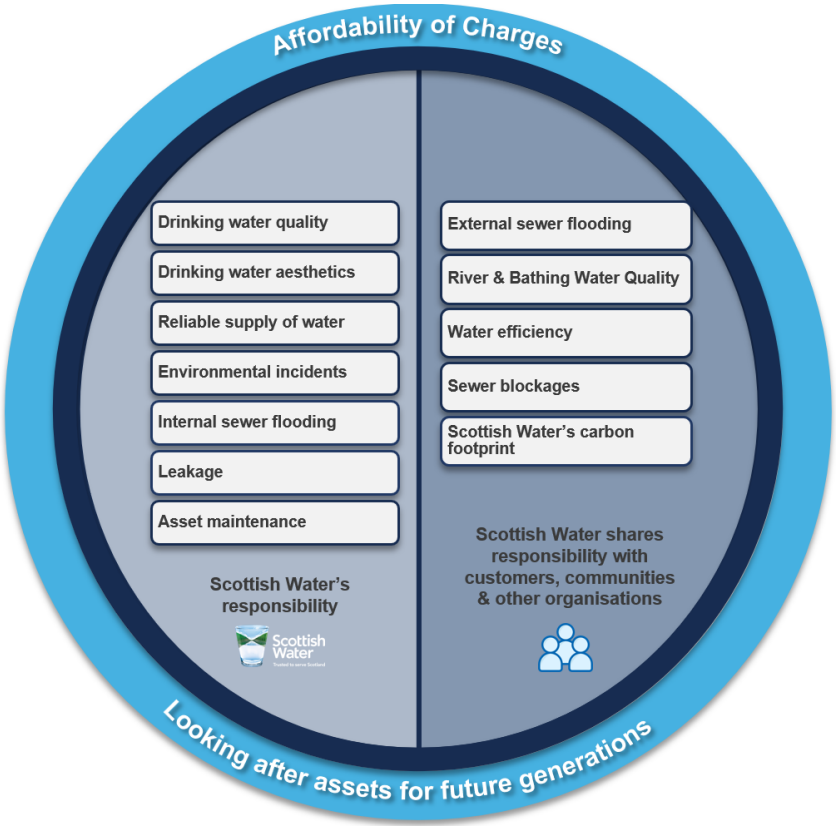


Figure 32: Customer Expectations

Maintaining assets and service levels

Customers might not be aware that Scottish Water owns and operates assets of all sizes the length and breadth of Scotland. When this information is shared, they can express surprise at the scale of Scottish Water's asset base. Increased awareness of the extent of work and cost involved in providing water and waste water services, and the condition of assets and related implications for service were key points of recall for Activity 1 customers who were reconvened to participate in Activity 3.

Echoing the findings of the Long-Term Strategy research referenced above, customers participating in Activity 1 saw asset maintenance as fundamental. Repairing and replacing assets emerged as a critical area for customers in Activity 1 – with customers feeling strongly about the need to repair and replace vulnerable pipework at a rate that would, at least, ensure service stays at current levels – with strong feeling that current service levels should not only be maintained but ideally enhanced.

When given information about the three long-term challenges, even proposals to maintain spending at current levels—in discussions about water network replacement rates—prompted concerns that this might not be sufficient to address the increasing scale of these challenges. There was a belief that lack of investment in this area would reduce confidence in Scottish Water.

Showing consistency with Scottish Water's Research synthesis (Table 7), Activity 1 and 3 participants were also seeking reassurance that asset maintenance will be long-lasting. They may also consider references to legacy systems and inherited problems as an excuse for lack of previous investment, and this can cause resentment that they are now being faced with paying the price for this.

Table 7: Research Synthesis Extract (asset maintenance)

5.3.1 What are customer expectations of Scottish Water in maintaining assets?

Key Insight:

Asset maintenance is a concept that people intuitively understand. It is felt to be highly important, and core to Scottish Water's purpose as an organisation, as it is an area that is clearly Scottish Water's sole responsibility. Customers recognise the need for investment and want to see lasting solutions put in place. Making things last is seen as an important area for Scottish Water's focus, appealing to all customers and older customers in particular. They are keen to reduce the risk of service failures, as well as avoid unnecessary costs.

Customers expect this to be an ongoing area of investment with a focus on preventing future problems. They generally expect Scottish Water to maintain or replace infrastructure before it fails to avoid service issues. Fixing assets on failure is perceived by some to cost more money over time than proactive intervention.

Customers may also seek some reassurance that investment is necessary. They may wish to be satisfied that investment is directed at parts of the system at risk of failing, and that interventions are future-proof, high quality and lasting.

References:

13 sources have been reviewed, resulting in 35 insights, with overall scores between 2.0 and 3.0. The highest scoring insights have been used to develop Key Insights, with overall scores between 2.8 and 3.0. These are derived from 7 sources, engaging more than 1,500 customers.

Drinking Water Quality

Customer pride in the quality of Scotland's drinking water was evident throughout the SR27 research programme (Table 8), with customers spontaneously referencing the taste of water, and often using patriotic language. This perception makes customers more likely to hold Scottish Water to high expectations, especially in terms of quality, sustainability, and protection of the resource. Clean, drinkable and 'tasty' water emerged as a spontaneous basic expectation across all customer groups in Activity 1 and was ranked by both household and non-household customers as the top priority for Scottish Water in Activity 4.

Table 8: Examples of pride in the quality of Scotland's drinking water (Activity 1)

"It's just the best in the world"
Household Customer, Aberdeen Group
"I think trying water in other countries has given me an appreciation for the quality of water in Scotland that I have taken for granted for most of my life"
Future Customer

Water Continuity

A continuous and reliable supply of drinking water was a spontaneous basic expectation of every customer group participating in Activity 1 and was the second top choice of both households and non-households in the priority ranking exercise in Activity 4. When the potential impact of the three long-term challenges on water availability was shared with customers, there was a general belief that Scotland's abundance of rainfall would protect the country from the risks of drought, and many were surprised to learn that some areas in Scotland could be more vulnerable to drought than others. This led to some participants in Activity 1 seeing investment in water

resilience projects as less of a priority for Scotland due to the level of rainfall making droughts seem unlikely.

When customers were supported with more information in Activity 3 there was less scepticism than in the previous stage about the likelihood of drought in Scotland, but customers still questioned the expected frequency of these issues in relation to the potential spend on solutions such as network connectivity. They did however recognise the importance of education around more careful use of water and suggested that Scottish Water needs to support homes and businesses with water saving tips and equipment.

Internal Sewer Flooding

Long-Term Strategy research identified that internal sewer flooding has the highest impact of any service issue which can occur in customers' homes or business premises[3] and similar sentiments were heard from participants in Activity 1. Participants often communicated an initial emotional response where the existence of this issue in the modern era was felt to be shameful and disgusting. It was felt to reflect poorly on Scottish Water that anyone had to live with the fear of internal sewer flooding and initially, that the proposed solutions would only slightly reduce the number of properties impacted.

However, participants also had a more measured response which noted the small number of properties impacted and considered this less of a priority on that basis. The potential cost of resolving this issue was also factored in with concerns that the cost might outweigh any benefits. When returning to the topic in Activity 3, reducing the risk of internal sewer flooding was again polarising to some extent (Table 9). It was seen as unacceptable for those affected. However, it was perceived to affect a relatively small number of customers in comparison to some of the other potential investment areas.

Additional information presented to customers about the 'at risk' register for internal sewer flooding and the fact that this register involved a churn of properties helped to deepen their understanding of the issue and the extent of the problem. On the whole participants remained conflicted between wanting to remove this risk for others and not wishing to divert spending from areas with a wider impact on a higher number of customers.

Table 9: Examples of polarised views on internal sewer flooding

"Whereas we're losing, you know, 462 megalitres a day versus maybe only 50 more houses per year getting added [to the Internal Sewer Flooding Register] maybe, it's like, obviously, yes, it's a terrible situation for those houses. But the rest of the millions that aren't affected. So, it's not as big a priority for me for investment for that area." Future
"You've got to do something about the possibility of faeces coming back up into people's homes. That's got to be priority. It's I mean, obviously that's the most catastrophic instance. But it's you know, also the damage to people's homes." Rural/Remote

[3] Accent (2017) Customer Research to inform Customer Priorities

Leakage

Through Scottish Water's Research Synthesis we know that customers can have strong views about leakage (Table 10), and we heard similar views in SR27 Research Programme Activities 1 and 3. Participants expressed strong negative views towards leakage, particularly in the context of encouraging customers to reduce water usage while Scottish Water itself was seen as wasting resources through leaks. This contradiction made leakage a sensitive topic, with participants feeling that it undermined Scottish Water's credibility in promoting water conservation. Leakage was perceived as wasting precious water, especially considering the growing emphasis on sustainability and resource management. The idea of asking customers to conserve water while Scottish Water continues to lose it through leaks was seen as hypocritical.

Participants also raised concerns about the cost of producing water and the associated inefficiencies of leaks, which were seen as not only wasting a vital resource but also driving up costs for customers. This added to the negative perception of leakage. Sharing information with customers about Scottish Water's progress on leakage over the last decade helped to soften some concerns, with participants acknowledging the progress made. However, many felt that it was not enough simply to maintain current leakage levels. There was a strong desire to see continued reduction in leakage, as this would be viewed as a tangible improvement and a more effective response to the challenges of water conservation.

Customers were presented in Activity 1 with three high level draft investment scenarios, of which only one (CPI+6.5%) involved any improvement in leakage, with the lower scenarios maintaining current leakage levels. Customers were concerned with the lack of progress in these scenarios and wanted more concrete and specific commitments to decrease leakage levels further, rather than just maintain current levels.

When these customers returned to participate in Activity 3, they were presented with an improved CPI+4% investment scenario which set out a plan to 'Keep on top of leakage and reduce it a further 10% over SR27'. This was welcomed, although still felt open to improvement. When invited to 'rebalance' this investment scenario, customers generally felt it could remain as it was – but when changes were suggested they did involve reallocating funds to drive further leakage improvements.

Table 10: Research Synthesis Extract (leakage)

What are customer expectations of Scottish Water regarding leakage?

Key Insight:

Customers are generally unaware of current leakage levels. Customers can be shocked to learn about leakage levels. Although they are also pleased to learn about Scottish Water's improvements in this area, they can feel that not enough progress has been made and seek further reduction. Leakage can be an emotive topic, with many customers feeling that it is a moral issue. Whilst some customers accept economic arguments around the acceptable level of leakage, others feel that leakage should be reduced even if the cost of repair is more than the value of the water lost. Customers make strong connections between leakage and the risks to water resilience and supply posed by the three Long-Terms challenges. They often feel that addressing leakage is part of planning for future water scarcity, recognising that the value of water will rise in the future. High levels of leakage are felt by some to potentially undermine Scottish Water's efforts to change customer water use behaviours.

References:

13 sources have been reviewed, resulting in 31 insights, with overall scores between 1.9 and 3.0. The highest scoring insights have been used to develop Key Insights, with overall scores between 2.8 and 3.0. These are derived from 7 sources, engaging more than 2,500 customers.

Environmental pollution and spills

Environmental pollution and spills emerged as a spontaneous need from participants entering Activity 1, with almost all customer groups suggesting 'stop releasing pollution' as a basic expectation for Scottish Water, water-only customers making a request for stronger environment protections that go beyond legal obligations, and vulnerable customers expecting Scottish Water to adhere to environmental guidelines. Businesses referenced bathing and river water quality – and also Combined Sewer Overflows (CSOs).

When it comes to environmental concerns, the greatest focus was placed on waste water spills, particularly with regards to CSOs. Participants expressed a strong desire for transparency in the CSO policy, showing concern about how and when these systems are used and their environmental impact, accompanying a perception from some that Scottish Water could be more transparent around their monitoring and reporting. Concerns seem to be heightened in comparison to the Long-Term Strategy qualitative research undertaken in October 2024, where spills were seen to be a big issue in England but less so in Scotland.

External Sewer Flooding

Although external sewer flooding and the management of rainwater did not emerge as a spontaneous basic priority for customers, the prevention of rainwater entering sewers was clearly understood by Activity 1 participants, who referenced the high levels of rainfall in Scotland. Some praised the idea of nature-based solutions, particularly those with an environmental interest. However, the focus in Activity 1 on schemes in Edinburgh, Glasgow and Dundee was very divisive, particularly for Remote / Rural customers. There was a belief that investment is too often concentrated on the Central Belt to the detriment of other areas in Scotland, especially rural areas.

When customers returned to participate in Activity 3, Scottish Water's plans to divert rainwater were welcomed but also questioned as to their effectiveness, especially in built-up areas where customers feel there are fewer opportunities to create green spaces or other drainage solutions. Working with others (such as developers and local authorities) is seen as key, as customers do not see this as something that Scottish Water can address on its own. They feel it can be linked to over-development and questionable planning decisions, and they feel that Scottish Water and our customers should not be solely responsible for funding solutions. NHH customers recognise the potential impact on their businesses' operation and reputation of sewer flooding in or around their premises, so they understand the importance of reducing sewer flooding risk.

The rebalanced scenario presented in Activity 1 referenced Glasgow, Dundee, Edinburgh and potential partnerships in Ayrshire and Fife. Customers again felt that this was too biased towards the central belt for some customers based in other areas of Scotland. When invited to 'rebalance' this investment scenario, customers generally felt it could remain as it was – but when changes were suggested they did involve reallocating funds to drive further improvements in rainwater management, as it was felt to have a positive impact for more people than some other areas.

Carbon footprint

Scottish Water engaged with customers in 2023 to explore our Strategic outcomes and ambitions. When discussing what characteristics made a company 'admirable', customers were largely focussed on themes around sustainability, or companies going 'above and beyond' basic service

offerings. This is consistent with findings from Scottish Water's 2022 'Customer Expectations' study, where Climate Change Mitigation was seen as vital by most and part of the role any good corporate citizen should be playing.

When Scottish Water's carbon footprint is placed in the context of investment and service delivery, customers are likely to place carbon mitigation behind water and waste water services. When looking at strategic investment areas as part of the Long-Term Strategy research in 2022, customers were clear that water and waste water services are what Scottish Water are there to do. Activity 1 of the SR27 Research programme found that customers again placed themes associated with climate mitigation as 'nice to do' behind the core services that emerged as basic expectations.

When customers returned to the topic of carbon emissions in Activity 3, they were given detailed information regarding Scottish Water's net zero commitments, the breakdown of current carbon emissions, and the proposed activities to meet the target helped participants gain a clearer understanding of the current situation. Regardless of their acceptance of the wider need to lower carbon emissions customers tended to feel uncertain about the need for investment in this area as a priority, on the basis it feels less pressing than some of the other challenges discussed and a sense that the 2040 target is unrealistic. There is also some emerging fatigue around a perception of target setting for the sake of it.

There was more support from some future customers and those with a more environmental outlook, who see the wider aim of addressing climate change as a priority and are wary about society in general not moving forward quickly enough in this area.

Despite these conflicts, Scottish Water's plans for woodland creation and land management are welcomed. Some felt positive about investment in technology and innovation to help reduce carbon emissions.

In activity 4, 16–44-year-olds ranked 'Carbon footprint' significantly higher in importance in their rankings than older customers (Mean scores for 16-24 = 4.80, 25-34 = 5.46, 35-44 = 5.53 v total HH sample 5.88 on a scale of 1 to 7). Participants in Activity 4 who cited Scottish Water's plans for an investment area as either 'very positive' or 'very negative' were given an opportunity to say why (Table 11), and these responses illustrate some of the polarisation on this topic.

Table 11: Customers with very positive or negative views on Scottish Water's plans for carbon mitigation

Context	Verbatim
Why participants feel very positive about this investment area N=358	"A 67% improvement in carbon capture is amazing and very important as climate change is getting worse year on year." ***HH***
	"I didn't know they planted trees etc. Excellent work" ***HH***
	"Anything that reduces the carbon footprint is positive; we all need to help fix this issue" ***HH***
Why participants feel very negative about this investment area	"Sick to death hearing about net zero, it is an excuse to put prices up and continue to fleece the public." ***HH***
	"Too much emphasis on carbon footprint nowadays" ***HH***

Context	Verbatim
N=26	"The people cannot afford to fund this carbon neutral nonsense. I would not be impressed if my bills rose for this." ***HH***

4.3 Synthesis of Customer Research

Scottish Water's Research Synthesis database contains c.2,000 insights drawn from more than 60 research sources involving more than 24,000 customers over 10 years. The Synthesis framework and process have been applied to supply Key Insights to Technical Appendices and the Business Plan. Full supporting evidence, scoring and referencing for these Key Insights are set out in the Research Synthesis Supporting Document.

4.3.1 Evaluation of Research Strength

Our evaluation of research strength (Table 12) gives us insight into which areas are well explored and better understood and informs our understanding of why other areas might be less well understood.

All research questions achieved an Overall Score of at least 2 (on a scale of 0 to 3). These high Overall Scores are driven by high 'Suitability of Evidence' scores (minimum of 2.6). This is because:

- All research in the synthesis is conducted by external research agencies.
- Most research sources include a suitable sample size, with many representing different customer segments including future and vulnerable customers.
- Many sources cover all of Scotland, with some including a regional breakdown supporting geographic analysis of results.
- Most research demonstrates a fair and accurate interpretation of results by including methods of analysis used or raw data that supports findings.

There is more variation on 'Topic Criteria', with a range of scores from 1.3 to 3 (on a scale of 0 to 3). Higher scores are associated with higher volumes of customers engaged and insights gathered.

- The topic with the highest 'Topic Criteria' scores is External Sewer flooding (3.0). Recent water sector research activity around blue-green infrastructure and the management of rainwater has generated a relatively large number of high-quality insights on the subject.
- Drinking Water Quality is also associated with a high 'Topic Criteria' Score (2.7). This reflects the frequent exploration of the topic in Scottish Water's research activities. It is also a top-of-mind subject for customers, resulting in frequent spontaneous mentions across all of Scottish Water's research activities.
- The topic with the lowest 'Topic Criteria' score is Bioresources (1.3). This topic has not been the subject of targeted research but can arise when related or broader themes are explored (e.g. circular economy research).

Table 12: Evaluation of Research Strength[4]

		# Insights	Insight Score (1-3)	# Sources	Source Score (1-3)	# Customers	Customer Score (1-3)	Coverage Score	Topic Criteria Score	Sample Size	Segmentation Coverage	Regional Coverage	Method of Engagement	Data Collection	Interpretation of Results	Suitability of Evidence Score	Overall Score
Long-Term Challenges	What are customers' attitudes towards Scottish Water's three long-term challenges?	50	2	15	2	3871	2	2.8	**2.2**	2.9	2.7	2.5	3.0	2.9	2.9	**2.8**	**2.5**
	What is customer understanding of climate change as a challenge?	28	1	10	2	8329	3	2.8	**2.2**	3.0	2.6	2.4	3.0	2.8	3.0	**2.8**	**2.5**
	What is customer understanding & acceptance of aging assets as a challenge?	14	1	9	2	1260	1	2.9	**1.7**	3.0	2.8	2.4	3.0	2.9	3.0	**2.9**	**2.3**
AR3	What are customer expectations of Scottish Water in maintaining assets?	35	2	13	2	2788	1	2.6	**1.9**	2.6	2.7	2.5	3.0	2.8	3.0	**2.8**	**2.3**
Drinking Water Quality	What are customer perceptions of drinking water quality in Scotland?	79	3	20	3	3673	2	2.5	**2.6**	2.9	2.6	2.5	3.0	2.7	3.0	**2.8**	**2.7**
	What is the perceived impact of drinking water quality issues on customers?	53	2	14	2	3641	2	2.8	**2.2**	2.8	2.8	2.7	3.0	2.8	3.0	**2.8**	**2.5**
	What are customer expectations of Scottish Water regarding drinking water quality?	54	2	19	3	7936	3	2.7	**2.7**	2.8	2.7	2.6	3.0	2.6	2.9	**2.8**	**2.7**
	What are customer expectations for dealing with lead in the network?	79	3	5	1	2368	1	2.8	**2.0**	3.0	2.4	2.2	3.0	2.6	2.8	**2.7**	**2.3**
Water Continuity	What is the perceived impact of an interruption to supply?	53	2	10	2	5559	2	2.9	**2.2**	2.8	2.8	2.8	3.0	2.9	3.0	**2.9**	**2.6**
	What are customer expectations of Scottish Water regarding water continuity?	54	2	17	3	5161	2	2.6	**2.4**	2.7	2.6	2.6	3.0	2.6	2.9	**2.7**	**2.6**

[4] Note that the numbers of insights, sources and customers cannot be totalled; where research covers more than one topic there will be double counts.

		# Insights	Insight Score (1-3)	# Sources	Source Score (1-3)	# Customers	Customer Score (1-3)	Coverage Score	Topic Criteria Score	Sample Size	Segmentation Coverage	Regional Coverage	Method of Engagement	Data Collection	Interpretation of Results	Suitability of Evidence Score	Overall Score
	What are customer perceptions of low pressure?	42	2	5	1	1513	1	3.0	**1.8**	2.6	2.8	2.6	3.0	2.4	2.8	**2.7**	**2.2**
	What are customer expectations of Scottish Water dealing with low pressure?	31	2	7	1	1274	1	2.6	**1.6**	2.6	2.7	2.6	3.0	2.4	3.0	**2.7**	**2.2**
	What are customer expectations of Scottish Water regarding leakage?	31	2	13	2	4088	2	2.5	**2.1**	2.8	2.7	2.7	3.0	2.6	2.9	**2.8**	**2.5**
Water Environment	What is customer understanding of Scottish Water providing waste water services?	13	1	11	2	3752	2	2.7	**1.9**	3.0	2.8	2.5	3.0	2.9	2.9	**2.9**	**2.4**
	What are customer perceptions of the water environment in Scotland?	53	2	14	2	4565	2	2.6	**2.2**	2.9	2.6	2.6	3.0	2.6	2.9	**2.8**	**2.5**
	What are customer expectations of Scottish Water in protecting the river and coastal water environment?	20	1	9	2	1303	1	2.6	**1.6**	2.7	2.7	2.4	3.0	2.6	3.0	**2.7**	**2.2**
	What are customer perceptions of pollution in the water environment?	48	2	11	2	3899	2	2.5	**2.1**	2.9	2.7	2.7	3.0	2.6	2.9	**2.8**	**2.5**
	What are customer expectations of Scottish Water in protecting the water environment from pollution?	29	2	9	2	2561	1	2.9	**2.0**	2.8	2.8	2.6	3.0	2.8	3.0	**2.8**	**2.4**
	What are customer perceptions on Scottish Water providing waste for bioresources?	14	1	7	1	2386	1	2.1	**1.3**	2.6	2.4	2.4	2.9	2.6	3.0	**2.6**	**2.0**
Waste Water Flows	What is the perceived impact of an internal sewer flooding incident?	28	1	15	2	4383	2	2.7	**1.9**	2.7	2.7	2.7	3.0	2.9	3.0	**2.8**	**2.4**
	What are customer expectations of Scottish Water regarding internal sewer flooding?	38	2	18	3	7639	3	2.6	**2.7**	2.8	2.7	2.7	3.0	2.7	2.9	**2.8**	**2.7**
	What are customer perceptions of external sewer flooding?	59	3	17	3	6844	3	2.8	**3.0**	2.7	2.7	2.6	3.0	2.8	2.9	**2.8**	**2.9**

		# Insights	Insight Score (1-3)	# Sources	Source Score (1-3)	# Customers	Customer Score (1-3)	Coverage Score	Topic Criteria Score	Sample Size	Segmentation Coverage	Regional Coverage	Method of Engagement	Data Collection	Interpretation of Results	Suitability of Evidence Score	Overall Score
	What are customer expectations of Scottish Water regarding external sewer flooding?	38	2	20	3	8838	3	2.7	**2.7**	2.8	2.7	2.7	3.0	2.7	3.0	**2.8**	**2.7**
	What are customer perceptions of surface water management measures?	51	2	9	2	2624	1	2.9	**1.7**	2.9	2.6	2.4	3.0	2.9	3.0	**2.8**	**2.3**
Climate Mitigation	What are customer views on climate change?	30	2	7	1	7120	3	2.6	**2.1**	3.0	2.7	2.4	3.0	2.7	3.0	**2.8**	**2.5**
	What are customer expectations of Scottish Water's carbon footprint?	45	2	11	2	5820	3	2.7	**2.4**	2.9	2.8	2.5	3.0	2.7	2.8	**2.8**	**2.6**
	What are customer expectations of Scottish Water protecting and improving Scotland's natural environment?	29	2	8	1	3486	2	2.6	**2.2**	3.0	2.8	2.5	3.0	2.6	2.8	**2.8**	**2.5**
Climate Adaptation	What are customer expectations around climate adaptation of assets?	19	1	4	1	2310	1	2.8	**1.4**	3.0	2.5	2.8	3.0	3.0	3.0	**2.9**	**2.2**
	How do customers view their role in supporting Scottish Water's adaptation to climate change?	21	1	9	2	4772	2	2.0	**1.8**	3.0	2.8	2.7	3.0	3.0	2.9	**2.9**	**2.3**

5 Conclusion

Scottish Water's research programme for SR27 is underpinned by insights from our Research Synthesis process and framework. The synthesis process maximises the value of Scottish Water's wide and rich evidence base to date, by drawing from more than 60 research projects involving more than 24,000 customers over the past 10 years. We have been building our in-house expertise on applying thematic analysis using the Framework since 2023, and a recent independent review of our process resulted in positive feedback, finding a strong, thorough and thoughtful approach to evaluation and synthesis, and strong evidence of structured evaluation. We will continue to develop the use of synthesised insights to support broader Scottish Water activities and future Business Plans.

Scottish Water's research programme for SR27 engaged with 1,166 household customers and 226 businesses. The programme commenced with an extended research methodology which enabled customers to build their understanding of the Scottish water industry and provide considered meaningful views on SR27 and ended with a quantitative study involving less informed customers to establish a statistically robust nationally representative view on Scottish Water's plans for SR27.

These research activities ran in co-ordination with Consumer Scotland's Longitudinal Deliberative Research, which will identify customers' considered views and perceptions of Scottish Water's SR27 Final Business Plan in 2026, to ascertain whether it meets customers' needs, priorities and expectations. Consumer Scotland's Longitudinal Deliberative Research will be a key piece of information in determining whether WICS' Final Determination commands consumers' support.

Scottish Water's research resulted in four broad recommendations which have informed the development of the SR27 Draft and Final Business Plans (further detailed explanation of how customers have informed decisions made in this SR27 Final Business Plan can be found in the Investment Planning Technical Appendix):

1. Review the early-stage draft investment scenarios to offer more value, which could involve better explanations and improved offerings to increase acceptability.
    a. This recommendation was actioned through the development of a rebalanced working reference scenario (based on outcomes which might be associated with a smooth and steady CPI +4% trajectory), which was shared with customers in the last stages of the development of the SR27 Draft Business Plan.
    b. Customers generally felt that this was well-balanced and offered clear, tangible outcomes.
    c. When invited to consider re-prioritising expenditure across investment areas, participants generally maintained the allocations presented in the rebalanced scenario.
    d. Where changes were suggested, they typically involved diverting funds to choice areas perceived to benefit a greater number of customers and deliver broader impact.
    e. Recognition that participants at this point in the research programme may not be representative of the general public (who we might expect to be less well informed) led to recommendation (3) below.
2. To reflect customer's preference for a smooth and steady bill increase in the development of the SR27 Draft Business Plan.
    a. This recommendation informed the price trajectory which has been put forward in the SR27 Final Business Plan of CPI +3.3% per annum on a smooth and stead basis, even though differing price profiling may result in lower bills overall and help support investment delivery.

3. Undertake further research on a more final version of investment scenarios, giving Scottish Water an opportunity to check how the reference scenario in the SR27 Draft Business Plan might be received by less informed customers, and reflect more broadly how the general public would view the charging impact and outcomes offered in the plan.
    a. This recommendation was actioned through the commissioning of Activity 4, where findings have been pivotal in reconsideration of the 'zone of acceptability' for customer charges.
4. Continue to engage with LPs as the SR27 plan develops.
    a. Research findings were shared with Senior Stakeholder Group (attended by Licensed Provider representatives, Central Market Agency and chaired by Consumer Scotland) on completion. We continue to work closely with LPs to develop plans for Smart Metering to work effectively within the market framework to support improved water efficiency.
5. Affordability of a CPI +4% plan is a concern for customers – particularly household customers with lower incomes.
    a. This recommendation informed the proposed price trajectory of CPI +3.3%.
6. Outcome proposals as set out in the SR27 Draft Business Plan are broadly acceptable to customers – although care is needed to ensure that outcomes around internal and external sewer flooding are not eroded over SR27.
    a. Outcomes have been largely preserved in the light of the change from CPI +4% to CPI +3.3% between DBP & FBP.
7. Communication of Scottish Water's plans for SR27 should recognise that not all customers are not convinced of the urgency of climate change, and that their personal views on the urgency of climate change can impact how they view the overall acceptability of Scottish Water's plans for SR27. The plan should be appealing to both customer viewpoints, to facilitate public support for the plan.
    a. Scottish Water's plans for carbon mitigation have been recontextualised away from Net Zero to emphasise the additional benefits that many carbon mitigating approaches bring.
8. Communicating SR27 plans in the context of long-term outcomes and the challenges that Scottish Water faces can have a significant impact on acceptability.
    a. Scottish Water will continue to use the Long-Term Strategy in our communications of the plan and will continue to test and develop approaches to increasing customer understanding of the long-term challenges in our customer research.

Annex A: Customer Research Activities

Activity 1

Activity	Fieldwork dates	Objectives	Sample
1. Customer Expectations: Informing the SR27 Draft Business Plan scenarios	December 2024 February 2025	1. Establish customer expectations for Scottish Water over the course of SR27 2. Understand customer views and preferences around SR27 charging and investment scenarios	101 Households (including 31 vulnerable (financial or medical), 17 future, 4 water only, 6 as part of multigen groups, 26 Business (4 water only)

SR27 research activities commenced with Accent Market research in early 2025. An extended qualitative methodology was designed (Figure 33) to ensure that participants had sufficient time and space to reflect on the topics discussed and provide considered, meaningful insights. By adopting this more extended and exploratory format, it was possible to capture richer, more nuanced feedback, ensuring that the findings reflect not just immediate reactions but also well-thought-out perspectives on key issues.

Customers undertook preparatory homework exercises from mid-December 2025, in advance of the Scottish Water hosted webinar on 8 January 2025, which was followed up by further homework exercises. The qualitative fieldwork commenced 13 January 2025. Many of the customers who participated have been retained as a panel to enable us to follow up with questions and choices for SR27 on a more flexible basis and participated in Activity 3.

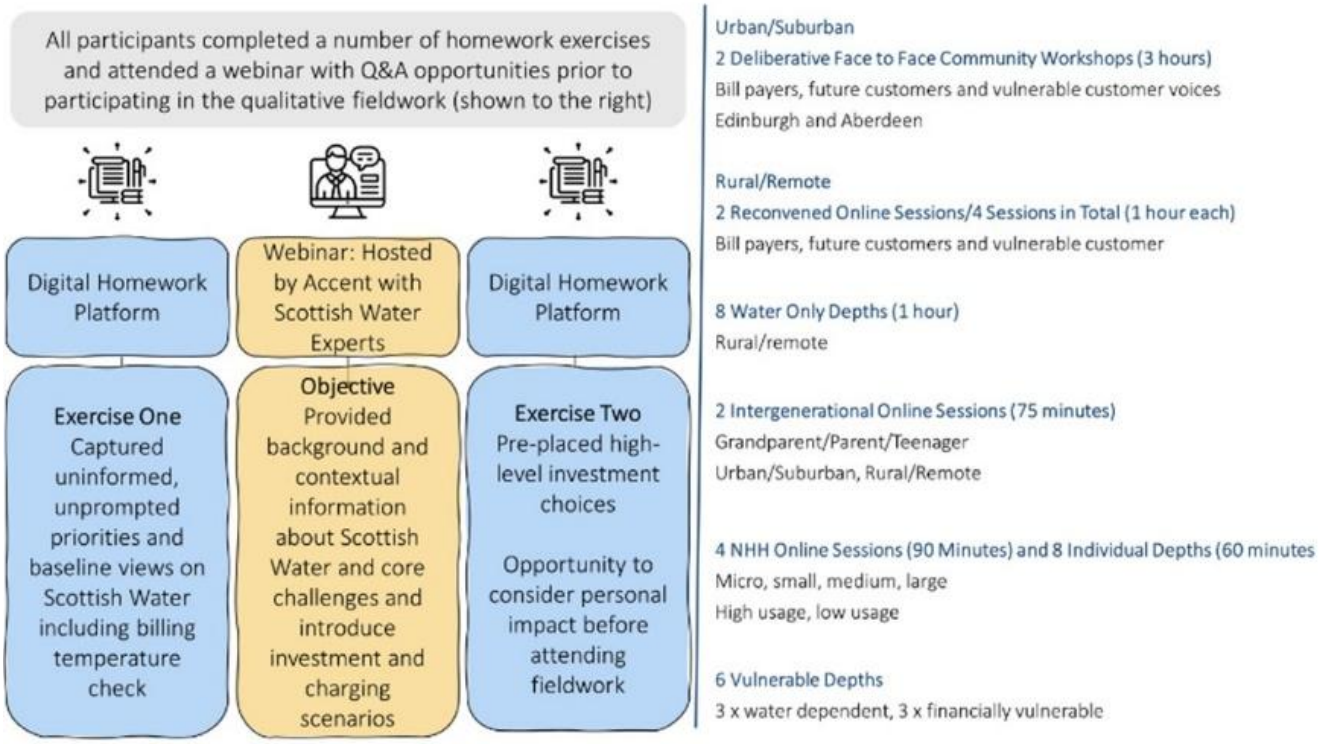


Figure 33 A summary of the Activity 1 process

The final report from Accent is available as a supporting document.

Activity 2: Customer Expectations: Licensed Providers (LPs) (Scottish Water led)

Activity	Fieldwork dates	Objectives	Sample
2. Customer Expectations: Licensed Providers	March/April 2025	1. Understand the needs and expectations of LPs in relation to SR27 2. Sense checking business customer research outputs from previous stage 3. Understanding LP's own future business plans or areas of focus	6 Licensed Providers (all active market participants were invited to take part)

Accent Market Research were commissioned to undertake this research, with fieldwork taking place in early April 2025. As a critical part of the business supply chain, and important Scottish Water customers, it is important to understand the spontaneous priorities of Licensed Providers and their views on what they and their non-household customers need during this period.

There are 22 Licensed Providers active in Scotland, all were invited to participate in the research, with six participating. The methodology involved 'depth interviews', one-on-one conversations which explore the issues around the research objectives in detail.

The final report from Accent is available as a supporting document.

Activity 3: Reconvened groups: Updated investment scenarios and charging trajectories

Activity	Fieldwork dates	Objectives	Sample
3. Reconvened groups: Updated investment scenarios and charging trajectories	Early April 2025	1. Gathering feedback from customers on an updated investment scenario 2.Understanding how customers might wish to make further changes to the investment scenarios when presented with choices as trade-offs 3. Understanding customer preferences around a front loaded and 'smooth and steady' charging trajectory	33 Household 15 Business 6 Future (Previous participants in Activity 1.)

Accent Market Research were commissioned to undertake this research, with fieldwork taking place in early April 2025. Participants had been drawn from a panel created as part of Activity 1 with the understanding that they would be open to future engagement in Scottish Water research. This informed audience were reconvened into digital focus groups. This ensured continuity and deeper insight from those already familiar with key topics and created an opportunity for 'you said we did' engagement.

Customers undertook preparatory homework in advance of fieldwork, and were also asked to complete a post-task survey (Figure 34 A summary of the Activity 2 process

As participants are drawn from the same group of customers involved in Activity 1, it replicates those demographics and continues to mix those from different age and social grade bands. As in Activity 1, bill impact was presented on a personalised basis, taking into account their Council Tax Band and discount level.

The final report from Accent is available as a supporting document.

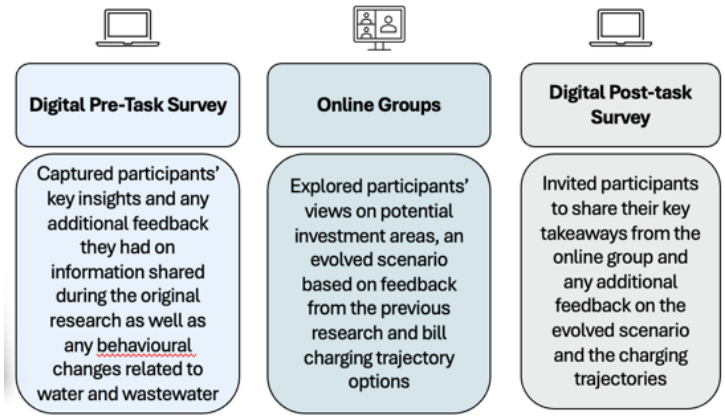


Figure 34 A summary of the Activity 2 process

Activity 4: Support of investment scenarios (Scottish Water led)

Activity	Fieldwork dates	Objectives	Sample
4. Support of investment scenarios	August 2025	1. Support for the outcomes set out in the Draft Plan, in the context of the associated impact on customers' charges. 2. Impacts of levels of understanding and how should Scottish Water communicate the plan	1,065 household (965 online and 100 face-to-face, including harder-to-reach groups). 200 non-household, spanning different business sizes, sectors, and consumption levels

Scottish Water, together with Consumer Scotland and the ICG agreed that the earliest stages of Scottish Water's research programme, together with Consumer Scotland's Deliberative Study should maximise the use of qualitative approaches, to ensure that customers have the time and information to give informed views. However, we collectively recognise these views might not be representative of our wider customer base, for whom water industry issues might not be top of mind. With this in mind, for the final stage of Scottish Water's research programme, Scottish Water and our stakeholders were keen to understand how less informed customers would view our plan for SR27, and to gather a nationally representative view exploring the outcomes offered by the SR27 Draft Business Plan and the associated increase in charges.

With these requirements in mind, Create Clarity were engaged to deliver an approach which would include household and non-household customers, making sure to include financially, medically and age vulnerable customers, digitally disengaged customers, and reach a representative cross spread across Council Tax bands and discounts. The mixed method methodology was largely online, supplemented with 100 face-to-face interviews to ensure inclusion of the digitally disengaged, as well as those living in very rural areas, and those aged 75+ who are less likely to be part of an online panel.

Two key considerations in the development of the survey were survey length and cognitive load, balanced the need to give survey participants sufficient information to make informed choices against a recommended maximum survey length of 20 minutes. Survey development was informed by extensive and rigorous testing of survey materials, involving 12 cognitive interviews, a pilot survey of 100 customers, and was additionally supported by using Scottish Water's own Water Matters online community to give feedback on early drafts of stimulus materials. This testing resulted in tangible changes.

The final survey was designed to present customers with increasing amounts of information as they progressed through the questions (Figure 35). The average completion time for the survey was 17 minutes for both the pilot and full scale survey.

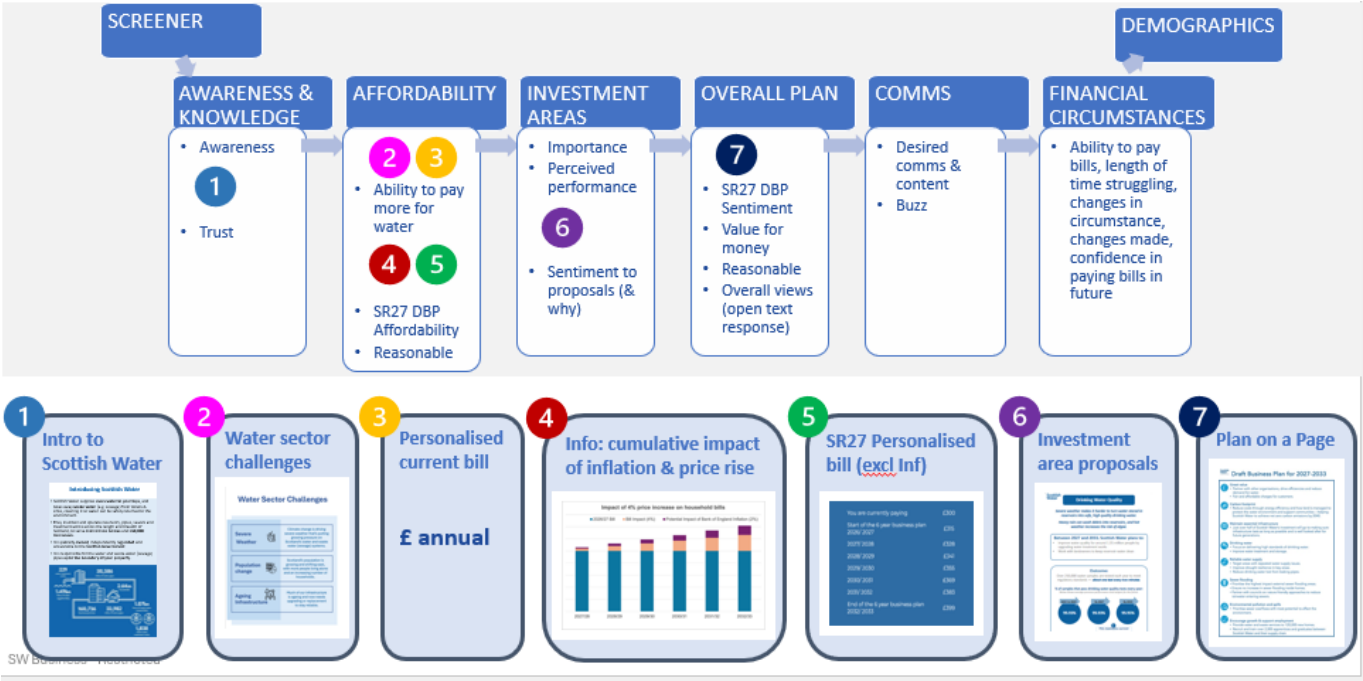


Figure 35 Activity 4 Survey Flow

The final report from Create Clarity is available as a supporting document.

Activity 5: Longitudinal Deliberative Research (Consumer Scotland led)

Activity	Fieldwork dates	Objectives	Sample
5. Consumer Scotland's Longitudinal Deliberative Research	Phase 1: Jan-March 2025 Phase 2: April-Aug 2025 Phase 3: Sept 2025 – May 2026	5. Explore understanding and knowledge of the long-term challenges facing Scotland's water sector and the strategies required to address these; 6. Assess the level of consumer support for the proposed SR27 Draft and Final business plans; 7. Gauge consumers' collective support for the proposed charging profile and the cumulative impact of price increases on customers' bills; and, 8. Understand views, expectations and tolerances for different service levels and/or pace of developments that would be associated with different pricing pathways.	100 Household 40 Business

Consumer Scotland has commissioned IPSOS to undertake longitudinal deliberative research over an 18-month period to enable consumers to inform Scottish Water's Business Plan at key

stages of development. A longitudinal deliberative approach has been adopted for this research due to the complex nature of the topic and to ensure that customers can inform the development of Scottish Water's Business Plan as it progresses.

The methodology combines a public dialogue with household customers, longitudinal qualitative research with household customers from under-represented groups, and in-depth qualitative research with non- household customers using a Delphi-style approach.

- **Phase one** focused on household customers, exploring initial views and awareness of water and waste water services in Scotland and gathering initial views on the key issues facing Scottish Water for its SR27 Draft Business Plan.
- **Phase two** engaged both household and non- household customers, exploring Scottish Water's SR27 Draft Business Plan and pricing pathways in more detail.
- **Phase three** provides an opportunity for household and non- household customers to review any changes to Scottish Water's Business Plan and to form conclusions

Annex B: Customer Research Synthesis Weighting and Scoring

Evaluating Research Insights

The synthesis framework and process bring objectivity through a strong weighting and scoring mechanism helps us to avoid confirmation bias. There are two sets of scores:

- **Source Assessment** (Table 13) Sources are scored to understand how suitable the evidence is within source for the purpose of synthesis. It aims to answer questions such as:
    - **Suitability**: How big was the sample? Did they break down findings between customer segments or geographical areas? How was the raw data collected? How did we engage customers? Is there evidence that the findings are supported by the raw data?
    - **Coverage**: How aligned are the findings with each topic? What is the contribution to topic of each resource.

Only the highest quality and most relevant insights are synthesised into key findings for the topic.

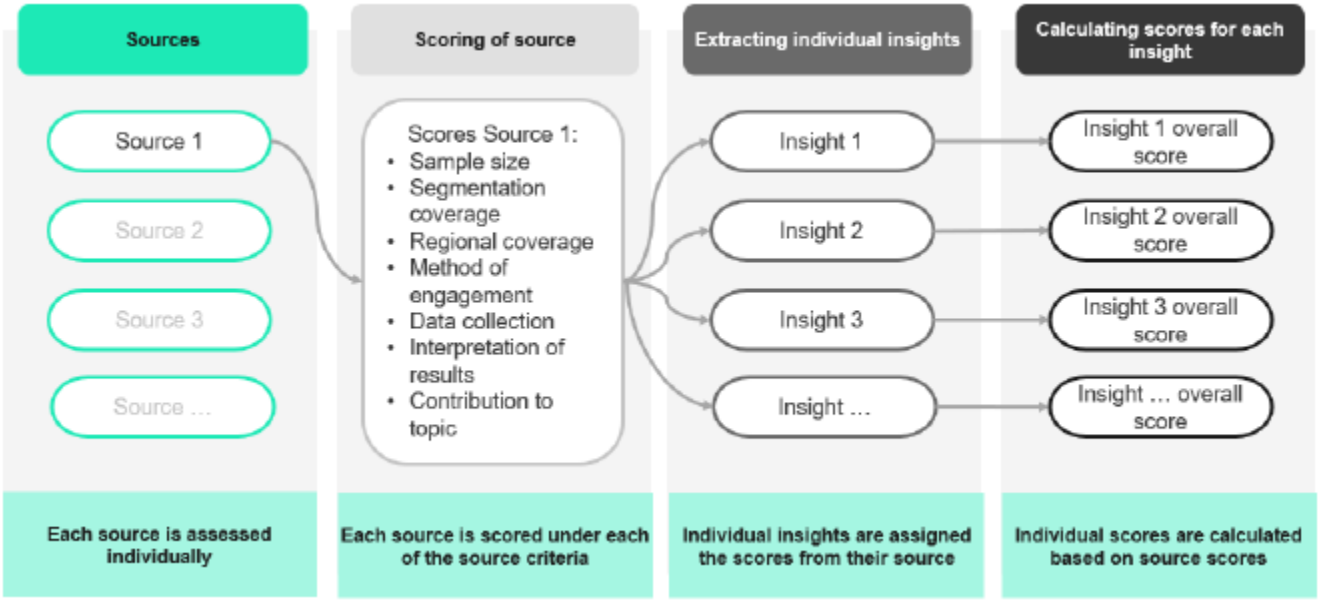


Figure 36 Source and Insight scoring

Evaluating Research Strength

The synthesis process also enables us to understand where our evidence base is strong, and where it needs strengthening. If topics are frequently studied in a methodologically-sound way, there is stronger evidence for the value of the findings.

- **Topic Assessment** (Table 14) Topics are scored to understand how frequently the topic has been studied in the sources analysed. It aims to answers questions such as: How many sources cover the topic? How many customers were engaged on this topic across all sources? How many insights were gathered across all sources?

Table 13: Source assessment criteria

Score	Suitability of Evidence Assessment (50%)					
	Sample Size	Segmentation Coverage	Regional Coverage	Method of Engagement	Data Collection	Interpretation of Results
0	Unknown / not provided	Not specified	Outside of Scotland	Unstructured data - e.g. customer verbatim	Not specified how data was collected	No interpretation of findings
1	Survey with less than 50 people or workshop / focus / group / interview with less than 10 people	High level e.g. customers/stakeholders	UK Wide	Generic surveys, social media tracking	Limited discussion of data collection technique	Lack of credible interpretation with potential for bias.
2	Survey with 50-100 people, workshop / focus / group / interview with 10-25 people	Certain customer types with indications of coverage such as across geographies and inclusion of vulnerable customers - e.g. HH, NHH	Scotland wide or one area in Scotland	Internal high quality, targeted qual/quant surveys, consultations, workshops, focus groups	Some discussion of data collection and the methods.	Some links and discussion of the engagement details, including some differing views.
3	Survey with 100+ people, workshop / focus / group / interview with 25+ people	Insights organised across detailed segments - e.g. vulnerable, future customers, HH, NHH, Developers	Breakdown of specific Scottish regions	External research, externally facilitated focus groups, workshops, online communities, surveys, etc.	Thorough discussion of data collection procedures, noted a range of perspectives and extensive detail of feedback	Engagement work interpreted accurately and fairly with a detailed outline of all perspectives and issues discussed.

Coverage Assessment (50%)	
0	Topic not covered by source
1	Source not designed to explore specific topic, however unprompted feedback on topic provided when discussing other topics within the source
2	Source not designed to explore specific topic, but certain questions include reference to the topic as it links with the objectives of the source
3	Source designed to explore the topic(s)

Table 14: Topic assessment criteria

Topic Assessment			
Score	Volume of Insights	Number of Sources	Volume of Customers
0	No insight on this topic	No sources on this topic	No customers engaged on this topic
1	Relatively low number of insights	Relatively low number of sources	Relatively low number of customers engaged
2	Relatively moderate volume of insight	Relatively moderate number of sources	Relatively moderate volume of customers engaged
3	Relatively high volume of insight	Relatively high number of sources	Relatively high volume of customers engaged

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

West Central Bioresource

February 2026

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Abbreviations List

Abbreviation	Definition
AAD	Advanced Anaerobic Digestion
AD	Anaerobic Digestion
AMP7	Asset Management Plan period 7 2020-2025
AMP8	Asset Management Plan period 8 2020-2030
AR25	Annual Return 2025 (Scottish Water regulatory reporting)
ATC	Advanced Thermal Conversion
BAT	Best Available Techniques
BAU	Business As Usual
BES	Benchmark Estimating Software (Scottish Water cost estimating tool)
BTC	Bioresource Treatment Centre
CAPEX	Capital Expenditure
CCC	Climate Change Committee
CDEL	Capital Departmental Expenditure Limit (Scottish Government budget constraint)
CHP	Combined Heat and Power
CG	Cumming Group (industry benchmarking consultant)
DPC	Direct Procurement for Customers
EA	Environment Agency
EASR	Environmental Authorisation (Scotland) Regulations
EfW	Energy from Waste
ELT	Executive Leadership Team
EY Parthenon	Ernst & Young Parthenon (consultancy)
FBP	Final Business Plan
GCC	Glasgow City Council
GGSM	Greater Glasgow Sludge Main
HM Treasury	Her Majesty's Treasury (UK Government)
HTL	Hydrothermal Liquefaction
HTC	Hydrothermal Carbonisation
IRR	Internal Rate of Return

IED	Industrial Emissions Directive
LTP	Liquor Treatment Plant
MIM	Mutual Investment Model
NPC	Net Present Cost
NPV	Net Present Value
OCU	Odour Control Unit
ONS	Office for National Statistics
PFI	Private Finance Initiative
PIA	Project Investment Appraisal
RAB	Regulated Asset Base
RAID	Risks, Assumptions, Issues, Dependencies
RSK	Risk (as referenced in corporate risk register)
rUWWTD	recast Urban Waste Water Treatment Directive
SEPA	Scottish Environment Protection Agency
SG	Scottish Government
SFT	Scottish Futures Trust
SINC	Site of Importance for Nature Conservation
SR27	Strategic Review 2027-33 (Scottish Water business planning period)
Scottish Water	Scottish Water
tCO_2e	Tonnes of Carbon Dioxide Equivalent
tDS	Tonnes Dry Solids
TTDS/Year	Thousand Tonnes Dry Solids per year
THP	Thermal Hydrolysis Plant
TPO	Tree Preservation Order
VfM	Value for Money
WCB	West Central Bioresource
WICS	Water Industry Commission for Scotland
WDF	Waste-Derived Fuel
WWTW	Waste Water Treatment Works

1 Executive Summary

Scottish Water treats over one billion litres of waste water every day, generating a bioresource with significant nutrient and energy value.

In 2024/25, as reported in the Annual Return, Scottish Water and its Private Finance Initiative (PFI) partners produced 121,910 tonnes of dry solids (tDS) bioresources:

- 91,470 tDS (75%) at PFI facilities
- 30,440 tDS (25%) at Scottish Water sites.

Bioresource treatment involves the concentration of solids through settlement and subsequent dewatering. The dewatered material is processed further by treatment methods such as drying, mixing with lime, or anaerobic digestion (AD). Drying produces a waste-derived fuel (WDF) whilst liming and AD result in materials suitable for agricultural use. Dewatered cake material, not receiving treatment, can only be used in land restoration applications.

The SR27 West Central Bioresource (WCB) investment is the critical intervention that enables Scottish Water to continue meeting statutory obligations, reduce strategic risks and deliver the Draft Ministerial Objectives for 2027–33 across service, environment, climate mitigation, and circular economy outcomes (Table 1).

Scottish Water Bioresource Strategy positions Scotland's bioresource system on a resilient long-term footing and will be the anchor project in the national 'spoke-and-hub' bioresource strategy, enabling Scotland's transition away from its current reliance on drying, liming and land reclamation. WCB provides a single, modern, 85,000 tDS/year Advanced Anaerobic Digestion (AAD) facility located at Daldowie - the optimum location technically, economically and operationally to produce a quality product that is the optimum for recycling to agricultural land.

Table 1: Relevant Requirements of Draft Ministerial Objectives 2027-33

Draft Ministerial Objectives Category	Draft Ministerial Objectives Detail
Standards of Service	Maintain or improve current levels of service over the long term
Environment	Scottish Water must improve the current level of compliance with its environmental authorisations for abstraction and discharge into the environment, by preparing and implementing investment plans that address the risks of impacts on the environment from its assets
Circular Economy	Scottish Water must have regard to the Scottish Government's circular economy strategy (as may be amended or replaced from time to time) in its provision of water and waste water services
	In particular, Scottish Water must assess the potential for resource recovery from sewerage
Climate Change (Adaptation & Mitigation)	Identify the expected impacts of climate change on its assets and assess the risk and likelihood
	Make substantive progress in the 2027-33 period towards the climate change targets, and ensure it is on an appropriate trajectory to meet or exceed those targets
Private finance initiative funded projects	Scottish Water must prepare and implement plans to manage its 6 remaining private finance initiative contracts which end in the 2027-33 period, to secure best value for money for the future operation of the relevant facilities
	Scottish Water must prepare such plans for its any of these 6 remaining private finance initiative contracts which end after 2033

There are several corporate risks associated with bioresource management (Table 2).

Table 2: Key corporate risks of bioresource management

Ref	Risk Description
RSK.56	Risk arising from failure or loss of a critical asset resulting in an impact to health, safety, service delivery and/or reputation, due to unplanned deterioration of asset condition, historical under-investment and/or poor levels of maintenance or failure to operate or manage asset effectively
RSK.221	Operational, financial and reputational damage should Scottish Water fail to make expected progress with delivery of the net zero route map in mitigating Climate Change
RSK171	Risk that outlets for bioresource recycling are no longer available
RSK172	Risk that contaminants of emerging concern in sewage prevents the recycling of bioresource and/or requires additional new treatment processes

This Technical Appendix evaluates the technical and financial options and sets out why Scottish Water has determined that WCB is the most effective way to meet our statutory obligations, address stakeholder needs, manage corporate risks and deliver best value for customers and why it needs to be delivered in SR27. The document follows the five-case structure mandated by HM Treasury Green Book[1].

1.1 Strategic Case

The WCB project is the essential step required to modernise Scotland's bioresource system and safeguard compliance, resilience and environmental performance. It delivers the transition set out in Scottish Water's 2018 Bioresource Strategy - reaffirmed by EY Parthenon in their independent review of 2023 – of moving away from high carbon drying and declining land restoration outlets toward a consolidated, robust AAD based system that reflects national policy, regulatory expectations and long term operational needs.

By locating an 85,000 tDS/year AAD facility adjacent to the existing Daldowie PFI site, WCB anchors a modern regional treatment hub at the most technically and operationally advantageous location. The end of the PFI contract in 2026 provides a unique opportunity to repurpose existing assets and avoid significant reinvestment in outdated technology. The site offers optimal coverage for Glasgow, Ayrshire and parts of Tayside and Fife, providing stronger resilience, efficient logistics and system-wide contingency.

WCB directly supports Scotland's net zero and circular economy ambitions by eliminating emissions from Scotland's largest gas fired drying operation, maximising biogas recovery, and producing a high quality agricultural product that reduces dry solids by around 50%. This eases pressure on agricultural land at a time when new Environmental Authorisations (Scotland) Regulations (EASR) guidance is tightening phosphorus limits.

WCB is aligned with the Draft Ministerial Objectives for 2027-33, directly contributing to maintaining and improving service resilience, securing environmentally compliant outlets, and ensuring long-term sustainable recycling of bioresources. The transition to AAD demonstrably supports the climate-change mitigation objective by addressing the single largest operational source of gas-related emissions in Scottish Water, while producing renewable biogas that

[1] The Green Book (2022) - GOV.UK

strengthens Scotland's energy security. WCB also advances circular-economy aims by recovering nutrients safely and reliably, supporting sustainable agriculture, and reducing Scotland's dependency on increasingly constrained land-restoration outlets.

The project also supports wider Scottish Government policy, complementing the Infrastructure Investment Plan's priorities for a Net Zero society and resilient communities. It aligns with the Bioenergy Policy Statement[2] by enabling sustainable bioenergy production from unavoidable waste streams. The Climate Change Committee's recommendations for universal advanced anaerobic digestion by 2030 are directly met through WCB, ensuring Scottish Water adopts recognised best practice and contributes meaningfully to national emission reduction targets. Together, these alignments reinforce that WCB is not only strategically necessary but is also a critical enabler of Scotland's long term environmental, regulatory and policy ambitions.

WCB therefore provides the long-term, strategically aligned and environmentally responsible solution. It reduces whole system risk, supports statutory compliance and establishes the platform for future advanced thermal conversion technologies.

1.2 Economic Case

Bioresources will be treated using advanced anaerobic digestion (AAD). The alternative considered was deferring building the AAD plant and extending the life of the dryers at Daldowie and treating the additional bioresources from the wider West Central region with further liming plants. A single-site AAD at Daldowie had the lowest 60-year Net Present Cost (£1,097m), saving up to £[redacted]m in capital and £[redacted]m in whole-life costs compared to multi-site options. Extending the life of the existing dryers and/or utilising liming increased the 60-year Net Present Costs by up to £240m.

AAD was selected as it provided best value for money (Table 3) and reduced landbank risks alongside providing net zero and circular economy benefits.

The available landbank will become further constrained due to The Environmental Authorisation (Scotland) Regulations[3] (EASR) guidance, which came into force in November 2025 with a 5 year transition period. The new EASR guidance means that the WCB investment would require three to four times more land for AAD bioresource application, to around 119,100 to 160,100 hectares per year, compared with what is needed today. If the WCB investment is not made, and the WCB material has to be limed instead, then it would require a further 84,000 to 150,000 hectares per year compared with AAD bioresource material under the same EASR rules.

The WCB AAD investment reduces the amount of dry solids by 50%, has an odour potential and order of magnitude lower than liming, reduces agricultural land risks and enables the transition to advanced thermal conversion (ATC) processes should public concern or regulation prevent the recycling of bioresource and/or require additional new treatment processes (RSK 171 and RSK 172).

[2] Bioenergy - draft policy statement: consultation
[3] Environmental Authorisations (Scotland) Regulations: call-in guidance

Table 3: Net Present Cost (NPC) summary comparing location and area covered options for West Central Bioresource and the Business As Usual (BAU) options (deferring building the AAD plant and extending the life of the dryers at Daldowie and treating the additional bioresources from the wider West Central region with further liming plants 0a and 0b utilising liming only)

Cost Assessment (£million)	Option 4a: One site at Daldowie	Option 6a: One site at Kinneil Kerse	Option 6b: One site at Daldowie and second site at Kinneil Kerse	Option 0a: BAU (dyers and liming)	Option 0b: BAU (liming)
NPC (60-years)	✂				
NPC (60-years) range	(917-1,355)	(1,024-1,473)	(998-1,478)	(1,204-1,487)	(1,204-1,514)

The Draft Ministerial Objectives 2027-33 and Statutory requirements are supported by the selection of AAD. In terms of Scottish Waters operational emissions, the current Daldowie facility is the single biggest user of natural gas for Scottish Water and collectively the emissions associated with the drying and burning of the WDF is c. 27,000 tCO_2e per annum. The WCB investment at Daldowie will eliminate these emissions and deliver significant further benefits in terms of the recovery of biogas and energy. The recovery of biogas is strongly aligned with (i) the draft Bioenergy Policy Statement and (ii) the recommendations of the Climate Change Committee to reduce emissions from the waste sector and their water sector recommendations to the UK Government that "Advanced anaerobic digestion is rolled out to all plants by 2030"[4]. Process emissions (currently 23% of Scottish Water's operational emissions) can also be reduced through ammonia recovery which further supports Scottish Government's Climate Change Plan and Scottish Water's Net Zero targets with wider Circular Economy resource recovery enabled, in the form of, grit, ammonia and phosphorus.

1.3 Financial Case

The Financial Case evaluated funding options for the WCB project and concludes that Scottish Water Tier 2 funding offers the lowest whole-life cost, strongest value for money and highest delivery certainty.

As Scottish Government Capital Departmental Expenditure Limit (CDEL) is constrained, alternative finance options were examined with EY-Parthenon. A Mutual Investment Model (MIM) funding is considered to be the most viable private finance funding option and EY-Parthenon have preliminarily concluded that a MIM for the AAD plant can be structured so as to be off balance sheet.

As there are no precedents for the use of MIM in delivering a project such as WCB, EY-Parthenon advised us the market will be cautious particularly in areas such as the level of technological risk, understanding interfaces with existing Scottish Water and PFI assets, evolving environmental regulations, and certainty of offtake. To test this advice, we conducted a market sounding exercise and feedback is that market interest is evident across all the participant groups, the market appetite for project finance is positive, but there was less engagement from potential construction partners.

Sponsors and senior finance providers have good knowledge and understanding of the MIM model and contractors have experience from involvement in PFI projects but outside a small few

[4] Scotland Carbon Budget
(ii) Infrastructure Investment Plan 2015

contractors there was limited experience and understanding of an AAD project, with risks around offtake, technology and operational interface raised. In addition, there is low appetite for fixed price construction contracts requiring more risk to sit with Scottish Water which in turn would need to be carefully managed to ensure the project is not classified as on balance sheet under Eurostat Guidance. This evidence signals that while technically feasible to satisfy the Office for National Statistics (ONS) tests for off balance sheet financing, the practical viability of achieving the required risk transfer is very low. In short this is the wrong asset vehicle for this form of financing.

Our modelling indicates that a MIM would add an additional £483m to the net present cost due to the cost of private capital (debt and equity) being higher than that accessible by Scottish Water. The post tax increase in customer charges over the period 2027 to 2051 would be £0.7bn, highlighting that the financial benefit to customers would be short term.

MIM projects can potentially lead to more certain outcomes that may flow through to improved value for money, depending on the level of risk pricing attached to a project. They can also enhance value for money by bringing additional innovation to the design and delivery of projects. However, these can be achieved through conventional procurement processes, and the relative advantage is hard to gauge in advance.

Therefore, on the basis of both deliverability and value for customer money, while acknowledging the potential benefits of a MIM funded approach, for this asset, an 85,000 tDS/year AAD plant at Daldowie we have concluded that the best financing option is the use of Scottish Water funding from customer charges in SR27.

1.4 Commercial Case

An independent capital cost benchmark by the Cumming Group confirms that Scottish Water's forecast costs for the WCB AAD facility sit well within the industry range for comparable UK projects, and below the industry average for both new AAD installations and Thermal Hydrolysis Plant (THP) upgrades when assessed on a cost per throughput basis. This provides assurance that the project costs at this early stage are aligned with market norms.

Alongside this, early engagement with major contractors and suppliers indicates clear market interest in delivering an AAD project of this scale. The location at Daldowie, with its existing utilities, site access and adjacency to the Greater Glasgow Sludge Main, significantly reduces commercial and delivery risk compared with newbuild or multisite alternatives. A structured procurement strategy based on NEC4, establishes risk transfer mechanisms and early supply chain involvement, supports buildability, sequencing and programme realism. The project has a route to contract award and delivery within the planned four year construction window.

1.5 Management Case

The WCB programme is built around the use of an existing operational site with available land, established utilities, reliable access and a skilled workforce at the location. Locating the new AAD facility immediately adjacent to the current Daldowie Bioresource Treatment Centre (BTC) ensures integration with existing assets, including crucially the Greater Glasgow Sludge Main, and represents the lowest risk option for delivery. This approach removes significant uncertainty associated with a developing a new location and provides a stable foundation for both construction and future operations.

The project design also minimises Scotland wide bioresource system risk by creating a central hub capable of supporting national contingency, including the planned maintenance shutdown of the Nigg AAD facility in 2033. Concentrating capacity at Daldowie reduces fleet mileage, transport costs and fleet related carbon emissions, delivering the lowest overall logistical footprint of all

options considered. This contributes directly to Scottish Water's Net Zero ambitions while improving system resilience.

Governance, design maturity and programme readiness are already well advanced. The project passed Gate 50 and is progressing toward Gate 70 in April 2026, supported by early design development, ground investigation works and ongoing regulatory and stakeholder engagement with Scottish Environment Protection Agency (SEPA) and Glasgow City Council. Planning and permitting pathways have been mapped, and an outline four-year construction programme has been developed through benchmarking and engagement with experienced technical partners. Risks such as land acquisition, supply chain capacity, planning approvals, and community engagement are being actively managed. These factors collectively demonstrate that the WCB project is practical, achievable and aligned with the timescales required to manage critical risks across Scotland's bioresource system.

Delivery confidence is strengthened by the ability to transition experienced PFI operational staff into Scottish Water, where retaining this experienced workforce with experience of bioresource management will support long term operational performance.

Two funding (Tier 2 and MIM) and delivery scenarios have been considered, each with provisional timelines informed by benchmarking, contractor input, and statutory planning requirements. Construction of the WCB programme will take four years, with operations expected to start in 2031, a MIM option would mean construction could start 2-3 years later, with a resultant delay to start of operations and increased landbank risks.

1.6 Conclusion

The WCB project gives Scottish Water a route to modernise how it manages bioresources, with a modern 85,000 tDS/year AAD hub. This shift reduced emissions, supports Scotland's circular economy ambitions, and produces a quality product that is recycled to agricultural land.

An options appraisal showed that a single AAD site at Daldowie is the lowest-cost solution, with a 60-year NPC of £[redacted]m, saving around £[redacted]m in capital and £[redacted]m in whole-life costs compared to multi-site alternatives. Delaying investment to SR33 would increase costs by another £[redacted]m and would heighten operational and compliance risks at a time when land-restoration outlets are diminishing and the regulatory environment is tightening.

AAD also reduces dry solids by about 50%, significantly easing pressure on agricultural landbank availability, whereas the alternative of limed cake generates has greater odour potential and almost twice the tonnage of material to recycle. EASR guidance makes the landbank challenge even more pressing. Under the new limits, AAD will require 119,000 - 160,000 ha/year, whereas a drying/liming approach would require 203,000 - 300,700 ha/year - meaning WCB reduces Scotland's exposure by 84,000 - 150,000 hectares each year.

Independent benchmarking by the Cumming Group confirms that WCB costs are within UK industry ranges and sit below the industry average for new AAD and THP facilities. From a financial perspective, Tier 2 public funding remains the best option. While a MIM is technically viable, the analysis shows it would increase the 60-year cost to £1,580m, a premium of £483m, and lead to £0.7bn higher customer charges by 2051. It would also delay delivery by 2 – 3 years, adding further operating costs and increasing exposure to landbank constraints. Based on both deliverability and value for customer money, we have concluded that the best financing option is the use of Scottish Water funding from customer charges in SR27.

WCB is deliverable, the project benefits from location on an existing operational site, using returning PFI assets and retaining skilled operational staff. It has passed Gate 50, is progressing towards Gate 70 in April 2026, and early design, ground investigations and SEPA engagement

are underway. The four-year construction period developed with industry experts provides a realistic delivery pathway.

In summary, WCB offers the best overall solution - a strong strategic fit, lowest whole-life cost, service impact and will deliver greater resilience for Scotland's bioresource system. It gives Scottish Water a route to meet statutory duties, reduce carbon, support national policy and protect customers from avoidable long-term cost and risk.

2 The Strategic Case

The Strategic Case sets out why investment in the WCB project is needed now, and why it offers the most credible long-term response to the challenges facing Scotland's bioresource system.

The system we rely on today is no longer fit for what Scotland needs tomorrow. Regulation is tightening, carbon expectations are rising, resilience is being reduced and the reuse options available to Scottish Water are narrowing each year. WCB provides the opportunity to address these challenges in a single, coordinated investment that future proofs bioresource treatment and recycling for decades to come.

Scotland's national approach to bioresources is evolving. Expectations on environmental protection, net zero delivery, circular economy outcomes and community impact are now central to how investment is planned.

WCB replaces high-carbon drying with a modern AAD-THP facility, cutting operational emissions significantly and capturing more biogas for energy recovery or injection into the national gas grid. It addresses the resilience challenges by creating a centrally located treatment hub capable of handling the nations needs during outages, maintenance or extreme events.

WCB therefore acts not only as an engineering solution, but it will also be the central core of a more modern, lower-carbon bioresource system for Scotland.

2.1 Regulatory and Policy Context

The project is strongly aligned to the strategic direction of Scottish Water and the wider policy environment in Scotland.

Scotland's waste hierarchy is the statutory framework used to prioritise waste management options in order of environmental preference. It requires waste to be managed in a way that prevents waste in the first instance, then maximises reuse, recycling and recovery, with disposal as a last resort.

The hierarchy ranks options as follows:

1. Prevention
2. Preparing for reuse
3. Recycling (including biological treatment such as anaerobic digestion)
4. Other recovery (including energy recovery through incineration) and
5. Disposal (landfill)

Public bodies and operators are legally required to apply the hierarchy when making waste management decisions and to justify any departure from higher-tier options. In Scotland, this framework underpins regulatory decisions by SEPA and is a key mechanism for delivering circular economy, climate change and resource efficiency objectives.

Landfill represents the lowest tier of the hierarchy and is subject to increasing statutory restriction, particularly for biodegradable waste. Incineration, while recognised as a recovery operation, is positioned below recycling and biological treatment. AD is classified as biological recovery, allowing both renewable energy and material recovery from bioresources. The proposed WCB investment therefore satisfies the waste hierarchy requirement set out in Regulation 4 of the

Waste (Scotland) Regulations 2012 and aligns with SEPA's guidance on selecting the highest-ranking practicable option.

The Scottish Government circular economy and bioenergy policy supports AD as a preferred treatment route for organic wastes, including bioresources, due to its contribution to renewable energy generation, greenhouse gas reduction and circular economy outcomes. AD enables unavoidable biological waste to be converted into biogas while retaining nutrients for beneficial reuse. Landfilling results in permanent loss of resources and long-term environmental liabilities, while incineration destroys recoverable nutrients and is increasingly constrained by concerns over carbon performance and residual waste capacity.

The proposed AAD solution is consistent with national policy objectives that SEPA is required to consider when determining authorisations under Regulation 9 of EASR. Standards and monitoring requirements for AAD are well understood and proportionate to the environmental risk posed. In contrast, incineration of sewage sludge generally falls within Schedule 20, Part 4 (Incineration and Co-incineration) and typically requires a bespoke permit. Scottish incinerators are authorised for residual municipal waste, and acceptance of sewage sludge would require permit variation, revised emissions modelling and potentially plant modification.

The proposal for WCB is strongly aligned with the Scottish Government's draft Bioenergy Policy Statement, in particular the following guiding principles:

- **Principle 1 - compliance with stringent sustainability criteria.** The transition from drying and burning as a fuel to advanced digestion and maximising bioenergy production for use locally represents the adoption of current best practice which, coupled with the significant emission benefits aligns well with principle 1.
- **Principle 2 – prioritising use of existing available waste feedstocks.** Maximising the benefit from bioresources arising from waste water treatment fits wholly with principle 2 and switches from exporting the material from Scotland for burning in a cement kiln to retaining and recovering value from waste within Scotland.
- **Principle 4 – supporting emissions reduction and the pathway to net zero emissions.** The existing dryer facility at Daldowie is the single biggest source of natural gas usage for Scottish Water and collectively the emissions associated with the drying and burning of bioresource is around 27,000 tCO_2e per annum. The investment at WCB will reduce these emissions and will deliver significant further benefits in terms of the recovery of biogas and energy.

The proposal for WCB aligns well with the key outcomes of the circular economy, as set out in the Scottish Government's draft Circular Economy Strategy[5]. The investment in AAD will significantly reduce Scottish Waters greenhouse gas emissions. The principal product will be energy in the form of biogas and heat and there are further opportunities to recover additional material such as nutrients – ammonia and phosphorus as the site processes concentrate material that make this option more viable in comparison to waste water effluent recovery where nutrient content is more diluted. Ammonia recovery will significantly reduce Scottish Water's process emissions which are currently 23% of our operational carbon footprint. Options for ammonia and phosphorus recovery will be examined in the detailed design phases.

The UK Climate Change Committee (CCC) highlighted that emissions from the treatment of waste water and sewage sludge are the most problematic for the water sector. The CCC sets out the following water sector recommendations to the UK Government:

- Advanced anaerobic digestion is rolled out to all plants by 2030. Membrane aerated biofilm reactors are rolled out from 2030 to 10% of sites by 2045

[5] Scottish Government Draft Circular Economy Strategy

- Enhanced monitoring, real-time control and Digital Twins reduce process emissions through optimisation along with biomethane gas, covering and containment are rolled out from 2025 to 70% of sites.

These recommendations were repeated in the May 2025 Climate Change Committee advice[6] on the Scottish Government and updated Climate Change Plan, which the Scottish Government has recently published for consultation[4]. Scottish Water's updated route map to net zero emissions (see Climate Change Mitigation Technical Appendix) has been informed by these recommendations and WCB is a major element in Scottish Water's emission reduction pathway.

Scottish Water is moving to AAD to align with industry best practice and address concerns that other recycling outlets are no longer available or resilient.

Bioresource treatment and recycling is a key part of waste water operations, involving the concentration of solids through settlement and subsequent dewatering. The dewatered material may be used for land restoration directly or processed further by methods such as drying, mixing with lime, or AAD. Scottish Water and PFI partners currently use a combination of AD or AAD, dryer operations, liming and land restoration to manage bioresources.

A number of BTCs are operated through PFI contracts, with c. 75% of Scotland's bioresource treated through PFI contracts. These contracts are coming to an end and the assets at these sites will come back into Scottish Water ownership and direct control at the expiry of these contracts. The PFI contracts are to provide a service for a fixed term and have provision of no, or little (5 years) additional residual asset life at the end of the contract. The technologies deployed at the PFIs reflect the time that they were designed, where low energy prices were the norm, bioresource was known as sludge and viewed as a problem to deal with, and carbon emissions were less considered. The assets returning are now at or near end of their design life and use obsolete or sub-optimal processes that have high energy demands, an insecure outlet and do not realise the benefit of the bioresource. Changing the assets through the PFI contract would be unaffordable, contractually difficult and slow. PFI concessionaires are not incentivised to make large scale upgrades of treatment process at their own cost due to the lack of payback period.

Much of the remaining c.25% of Scotland's bioresources are treated by Scottish Water through smaller scale liming or AD facilities or taken directly as a dewatered cake material to land restoration. The AD facilities are up to 60 years old and are not at the regulatory or asset standards required today. Significant investment would be required to update, maintain and upgrade these facilities to meet current process safety standards and Industrial Emissions Directive (IED) requirements. These AD facilities are low capacity (c. 1,000 - 4,000 tDS/year compared to the proposed WCB at 85,000 tDS/year) but require much of the same ancillaries and systems, so the economic case is at a different scale and the smaller AD sites are not good value to maintain in operation.

Lime treatment has been assessed as not maximising the potential of bioresource and requiring more landbank for recycling alongside incurring public acceptability odour management issues. Land restoration as an outlet is forecast to become significantly constrained. Drying, such as at Daldowie, produces a WDF pellet output but relies on gas for heat which produces significant greenhouse gas emissions (27,000 tCO_2e per year). More energy is used to dry the material than is produced when the WDF pellet is used. The Energy-from-Waste (EfW) contract with a cement works (which currently takes the majority of bioresource pellets from the Daldowie BTC) will expire with the PFI contract in 2026, likely leading to a cost rather than revenue for pellet recycling.

The Bioresource Strategy was developed on this basis and considers the opportunity of the returning PFI contracts to address the needs of aging assets, obsolete technology and emerging risks to provide a bioresource service fit for today and the future. The bioresource system for Scotland is being developed with a 'spoke and hub' model of a small number of large capacity

[6] Scottish Government Draft Climate Change Plan

treatment sites fed by a network of dewatering centres to reduce logistics costs. The single largest contributor to the delivery of this strategy is the WCB investment, which, when complete, will process bioresource from over 270 waste water treatment works (WWTWs), and 323 public septic tanks, across Greater Glasgow, Ayrshire, Fife and Tayside using regional dewatering centres and a central AAD plant at Daldowie.

A number of investment decisions have already been made in line with this strategy. Smaller scale anaerobic digesters at Stirling and Dalderse WWTWs have been decommissioned as it was demonstrated that this was the best value option for customers. Galashiels and Cumnock digesters will similarly be decommissioned in 2026, when their 10 yearly internal inspections are scheduled, and the Hawick digester will not be reinstated following a recent internal safety inspection. Bioresource from these sites will be transported to West Central or Seafield AAD sites for treatment once these sites are available. In the interim period, lime treatment and increasing throughput at other BTCs, will provide treatment capacity. This presents a temporary risk that is being managed on the basis that WCB will be delivered by 2031.

AAD was identified in Scottish Water's Bioresource Strategy as the preferred bioresource treatment solution for future investments, a decision independently revalidated in 2023 by EY-Parthenon. AAD is the preferred bioresource treatment technology used by water utilities in England and Wales, as well as Europe. AAD produces an enhanced biosolid product suitable for agriculture, typically reduces dry solids by 50%, (resulting in a substantial decrease in bioresource mass compared to conventional dewatering processes), minimises odour, and valorises byproducts such as biogas, providing value for customers. Scotland produces around 32 GWh/year of electricity from bioresources, maximising AAD at Daldowie could increase this generation up to 215 GWh/year.

Across England and Wales, the water and sewerage companies have transitioned to using AAD, with liming used as a contingency outlet for 1 – 5% of bioresources. The outlier is South West Water, which in Asset Management Plan period 7 2020-2025 (AMP7) treated 70% of their bioresources using lime stabilisation. Their Asset Management Plan period 8 2020-2030 (AMP8) business plan sets out their plan to transition from liming to 100% AAD over the regulatory period[7].

2.2 The Future of Daldowie Bioresource Treatment Centre (BTC)

Daldowie BTC is the largest bioresource treatment facility in Scotland. It was built under a PFI agreement that is set to expire in 2026, returning to Scottish Water with 5 years remaining life. In 2022, Scottish Water decided not to extend the existing contract by another five years.

The Greater Glasgow region produces c. 64,000 tDS of bioresources per year, with Daldowie BTC currently processing around half of that. About 70% of this bioresource arrives via the 32 km Greater Glasgow Sludge Main (GGSM), while the remainder is transported to site by road tankers. Daldowie PFI was originally designed to handle up to 65,000 tDS annually using centrifugation and six parallel dryers.

Although the facility is expected to operate for five more years after the handover, outdated technology has resulted in decreased output and higher costs. The plant currently processes 32,000 tDS annually, well below its original design capacity of 65,000 tDS. Storage limitations also add risk, once the bioresource storage tanks fill (usually after three days), intake from the Greater Glasgow region must be restricted, creating compliance concerns at 150 WWTWs. These restrictions totalled 44 days in 2022; 53 days in 2023; 28 days in 2024 and 58 days in 2025 (excluding November and December), indicating continuing reliability concerns.

[7] Southwest water Enhancement Business Case

We have assessed changes to land restoration and the agricultural land availability

Currently, 17,506 tDS of Scotland's processed bioresource is directed to land restoration alongside water treatment works potable sludge. This represents one of Scottish Water's most significant corporate risks.

Over time, Scottish Water has relied on land restoration as an outlet route. This approach uses dewatered bioresources, blended with supplementary materials to engineer a topsoil-like substrate for application on vacant and derelict land, including the remediation of landfills and legacy industrial sites such as former open-cast mines. This blending process needs to be completed as this raw dewatered material is 'sticky' and difficult to spread otherwise with a high odour potential and pathogen content in comparison to an AD or AAD dewatered cake. However, the long-term capacity for land restoration projects is increasingly not viable and engagement with our supply chain indicates that, at the current throughput, land restoration capacity will be significantly constrained from 2027/28.

For Scottish Water and our PFI partners, the loss of the land restoration route and lack of current AAD capacity will mean a greater use of liming of dewatered cake as an interim measure. SEPA have expressed concerns about an increasing reliance on liming to support recycling bioresource to agriculture, and any resulting increase in odour complaints, should risks not be properly mitigated. The James Hutton Institute found that during and after land spreading odour emissions from the limed bioresources were 'more than an order of magnitude higher than from AD and AAD treated cake'[8]. Liming also adds chemicals and does not achieve the 50% destruction in solids accomplished with AAD which increases the amount of material and land (approximately double) required for recycling as application rates are based on dry solids. SEPA see activities that reduce the timescale on which we are relying on liming, and reduce the overall demand on agricultural landbank, as an advantage.

Since the Bioresources Strategy was produced there has been a significant change in regulations governing the application of bioresources to agricultural land. Between December 2023 and March 2024, the Scottish Government consulted on proposals to streamline environmental authorisations (Environmental Authorisation Scotland Regulations - EASR) to create an integrated framework covering water, waste, industrial activities and radioactive substances. The proposals included plans to require a permit for the application and storage of biosolids. At the same time, a number of new technical requirements were also proposed including incorporating parts of the Safe Sludge Matrix into legislation, tightening soil protection values and improving monitoring and sampling provisions. The proposals within EASR have consistently referred to the term 'acceptable agronomic levels' although this term is not defined within the legislation. SEPA consulted on proposed authorisation types between January and April 2024 and on proposed standard conditions between September and November 2024. In our response to the consultation on standard conditions, we asked SEPA for further guidance on the definition of 'acceptable agronomic limits' which appeared in a standard condition for phosphorus.

In February 2025, SEPA shared draft guidance on the recovery of waste to land for the purpose of soil recovery, setting out limitations on where recycling to agriculture would be appropriate. Further to feedback from Scottish Water and others, this draft guidance was amended and published on SEPA's website in May 2025. The Environmental Authorisation Scotland Regulations (EASR) came into force in November 2025 with supporting guidance aimed at ensuring 'acceptable agronomic levels' are met. Application of bioresources to existing landbank soils with moderate or high phosphorus levels will be more limited or prevented under the new rules. Over Autumn 2025, SEPA met with Scottish Water and other operators, to explore impacts on land recycling activity. SEPA have published a temporary regulatory position statement

[8] Sewage sludge: odour emissions assessment

(TRPS) that covers storage, soil sampling frequency, laboratory accreditation and soil phosphorus levels, with the latter introducing a 5-year transition (up to November 2030) to meeting required phosphorus limits. This guidance works across all material being applied to agricultural land with material from Scottish Water making up c. 2% of that total.

From the 2024 UK-wide Grieve landbank report, the current total agricultural land required for Scottish Water bioresources is estimated to increase by around three times to c. 203,800 ha (from a baseline of c. 72,500 ha) as permissible agricultural land application rates, in particular for phosphorus, are reduced. Initial Scottish Water assessments with PFI operators forecast up to a four times increase in land required for recycling based on SEPA's EASR guidance. The higher PFI forecast is related to the application of the Daldowie pellets which potentially can have a more concentrated phosphorus content and this needs to be examined further. Both assessments are based on a one in three year field application. More detail is provided in Section 3 in relation to the WCB investment and liming option Decision 5 comparison and the Scottish agricultural landbank requirements will be subject to a further review in 2026 by Grieve Strategic. However, at this stage it is forecast on a UK basis that the EASR related guidance land requirements of 3,799,000 ha are above the current UK agricultural land availability of 1,341,000 ha.

Alongside, these increased requirements for agricultural land and cessation of land restoration in Scotland, related changes in Environment Agency (EA) farming regulations in England are likely to intensify competition for suitable land within Scotland (Figure 1).

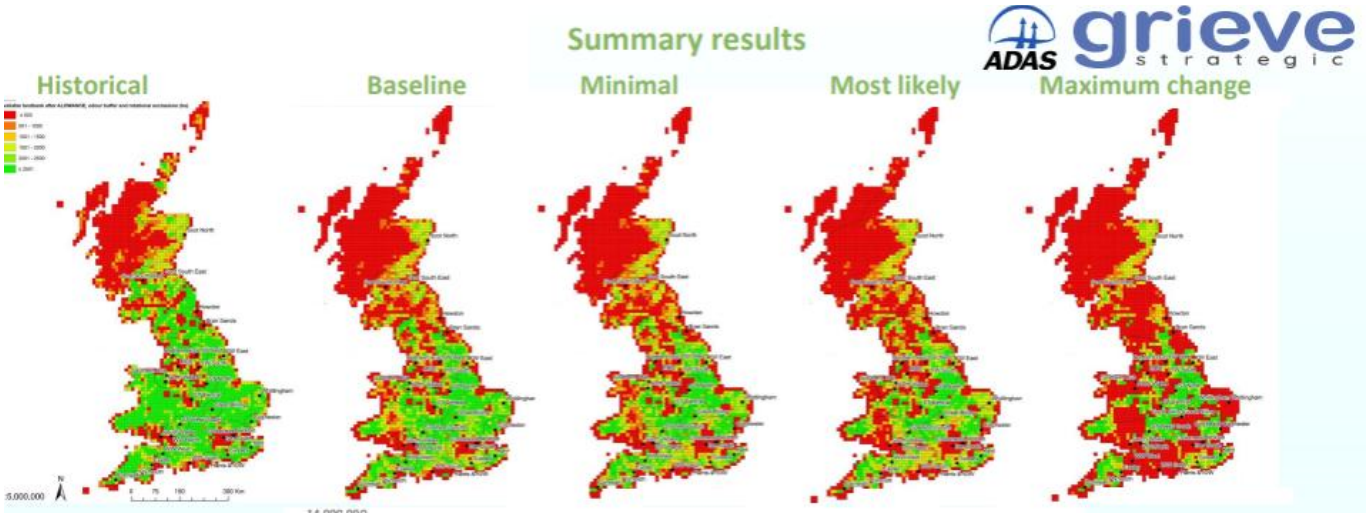


Figure 1: Summary of National Landbank Study showing impact of changes to EA regulation on landbank availability (Grieve, 2024)

Therefore, new agricultural outlets must be identified. To address the current gap in outlets as land restoration capacity diminishes, Scottish Water have recently initiated a procurement process to secure additional recycling capacity. This targets strategic locations where capacity shortfalls have been identified, including Inverness, Perth, Kinneil Kerse and Central Glasgow.

If over the transition period we find that we cannot identify and access the landbank (with low enough phosphorus status) to allow us to recycle bioresource at lower application rates required, we will need to identify alternative routes. This is likely to need us to identify options such as Advanced Thermal Conversion (ATC) technologies or incineration to treat any residual bioresources.

2.3 Assessment of Alternative Bioresources Treatment Technologies

Waste water regulations in the EU have recently changed and tightened, with further restrictions, for example in the recast Urban Waste Water Treatment Directive (rUWWTD – 91/271/EEC) for micro-pollutants (e.g., PFAS, pharmaceuticals). In Scotland, there are ongoing discussions on proposed alignment to the rUWWTD which could bring a stronger focus on the treatment of these pollutants.

If greater levels of waste water treatment were required, then this would in turn need additional treatment of bioresources. Two further alternative treatment methods are available. Firstly, incineration, which reduces bioresource solid content and volume and produces an ash which can be taken to landfill. However, it is costly, sits lower in the waste hierarchy, has lower energy recovery benefit than AAD and there is currently a Scottish Government initiated moratorium on new incinerators in Scotland[9]. Advanced Thermal Conversion (ATC) technologies such as hydrothermal liquefaction (HTL), pyrolysis, hydrothermal carbonisation (HTC) and gasification may offer greater potential in the future for treatment of bioresources, opening up new routes to energy recovery, pollutant destruction and recovery of other resources (Table 4). The resource recovery routes may reduce dependency on existing outlets to land, landfill and direct energy recovery. However, these ATC technologies are in their infancy within the waste water sector in the UK, have high potential capital costs and unproven performance. These technologies could be incorporated in the future as they develop. Current knowledge indicates that it is likely to be cost viable to use these ATC technologies following AAD, since the amount of dry solids requiring processing (and therefore scale and cost) is much reduced.

Preliminary results from an assessment being completed by AtkinsRéalis due to conclude in 2026, indicate that if future legislation requires further processing of bioresource, direct pyrolysis would be c. 50% more costly than AAD combined with pyrolysis. This assessment is standalone and the throughput and cost basis are not to be compared directly with Section 3.

Table 4: Summary of ATC technologies being evaluated

Company	Scale	ATC process	Input material	Output Material
FireFly[10]	Pilot scale - commercial scale by 2028	Hydrothermal liquefaction	AAD dewatered advanced digested cake (Seafield BTC and Nigg BTC)	Biocrude for use as a sustainable aviation fuel, waste water and char
EnertecGreen[11]	Pilot scale funded by OFWAT Innovation Fund.	Gasification	Pellets. Digested cake trials not yet conducted.	Syngas, ash and vitrified stone Drying stage is required which is energy intensive.

[9] The effectiveness of the Scottish Government's implementation and application of environmental law in relation to incineration capacity in Scotland

[10] Firefly announce plans for world-first sewage to SAF plant in Harwich

[11] Yorkshire Water ATC Gasification Project

Company	Scale	ATC process	Input material	Output Material
Onunda (UK)[12]	Pilot scale	Hydrothermal carbonisation + Gasification	AAD dewatered cake (Nigg BTC) AD dewatered cake (Hatton BTC)	Char, waste water and ash

Overview

Our conclusion is that AAD is the optimum technology and the intervention is essential to replace ageing assets, and reduce rising operational, compliance, and environmental risks. It aligns with Scotland's circular-economy and net-zero ambitions by maximising value from bioresources and reducing environmental impact. A modern AAD solution strengthens long-term national resilience, provides a flexible platform for future regulatory and technological change, and supports reliable customer service. Overall, the preferred direction offers the strongest strategic fit with national policy, regulatory expectations, and Scottish Water's long-term objectives.

[12] Onunda

3 The Economic Case

3.1 Context

Scottish Water's Business Plan 2015 to 2021 outlined the intention to review the National Sludge Strategy in light of PFI concessions expiring from 2021 onwards, and to seek ways to exploit opportunities to extract maximum value from waste, with a projection to 2040.

The context at the time was that the Scottish Government published 'A Circular Economy Strategy for Scotland' in 2016 setting out priorities which include: "…. where products and materials are kept in high value use for as long as possible' and for 'Scotland to be an international leader in the efficient use of biological resources. While reducing waste is our priority, we want to maximise the value from biological resources which would otherwise end up in lower value uses or as waste.'' The Scottish Government also published a 'Scottish Energy Strategy' in December 2017. The main area applicable in the context of this strategy is to increase the percentage of the energy required for Scotland's heat, transport and electricity consumption from renewable sources. A third publication, 'Climate Change Plan' was published in February 2018 outlining the Scottish Government's vision and Scotland's path to a sustainable, inclusive low carbon society which covered sectors relating to transport, waste, land use and agriculture.

Scottish Water's Bioresource Strategy, developed in 2018, outlined how and when the following strategic objective should be delivered to maximise benefit from Scotland's bioresource (Table 5).

Table 5: Scottish Water's Strategic Objective in Relation to Bioresource

Customer	**Strategic Objective** **A sustainable bioresource service that delivers value for our customers**
Environment	• We will strengthen relationships with key stakeholders, farmers and local communities to demonstrate value and to ensure continuity in our biosolids service.
	• We will proactively work in partnership with other organisations to explore alternative sustainable options for water and waste water bioresource
	• We will review the strategic direction as necessary to adapt to changes and emerging risks and opportunities, such as legislative amendments, innovative technology and partnership working.
Assets	• We will operate and maintain bioresource assets to deliver a resilient service to internal and external customers, maximising value and producing consistently compliant biosolids.
	• In rural areas we will lead innovative approaches in smaller scale technologies, developing opportunities and integrated community solutions.
	• We will look to innovative and sustainable technologies and processes that will maximise renewable energy and be resource efficient.
Logistics	• We will explore options for reducing bioresource volumes transported and will continue to drive efficiencies in bioresource transportation while moving to a zero emission fleet
People	• We will develop the skills and talents of our people to ensure they have the capabilities required to operate, maintain, plan and deliver the asset systems in compliance with best practice.

The Bioresource Strategy made the following conclusions:

- Bioresources deliver benefit to society and the environment
- Maximising value from bioresource in terms of renewable energy, biofuel and biosolids is the key to reducing Scottish Water's overall carbon footprint while realising customer value

- Application of bioresources to land continues to provide the best sustainable environmental option for Scottish Water
- Best practice management of the bioresources service is vital to ensure delivery of efficiencies, resilience and customer service
- A high transport requirement will remain and is an area that requires further optimisation
- The production of renewable energy provides an opportunity to use this energy to fuel zero emission tankers in the future
- AAD is the preferred technology for treatment of Scotland's bioresource
- Further technology innovation will help address future landbank risk.

The Bioresource Strategy identified AAD as the best proven technology today and recognised there are innovative emerging technologies such as gasification and pyrolysis, as well as improvements to existing AAD technology, that could realise more benefits and further increase renewable energy generation.

In 2023, Scottish Water engaged EY-Parthenon to undertake a review of the Bioresource Strategy. This review made the following conclusions and recommendations:

- The bioresource strategy set in 2018 still holds and Scottish Water has made progress against it
- Near term, Scottish Water should process biogas through a mix of biomethane upgrading and Combined Heat and Power (CHP) with the digestate sent to farmland
- Scottish Water should fund the AAD programme 'internally' unless the cost of doing so compromises other strategic objectives
- Near term, to simplify the PFI transition, protect core business and ensure sites preserve focus on operational performance, an asset based operating structure for large bioresource sites may be most suited
- A phased roadmap and execution plan is needed to allow Scottish Water to evolve activity in line with market and policy developments.

3.2 SR21 Needs and Business Plan

The completion of the Bioresource Strategy prompted the creation of the following SR21 Needs:

- **Need ID 807 – Develop plans to generate energy and maximise value at Daldowie Sludge Treatment Centre post PFI contract**
- **Need ID 795 – Maximise energy generation and maximise value at Kinneil sludge treatment centre**

This resulted in the initiation of two projects which were raised under the Scottish Water 5-Step Intervention Delivery Process. This process is assigned to the most complex Needs and uses gateways and Project Investment Appraisals (PIAs) to structure, document and provide Governance for decisions.[13]

The development of these two projects necessitated a number of key decisions that are described below. These decisions were developed, documented and agreed through the PIA and Scottish Water's Investment Group

[13] The gateways and Project Investment Appraisals are Scottish Water specific and incorporate our understanding of the requirements of the Scottish Public Finance Manual and the HM Treasury Green Book.

Decision 1: Whether to extend PFI contract at Daldowie

Scottish Water inherited the Daldowie PFI contract from its predecessor, West of Scotland Water Authority. The contract is scheduled to expire on 1st April 2026, with three options at expiry:

- Option 1: Scottish Water extends the contract for five years, until 1st April 2031. This option had to be requested at least two years before expiry, or by 31st March 2024
- Option 2: Scottish Water assumes responsibility for the asset with a termination payment to the PFI owner. This option can be notified at expiry of the Contract or shortly thereafter
- Option 3: Scottish Water lets the contract expire, but the PFI owner retains the asset until 2059 (this is the default option of the Contract, but it is not viable as it will require Scottish Water to have an alternative facility in place by 2026).

In January 2022, the Scottish Water Board approved the recommendation that Scottish Water should not exercise its right to extend the contract and should assume responsibility for the assets from 1st April 2026 (Option 2), with a termination payment to be paid to the PFI partner in accordance with the contract.

The recommendation was based on the following reasons:

- Option 1 entails additional risk transfer from the PFI to Scottish Water, leaving all key risks, except operational and maintenance, to sit with Scottish Water regardless of who operates the asset. The following risks are transferred to Scottish Water under Option 1: (1) Energy inflation above RPI, (2) 5-year residual asset life, (3) General change in law, (4) Bioresource recycling outlet (including transport), (5) Plant enhancements
- Under a like-for-like scenario, the Net Present Value (NPV), over the period 2022/23 to 2031/32, will be between £7m and £16m lower for Scottish Water to take responsibility of the asset, than to extend the PFI contract
- By taking responsibility of the Daldowie BTC, Scottish Water will be able to operate the Glasgow waste water and bioresource systems as a whole and adopt a system approach. This provides opportunities to adjust risk appetite, improve performance, and, if possible, accelerate decision making around planning for an alternative solution to maximise the value of the bioresource once Daldowie reaches end of asset life in 2031.

As a result of this decision, Scottish Water will assume responsibility of Daldowie from 1st April 2026. The extension option has been discarded, and the PFI will expire.

Decision 2: How many bioresource treatment centres and projects are required?

Implementation of the Bioresource Strategy prompted the initiation of two projects to be developed concurrently: one for the WCB region (Need ID 807) and another for the Fife & Tayside bioresource region (Need ID 795).

Both projects were raised to provide bioresource treatment using AAD technology, maximise value from bioresources through energy and recovery, and recycle biosolids to agricultural land as the best sustainable option for the final outlet. This is to replace PFI assets, age expired conventional AD facilities and loss of land restoration as an outlet.

In developing these projects, costs were estimated for various sizes of AAD facility to help to understand what capacity should be provided for the best economic case. Through this work it was demonstrated that **it is better value to provide a single site to treat all the bioresource from the West Central and parts of the Fife and Tayside regions**. The PIA stages at which these decisions were made are summarised below in Figure 2.

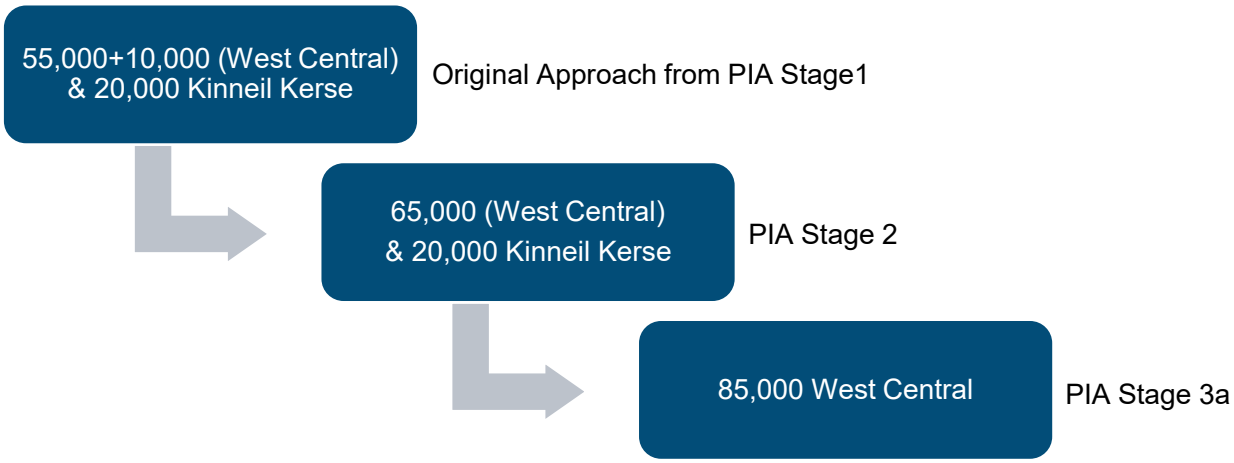


Figure 2: Stages of decision-making for number of bioresource treatment sites and projects

The projects were initially developed separately and then combined into one project at PIA Stage 3a. The justification for this is outlined in the following sections.

Decision 3: How many AAD facilities are required to provide best value and minimise operational risk in the West Central region?

Scottish Water explored whether it would be more economical to operate multiple smaller capacity AAD plants on different sites or consolidate all AAD capacity for the region onto a single site.

The assessment determined whether constructing a 10,000tDS/year AAD plant at Meadowhead, in addition to the 55,000tDS/year plant in Greater Glasgow, would be a more economical option compared to transporting the Meadowhead bioresource to a single larger energy hub within Greater Glasgow.

As shown below (Table 6), the comparison investigated build capital costs (promoted price), operating costs (base year 2025), and Net Present Cost (60 years) cost requirements. The costs were calculated using a BES Estimating tool and estimates of bioresource transportation costs between sites.

Table 6: Cost comparison of having a second facility at Meadowhead vs a larger facility in Greater Glasgow

	Meadowhead AAD	Greater Glasgow AAD	Two AAD: 1 in Greater Glasgow 1 at Meadowhead	Single AAD: 1 in Greater Glasgow	Savings if single AAD site in Greater Glasgow is selected
Throughput (tDS/year)	10,000	55,000	10,000 + 55,000	65,000	-
Capital costs (promoted price)					
Operating costs (base year 2025)					
60yr NPC					

The analysis confirmed that **it would be more economical to have a single 65,000 tDS/year facility in Greater Glasgow** . Having a 10,000 tDS/year AAD facility at Meadowhead would provide minimal operational benefits in terms of resilience but that this benefit would not justify the additional cost. The 10,000 tDS capacity is not big enough to receive additional inputs should the 55,000 tDS facility have reduced capacity due to maintenance activity.

Decision 4: Where should the 65,000 tDS AAD facility be located?

An assessment of possible locations for the region's AAD facility was undertaken and included evaluation of 17 existing waste water treatment works and 35 new sites (greenfield or brownfield sites within a 1km search boundary from the Greater Glasgow Sludge Main or GGSM). The number of possible new sites was reduced to six through an independent assessment by our consultant M2.

The possible locations were assessed based on several criteria:

- Land availability within or adjacent to identified sites
- Transport links and site access
- Proximity to the GGSM
- Capacity to export biomethane or excess power
- Environmental, community, and planning constraints
- Buildability.

The results of this assessment are shown below (Table 7).

Table 7: Rationale for discarding bioresource treatment facility location options

Option	Rationale for discarding
Philipshill	Constrained site with poor access
Allers	Poor access
Bothwellbank	Constrained site with poor access
Hamilton	Constrained site
Coursington	Constrained site with poor access
Carbarns	Poor access
SwinstieLo	Small WWTW with low final effluent (FE) flow, giving poor dilution of AAD treated liquors, resulting in high risk of FE compliance failures
Ardoch	Too remote, constrained capacity and history of odour issues
Inverclyde	Too remote and constrained capacity
Dunnswood	Constrained site with poor access
Dalmuir	No available land within or adjacent to site
Dalmarnock	No available land within or adjacent to site
Erskine	No available land within site and owner of adjacent land unwilling to sell
Laighpark	Buildability risks with land available within site and confirmed development on adjacent land

Option	Rationale for discarding
Shieldhall	No available land within site and owner of adjacent land unwilling to sell
New Site 17	Lack of access, community sensitivity and complex extension of GGSM
New Site 23	Scotia Gas Networks (SGN) advised against consideration as site extremely constrained in relation to its location between the River Clyde and the M74
New Site 27/28	SGN advised against consideration as full proposed injection rate cannot be achieved at this location, even if SGN were to make adjustments on the network
New Site 33	Unacceptable distance from GGSM
New Site 34	Located on the same plot of land as New Site 23 and owned by the same landowner. The landowner was approached with regards to New Site 34 but as the entire plot of land including New Site 23 is currently for sale, they confirmed they would be unwilling to sell part of the land to Scottish Water
New Site 35	Lack of available land on site

All possible new site options were deemed unattractive for the reasons shown and these options were discarded prior to the Stage 3a PIA. Further assessment of detailed costs related to construction, operation, and maintenance, and the associated carbon impacts of these options was therefore not undertaken.

The assessment of possible locations resulted in the decision to locate the region's 65,000 tDS/yr AAD facility adjacent to the existing Daldowie BTC.

Decision 5: Is it better value to combine Daldowie 65,000 tDS/year AAD facility and Kinneil Kerse AAD facility into one 85,000 tDS/yr AAD facility?

The Bioresource Strategy identified the close synergies between the Fife and Tayside and West Central regions and with the evidence prepared to combine Meadowhead and Daldowie, Scottish Water then considered if combining the Daldowie and Kinneil Kerse facilities would offer more value, resilience and operational flexibility (Table 8). For a robust comparison, the one site at Daldowie option was compared to Business as Usual (BAU), one site at Kinneil Kerse and a hybrid option with a site at Daldowie and another at Kinneil Kerse.

Table 8: A Summary of Options for Stage 3a: Outline Investment Appraisal

Strategic Option	Details
Option 0a: BAU (dryer with liming)	Maintaining existing operational practices alongside investment required to keep legal obligations and service levels, including replacing the existing dryers at Daldowie to be the best available equivalent technology, and other sites such as Meadowhead and Dalderse switching to liming to produce a treated product suitable for agriculture. Carbon capture could be used to ensure the contribution of the WCB project to the Scottish Water Net Zero target is unaffected. With the dryers remaining in operation in this option other measures would be required to offset the carbon impact of the dryers. This makes the carbon benefit comparable to option 4a.
Option 0b: BAU (liming)	Maintaining existing operational practices alongside investment required to keep legal obligations and service levels by switching to liming for all sites (including Daldowie) to produce a treated product suitable for agriculture
Option 4a: One site at Daldowie (85,000 tDS/yr)	Involves building an AAD plant at Daldowie and transporting all bioresource to the site via GGSM (58%), liquid tanker (13%) or as cake (29%). Dewatering capabilities will be added to current BTC sites that need to transport their cake

Strategic Option	Details
Option 6a: One site at Kinneil Kerse (85,000 tDS/yr)	Involves building an AAD plant at Kinneil Kerse and transporting all bioresource to the site via liquid tanker or as cake. Dewatering capabilities will be added to current BTC sites that need to transport their cake
Option 6b: One site at Daldowie (65,000 tDS/yr) and one site at Kinneil Kerse (20,000 tDS/yr)	Involves building two AAD plants, one at Daldowie and one at Kinneil Kerse. The bioresource from West Central is transported to Daldowie via GGSM, liquid tanker or as cake, and the bioresource from Fife & Tayside to Kinneil Kerse via liquid tanker or as cake. Dewatering capabilities will be added to current BTC sites that need to transport their cake

The costings for these options are shown in the table below and are taken from the Stage 3a PIA for West Central Bioresource (Table 9).

Table 9: Appraisal option cost summary

Cost Assessment	Option 4a: One site at Daldowie	Option 6a: One site at Kinneil Kerse	Option 6b: One site at Daldowie and second site at Kinneil Kerse
Tier 2 capital costs (60 years)			
Tier 1 operating costs (60 years)			
Carbon capture costs (60 year)			
Revenues (60 years)			
NPC (60-years)	917-1,355	1,024-1,473	998-1,478
SR27 capital costs (in 2025 prices)			
Annual operating costs 2031 (in 2025 prices)			

The carbon emissions for these options are shown below (Table 10) taken from the Stage 3a PIA.

Table 10: Appraisal option carbon summary

Carbon Assessment	Option 4a: One site at Daldowie	Option 6a: One site at Kinneil Kerse	Option 6b: One site at Daldowie and second site at Kinneil Kerse

Embodied carbon (60-years) (tCO_2e)	110,658	110,658	124,133
Operational carbon (60-years) (tCO_2e)	511,522	608,384	538,408
Annual operational emissions in 2040 (tCO_2e)	6,244	8,027	6,648
Whole-life carbon (60-years) (tCO_2e)	622,180	719,042	662,541

The above data shows that one site at Daldowie (Option 4a) has the lowest NPC and lowest whole life carbon.

The 85,000 tDS/yr AAD plant would have 4 streams. All streams would operate in normal conditions at a steady state. There is the capacity to change the operating parameters and 'ramp up' the lines meaning that for 'maintenance mode' the equivalent 85,000 tDS/yr throughput can be achieved through three streams. This allows for both maintenance at Daldowie and at other BTCs throughout Scotland so is the best overall system option to provide resilience and operational flexibility. The maintenance throughput has been used for the commercial comparison in Section 5.

Having one site at Kinneil Kerse (Option 6a) was discarded on the basis that the transport of bioresource would add more cost and risk than a Daldowie option [redacted] NPC over 60 years. Having one site at Daldowie and a second at Kinneil Kerse (Option 6b) was discarded as there are higher costs and risks associated with building and running two sites rather than one.

Having one site treating 85,000 tDS/yr at Daldowie (Option 4a) was therefore selected as the preferred option, meaning both Need ID 807 and Need ID 795 will be addressed as part of the WCB project. With both projects combined, the project to deliver Need ID 795 was closed.

Decision 6: Can Project Willow deliver the Needs?

One of the recommendations in the Project Willow report[14] is a 150,000-200,000 tonnes wet weight/yr AD/AAD (estimated at 37,500 - 50,000 tds/yr) plant at Grangemouth, treating a feedstock made up of farmyard manure and waste water bioresources collected from within a 20 km radius. Distance was seen as the limiting factor in the sizing of the plant and the high-level estimate of the capital cost is £[redacted]m and the new site would deliver 55 – 70 operational jobs. For comparison, the operation of the current Daldowie PFI plant supports 75 full time roles, these roles will transfer into Scottish Water in line with Transfer of Undertakings (Protection of Employment) regulations in April 2026 and we expect the majority of these will be required to operate the WCB plant once constructed.

Scottish Water examined the option of locating an AAD facility at the Grangemouth refinery site. Grangemouth is adjacent to Kinneil Kerse and the costs of this option has been examined in comparison to Daldowie and Kinneil Kerse. Grangemouth's 60 year NPV was assessed as £[redacted]m significantly higher than both previous options. The cost comparisons are shown below (Figure 3), which also identifies hybrid options to regenerate both sites for comparison.

[14] Project Willow

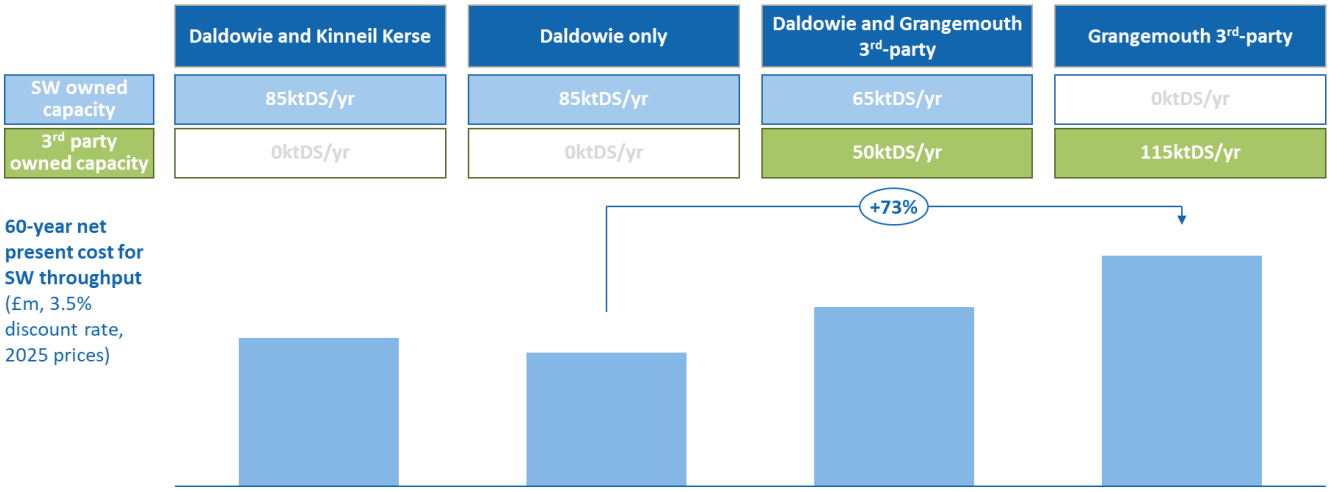


*Figure 3: Grangemouth option cost comparison**

*SR27 Scottish Water Capex (£m) is not directly comparable to Table 9 due to the costs in Table 9 being undiscounted whereas the figures in Figure 3 use a discounted cost model.

If a third party were to express interest in acquiring and redeveloping the refinery site, this option would be more costly than redeveloping Daldowie and would offer no additional benefits beyond social value. However, it would also reduce social value in the Daldowie area, as the dryer facility there would be closed and not replaced. The conditions identified for Grangemouth to be a viable option include:

- A third-party developer to have a confirmed commitment to establishing a new AAD facility at Grangemouth within the timeframe for EASR. This would be no later than the WCB option.
- Confidence in the growth potential of Scotland's bioresource sector, specifically the expectation of processing volumes exceeding 85,000 tDS/yr, which would enable economies of scale and support gas-to-grid revenue generation.

While these options would support the Scottish Government's strategy for Grangemouth, either would increase costs for Scottish Water customers. There are two developers that Scottish Water have been in discussion with and are developing plans for facilities at Grangemouth. The first development required AAD cake (i.e. the output from the proposed WCB project) and so remains a potential opportunity to work with, regardless of where the AAD facility is constructed. A second early-stage developer enquiry has been notified to Scottish Water in 2025 via Scottish Enterprise whom we will continue to engage with alongside the prospective developer, as yet it is not confirmed whether the feedstock required is raw cake or AAD cake.

The proposed single site AAD facility at Daldowie, treating 85,000 tDS/yr was concluded as the best value.

Decision 7: Can we defer investment to SR33 and manage the biosolids recycling risk through extended liming operations in SR27?

Given the significant capital investment required, Scottish Water has explored the potential to defer the start of the WCB project to the next Strategic Review of Charges (2033). Two scenarios to defer the investment were assessed, both assuming no change to current legislation:

- **Deferral option 1: Defer AAD facility investment until SR33 by maintaining the Daldowie dryers.** Build AAD facility to be operational in 2037. The dryers at Daldowie will be replaced when they reach end of life in 2031 and run until AAD is operational. Other sites will switch to liming until AAD is operational to produce a treated bioresource that is suitable for recycling. Option 0a

- **Deferral option 2: Defer AAD facility investment until SR33 by installing liming at Daldowie.** Build AAD facility to be operational in 2037. The dryers at Daldowie will be turned off upon PFI return and replaced by liming until AAD is operational. Other sites will switch to liming until AAD is operational to produce a treated bioresource that is suitable for recycling. Option 0b

There are two key activities that are required to sustain operations: keeping the thermal dryers at Daldowie operational at their current throughput (32,000 tDS/year) and, managing the liming operations for a longer period of time for 48,000 tDS/year. It is realistic to assume that the dryer operational performance will be consistent with current throughput deterioration over the last few years.

Therefore, the following actions are required:

- Implementing a targeted maintenance programme to sustain asset performance of the dryer (32,000 tDS/year)
- Continuing liming operations with dewatered cake from Daldowie (c. 8,000 tDS/year)
- Continuing liming operations across the Central Belt (c.11,000 tDS/year)
- Develop new liming capacity to replace land restoration (c. 22,000 tDS/year)
- Continued drying at Levenmouth BTC until 2038 (c. 3,000 tDS/year)
- Transfer to Nigg BTC for treatment by AAD (c. 4,000 tDS/year)
- Enhancing odour monitoring and management to address community and regulatory concerns
- Securing additional non-agricultural outlet for pellets for at least five years to diversify recycling routes.

Deferring the WCB project at Daldowie from 2031 to 2037 would reduce Tier 2 investment in SR27. These reductions are then offset by the Tier 2 expenditure then required in SR33. The overall increase in NPC for 2037 deferral is c. £[redacted]m.

Deferral would elevate operational, financial, and compliance risks across Greater Glasgow and Scotland more broadly. An example of this is the AAD plant at Scottish Water's Nigg facility in Aberdeen, which is due for significant maintenance around 2033, which will remove all treatment capacity at Nigg for around a year. The interlinked, system nature of bioresources means that the planned AAD plant at WCB will be used to provide additional capacity to mitigate that lost during the Nigg maintenance. If WCB is not available, liming will be the only option to replace Nigg during maintenance. Liming would approximately double the landbank requirement (based on dry solids) based on current application rates for recycling of Nigg's bioresource as well as significantly increase the odour risk.

The reliability of the existing dryers at Daldowie is deteriorating, threatening service continuity and regulatory compliance, and putting more pressure on liming operations and land availability. Land restoration is forecast to become significantly constrained from 2027/28 and this, compounded with the tightening regulatory standards for agricultural land application, due to EASR guidance, potentially increases the need for agricultural land requirements by 3-4 times. As this new

guidance is in force from 2025, there is a significant risk that the availability of agricultural land suitable for bioresource recycling will diminish over the next 5 years.

In the UK, Scottish Water will be uniquely exposed to the risks associated with liming operations. These risks include:

- Larger amounts of dry solids in the product, so higher land requirements
- Odour from limed bioresource is much more aggressive than the AAD product. This leads to increased negative attention to our recycling operations and draws attention to sewage bioresource being 'spread' on agricultural land overall for the UK. The public perception of this is growing, and liming operations in Scotland are likely to elevate this perception. We will be unique in the UK by using liming and our activities may elevate a UK debate in a similar way to the topic of Unsatisfactory Intermittent Discharges (UIDs), bringing forward legislation and actions to end the practice
- SEPA has expressed concern about growing reliance on liming before agricultural recycling. Reducing this dependency and easing pressure on the agricultural landbank through alternative treatment options; such as AAD is advantageous. SEPA also notes that limiting the duration of reliance on liming and reducing overall demand on agricultural land (e.g. via AAD) would provide significant benefits
- Scottish Water Corporate Risk Register RSK171 Risk notes that outlets for bioresource recycling are no longer available and cannot be effectively mitigated by lime treatment options
- If agriculture becomes unavailable to us, we do not have an alternative regulatory outlet as land restoration is due to become significantly constrained from 2027/28 and landfill is not a viable option. In the wider water industry, incineration is viewed as being the only viable immediate option, were recycling to land disappear. Incinerators have lengthy planning and construction periods, are capital intensive and do not recover nutrients or energy from bioresource or contribute to our Net Zero ambition.

The quantity of bioresource that will need to be recycled in the three scenarios below are presented in Figures 4 - 12:

- With WCB: the scenario where the 85,000 tDS/yr AAD facility is constructed by 2031 (Option 4a in the Stage 3a PIA) – Figure 4, 7 and 10
- No WCB: the scenario where AAD is not constructed and the Daldowie dryers are kept in use (Option 0a in the Stage 3a PIA). Other sites will switch to liming. Figure 5, 8 and 11
- No WCB – Dryers off: the scenario where AAD is not constructed and the dryers are switched off in 2031 at the end of their forecast lifespan. Additional lime treatment would be used to replace the capacity lost from the dryer de-commissioning (Option 0b in the Stage 3a PIA). Figure 6, 9 and 12

In all scenarios the spike of volume in 2033 represents the planned maintenance at Nigg Bioresource Treatment Centre, which will result in shut-down of the facility for c.12 months. Without WCB available this results in a larger temporary increase of biosolids as this would be treated by lime without WCB. This situation would be the same in any loss of capacity in the Scotland-wide system.

The consequence of more wet tonnes to recycle is an increase in transport requirements. This results in more vehicle movements, more tankers/haulers required in the transport fleet, and higher carbon emissions and operating costs. In addition, for the two scenarios without WCB (0a and 0b) the amount of tonnes dry solids of bioresource is higher, than the AAD WCB option, with or without the dryers, as dryers only remove water from bioresource. With the AAD that the WCB project provides, the process converts dry solids into biogas and so there is 50% less dry solids to recycle. This means that when recycling the treated bioresource to agricultural land, as the

application rate allowed is linked to the phosphorus content, which is proportional to tonnes dry solids, the amount of land required is reduced. Although operating dryers has an advantage in reducing wet volume and so saving transport costs, it does not reduce dry solids and so the land required is the same (or greater depending on the phosphorus content) as for lime treatment.

The land requirement for the WCB AAD product before EASR guidance is taken into account is c. 39,700 – 40,000 ha/year compared to the deferral option (0a) retaining the dryers and liming which is approaching doubling of that land requirement at c. 67,700 – 75,200 ha/year. (Figure 4,5 and 6).

Following EASR guidance implementation, initial assessments forecast the land requirement to increase by 3 – 4 times, to c. 119,100 – 160,100 ha/year for the WCB AAD bioresource product and 203,100 – 300,700 ha/year for the deferred dryer and liming option (0a). The WCB investment would therefore greatly reduce the area of land required (by c. 84,000 – 150,000 ha/year) and therefore is significantly less exposed to the landbank availability risk (Figures 7-12).

Scottish Water will be completing a review in 2026 with the consultants Grieve Strategic to assess Scotland's agricultural landbank availability. However, availability in the range of c.200,00-300,000 ha/year for the deferred options is not assessed to be viable at this point.

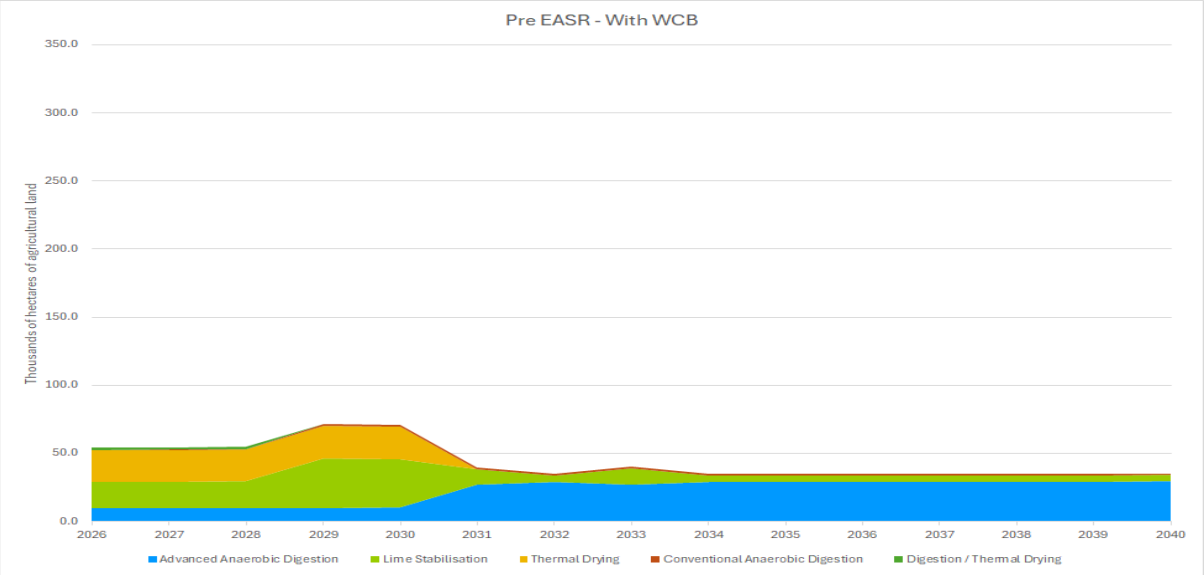


Figure 4: Agricultural land required (in hectares and assuming a one in three year field application) for WCB prior to EASR implementation (Option 4a)

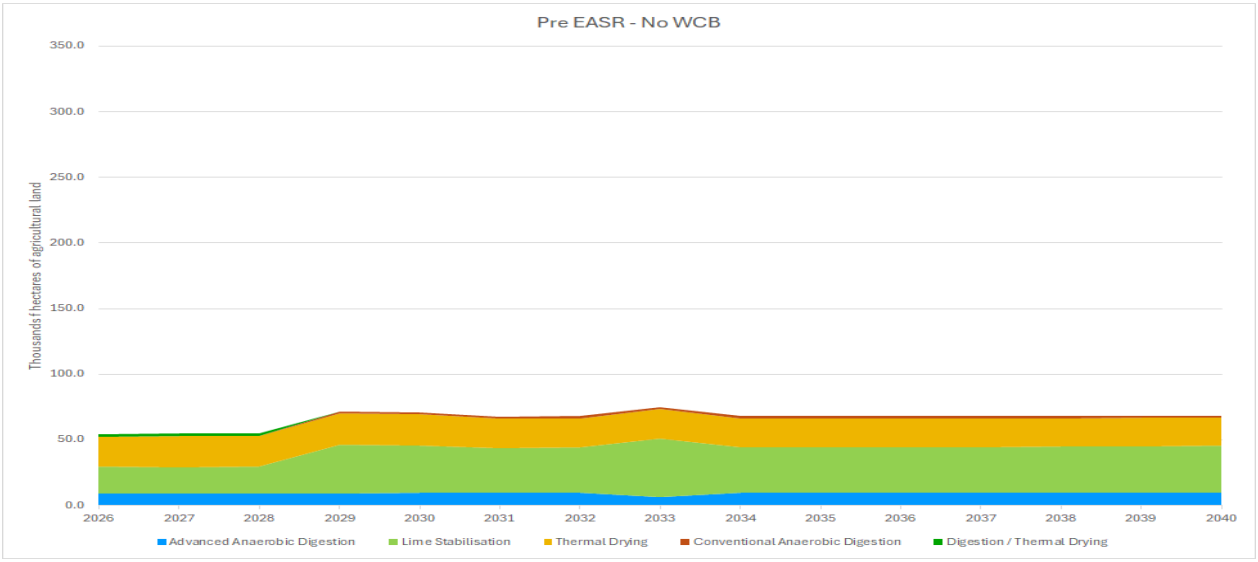


Figure 5: Agricultural land required (in hectares and assuming a one in three year field application) for the deferral option (No WCB: Daldowie dryers are kept in use (Option 0a in the Stage 3a PIA) with liming) prior to EASR implementation

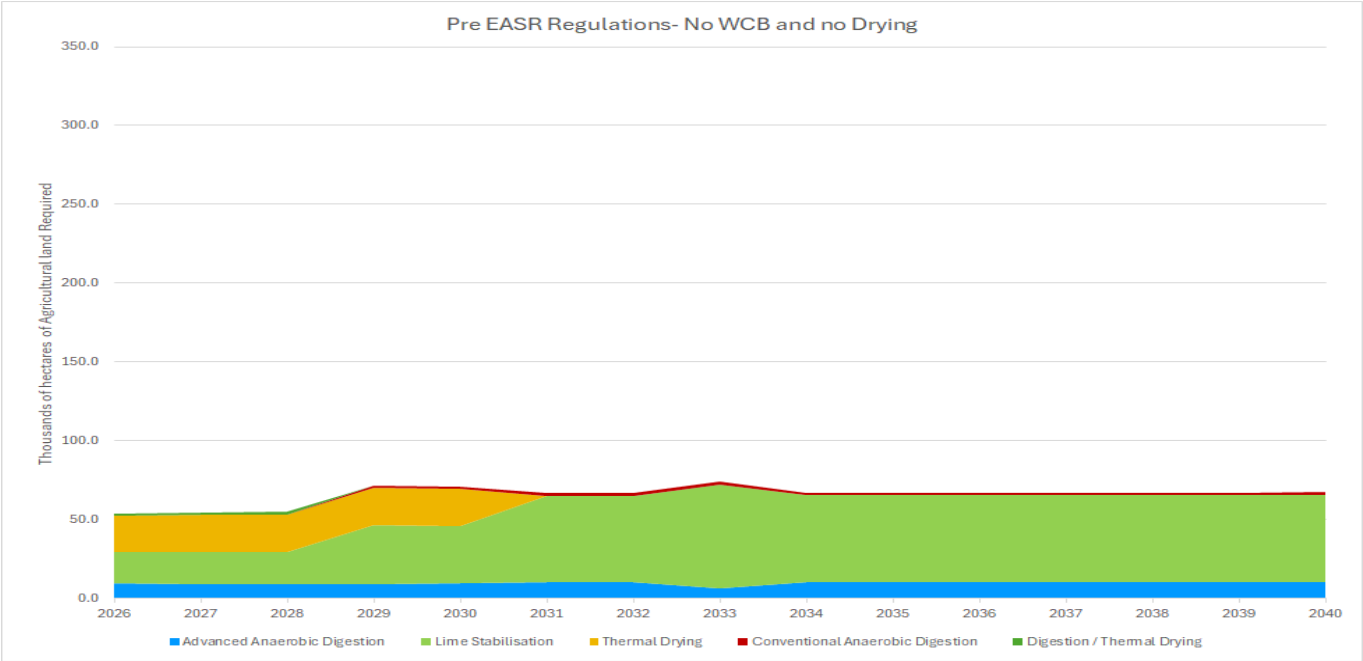


Figure 6: Agricultural land required (in hectares and assuming a one in three year field application) for the deferral option (No WCB: No dryers kept in use (Option 0b in the Stage 3a PIA) with liming) prior to EASR implementation

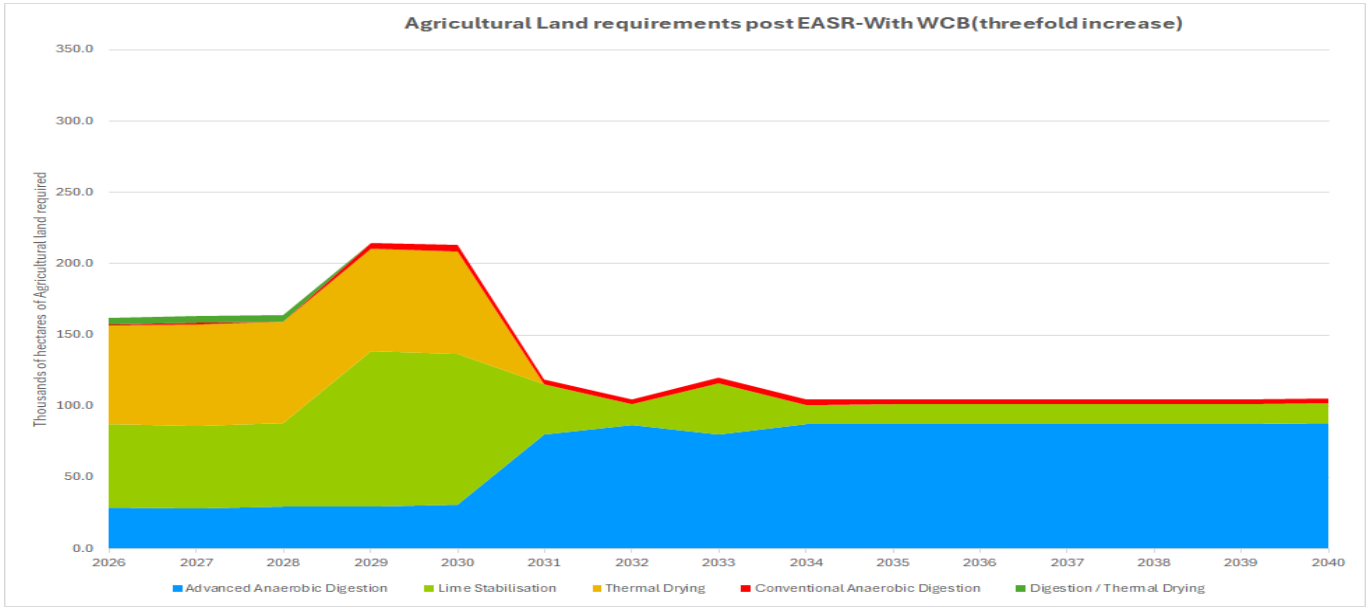


Figure 7: Agricultural land required (in hectares and assuming a one in three year field application) for WCB deferral options with EASR implementation assuming a three times increase in land requirements (Grieve report basis)

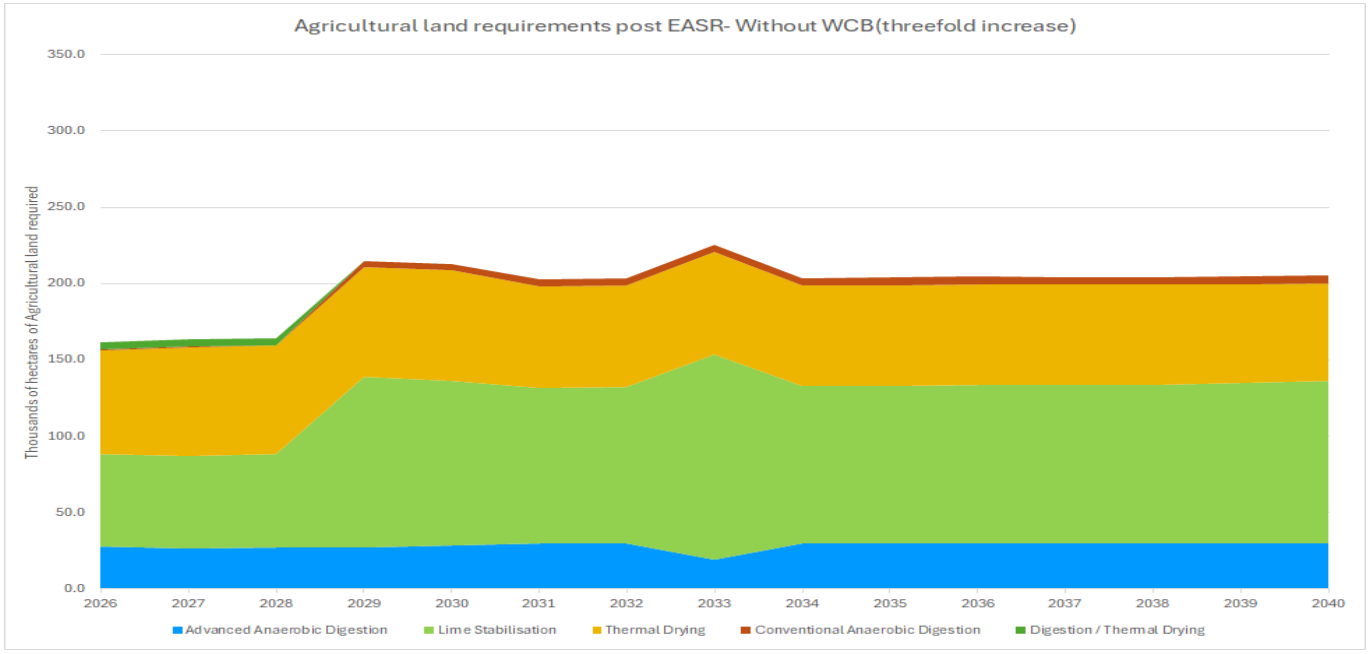


Figure 8: Agricultural land required (in hectares and assuming a one in three year field application) for WCB deferral option (No WCB: Daldowie dryers are kept in use (Option 0a in the Stage 3a PIA) withliming) with EASR implementation assuming a three times increase in land requirements (Grieve report basis)

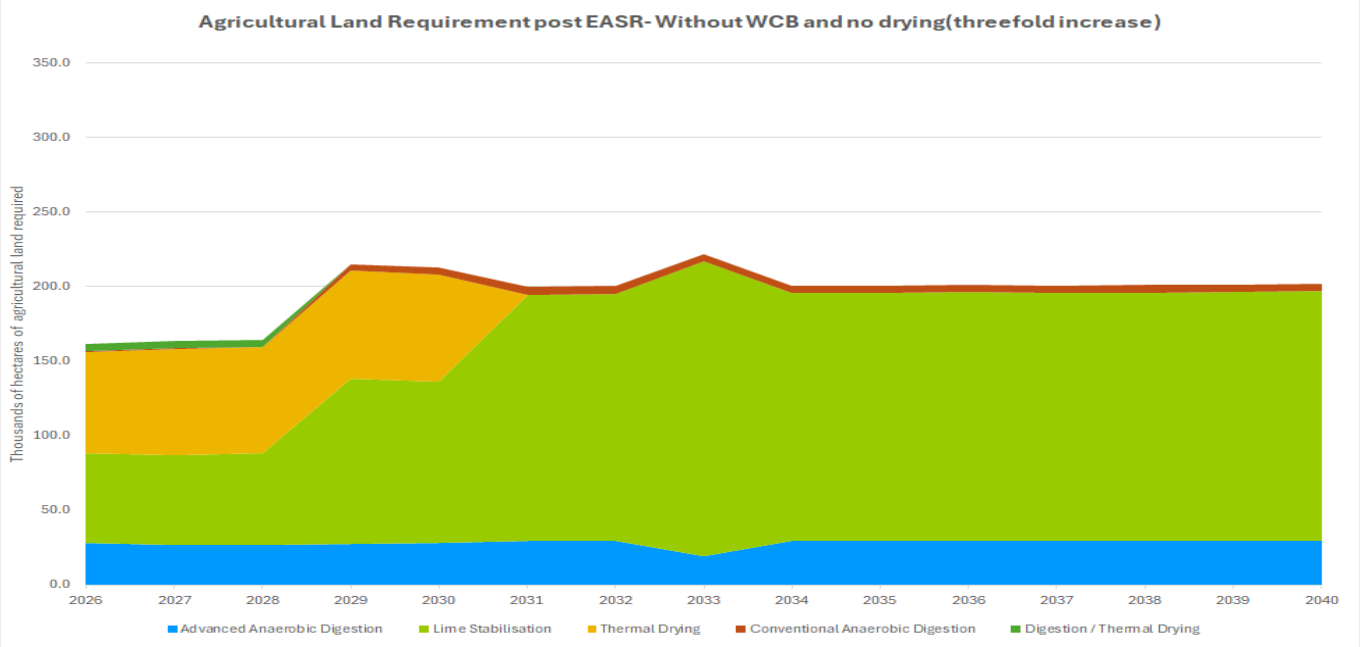


Figure 9: Agricultural land required (in hectares and assuming a one in three year field application) for WCB deferral option (No WCB: No dryers kept in use (Option 0b in the Stage 3a PIA) with liming) with EASR implementation assuming a three times increase in land requirements (Grieve report basis)

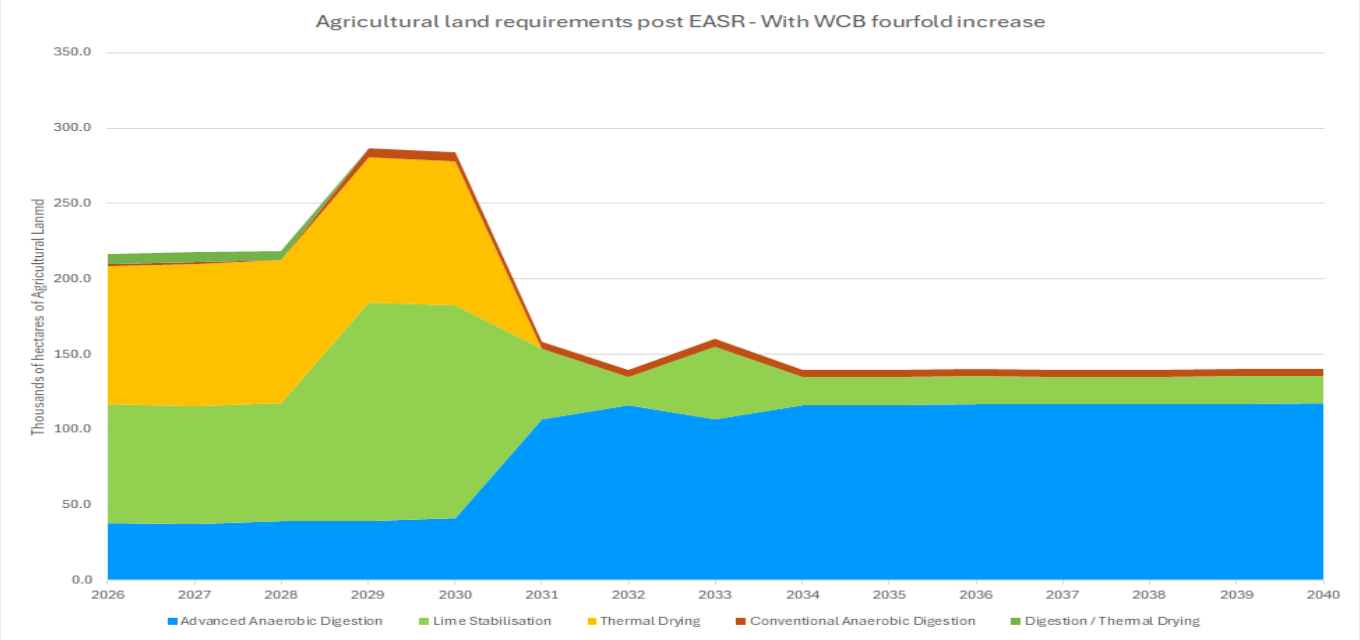


Figure 10: Agricultural land required (in hectares and assuming a one in three year field application) for WCB deferral options with EASR implementation assuming a four times increase in land requirements

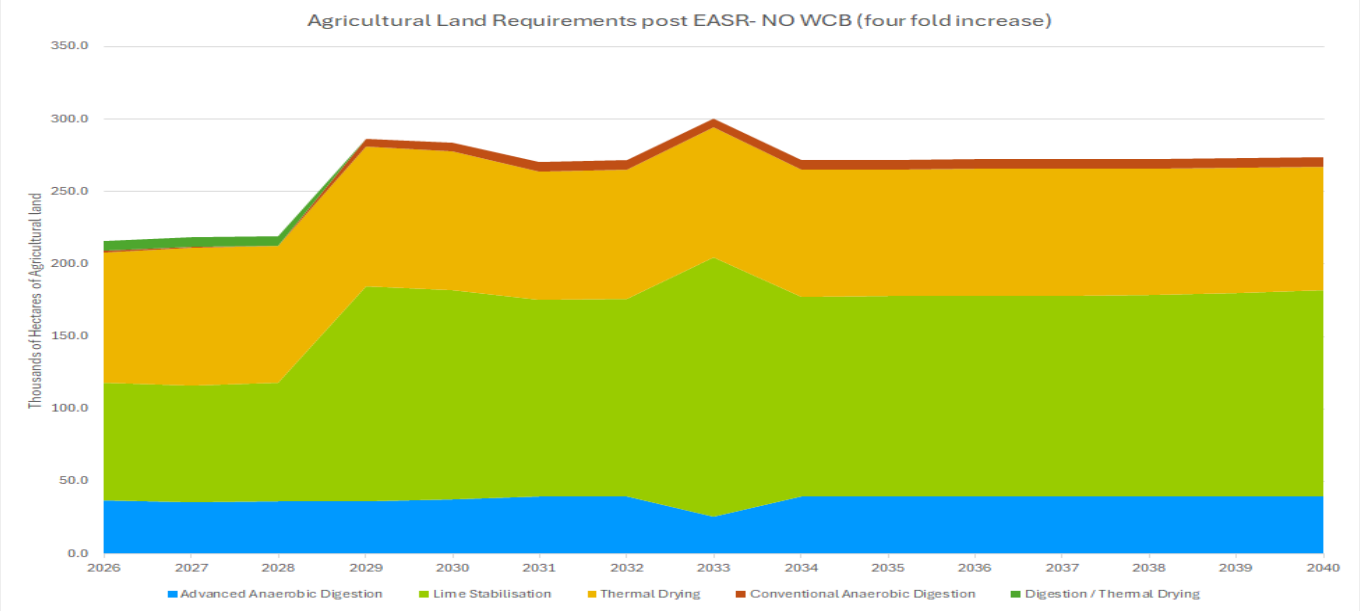


Figure 11: Agricultural land required (in hectares and assuming a one in three year field application) for WCB deferral option (No WCB: Daldowie dryers are kept in use (Option 0a in the Stage 3a PIA) with liming) with EASR implementation assuming a four times increase in land requirements

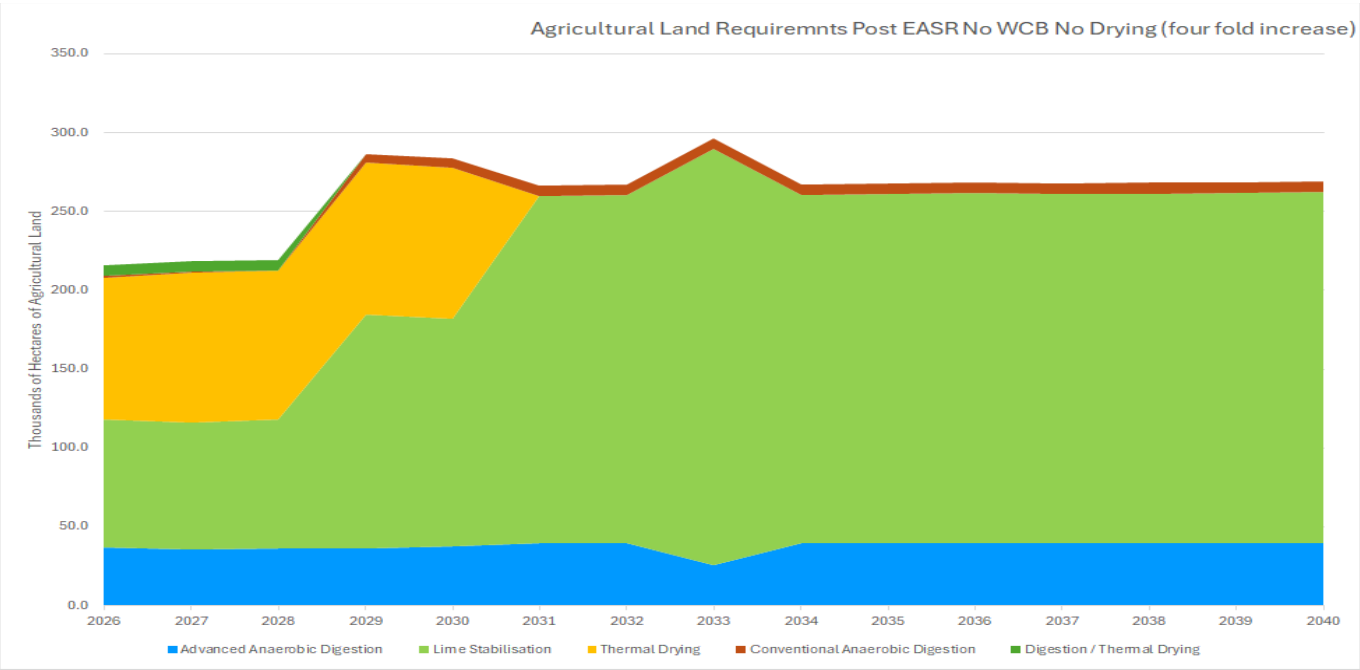
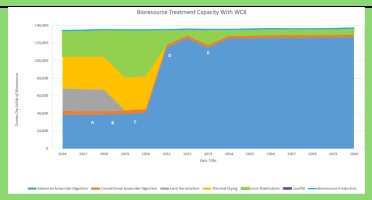
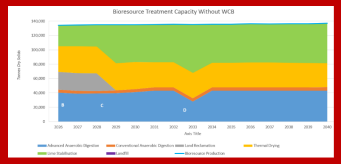
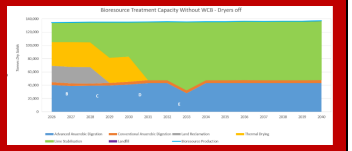


Figure 12: Agricultural land required (in hectares and assuming a one in three year field application) for WCB deferral option (No WCB: No dryers kept in use (Option 0b in the Stage 3a PIA) with liming) with EASR implementation assuming a four times increase in land requirements

These considerations are summarised in Table 11 below:

Table 11: Comparison of Options 4a, 0a and 0b

		Option 4a: 85,000tDS/yr site at Daldowie	Option 0a: BAU (dryer with liming)	Option 0b: BAU (liming)	Comments
Risk	**Aligns with Bioresource Strategy (N807 & N795 Maximise value from bioresource product)**	Meets Needs	Does not meet Needs	Does not meet Needs	
	Compliance with Regulations	Yes	Yes	Yes	SEPA has raised concerns about continued use of liming
	Improved Treated Product				Lime stabilised product are not fully enhanced and have lower farmer acceptability Graphs replicated with detail below - Figure 17
	Agricultural Land Requirement	c.39,700 ha/year prior to EASR and 40,000 ha/year with Nigg (2033) c. 119,100 ha/year with EASR (three times) and 120,000 ha/year with Nigg (2033) c. 158,700 ha/year with EASR (four times) and 160,100 ha/year with Nigg (2033)	c. 67,700 ha/year prior to EASR and 75,200 ha/year with Nigg (2033) c. 203,100 ha/year with EASR (three times) and 225,500 ha/year with Nigg (2033) c. 270,700 ha/year with EASR (four times) and 300,700 ha/year with Nigg (2033)	c. 66,600 ha/year prior to EASR and 74,000 ha/year with Nigg (2033) c. 199,700 ha/year with EASR (three times) and 220,100 ha/year with Nigg (2033) c. 266,300 ha/year with EASR (four times) and 296,200 ha/year with Nigg (2033)	
	Provide Contingency for Scotland's Bioresource system	Yes - Flexible standby available	No - Additional land and liming operations required	No - Additional land and liming operations required	The WCB design includes resilience for wider system
	Prepare for loss of agricultural recycling	Partial	No	No	AAD provides reduced dry solids for input to future ATC. If AAD not already installed, then both AAD and ATC would likely be required to be built to provide alternative outlet

		Option 4a: 85,000tDS/yr site at Daldowie	Option 0a: BAU (dryer with liming)	Option 0b: BAU (liming)	Comments
Cost Assessment[i]	**Tier 2 capital costs (60 years)**	✂			
	Tier 1 operating costs (60 years)				AAD generates energy, drying and lime production use energy.
	Carbon capture costs (60 year)				
	Revenues (60 years)	113	-	-	AAD produces energy
	NPC (60-years)	(917-1,355)	(1,204-1,487)	(1,204-1,514)	
	SR27 capital costs (in 2025 prices, undiscounted)	✂			
	Annual operating costs 2031[ii] (in 2025 prices)				
	AAD Deferral to SR33 NPC (60 years	-	(994-1417)	(1049-1508)	Both options stop when AAD is introduced during SR33. Higher NPC than introducing AAD in SR27
Carbon	**Embodied carbon (60-years) (tCO_2e)**	110,658	34,007	41,174	
	Operational carbon (60-years) (tCO_2e)	511,522	498,335	788,237	
	Annual operational emissions in 2040 (tCO_2e)	6,244	6,244 *(40,700 without carbon capture)*	13,390	
	Whole-life carbon (60-years) (tCO_2e)	622,180	532,341 *(2,438,915 without carbon capture)*	829,411	

		Option 4a: 85,000tDS/yr site at Daldowie	Option 0a: BAU (dryer with liming)	Option 0b: BAU (liming)	Comments
	Reliability & maintainability	All assets on one site enabling partial shutdown to maintain and repair. No single point of failure	Additional liming operations and expanded land requirement to manage outages	Additional liming operations and expanded land requirement to manage outages	
	Enhanced product created that can be used in agriculture	Clear route to agriculture and at lower volumes increasing land bank reserves	Liming required to treat wider system bioresource before it is suitable for agriculture. No guarantee for future demand for dried product	Liming at all sites produces a suitable product however increases volumes	

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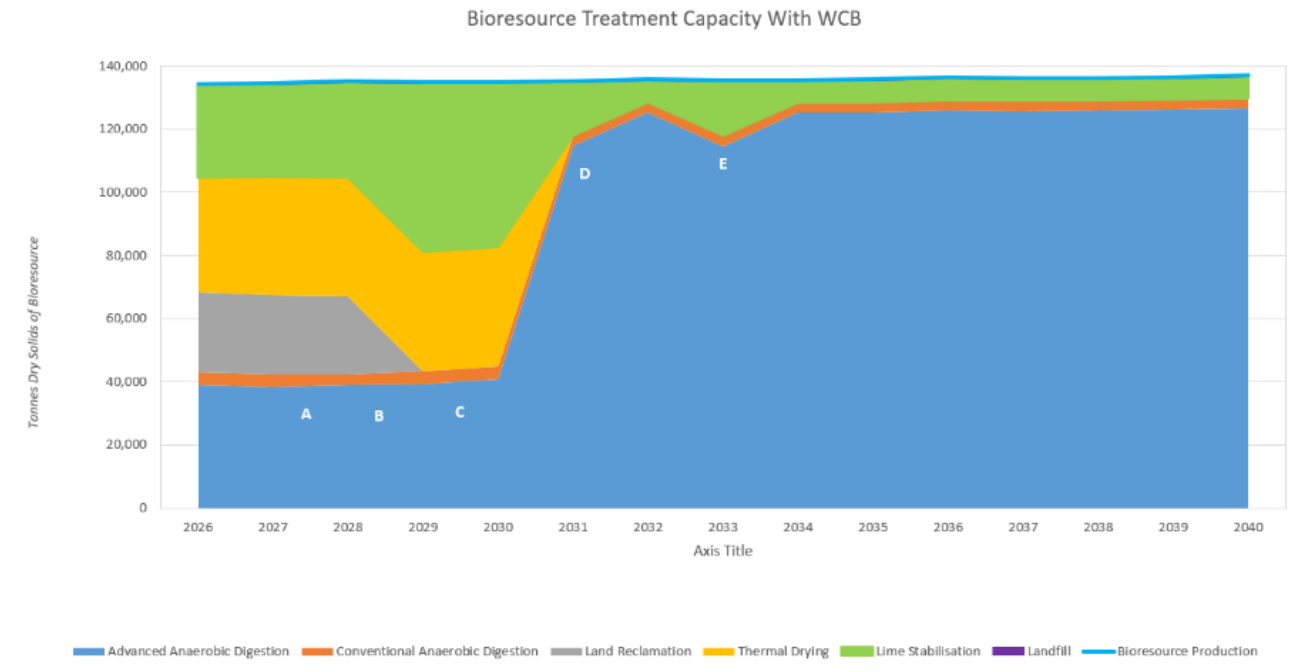
[15] The Net Present Cost (NPC) figures in this document have been updated to reflect energy cost assumptions aligned with Scottish Water's internal gas and power cost forecasts. Final assurance and validation of these calculations is ongoing but there is a high degree of confidence in their directionality.
[ii] Excludes carbon capture costs.
[iii] Excludes carbon capture costs.
[iv] Operating costs included to allow comparison from when the AAD plants would be running in Options 4a, 6a, 6b. Costs as per table in 2025 prices.

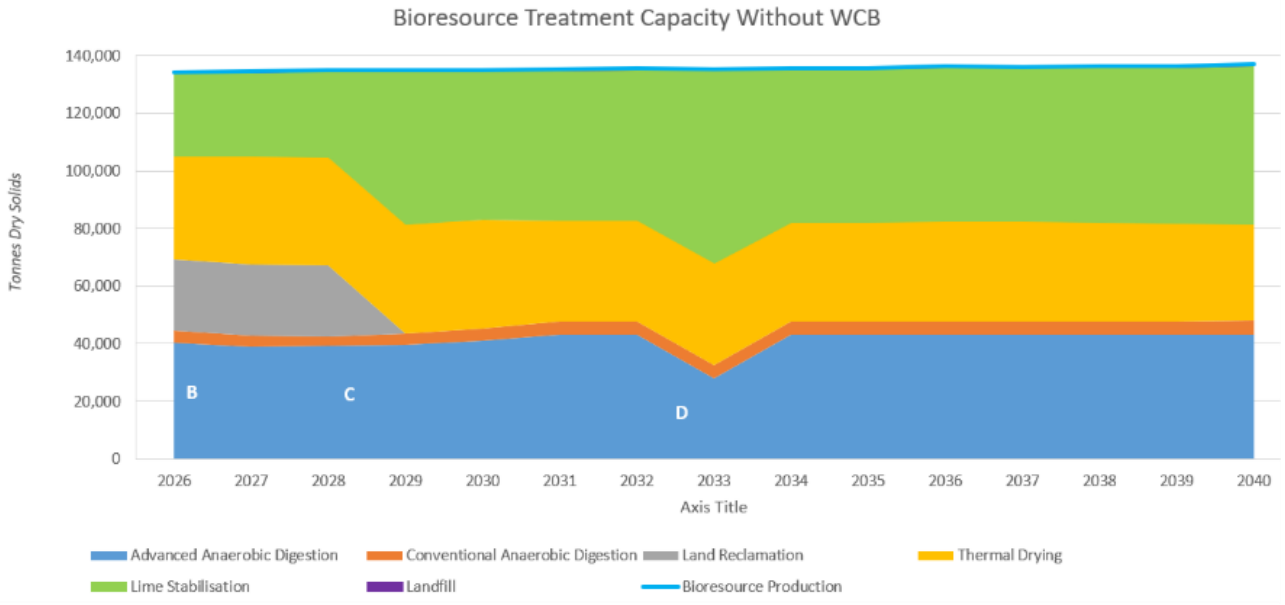
Improved Treated Product - expanded detail for the line in the table above to add detail on this point and enable readers to view the graphs in detail.

The three graphs below show how Scottish Water bioresource will be treated in future for each scenario being considered, Options 0a, 0b and 4a from the Stage 3a PIA. These graphs show how the Scottish Water bioresource produced at Scottish Water Waste Water Treatment Works across the whole of Scotland is treated and what technology is used. The total amount of bioresource increases gradually over time due to forecast population growth. The graphs show the impact of land restoration capacity (grey coloured) ending 2027/28 and the subsequent increase in lime treatment (green) required. Beyond this point each graph shows the different impacts of event particular to that option. A key is provided below to describe the major change points. These graphs show the overall significance of the scale of the project within the whole of Scottish Water's bioresource treatment system.

Option 1 (4a): Build 85,000tDS/yr facility at Daldowie (West Central Bioresource AAD)



Option 2 (0a): West Central Bioresource AAD is not built, drying continues at Daldowie



Option 3 (0b): West Central Bioresource AAD is not built, decommission Daldowie dryers in 2031, replaced by lime treatment

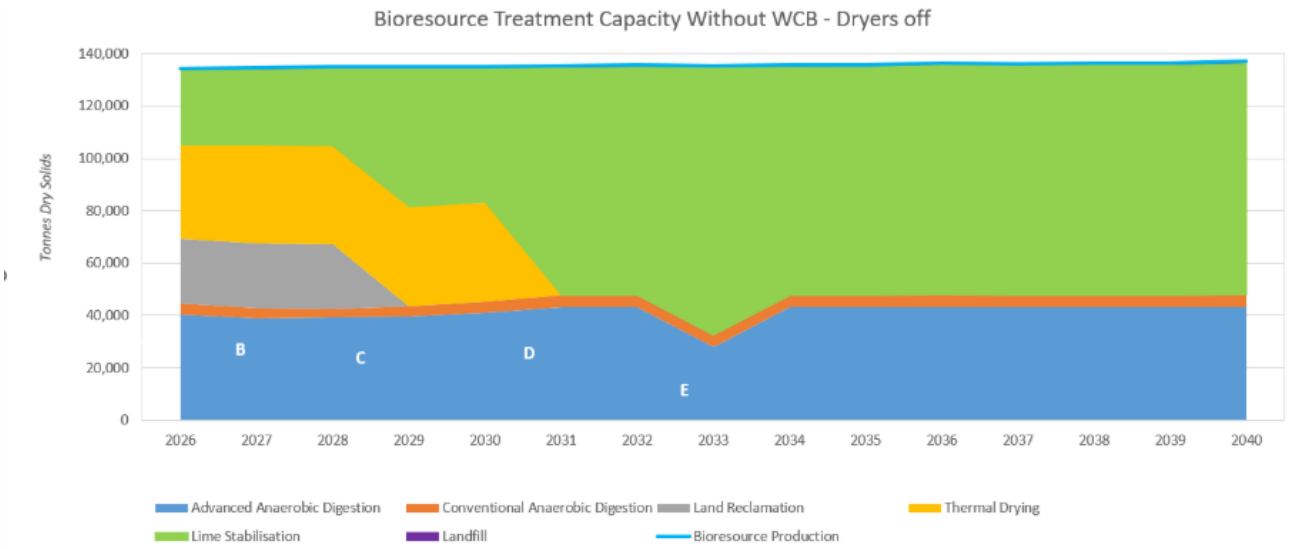


Figure 13: Scottish Water bioresource treatment showing throughput of each type of treatment technology in tDS/year through time

Figure 13 shows, for each option being considered, the throughput of each treatment process over time. uses the following key to describe the key points on the graphs.

Option 1*

A: Galashiels Digester decommissioned site changes treatment to Lime Stabilisation.

B: Cumnock Digesters decommissioned site changes treatment to Lime Stabilisation.

C: Land Restoration outlet exhausted, bioresource diverted to Lime Stabilisation.

D: WCB online, only Allanfearn/Thurso/Invergordon bioresource continues to be limed, until new highland bioresources treatment centre built.

E: Nigg AAD facility offline, requiring an increase in lime stabilisation for 12 months.

Option 2 (0a)*

A: Galashiels Digester decommissioned site changes treatment to Lime Stabilisation.

B: Cumnock Digesters decommissioned site changes treatment to Lime Stabilisation.

C: Land Restoration outlet exhausted, bioresource diverted to Lime Stabilisation.

D: Nigg AAD facility offline, requiring an increase in lime stabilisation for 12 months.

Option 3 (0b)*

A: Galashiels Digester decommissioned site changes treatment to Lime Stabilisation.

B: Cumnock Digesters decommissioned site changes treatment to Lime Stabilisation.

C: Land Restoration outlet exhausted, bioresource diverted to Lime Stabilisation.

D: Decommission driers at Daldowie, bioresource diverted to Lime Stabilisation.

E: Nigg AAD facility offline, requiring an increase in lime stabilisation for 12 months.

* To note, is that as sites change treatment to Lime Stabilisation opportunities to apply dewatered cake to land restoration will be taken where possible to reduce costs.

It was concluded that deferring the WCB investment to SR33 would result in a higher Net Present Cost (up to £ m) and a reduction in Scotland-wide system resilience (for example, to manage the planned Nigg shutdown in 2033). Additionally, due to the reliance on liming there is an increased exposure of Scotland and the wider UK water sector to public acceptability risks due to elevated odour emissions and the requirement for an additional c. 84,000–150,000 hectares of agricultural land from 2030, which is considered unlikely to be viable, following the implementation of EASR guidance.

3.3 Further Decision Points

Several key actions will need to be taken prior to Gate 70 to inform design decisions. The next gateway in the Scottish Water End-2-End process will be the Stage 3b PIA and the Gate 70. At this point the following decisions are to be presented for approval:

- Comparison of option 4a (preferred option from Stage 3a PIA) and options 0a and 0b to assess the best value option. As stated in the Stage 3a PIA funding for the project is being considered alongside the project progression and the project will assess risk of progressing against risk of business-as-usual options.

For option 4a recommendations for the following decisions will be made:

- Use of biogas – the AAD facility will produce biogas, and a decision remains on how best to utilise this. There are three options being considered:-
    - **100% CHP engines** – all of the biogases will be used to fuel combined heat and power (CHP) engines. These will produce electricity and heat which will be used to supply electricity and heat to the AAD process and also provide electricity to the adjacent Daldowie WWTWs. This will reduce the operational cost of electricity and protect Scottish Water from electricity price fluctuations. Surplus electricity will be exported to the power supply network to provide a revenue stream. Surplus heat will be available and opportunities to use this will be explored.
    - 100% Gas to Grid – process biogas to meet specification required for export (remove carbon dioxide and addition of propane as needed) and export biomethane to the gas supply network. This will displace fossil fuel gas in the network and provide a carbon benefit to Scotland as well as providing an income stream.
    - **Hybrid solution (approximately 50% CHP and 50% Gas to Grid**). - A hybrid scenario to generate sufficient electricity for parasitic loading (including Daldowie WWTW) and the remaining gas exported to the gas grid.
- Decision on how to manage return liquors, including whether to include ammonia recovery with process emission benefits.

These decisions have significant cost and/or carbon benefit impact. The decisions will be made based on using net present cost and carbon calculations and benefits comparison.

We are considering an opportunity due to the UK Government's decision to extend the Green Gas Support Scheme (GGSS) deadline. GGSS offers financial incentives for new biomethane plants supplying green gas to the network, similar to past Feed in Tariffs and Renewable Obligation Certificates we have used for CHP engines. Originally ending for new developments in 2028, the scheme now allows plants commissioned up to 31st March 2030 to join, running through 2043. If WCB is commissioned by the new deadline and approved, it could generate £8–£10 million annually.

3.4 Wider System Needs

The bioresource system differs from the waste water treatment system in its nationwide reach. The capability to dewater bioresources into 'cake' by removing water and reducing volume – this enables efficient transportation over greater distances for subsequent treatment. The Bioresource Strategy leverages dewatering and the consolidation of treatment facilities, establishing fewer and larger BTCs to realise economies of scale.

To maximise the effectiveness of large-scale BTCs, a consistent supply of bioresources must be maintained with accurate volumes, timely delivery, and appropriate standards. This will be accomplished by adopting a production-focused approach, positioning WWTWs as producers supplying fuel to the BTCs.

Key requirements at various feed sites include:

- Enhanced screening measures to reduce contamination within bioresources, thereby minimising maintenance needs at the Daldowie BTC. These improvements surpass the existing 6mm inlet screening at the WWTW, which does not capture all contaminants
- Conversion of small-scale bioresource treatment locations into bioresource dewatering centres. Facilities currently utilising liming or conventional anaerobic digestion will discontinue treatment operations, instead focusing on dewatering bioresources for onward transport to the WCB site for further processing
- Optimisation of current dewatering facilities that presently export cake via 14-ton skips. Transitioning to bulk haulage would facilitate the use of 28-ton trucks, effectively halving vehicle movements
- Operational enhancements for the Greater Glasgow Sludge Main, including improved visibility, control, and management. The scope encompasses cleaning, repairs, routine maintenance, and the installation of additional instrumentation for monitoring and flow control.
- Interim solutions to provide lime treatment, mitigating the decrease in land restoration capacity before the WCB Treatment Centre becomes operational at Daldowie. These measures ensure adequate treatment capacity during the interim period between exhausting current land restoration options and commissioning new treatment capabilities through AAD at the WCB project.

These requirements are applicable regardless of whether the proposed WCB facility is delivered by Scottish Water or through a mutual investment model (MIM). The timing and delivery of these additional projects will need to be co-ordinated with the delivery of the main project.

3.5 Risk Management

The risk of operating the existing facility will continue to be managed until provision of a new facility. The dryers return to Scottish Water with a five-year life, which ends around the same time as the proposed AAD facility would be available. Maintenance of the dryer facility is planned to continue to the standard that is currently provided by the PFI operator. Scottish Water will maintain the same maintenance process once the PFI contract ends and the facility passes to Scottish Water ownership. Co-ordination between the project and the operational/asset management teams will ensure that risk of timescale of the project are understood and impact on the existing operation mitigated. A risk study and risk bow-tie is in place for the existing operation and this will be managed and updated periodically. In the event of delayed delivery of a planned new facility, which may lead to the dryers becoming unrepairable, alternative outlets will be sought, this is likely to be lime treatment. As described elsewhere in this paper there are risks around this outlet, which will be monitored.

Overview

The economic analysis shows that the WCB option is the most cost-effective, resilient, and lowest risk among alternatives.

- **Cost Efficiency:** A single-site AAD at Daldowie (Option 4a) has the lowest 60-year Net Present Cost (£[redacted]m), saving up to £[redacted]m in capital and £[redacted]m in whole-life costs compared to multi-site options. Continued use of existing methods would increase costs significantly.
- **Risk Reduction:** A single AAD site consolidates capacity, minimising operational, compliance, and service interruption risks. It also reduces bioresource dry solids by 50%, lowering land and environmental risks more effectively than liming or drying.
- **Resilience:** The facility offers backup for outages elsewhere, maintains compliance, adapts easily to regulatory changes, and can integrate future technologies.
- **Benchmarking:** Industry benchmarks show the WCB scheme's costs are within industry ranges, with its lower estimate below the average for new AAD sites (Section 5).

4 Financial Case

4.1 Introduction

Scottish Water funds its activities mainly through customer charges and borrowing from the Scottish Government. Debt is an appropriate method for financing long-term, capital-intensive investment, and Scottish Water currently accesses all borrowing from the Scottish Government via the National Loans Fund. This debt counts toward Scottish Government's Capital Departmental Expenditure Limit (CDEL), creating a constraint independent of Scottish Water's financial strength. As a result, the limiting factor on borrowing is CDEL availability, not Scottish Water's covenant.

In our SR27 Final Business Plan, it is assumed that the Scottish Government will provide £170m per year, a real terms reduction in each of the six years and over SR21. This creates higher pressure on customer charges, and the plan assumes the WCB project will be funded through customer revenues.

An alternative is private project finance structured to be "off-balance sheet," meaning it would not count against CDEL. Classification relies on European System of Accounts (ESA10) and Eurostat/ONS guidance. A multi-stage assessment that examines whether the entity is public or private, reviews automatic triggers, evaluates risk transfer, and then considers economic ownership and asset control.

Scottish Water, alongside EY-Parthenon, considered several finance models:

Scottish Water Funding: Lowest cost of capital, simplest to deliver, and assumed in the business plan.

Direct Procurement for Customers (DPC): Used in England and Wales but not tested for public balance-sheet treatment and therefore not considered suitable for WCB.

Regulated Asset Base (RAB): Transfers construction and operational risk to a Special Purpose Vehicle (SPV) but relies on customer-charge-funded revenues. Previous applications are in the private sector, and balance sheet treatment is unlikely to be off-balance-sheet. Not taken forward.

Mutual Investment Model (MIM): Developed in Wales, combining public and private sectors. The SPV designs, builds, finances, and maintains the asset, with payments linked to performance and availability.

Our assessment is that MIM is the most viable private-finance option for the WCB project. We appointed EY- Parthenon to undertake an initial assessment on the application of MIM to the proposed West Central AAD facility. This included the cost of delivering the project under MIM, potential for the project to be assessed as off balance sheet, market interest and timeline to deliver.

Further information on ESA10 and Eurostat/ONS guidance, the finance models highlighted above, and in particular the MIM, can be found in Annex D.

4.2 Value for Money of MIM - Inputs

As part of their commission, EY-Parthenon built a financial model so that the net present cost of Scottish Water funding could be compared to a MIM[16]. This financial model has inputs of opex,

[16] The financial model included RAB as an option as well as Scottish Water funded and a MIM and had each of these three for an 85kt plant at Daldowie, an 85kt plant at Kinneil Kerse and a 60kt plant at Daldowie with a 25kt plant at Kinneil Kerse. The focus of this section is on a MIM as an alternative to Scottish Water funded for an 85kt plant at Daldowie.

initial capex and maintenance together with how these are financed. The model then calculates the financial outflows to achieve the assumed return for the investors and then converts the financial outflows into a net present cost. Further information on the assumptions, financing and results are set out below.

The cost stacks input into the financial model are the same for Scottish Water funded and the MIM. A brief summary of each is provided below[17]:

- **Operating cost:** Until the new AAD plant is operational in 2031, this is the estimated cost to run the existing Daldowie facility and wider bioresource management across the west central region. To simplify, the modelling assumes that land reclamation is exhausted and hence liming treatment and disposal to agriculture is the alternative. From 2031 the operating costs are the estimated costs of operating the 85kt AAD plant.
- **Capital investment:** The investment required to build the 85,000 tDS/year AAD plant, over the period 2027-2031.
- **Capital Maintenance**: Capital maintenance is estimated at ten yearly intervals (i.e. 2040, 2050 etc).
- **Revenue:** commences when the site becomes operational in 2031.

To create the financial model, the following financing inputs were used:

- **Length of MIM:** this was assumed to be 25 years, after which the 85,000 tDS/year AAD plant is transferred to Scottish Water ownership.
- **Equity stake:** aligned to the Welsh Government experience, a 20% Scottish Water equity stake was assumed in the MIM with the remainder (80%) being provided by the MIM investors.
- **Contribution to investment:** based on their market knowledge, EY-Parthenon estimated this as 80% debt investment, 20% equity investment. This implies that Scottish Water funds 4% of the total investment (i.e. 20% of the 20% equity investment).
- **Debt period:** the debt period was matched to the expected contract length of 25 years.
- **Debt and Equity returns:** based on their market knowledge, EY-Parthenon judged that a mid-case interest rate on debt is 7.1% with an investor hurdle rate on equity of 11.5%, giving an average rate of return of 8.0%.

4.3 Value for Money of MIM – Results

As set out in the Economic Case, the NPC over 60 years of the 85,000 tDS/year AAD at Daldowie option is £[redacted]m in 2024/25 prices. Using the assumptions set out above the equivalent NPC for the MIM option over 60 years[18] is £[redacted]m[19], a premium of £[redacted]m.

Through subsequent model runs we have analysed the additional £[redacted]m net present cost from the Scottish Water financing option into the following factors:

- Financing the investment from debt at an interest rate of 5% and repaying it over twenty-five years. Financing the investment from debt reduces the net present cost by £[redacted]m (as the debt repayments are spread over twenty-five years and discounted back to 2024/25 prices at 3.5%

[17] As more detail has been provided in Chapter 3.

[18] Noting that the MIM contract is for 25 years

[19] Under EY-Parthenon's model run the net present cost was £[redacted]m and this is therefore the value used in the June 2025 Investment Group paper. Having interrogated the EY-Parthenon's model we have identified that it used debt repayment as a proxy for capital allowances for the MIM. We have updated the model with a more accurate estimate of capital allowances for the MIM, and this reduces the net present cost to £[redacted]m.

rather than being paid up front). However, the interest cost on the debt more than outweighs this benefit at a net present cost of £[redacted]m. The combined effect therefore explains £[redacted]m of the difference.

- Increasing the interest rate from that which Scottish Water might pay (i.e. 5%) to the commercial rate EY -Parthenon judges a commercial lender would require (7.1%) explains a further £[redacted]m of the difference.
- Introducing an equity stake to cover 20% of the investment with an investor hurdle rate of 11.5% explains a further £205m of the difference; and
- The requirement of the MIM to pay corporation tax (assumed to be the current rate of 25%) explains the remaining £113m.

In summary, the additional £483m net present cost of the MIM is due to cash leakage in the form of the cost of private capital (debt and equity) being higher than that accessible by Scottish Water, together with the requirement for equity returns to be paid and the corporation tax liability.

As set out above, a MIM can enhance risk management incentives. Depending on the circumstances these might increase or decrease the net present cost difference of the MIM relative to Scottish Water Tier 2 funding[20]. The impact of the allowed for capital investment in the MIM option varying by 20% is a change in the net present cost of c. £[redacted]m. We have also modelled the impact of a range of investor hurdle rates with a rate of 9% reducing the net present cost by £[redacted]m and a rate of 15% increasing it by £[redacted]m.

We have highlighted above the impact of corporate tax on the cash flows associated with a MIM. However, this is only part of the corporation tax impact. The other part is in Scottish Water as in a MIM option:

- The capital allowances available to Scottish Water are lower (as those associated with the 85,000 tDS/year AAD plant are available to the MIM rather than Scottish Water),
- The service payments to the MIM by Scottish Water are tax deductible (other than the element attributable to the repayment of debt in the MIM); and
- Customer charge levels are lower in the SR27 period (as customers are not funding the capital investment in that period) but are then higher in subsequent periods (to fund an equivalent level of investment in future Strategic Review periods as in the self-fund option, and to fund the MIM service payments).

We have created a model run to incorporate these effects. All amounts in the next paragraph are in 2024/25 prices.

Our SR27 Final Business Plan has charges over the SR27 period increasing by CPI+3.3 p.a. Our modelling is that in a MIM scenario charge increases over the SR27 period would be lower at CPI+2.55% p.a., raising £0.3bn less in customer charges to reflect the lower capital and cash required. However, to achieve the equivalent cumulative investment of £51.4bn by 2051(including the investment that is financed by the MIM partners in the MIM scenario), over the period from 2027 to 2051 customer charges would be £0.7bn higher in the MIM scenario.

[20] If a MIM structure drives greater disciple of risk and innovation into a project this would be expected to lower the adjusted net present cost of the MIM. On the other hand, if there are already strong risk management disciple and innovation in the procurement and project management processes of Scottish Water then the risk premium required by MIM investors would increase the adjusted net present cost of the MIM. Scottish Water's outturn cost measure, IFAC, has out turned every year in SR21 within its target range (+/-5%) – given this appears hard to argue that strong risk management disciplines are not present.

Corporation tax payable by Scottish Water is very similar (£20m difference) in both scenarios as the tax deductible element of MIM payments is offset by higher revenue, lower operating costs and lower capital allowances.

While in-period affordability of the SR27 Final Business Plan is an important consideration, Scottish Water considers that the additional £0.7bn of cost does not provide value for money to current or future customers.

The following two graphs show the difference in the average customer price in the MIM scenario to the Final Business Plan and the different investment profile in each as well, highlighting that in the MIM scenario with smooth price increases in the SR33 and subsequent periods investment is £0.7bn lower by 2042 and only catches up again in 2051.

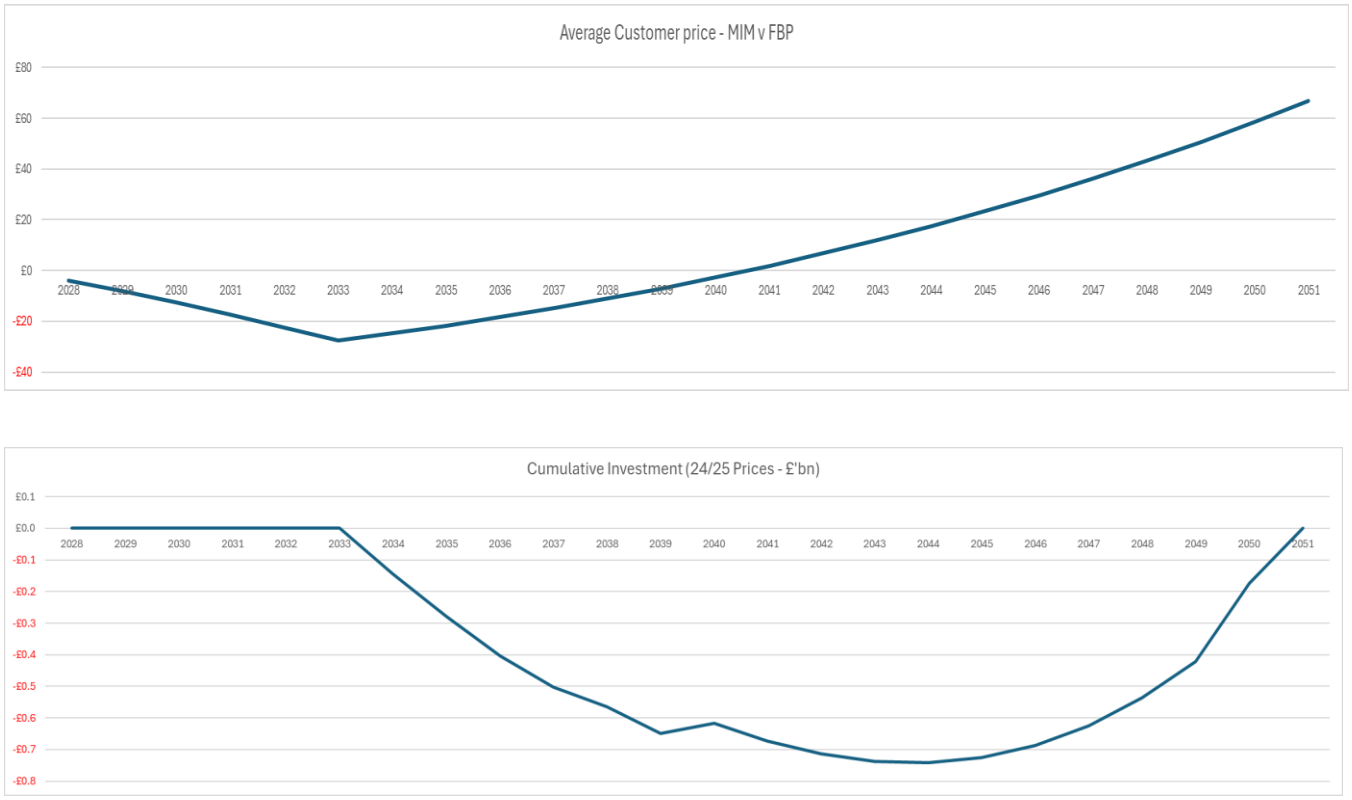


Figure 14 : Difference in average customer price in the MIM scenario to Final Business Plan

4.4 Feasibility of MIM

Technical feasibility of MIM

EY-Parthenon concluded the MIM model can be structured to avoid the 20 automatic on-balance-sheet Eurostat triggers, provided economic ownership clearly sits with the private sector. This requires material risk transfer including the private partner to take full construction responsibility and at least the primary maintenance and asset-availability obligations, with Scottish Water retaining only secondary operational roles. Interfaces must be tightly managed as they affect classification and operational risk.

A payment mechanism with deductions for unavailability and poor performance is mandatory, with no minimum revenue guarantees. Scottish Water may hold up to 20% equity, but public-sector financing exposure cannot exceed 50%, requiring careful consideration of Scottish Water equity, refinancing gains and publicly sourced finance.

Because MIM has not been used in Scotland or the water sector, EY-Parthenon relied on general best-practice guidance and Welsh experience. Welsh Government sought ONS classification before procurement. EY-Parthenon recommend Scottish Water does the same if pursuing MIM.

With a technically feasible route to project finance identified the next stage was to assess the practical feasibility based on more specific context of the West Central project.

Practical feasibility of MIM for the West Central Bioresource project

While MIM has proven viable in Wales, specific risks exist for WCB. Market appetite for PFI-style risk transfer has reduced over the last 20 years, and WCB presents challenges to bidders around construction, technology and operational interfaces, and opportunity pipeline. These are set out below:

Construction Risk: The market is now reluctant to take fixed-price construction risk. Mechanisms like targeted compensation events or index-linked adjustments could help but remain untested for classification impacts. To satisfy the 'off balance sheet' criteria the risk transfer would have to be in place

Technology & Operational Risk: MIM has not been applied to a project of WCB's complexity. It is expected the market would be cautious around interfaces with Scottish Water operations and legacy PFI assets, regulatory change and uncertainty around bioresources and energy offtake. To satisfy the 'off balance sheet' criteria the risk transfer would have to be in place and a model that encompasses revenue deductions.

Opportunity Pipeline: EY-Parthenon noted that bidding for project-finance procurements is costly, and market confidence improves when governments offer a pipeline of future opportunities. The Scottish Government's Non-Profit Distributing programme showed that bidders invest more when further competitions are expected. At present while the Scottish Government has published a pipeline of Infrastructure projects there is no indication that this would be satisfied by 'off balance sheet' models. Bidders may seek greater assurance or measures to mitigate the required investment such as some degree of bid-cost support.

Despite the potential concerns, advice also indicated that there would be underlying interest as infrastructure is expected to remain an attractive asset class. Comparators such as the United Utilities DPC project, and continuing activity in the water sector across England and Wales, suggested that finance would be available for a well-designed proposition. To test the balance between some of these expected market concerns and potential areas of interest it reinforced the need to gather better evidence and to conduct a market-sounding exercise to test assumptions and shape the procurement strategy options.

Market Engagement: To better evidence the market posture on these challenges a market engagement exercise has been carried out. This was again undertaken by EY-Parthenon utilising their expertise and independence. The objective of this exercise was to establish the level of interest from contractors, project sponsors and private financiers to participate in a MIM procurement through a series of interviews. A total of 21 parties were identified and of these 11 interviews were completed. (4 project sponsors, 4 senior finance providers and 3 contractors).

In advance of the interviews, details in relation to Scottish Water, proposed AAD facility and estimated construction cost were provided to the participants. The focus which was tested is the appetite to engage on this specific project, not necessarily MIM in general, given the specific risk profile identified.

The feedback from the 11 interviews is that market interest is evident across all of the participant groups, the market appetite for project finance is positive but there was less engagement from

the potential construction partners. Sponsors identified that competition could be restricted where there is insufficient depth in the contractor market to support multiple consortium bids, that is consortiums may be competing for constructors and as a result the number of bidders may be constrained and impact the level of competition. This would undermine the advantages of a project finance approach. As expected, there was also confirmation that expected bid costs will be high with one sponsor seeking reimbursement of these costs as part of the interview.

Sponsors and senior finance providers demonstrated a good knowledge and understanding of the MIM model, with contractor's experience predominantly from involvement with PFI projects. Outside the contractor market there was limited experience and understanding of the technology and operations associated with an AAD project. Risks around offtake certainty, technology and operational interface were raised and contractors stressed the importance of clear evaluation and allocation of risk.

Perhaps most clearly contractors confirmed unwillingness to accept full fixed-price construction risk transfer, citing factors such as inflation, supply-chain pressures and legacy sector losses have resulted in contractors being unwilling to take full exposure, preferring target-cost or index-linked approaches. At interview, contractors also expressed a preference for the procurement to appoint a partner to develop the design, and then competitively tender construction work packages on a target cost open book basis, an approach that would not be consistent with a MIM. Senior funders also sought a similar construction support package to share this risk with Scottish Water.

In summary, the commercial pressure to share risks on construction, feedstocks and offtake would place pressure on the off balance sheet classification under the Eurostat Guidance. This is broadly in line with the hypothesis before market sounding.

It is our assessment that there is a material risk that a MIM procurement process would not yield a successful bid that satisfied the criteria for off balance sheet classification. In such an eventuality significant time would have been dedicated and the overall timetable would have been extended. At this point a decision would be required between progressing and the project counting as on balance sheet, with the consequences for the Scottish Water and the Scottish Government balance sheets or to not progress the project, at which point a further procurement would be required to deliver the project with the consequences of the timeline for delivery significantly delayed and resources expended that would be wasted.

Implications of a MIM approach on timeline

Any MIM procurement, and potential need for replanning will add time until the new plan is operational. It is estimated that a Scottish Water designed, SPV delivered scheme might need an additional 2 to 3 years due to the procurement and negotiation. A MIM designed and delivered scheme might add a further year.

The additional operating costs of an extension of the timeline are in the region of £[redacted]m a year in 24/25 prices. There are also likely to be some substantial capital maintenance implications to keep the existing dryers operating over this extended time period. These have not been factored into the modelling at this stage.

Implications of a MIM approach on operational risk

Scottish Water's analysis of MIM approaches conducted to date have focused on the potential impact that a MIM would have on value for money for Scottish Water customers and the time taken to deliver the WCB project. If a MIM structure was followed, extensive further analysis of long-term operational risks would be required as part of the MIM design and procurement process.

Scottish Water currently works with external providers of services via the existing PFI portfolio and has experience of managing these risks. However, market dynamics, operational risk sharing practices and risk premiums have changed substantially since the bulk of the existing PFI portfolio was established – and the full extent of costs and risks are only likely to be revealed by conducting a formal MIM tendering process. For example, we expect changes in areas such as energy price risk premia following the increased volatility seen in global energy prices in recent years or the rejection of accepting this risk.

This assessment would be built into any MIM procurement process to ensure that any privately operated assets were well integrated with Scottish Water assets, that risks were appropriately mitigated where possible and that Scottish Water customers received strong protections in relation to the financial impact of operational risks. However, this process may reveal operational risks and mitigation costs that result in the total cost to Scottish Water customers being higher than suggested by the analysis above (net of any operational cost and risk benefits gained from the MIM partner relationship).

4.5 Conclusion

MIM funding is considered to be the most viable private finance funding option and EY-Parthenon have preliminarily concluded that a MIM for the AAD plant can be structured so as to be off balance sheet.

As there are no precedents for the use of MIM in delivering a project such as WCB, EY-Parthenon advised us the market will be cautious particularly in areas such as the level of technological risk, understanding interfaces with existing Scottish Water and PFI assets, evolving environmental regulations, and certainty of offtake. To test this advice, we conducted a market sounding exercise and feedback is that market interest is evident across all of the participant groups, the market appetite for project finance is positive, but there was less engagement from potential construction partners.

Sponsors and senior finance providers have good knowledge and understanding of the MIM model and contractors have experience from involvement in PFI projects but outside a small few contractors there was limited experience and understanding of an AAD project, with risks around offtake, technology and operational interface raised. In addition, there is low appetite for fixed price construction contracts requiring more risk to sit with Scottish Water which in turn would need to be carefully managed to ensure the project is not classified as on balance sheet under Eurostat Guidance. This evidence signals that while technically feasible to satisfy the ONS tests for off balance sheet financing, the practical viability of achieving the required risk transfer is very low. In short this is the wrong asset vehicle for this form of financing.

Our modelling indicates that a MIM would add an additional £483m to the net present cost due to the cost of private capital (debt and equity) being higher than that accessible by Scottish Water. The post tax increase in customer charges over the period 2027 to 2051 would be £0.7bn, highlighting that the financial benefit to customers would be short term.

MIM projects can potentially lead to more certain outcomes that may flow through to improved value for money, depending on the level of risk pricing attached to a project. They can also enhance value for money by bringing additional innovation to the design and delivery of projects. However, these can be achieved through conventional procurement processes, and the relative advantage is hard to gauge in advance. The critical component here is the level of competition. If a 20% reduction in the initial capital investment was achieved this would reduce the project net present cost by c. £152m. As achieving this would likely require a MIM designed and delivered scheme and additional time before the plant would be operational would incur over £[redacted]m additional operating and capital maintenance costs.

Therefore, on the basis of both deliverability and value for customer money, while acknowledging the potential benefits of a MIM funded approach, for this asset, an 85,000 tDS/year AAD plant at Daldowie we have concluded that the best financing option is the use of Scottish Water funding from customer charges in SR27.

5 Commercial Case

The purpose of this Commercial Case is to demonstrate that the WCB project is commercially viable, benchmarked against industry norms, and capable of being procured through an established route that allocates risk appropriately and delivers value for money. This section summarises the independent capital cost benchmarking undertaken by Cumming Group and outlines the proposed procurement and contracting strategy that Scottish Water will adopt for subsequent stages.

5.1 Benchmarking

Scottish Water commissioned Cumming Group to undertake an independent capital expenditure (capex) benchmark of the WCB AAD facility. Cumming Group has completed similar exercises for other UK water utilities and maintains a Cost Intelligence Database containing delivered bioresource schemes, cost models, and normalisation indices. For comparability across the sector, Cumming Group benchmarked WCB using its peak throughput of c.106,000 tDS/year, representing full-load operation during maintenance conditions, rather than the average throughput of 85,000 tDS/year.

Cumming Group assessed Scottish Water's Total Project Cost (TPC) estimate on a like-for-like basis with industry cost data. The TPC includes construction costs, risk allowances, company overheads and costs to date. Benchmark datasets also include equivalent allowances and therefore provide a consistent basis for comparison. Because historic bioresource schemes vary significantly in baseline scope and site maturity, Cumming Group compared WCB against two standard sector categories: New THP Bioresource Treatment Centres and Existing THP Upgrade Sites.

Cumming Group review showed that the WCB scheme sits within the industry minimum and maximum, below the industry average for New THP Sites when assessed using the £ / TTDS/Year and the Cost Equation and sits below the industry average for THP Upgrades when assessed using the £ / TTDS/Year.

Benchmark costs have therefore been split into the following for comparison:

- Daldowie BTC Total Project Cost – New THP Site Lower Cost – £ [redacted] M.
- Daldowie BTC Total Project Cost – New THP Site Upper Cost – £ [redacted] M.
- Daldowie BTC Total Project Cost – THP Upgrade Only Lower Cost – £ [redacted] M
- Daldowie BTC Total Project Cost – THP Upgrade Only Upper Cost – £ [redacted] M

It is important to note that when carrying out benchmarking analysis there is always a degree of variance and a mature scope and design including site specific factors the more accurate the cost range. The data below outlines the categories of magnitude of benchmarking variance. These ranges identified by the lower and upper bounds are applicable for both positive and negative percentages.

Grading Comment	Variance Lower Bound	Variance Upper Bound
Low	0%	less than 10%
Moderate	10%	less than 25%
High	25%	less than 50%
Significant	greater than 50%	

Cumming Group concludes that Scottish Water's current forecast costs for the Daldowie scheme sits within the industry minimum and maximum. The lower cost is considered the comparator to the industry and sits below the industry average for New THP Sites when assessed using the £ / TTDS/Year and the Cost Equation and sits below the industry average for THP Upgrades when assessed using the £ / TTDS/Year. Variances are expected to tighten as scope and design mature.

Commercial Viability

The benchmarking exercise provides assurance that WCB's cost envelope aligns with market norms and is suitable for competitive tendering. The size and structure of the project are appropriate for UK market capability, and no abnormal cost features or delivery risks were identified that would limit supplier appetite.

Procurement Strategy

At this stage, the preferred procurement strategy is to utilise the NEC4 family of contracts, reflecting established UK water sector practice. NEC4 provides collaborative risk management mechanisms, transparency of cost through target-cost approaches, and flexibility for early contractor involvement. This approach aligns with market expectations for major process-intensive projects and with Scottish Water's procurement standards and governance.

All contracts will incorporate Scottish Water's SR27 sourcing standards, including requirements for social value, sustainability, health and safety, security, and responsible procurement. Contractors will be expected to comply with Scottish Water's Supplier Code of Conduct and wider regulatory obligations.

Summary

The independent benchmarking confirms that the WCB project costs are aligned with industry norms and that the project is commercially feasible. The proposed NEC4-based procurement approach is consistent with good practice and is capable of delivering the project efficiently while ensuring appropriate risk allocation. Together, these factors demonstrate that WCB is commercially viable, market-ready, and deliverable through standard, proven UK infrastructure procurement routes.

6 Management Case

6.1 Introduction

This Management Case sets out the arrangements for governing, managing, assuring and delivering the WCB project. It demonstrates that WCB is deliverable within Scottish Water's established investment and programme controls, that risks and dependencies are understood and actively managed, and that the project has clear ownership, realistic delivery plans, robust assurance pathways and a credible transition into procurement and construction.

We consider that delivery of this project by Scottish Water is likely to be most efficient and provide the best value for money for our customers. However, to ensure that we have fully considered the relevant delivery options, this section also examines the procedures and practices that would need to be adopted in order to facilitate delivery via a MIM structure.

The timelines discussed in this section (across both Scottish Water delivery and MIM delivery approaches) are based on currently anticipated project and regulatory milestones such as the WICS Draft and Final Determinations during 2026.

The topics below are covered in this section of the document:

- **Background**: describing the current project status
- **Milestone Plans**: describing how the project will progress, decision gateways and key milestones and activities for both Scottish Water delivered and MIM options
- **Governance**: describing the structured framework for managing milestones, risks, and opportunities
- **Project Management**: describing the project management tools Scottish Water recognise as being critical to the successful development and delivery of the project
- **Risks and opportunities:** describing the risks and opportunities associated with the delivery of the project
- **Next Steps**: describing next steps in relation to the timelines contained in Annex C.

6.2 Current Project Status

As described in Section 3, the West Central Bioresource project has to date passed through Stages 1-3a of the Project Investment Appraisal (PIA) process. At Stage 2, the strategic options review concluded that there were two sites (Daldowie and Kinneil Kerse), with the potential to be developed to fulfil the project objectives. Further investment appraisal work at Stage 3a of the Investment Appraisal Process, assessed that the most beneficial scenario was a single 85,000 tds/year facility located adjacent to the Daldowie BTC. Figure 15 displays the progress to date.

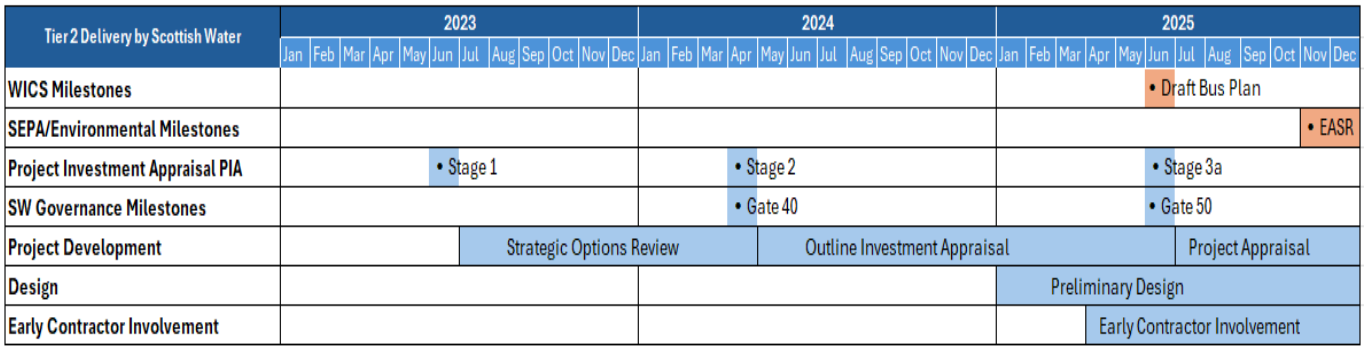


Figure 15: Project development progress to December 2025

A provisional site layout, based on the process design work which has been carried out to date, is shown below (Figure 16).

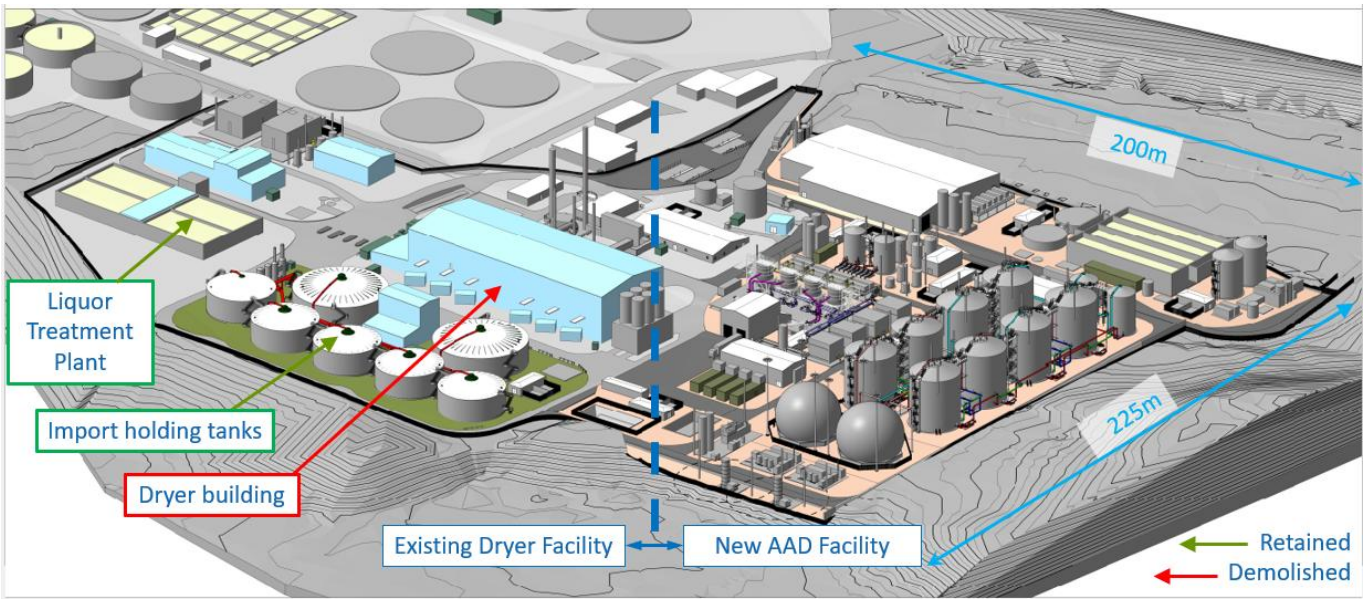


Figure 16: Provisional site layout design at Daldowie

The proposed new AAD facility is predominately on the right of the image adjacent to the existing PFI BTC situated in the middle, and the existing Daldowie WWTWs located at the top left of the image.

As outlined in Figure 15, the project was approved at Gate 50 in June 25. The decision gateway process is outlined in Figure 17. In preparation for this approval, an external design consultant was engaged throughout to develop the conceptual design. Scottish Water also engaged an experienced technical contractor to help us understand the required site layout, provisional programme and timeline. Initial enabling investigations relating to elements such as ground investigation, and the identification of existing site services were also completed at this time.

6.3 Milestone Plans

Decision Gateways

Scottish Water corporate governance and decision gateways are embedded throughout the project timeline. Progression between gates is contingent upon completion of gateway appraisal activities and appropriate internal and external assurance. The project is currently at PIA Stage 3a (Gate 50) and forecasting April 2026 for PIA Stage 3b (Gate 70) which is the second stage of the optioneering phases where assumptions made in the project development are validated.

Figure 17: Decision Gateways

Each stage and gate has a defined set of prescribed deliverables. The gateway process (Figure 17) will be adopted regardless of whether an Internally Funded, or MIM delivery approach is adopted. This process is further described in the Investment Planning Technical Appendix.

Moving forward to Gate 70 the Stage 3b PIA will include updates of options 0a (business as usual - dryer) and 0b (business as usual – liming) to allow an assessment of risks compared with the development of AAD at Daldowie (option 4a). Options 0a and 0b would extend the current and interim bioresource treatment approaches beyond 2031 (at risk), whereas option 4a would replace these measures with a new AAD facility from 2031.

Two provisional project timelines have been developed, covering two separate funding scenarios (Scenario 1 - Internally funded and Scenario 2 - MIM funded). Summary timelines are detailed below with further more granular details provided in Annex C.

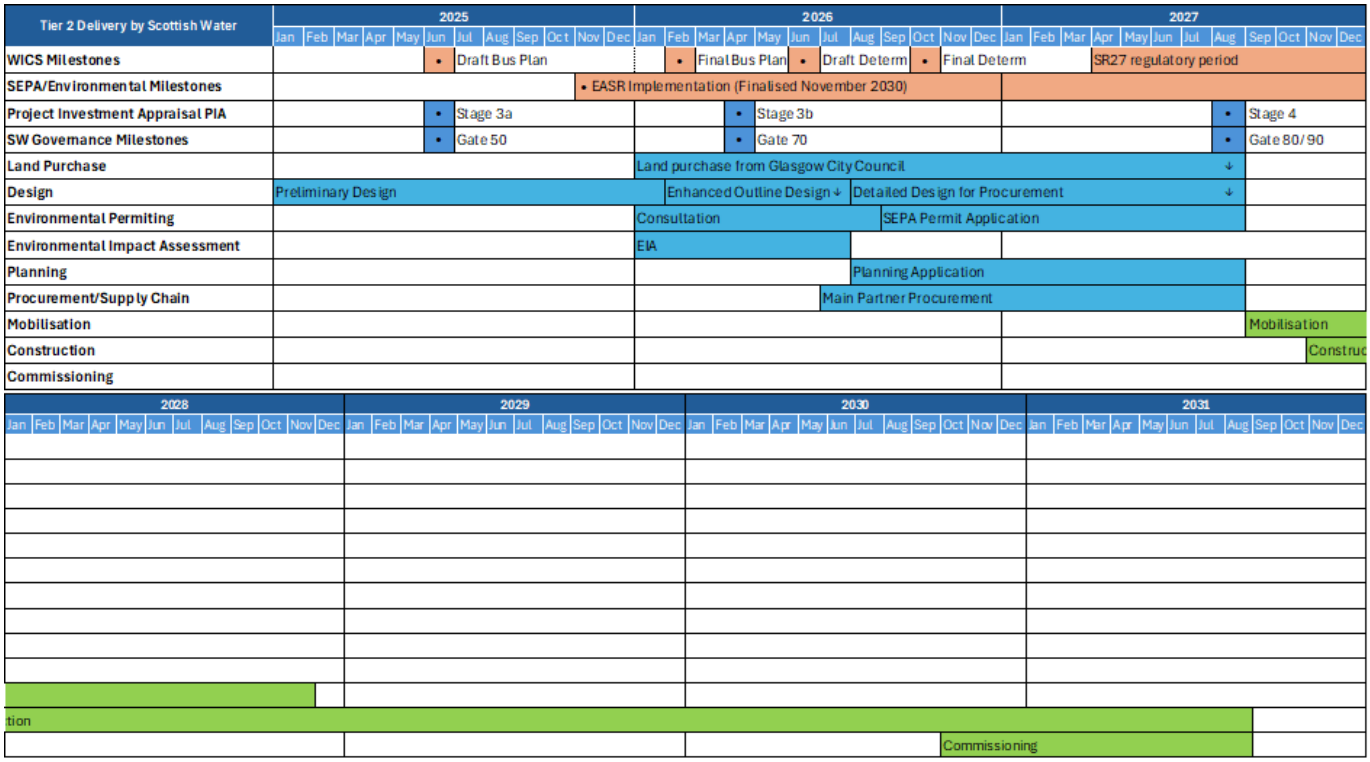


Figure 18: Scenario 1 - Key activities and milestones assuming Scottish Water funding delivery

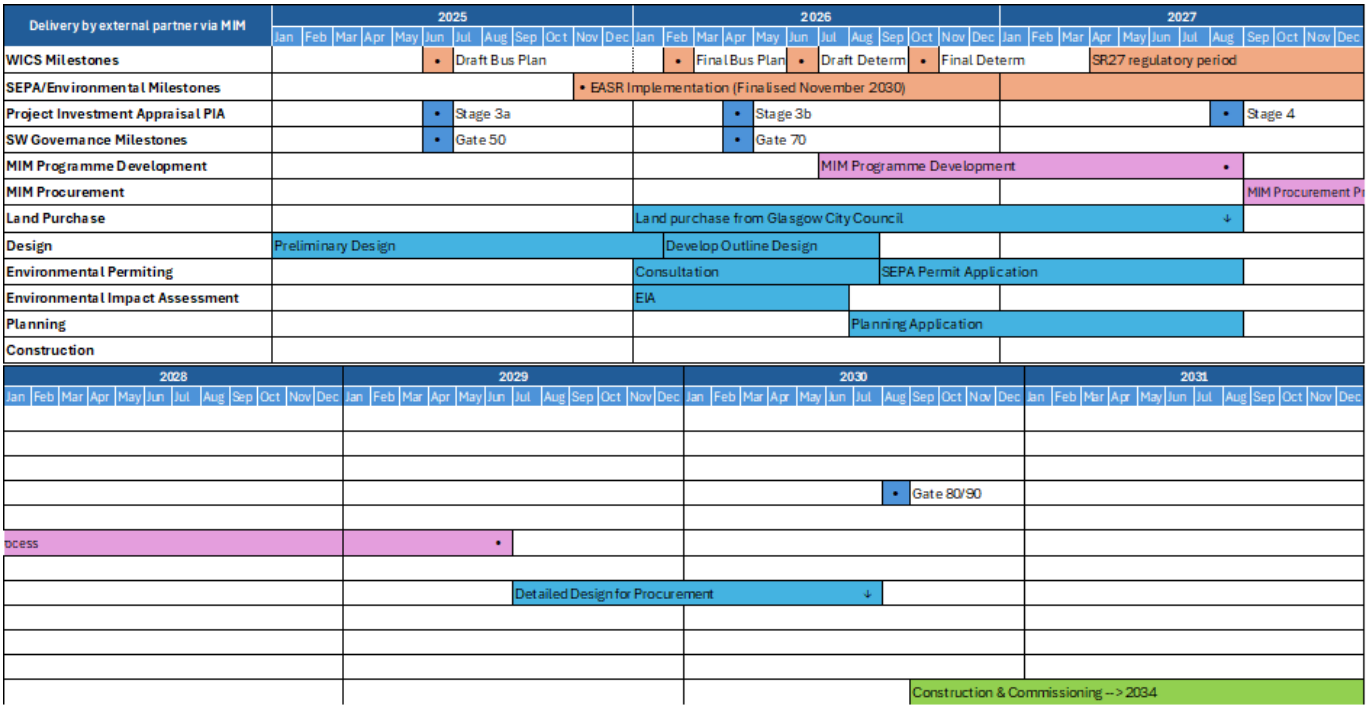


Figure 19: Scenario 2 - Key activities and milestones assuming MIM delivery

In both scenarios the next Gate (Gate 70, at Stage 3b of the PIA process), and associated "design freeze", is forecast to be complete by April 2026, meaning that we will in principle be ready to commence engagement with external agencies and the construction supply chain to progress the project. Progression will be aligned to the Final Determination and ongoing stakeholder discussions.

As can be seen, by comparing the two scenarios above, application of the MIM could take up to 3 years longer to complete, resulting in a period of greater risk – both in terms of managing the existing asset and the risk associated with access to the existing landbank recycling routes. It is expected, however, that a proportion of this prolongation could be recovered if the MIM adopted Scottish Water's design, and it was possible to continue with detailed design, ancillary enabling work, and purchase of equipment during the MIM procurement period.

These provisional project timelines have been developed using Scottish Water's experience of delivering large-scale projects, programmes, statutory planning and environmental assessment requirements, anticipated regulatory assurance periods and prevailing market evidence for procurement and construction timescales. The durations also reflect a viable and realistic approach that has been benchmarked against work durations and programmes established through liaison with our appointed technical contractor.

Several site visits have been undertaken to UK AAD installations where insights have been gained on construction sequencing and potential material handling issues which are inherent in bioresource handling processes. These insights have since been embedded in the plans that have been developed to date.

The provisional timelines for both scenarios allow sufficient time for value engineering, consideration of environmental outcomes and engagement with Scottish Government, WICS and SEPA prior to key decision points. These timelines should be regarded as indicative and will be refined as the project matures through the governed PIA process. Any material changes arising from the project investment appraisal process or further to stakeholder consultation will be

reflected through controlled updates. This includes changes that may be linked with the opportunity associated with the extension of the deadline for the UK Government Green Gas Support Scheme.

Key Activities

As shown in Figure 18 and Figure 19, key preparatory activities are being advanced to de-risk delivery and maintain programme timelines for both internally funded and MIM delivery models. These actions are low-cost relative to the risk of delay and do not constrain future decisions. These key activities comprise:

- **Land Acquisition:** Discussions with Glasgow City Council are underway to secure the site at Daldowie. Early engagement ensures land purchase can follow swiftly after planning approval, reducing programme risk. Acquisition completion will be aligned to Final Determination and project confirmation
- **Preliminary and Outline Design:** Design development is progressing to establish cost certainty and meet potentially long lead times for a project of this scale. Current work supports both delivery models and minimises abortive cost risk. Further outline design will provide confidence in layout ahead of planning submission, further de-risking delivery
- **Consultation:** Public consultation will precede planning and environmental permitting, both critical path activities. This project is a major planning application and has a three month mandatory pre-application public consultation period. During this period two public events must be held to inform the local community about the proposed planning application and seek feedback on the proposals.

  This will enable the local communities to be better informed about the proposals and have an opportunity to contribute their views before a formal planning application is submitted. This will help improve the quality of the application, address any misunderstandings and highlight any issues which are particularly important to the local community. It may be possible to try to address any concerns through design, which could be intimated at the second consultation. Consultation will take place as a prelude to the Environment permit application. SEPA are expecting that the consultation for this will take place at the same time and venues.

  This engagement will also strengthen stakeholder confidence. Plans will be shared with key stakeholders, including WICS, in advance.
- **Environmental Permitting (SEPA):** Agreement on Best Available Techniques (BAT) is essential for licensing. Early dialogue with SEPA will mitigate risk by securing BAT approval before detailed design and construction commence
- **Planning Approval:** Planning consent will be sought at the optimal stage to avoid abortive design work and maintain programme certainty
- **Procurement:**
  - **Scottish Water Funded Option:** Partner procurement will run in parallel with preparatory activities to prevent delay, with appointment contingent on SR27 Business Plan approval and governance
  - **MIM Option:** Development of the MIM structure and subsequent procurement will follow to identify preferred bidders.

The investment in these preparatory activities is modest compared to the cost of delay given the necessity of the project to deliver outcomes (as described in Sections 2 and 3) and is largely required for both options. As per the standard Scottish Water PIA process, benefits and financial justification will be further matured and detailed in the Stage 3b PIA.

Stakeholder Engagement

Scottish Water will undertake regular engagement meetings with senior stakeholders WICS, SEPA and the Scottish Government to ensure alignment of the strategic approach to the planning and procurement of this project. It would also be beneficial to hold regular project specific engagements moving forward, to further ensure understanding and alignment. As per Scottish Water standard PIA process, a stakeholder plan will be developed during future PIA stages.

Design

In preparation for Gate 70 and the Stage 3b PIA, a comprehensive process design has been undertaken to inform a preliminarily layout (Figure 15) The Technical Basis of Design has been agreed with our internal stakeholders (Environment, Planning and Assurance and Technical Support and Assurance) and liaison has started with the relevant parties within SEPA.

In order to further refine the layout and reduce risk, another evolved set of design deliverables will be developed in the next 3-6 months in advance of delivery partner procurement. These will focus on buildability and will aim to reduce any risk of layout change in advance of the currently programmed date for planning submission. It is expected, however, that final detailed design will be undertaken by the supply chain sub-contractors as part of their key deliverables and will only be complete during the construction process.

Environmental Assurance

Dedicated periods are included for SEPA engagement and environmental assessment, reflecting the policy expectation that environmental outcomes are fully considered alongside cost and deliverability.

Environmental Impact Assessment

Under the provisions of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, (the EIA Regulations), Scottish Water sought an Environmental Impact Assessment (EIA) screening opinion from Glasgow City Council (GCC) in July 2025. The response confirmed that the proposal was an EIA development, on the basis of arboricultural concerns. In order to confirm the scope of the proposed EIA, Scottish Water will seek a formal EIA Scoping Opinion from GCC as Planning Authority during January 2026. This Scoping Opinion would be relevant for a Daldowie based solution, regardless of funding mechanism (Scottish Water or MIM).

Scottish Water will submit a Scoping Report to support the formal request under the Regulations for a Scoping Opinion for the EIA and provide information about the proposed bioresource facility and its potential environmental effects. A methodology for the EIA has been set out. The screening response received from GCC provided a comprehensive summary of potential environmental impacts associated with the development and assessed which of these impacts were considered likely to be significant. This response, along with the responses received from statutory consultees during the screening process, has been used as the basis for this scoping report. Location and site plans, model extracts, Preliminary Ecological Appraisal (PEA) and a Preliminary Arboricultural Impact Assessment (AIA) will be included in the submission.

It is anticipated that the scoping opinion will be received by the end of March 2026 and that the EIA will take 4 – 8 months to complete. This timescale is derived from the judgement of our experienced planning and environment experts based on historical precedents.

Environmental Permit

The proposed WCB facility will require planning consent from GCC, and an environmental permit will be sought from SEPA under the provisions of the Environmental Authorisations (Scotland) Regulations 2018 (EASR). This permit will closely control emissions to air, water and land resulting from the development. The site will be designed to meet the controls set out in the permit which are derived from a European Directive (the Industrial Emissions Directive (IED)).

The timescale to complete the permitting process is estimated to be 10 – 12 months. Again, this timescale is derived from the judgement of our experienced environmental regulation experts based on historical precedents.

The project team are already undertaking regular liaison meetings with SEPA, including site visits, to secure a good early understanding of our plans for the project. Scottish Water and its consultant have used these opportunities to share design proposals and seek clarity and guidance on environmental compliance requirements, specifically in relation to the IED and the associated permit application requirements. This engagement will be maintained throughout the project programme. Once the site is commissioned, contact with SEPA will focus on operational compliance.

Governance Structure

WCB will be delivered through Scottish Water's existing, well-tested governance framework. This provides a clear line of sight from strategic decisions from Scottish Water Executive Leadership Team right down to day-to-day project activity. The structure is layered, yet simple in how it functions. It is detailed in Table 12 with their governance structure outlined in Figure 2020.

Table 12: Proposed governance arrangements

Group	Role & Focus	Members	Frequency
Sponsor Group	Provides the overarching mandate for the programme, sets long-term priorities, and approves any major changes to scope, budget, or strategic intent. Provides Director level strategic direction and alignment with corporate goals and funding.	• Scottish Water Executive decision makers (led by the Director of Capital Investment)	Every 6 months
Steering Group	Strategic guidance and stakeholder alignment. Focus is on advice to Programme Board on vision, benefits and external alignment.	• Scottish Water General Managers (with active engagement from Scottish Government, WICS and SEPA).	Every 3 months
Programme Board	Responsible for operational decision-making and the coordinated delivery of the programme. Driving delivery and facilitating operational decisions to ensure the alignment across programme work packages and wider projects. Programme Board approves plans, budgets and proposed changes.	A jointly led Scottish Water and Delivery Partner group • Programme Director • Programme Manager • Scottish Water Project Managers Delivery Partner Leads	Every 2 months
Project Board (Delivery)	Ensures the execution of project workstreams and deliverables. This level takes direction from the Programme Board and fundamentally secures delivery of the project. Project Board provides reporting on progress.	• Scottish Water Project Managers • Supply chain leads • Technical teams	Every 1 month

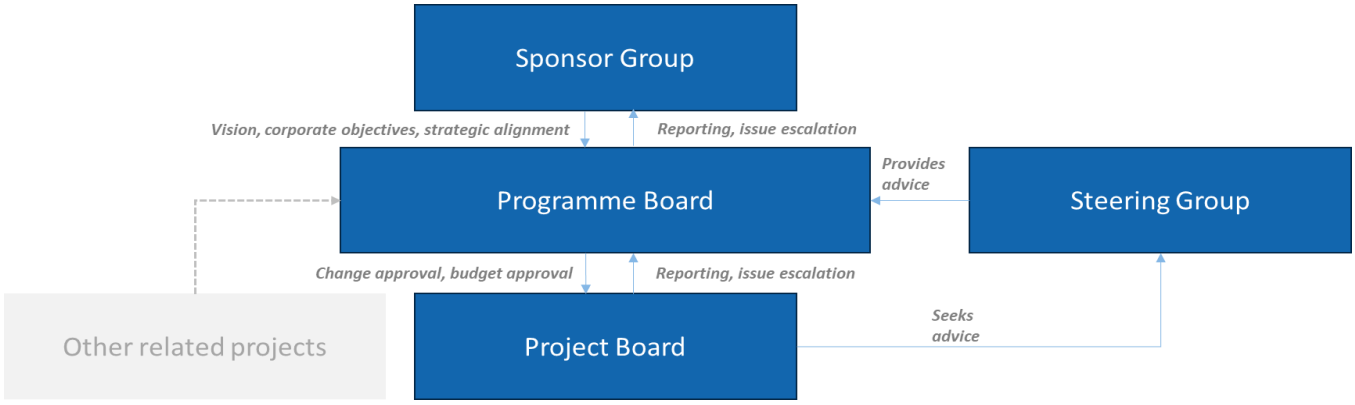


Figure 20: Proposed outline governance structure

This governance process will support a continued level of senior challenge, which will focus on primary and secondary scope, construction methodology, operational constraints, customer impact, risk transfer and specification. The knowledge and experience from the supply chain will be critical in this respect and foremost among this will be the selection of an experienced construction delivery partner.

Evolution of the Governance Structure

Once a decision is made as to the funding/delivery route of this project the proposed governance and project structure will be reviewed. Specifically:

Scottish Water funded

On the assumption the programme is funded solely through internal Scottish Water investment, the organisational structure would retain the same core groups. The Sponsor Group would remain the ultimate authority. With no external funding partners, strategic direction, investment approvals, and change control would be managed entirely within Scottish Water's established corporate frameworks, enabling faster decision cycles and reduced complexity in approvals. The Programme Board would continue to act as the central delivery authority, but with greater autonomy to refine budgets, optimise delivery strategies, and adjust programme phasing in response to operational priorities. The Steering Group would focus primarily on internal stakeholder alignment across operations, asset management, finance, and environmental compliance, rather than managing multi-party interests. At the delivery level, the Project Board would operate with clearer and more direct reporting lines, benefiting from simplified escalation routes and a single organisational risk appetite. Overall, an internally funded model would maintain rigorous governance while enabling more agile decision-making, reduced administrative overhead, and tighter alignment with Scottish Water's long-term asset strategy.

MIM

Under a MIM funding model, the structure would require enhanced transparency and strengthened stakeholder representation to ensure confidence and accountability across all contributing organisations. The Sponsor Group would expand to include senior representatives from each funding partner, with clearly defined voting rights, approval thresholds, and dispute-resolution mechanisms. Its role would extend beyond strategic direction to include joint oversight of funding conditions, compliance obligations, and shared risk management. The Programme Board would continue to lead delivery, but its authority would be exercised within a more structured reporting framework, ensuring that each funder receives consistent, auditable information on progress, budget performance, and emerging risks. The Steering Group would become a critical coordination forum, tasked with maintaining alignment across diverse stakeholder interests, managing inter-organisational dependencies, and escalating issues that

require Sponsor Group intervention. At the operational level, the Project Board would retain responsibility for day-to-day delivery but would operate under more formalised reporting protocols, ensuring traceability of decisions and clarity of accountability. This multi-party model introduces additional governance complexity, but it provides a robust structure for managing shared investment, ensuring transparency, and maintaining collective confidence in the delivery of a major national infrastructure asset.

The enduring governance structure for the project can only be determined once the decision on the funding model has been made. Consideration has been given to the optimal model for project control for each of the financing options available.

6.4 Project Management

Project Management Capability and Proficiency

Scottish Water projects follow a proportionate governance process aligned with best practices such as APM® and PRINCE2®, incorporating Agile/SCRUM techniques as needed. Together, these methods provide a structured yet adaptable framework that promotes strong governance, clear decision-making, and active stakeholder engagement throughout the project lifecycle. It also ensures that roles, responsibilities and lines of accountability are clearly defined and consistently applied.

Project management is further supported by programme and portfolio methods including MSP® and MoP®. If the project was to be delivered through MIM, Scottish Water would agree with the delivery vehicle, what the arrangements would be, through the Project Agreement.

Proficiency is evaluated through tailored competency frameworks, My Story development, and resources provided by our online platform Cornerstone and the People Learning, Resourcing and Organisational Development team. Our people are encouraged to pursue project management chartership, and Corporate Membership of APM provides additional learning opportunities.

Project Risks and Opportunities

Scottish Water has a consistent and robust approach to risk management for all projects, that allows project teams to proactively and effectively manage risk, to determine priorities and provide interventions by identifying where the greatest threats and opportunities are.

Scottish Water project risk methodology and the project risk register contained within our corporate systems are based on both the ISO 31000 Risk Management Guidance and the Association of Project Management (APM) approach to ensure industry best practice. The project continues to follow this guidance and practices.
It should be noted that the risks and opportunities outlined below are solely project delivery risks and not associated wider Scottish Water project risks i.e. agricultural land availability for example.

Table 13: Primary Risks and Opportunities

Primary Risks:		
	Impact	**Mitigation actions**
1. **Land purchase – final agreement of land purchase terms, timeline for vacant position.**	Delayed start on site	Early engagement with Glasgow City Council who are the owner.
2. **Supply chain capacity causing delay as a result of parallel delivery activities associated with the English/ Welsh AMP 8 programme.**	Late delivery of key process elements, and equipment	Early liaison with key suppliers. Early contractor involvement in strategic programme analysis.
3. **Scope of the EIA – the potential for EIA scope expansion and a corresponding lengthening of the EIA process.**	Delay in submitting Planning Application	Ecological surveys already in progress. Confirmation of scope being obtained prior to progressing to planning application and undertaking full EIA.
4. **Planning permission approval – a longer and more complex EIA, or a protracted public consultation would influence and potentially delay the planning approval.**	Delay in submitting Planning Application	Close and regular liaison with Glasgow City Council Planning Department. Obtaining confirmation of EIA scope prior to undertaking and submitting assessments.
5. **Ancillary process - critical bioresource improvements (outlined in Annex B) cannot be delivered ahead of the new plant completion.**	Process risks, cost increases, or contractual penalties.	Projects are being promoted to start early in SR27 programme of work
Primary Opportunities:		
	Impact	**Enabling Actions**
1. **Programme optimisation – the development of a detailed resource loaded programme.**	Reduce overall programme time and therefore cost.	Early contractor involvement and key supply chain companies will be engaged
2. **Off-site manufacture**	A proven method of time and cost reduction.	This technique has been used by Scottish Water successfully for non-infrastructure projects.
3. **Value engineering focussed on - construction methodology, temporary works design, material selection, and optimisation of Standards and Specifications,**	Reduce costs and timescales for delivery.	Further Value Engineering workstreams will follow the Value Management decisions.

Scottish Water will further enhance the project's risk governance by updating and expanding the Risk Register, developing a high-level Risk Management Plan, and undertake periodic Quantified Schedule Risk Analysis (QSRA) and Quantified Cost Risk Analysis (QCRA) to strengthen alignment between scope, schedule and delivery as the project progresses toward Stage 3b. In addition, Scottish Water will also complete an integrated Quantified Risk Analysis (QRA) for Cost and Schedule. The quality and benefits of the outputs of this is contingent on there being a robust detailed resource loaded programme. There is already a detailed pre-construction P6 programme and Scottish Water have engaged (via Early Contractor Involvement), input on the construction phase programme. The main opportunities to strengthen relate to adding project specific comparators and demonstrating more advanced modelling to quantify risk and uncertainty (i.e. Monte Carlo, QCRAs). Further work will be undertaken to quantify broader risks and opportunities, including the potential impact on Scottish Water's relationship and standing with customers, employees, Trade Unions and key sector stakeholders.

6.5 Next Steps

As per Figure 18 and Figure 19 and the more detailed plans in Annex C, the key next steps for both scenarios are to work towards the completion of the Stage 3b PIA and Gate 70 by April 2026. To support this, we will take forward the key preparatory activities, further the design and progress the environmental requirements.

The WCB project is deliverable and benefits from being located on an existing operational site with established access, utilities, and an experienced workforce, ensuring the lowest-risk pathway to delivery.

Summary

Early design development, ground investigations, and productive engagement with SEPA and Glasgow City Council have significantly reduced planning and permitting uncertainty, while progression toward Gate 70 in April 2026 demonstrates strong governance maturity and programme readiness.

Delivery risks across construction, planning, supply chain capacity and landbank availability have been identified early, with targeted mitigation already in train - including preparatory works, refined design, and proactive engagement with regulators and stakeholders. The programme aligns with the EASR timeline and allows WCB to providing critical contingency during planned outages at the Nigg AAD.

Financially and operationally, delivery through Scottish Water's Tier 2 funding route provides the lowest overall cost and the highest degree of delivery confidence. While the MIM is technically feasible, it introduces additional programme duration, cost and classification risk, and does not offset the £483m additional whole-life cost. The extended timescales associated with a MIM option would also increase exposure to tightening landbank constraints under EASR.

Overall, the WCB project is ready to proceed to the next stage of development, with governance, programme structure and delivery planning firmly in place to support timely and successful implementation.

7 Conclusions

In summary, WCB offers the best overall solution: a strong strategic fit, lowest whole-life cost, service impact and delivered greater resilience for Scotland's bioresource system. It gives Scottish Water a route to meet statutory duties, reduce carbon, support national policy and protect customers from avoidable long-term cost and risk.

WCB aligns directly with the Draft Ministerial Objectives 2027-33 and Scotland's priorities for net zero, circular economy, resilience and environmental compliance. A modern AAD hub at Daldowie delivers the transition required by tightening regulation and is consistent with national policy and the Climate Change Committee's recommendation for universal advanced digestion by 2030.

An options appraisal showed that a single AAD site at Daldowie is the lowest-cost solution, with a 60-year NPC of £ m, saving around £ m in capital and £ m in whole-life costs compared to multi-site alternatives. Delaying investment to SR33 would increase costs by another £ m and would heighten operational and compliance risks at a time when land-restoration outlets are diminishing and the regulatory environment is tightening.

EASR guidance makes the landbank challenge even more pressing. Under the new limits, AAD will require 119,000 - 160,000 ha/year, whereas a drying/liming approach would require 203,000 - 300,700 ha/year - meaning WCB reduces Scotland's exposure by 84,000 - 150,000 hectares each year. AAD also reduces dry solids by about 50%, significantly easing pressure on land availability, whereas the alternative of limed cake generates has greater odour potential and almost twice the tonnage of material to recycle.

Independent benchmarking by the Cumming Group confirms that WCB costs are within UK industry ranges and sit below the industry average for new AAD and THP facilities. From a financial perspective, Tier 2 public funding remains the best option. While a Mutual Investment Model is technically viable, the analysis shows it would increase the 60-year cost to £1,580m, a premium of £483m, and lead to £0.7bn higher customer charges by 2051. It would also delay delivery by 2 – 3 years, adding further operating costs and increasing exposure to landbank constraints.

WCB is deliverable, the project benefits from location on an existing operational site, using returning PFI assets and retaining skilled operational staff. It has passed Gate 50, is progressing towards Gate 70 in April 2026, and early design, ground investigations and SEPA engagement are underway. The four-year construction period developed with industry experts provides a realistic delivery pathway.

In summary, WCB offers the best overall solution: a strong strategic fit, lowest whole-life cost, service impact and delivered greater resilience for Scotland's bioresource system. It gives Scottish Water a route to meet statutory duties, reduce carbon, support national policy and protect customers from avoidable long-term cost and risk.

Annex A. Environmental

A brief summary of some of the environmental factors for the WCB scheme are as follows:

- **The development**: The scheme is to use an existing Scottish Water site. Construction will be adjacent to existing facilities which will be decommissioned once the new scheme is operational.
- **Use of natural resources**: The existing Daldowie BTC dryer treatment technology is energy intensive. The WCB scheme is more energy efficient by at least 45%.
- **Production of waste**: The WCB scheme will produce stabilised bioresource with reduced pathogens and odour meeting stricter regulatory standards for land application (e.g. Class A biosolids). It will reduce operational carbon emissions by 27,000 tCO_2e and produce 50% less dry solids product to recycle. It will transform organic matter into biogas (methane and CO_2), which can be utilised for heat and electricity generation or upgraded to renewable natural gas (RNG). This process supports energy neutrality and advances sustainability objectives for waste water treatment facilities through efficient biogas utilisation and nutrient recovery.
- **Pollution and nuisances**: The WCB's biosolids will be produced with reduced odours in comparison to the existing dryer and lime treatment alternatives.
- **Risk of major accidents or disasters**: The Daldowie BTC assets are returning from PFI to Scottish Water in 2026 with five years of residual asset life. Daldowie is a critical asset. Failure of the asset would pose a system-wide risk, preventing the de-sludging of c. 150nr upstream Waste Water Treatment Works which would quickly lead to compliance failures. The Daldowie BTC is unable to reliably process mean daily volumes of current bioresource load and does not have the capacity to accommodate growth within the region. Scottish Water is already experiencing risks associated with the WDF and land restoration outlets. These risks are mitigated with the commissioning of the WCB scheme.
- **Climate change**: A high level Scottish Water assessment of site flood risk has been undertaken for water and waste water assets, against the current and future SEPA flood maps (SEPA Flood Maps). A static output is available in Supporting Document 7 - Waste water flood risk assessment . Daldowie BTC (STC assets tab) is assessed to be currently exposed to a high likelihood (1 in 10 year) of medium impacts, with climate change the flood risk is estimated to increase (with more of the site expected to be at flood risk). This is not a detailed flood risk assessment and does not take account of any flood protection at site being assessed as part of the design process.

BTC and the GCC Training Centre

'ALScottish Water035 Brown Wood' is located to the immediate south of the current Proposed Development Boundary, south of Daldowie BTC.

Both 'ALScottish Water019 Ashwood' and 'ALScottish Water035 Brown Wood' relate to Long-Established Woodland of Plantation Origin (LEPO). There is also mature woodland between the training centre site and Crematorium to the east and the trees within the Crematorium grounds are subject to Tree Preservation Order (TPO). There are also some trees between the existing BTC site and the training centre. Scheme design iterations have aimed to avoid impacts to areas of designated woodland.

The survey found a range of category A, B and C trees and groups of trees, along with 2 veteran trees, on the peripheries of the proposed development site. Whilst there were no category A trees

between the BTC site and training centre, the area at the eastern edge of the site contained a large number of category A trees.

A constraints-led approach to the design of the facility was adopted. The Long-Established woodland and SINC to the north of the site and Daldowie Ponds SINC to the south were not included within the development area and a buffer strip for the woodland immediately north of the proposed development site was agreed with GCC. The Preliminary Arboricultural Impact Assessment (AIA) prepared for the development found that the eastern boundary of the site, as initially provided for the EIA screening request, would have resulted in the loss of a number of mature trees including one veteran tree. As a result, the eastern boundary was moved around 20m to the west which enabled retention of a significant number of these trees, including the veteran tree, and the development footprint was updated. There will remain an impact on mature trees that encroach into the centre of the training centre site from the east and around 8 category A trees will be lost.

Trees to the north and south of the development, and those not being removed to the east, will be protected during construction. Appropriate compensatory planting will be provided in conjunction with biodiversity net gain. Due to the constraints of the site, it is anticipated that off-site planting will be required and potential sites are currently under consideration in the vicinity of the site.

The screening opinion confirmed that in relation to the characteristics and location of the development it will potentially "*have a detrimental effect on the woodland during construction of the bioresource facility and potentially during its continued operation by way of woodland disturbance. The whole of the Daldowie Crematorium site is covered by a TPO."* In relation to the characteristics of the potential impact there were concerns that *"the associated tree loss required to facilitate the development of the bioresource centre shall significantly degrade coverage of mature trees of good quality at this location."*

The baseline surveys undertaken for the PEA also confirmed *"the presence, or suitability of habitats to support several protected and notable species, including bats, badger Meles meles, water vole Arvicola amphibius, breeding birds, common or widespread amphibians and reptiles, otter Lutra lutra and hedgehog Erinaceus europaeus"*

Protected species within the Zone of Influence (ZoI) of the works that have the potential to be impacted by the proposals include:

- **Badgers:** some badger sets were identified within the woodland around the proposed development site. Further badger survey work will be conducted in order to facilitate an assessment of impacts to badgers and determine a suitable mitigation package to support the planning application.
- **Bats:** there are a number of buildings and trees within the development site that have potential for supporting roosting bats. A programme of bat activity surveys is being undertaken to understand impact.
- **Otters:** No confirmed otter shelters were identified during surveys; however, suitable shelter features were noted to be present (albeit largely inaccessible by land) along the River Clyde. The PEA concluded this "*species is considered unlikely to be present within the ZoI of the Proposed Development and is scoped out of further assessment*"
- **Water Vole:** No evidence of water vole was noted during the PEA walkover survey. Habitats within the site are largely considered to be unsuitable or sub-optimal for this

species, however the ongoing programme of protected species survey work will consider potential for presence within the site.

- **Breeding Birds:** there are suitable habitats for nesting within the development site and breeding bird surveys will be carried out. The aim will be to remove vegetation out with the breeding bird season and where this is not possible, nesting bird surveys would be undertaken immediately prior to removal.
- **Reptiles:** Habitats are ostensibly suitable to support reptiles, in particular, in areas of disturbed land, some open areas and within riparian zones along watercourses within the ZoI of the proposed development. Risks will be mitigated by construction timing and ECoW support during the construction phase.
- **Amphibians:** The wetlands within the ZoI are *"potentially suitable to support common species".* Impact on amphibians will be mitigated during the construction phase in any high risk areas. Wetland habitats were assessed to determine suitability for Great Crested Newt, but it was found that *"the likelihood of a great crested newt population being present and persisting over time, or subsequently colonising created wetlands and terrestrial habitats in the ZoI of the Proposed Development over this period is low*".

The PEA includes recommendations for additional survey work and sets out mitigation measures which will be incorporated within a Construction Phase Environmental Management Plan (CEMP).

The NatureScot response to the screening consultation from GCC confirmed "*in ecological terms it will be necessary for the applicants to consider impacts on all of the usual protected species of animal that need to be considered in relation to any development proposal, as well as the means by which their proposed development can deliver biodiversity enhancements*." However, "*there is no particular need for these issues to be addressed by EIA*".

A Biodiversity Net Gain appraisal will be carried out based on a modification of the Defra matrix. Appropriate biodiversity enhancement measures will be developed in combination with the compensatory planting plan to ensure an overall positive impact on biodiversity in the area. Some suggestions are provided within the PEA. Where practicable these will be within the existing and proposed Scottish Water landholding at Daldowie and are likely to include management of existing woodland and SINCs. Opportunities for additional off-site biodiversity enhancement and compensatory planting are also being examined.

The screening opinion from GCC concluded that, whilst the arboricultural survey was ongoing, the proposal is likely to have a significant impact on the woodland, "*The Planning Authority has significant concerns that the proposed development shall have a negative impact on existing woodland both within the development site and adjacent to it. The development site lies immediately adjacent to Ancient, Long-Established and Semi-Natural Woodland, and the proposal will have a detrimental effect on the woodland during construction of the bioresource facility and potentially during its continued operation by way of woodland disturbance. The whole of the Daldowie Crematorium site is covered by a Tree Preservation Order. A large number of mature tree species of good quality within the training centre site shall have to be felled in order to make way for the bioresource centre. At this stage the developer has not provided details of mitigation measures to avoid, prevent, repair or reduce the potential impact*."

Due to design constraints, and the need to keep the existing BTC operational until construction is complete, there will remain some loss of trees to facilitate the development but incursion into the protected areas has been avoided through careful design.

Impact on the woodland, which it is assumed includes consideration of potential disturbance to protected species has, therefore, been scoped into the EIA.

Landscape and Visual

There are no national or local landscape designations on the site. However, the local designation Special Area of Landscape Importance (SALI) applies to the adjacent Daldowie Crematorium land.

The proposed development site is in a mixed-use area with the existing BTC and WWTW immediately west with a quarry beyond and the crematorium to the east. South is the River Clyde with a residential area beyond, and north is an area of woodland, quarry and the M74 with a residential area beyond. The development has been carefully set within the existing woodland surrounding and largely screening the site.

The wooded Chuckie Hill to the east climbs to around 29m AoD which provides good screening for the residential properties within Daldowie estate and the crematorium buildings. The woodland to the northeast of the site also provides good screening for the residential properties. Views to the north of the site including the M74 are also screened by existing woodland. There are a limited number of trees between the existing BTC site and training centre, and views are available into the site from the BTC. The existing woodland at Daldowie Ponds to the south of the site provides good screening from lower levels on the south side of the River Clyde and including the core path. The land rises quickly to the south and residential properties on higher ground within Newton, for example at Plantation Grove, have existing views to the BTC and into the proposed site.

There will be a requirement to remove some trees within the eastern and western fringes of the development area due to the physical constraints of the site. However, all trees to the north and northeast of the site, and the majority of trees to the east and south, will be protected during construction. Retaining the majority of this woodland retains good screening of the development.

The training centre site slopes from around 21m AoD at the centre of the existing development to 15.3m AoD to the site boundary to the north and 16.5m AoD to the edge of the proposed development area to the south. The land rises in the eastern part of the site to Chuckie Hill at around 31.55m AoD.

The bioresource centre development area level will be reduced and sloped towards the existing BTC to tie both sites together to allow vehicle movements between both sites. The current level of the GCC training centre facility area is 21m AoD and will be reduced to approximately 17.5m AoD at the centre of the site. Based on the proposed site levels and crossfalls, bund walls of varying height will be position at critical areas, identified from the spill modelling, around the site boundary.

Containment bund walls are required at critical locations. The height of the bund wall will vary in height from 0.7m in some areas to 1.2m in others, dependant on the depth of material determined through the spill modelling The tallest new structures on the site will be the gas bag lightning protection conductors at approximately 30m high but these are very narrow and will largely assimilate with the woodland beyond the site. The gas bags themselves are 19.6m high. The 8 digesters will be the largest new tanks, each being 18m in diameter with a height of approximately

23m. The OCU stacks are sized at 15m and 9.5m with the steam boiler/CHP flue at 14m. Air emissions modelling may require the boiler flue to be extended to 28m in height. By way of comparison the blue Drax BTC building on the existing site, which is likely to be removed, is 21m in height and the existing primary odour control stack is 50m high. It is currently anticipated that the digesters will be constructed from concrete. The gas bags need to be a light colour to reflect sunlight and keep the gas cool and we are currently looking at a light grey (the visualisations have used white as the worst-case scenario). The other structures will be coloured a recessive green to assimilate with the surrounding woodland.

Visualisations were developed using the model of the proposed development and photographs from key viewpoints. These visualisations confirmed that from elevated positions within Newton the top of the taller structures, such as the gas bags, digesters and lightning rods, will be visible above the woodland. These are viewed in the context of the existing BTC structures. From the viewpoints selected within the crematorium and close to the River Clyde no portion of the proposed development is predicted to be visible due to screening effects of landform and intervening vegetation cover. The visual impact will be long term but mitigated by landform and existing and proposed woodland planting.

The lighting will be designed to ensure safe operation of the plant whilst minimising light pollution and impact on surrounding areas.

In relation to impact on the landscape, and specifically the adjacent local designation, the development will not directly impact the crematorium land and GCC concluded that whilst there was potential for environmental impact this would not be significant, "*It is highly unlikely that the adjacent SSLI shall be negatively impacted by the proposal due to the existing dense forestry/ trees between it and the development site."* In relation to the broader landscape, NatureScot advised GCC that "*The landscape as a natural heritage resource will however not be affected by this proposal."*

In relation to the visibility of the site GCC acknowledged there is a potential impact on properties in the Newton area but concluded that the impact would not be significant "*It is considered that there is a sufficient separation distance between the site and Newton which shall limit the visual impact of the proposal on this residential neighbourhood*."

Landscape and Visual impact has been scoped out of the EIA, but visualisations will be provided with the planning application.

Air Quality, Noise and Human Health

The proposed development site is in a mixed-use area with the crematorium, landfill site, quarry, WWTW and existing BTC all nearby. There are also some residential properties within the Daldowie Estate and larger areas of housing across the River Clyde and to the north of the M74. Additionally, there is a garden of remembrance at the crematorium east of the site.

In relation to pollution and nuisances the screening opinion stated that "*The development will require a PPC application under the provisions of The Pollution Prevention and Control (Scotland) Regulations 2012, Part A, and emissions to air, water and land will be controlled and monitored through this process. Unless SEPA are satisfied the proposal meets the requirements of the consenting regime no permit will be issued*."

SEPA will control and monitor operational emissions to air, water and land through the EASR permitting process and SEPA guidelines are being followed in design. In relation to emissions to air the following assessments are being undertaken:

- Air Emissions Risk Assessment, including Air dispersion modelling to determine stack and flare heights.
- Odour Risk Assessment, including Odour modelling, and preparation of an Odour Management Plan for the site.

These assessments will outline potential effects, identify mitigation through design and confirm ongoing monitoring requirements that will be controlled through the EASR process. SEPA confirmed to GCC in their response to the EIA screening opinion consultation that "*we do not consider that the proposed development would require EIA for matters within our remit*".

Changing the process to AAD means biogas from the digestion process could be captured and reused within the site to feed the steam boilers and CHP engines, substantially reducing airborne emissions from the site. Biogas could also be upgraded to provide renewable natural gas which will be assessed at Stage 3b. Biogas will only be flared within the constraints of the permit. Emissions from combustion of the biogas within the CHP engines and steam boilers will be vented to the atmosphere through stacks. It is currently proposed that there will be two new odour control units (OCU) and associated stacks and three of the existing OCUs will be retained. The outcome of the odour risk assessment will confirm the location of the required OCUs and will inform the extent of the assets requiring odour capture and treatment. A management plan will be prepared to accompany the permit application and odour control equipment designed accordingly to minimise risk of odour nuisance.

A Bioaerosol Risk Assessment will also be carried out and measures implemented to restrict the emissions of bioaerosols out with the site boundary, in accordance with SEPA guidance.

The screening response acknowledges the potential for cumulative odour impact in relation to proximity to the WWTW and landfill site and this will be taken into account in the odour modelling which will include the bioresource centre, BTC and WWTW. The response did not consider there is likely to be a significant adverse odour impact, "*Potential cumulative odour impacts with the existing WWTW and the Greenoakhill No landfill site will need to be carefully considered. The applicant intends to submit an Odour Risk Assessment, including Odour modelling to inform the detailed design of the proposed development. The outcome of the Odour Risk Assessment will inform the detailed design of the new bioresource centre, with odour control units and associated stacks incorporated*." The odour risk assessment will be included with the planning application.

The EASR permit application will also control noise emissions from the site. A Noise and Vibration Assessment, including noise modelling, will be carried out to assess potential noise nuisance. A Noise and Vibration Management Plan will be generated for the operation of the site. There is potential for noise disturbance to the adjacent crematorium and nearby residential properties during construction activities. Construction Phase Plans will be generated setting out measures to mitigate potential nuisance through construction phases. The overall construction programme will be in the region of 36 months, and it is currently anticipated that the site compound will be located within the Drax site so not in close proximity to residential properties.

During dry periods whilst construction is ongoing there is potential for dust nuisance, appropriate mitigation will be specified in the Construction Phase Environmental Management Plan. Additionally, wheel washers will be employed as required to keep the road network clean.

The potential for noise and vibration impact on the crematorium site and nearby residential properties was acknowledged in the screening opinion, but no significant impact was considered likely, "*It is considered that noise and vibration impact can be acceptably controlled under the PPC regime. It is the developer's intention that a Noise & Vibration Assessment, including noise modelling, shall be carried out to assess potential noise nuisance and from that a Noise &*

Vibration Management Plan shall be prepared for the operation of the facility. The implementation of this shall help to avoid unacceptable noise impact on sensitive receptors."

The response did state "*Further information on the flaring of biogas is required so any potential associated impact can be adequately assessed*." At present this is anticipated to be emergency flaring only but if required more frequently it would be to a maximum of twice a month. This will be confirmed through the planning application process.

In relation to human health associated with the bioresource cake by-product of the process, the screening opinion confirmed that there is not likely to be a significant impact because "*the organic sludge by-product shall be processed and removed from site and applied to farmland under licence, which is an approach viewed as environmental best practice by SEPA. Both a sludge cake reception facility and storage building are proposed in order to manage this waste product. The PPC permitting regime will set controls on emissions to air, water and land resulting from the development. Furthermore, the replacement of the existing BTC with a more modern bioresource centre will maximise the efficiency of the sludge processing, reduce CO2 emissions and minimise waste products generated. This shall be an improvement on the existing situation*."

In relation to risk of accidents the potential impact is assessed in the screening opinion as being usual risk that is not likely to be significant "*Necessary control and mitigation measures will be put in place to limit the risk of accidents associated with construction works and to help ensure safe working practices. In terms of the risk of accidents associated with operational activities, an Environmental Accident Management Plan is being prepared by the developer, and this shall be a consideration for SEPA under the PPC regime. Unless SEPA is satisfied that risk of accidents is properly addressed, no permit will be issued*."

Accordingly, Air Quality, Noise and Human Health has been screened out of the EIA, but information will be provided with the planning application.

Water Environment

The proposed development site is located around 200m to the northeast of the River Clyde at an elevated level. Between the site and the river is Daldowie Ponds SINC but no permanent ponds were in evidence on the PEA walkover surveys. There is also a drainage ditch to the north of the proposed development area. There are no groundwater source protection zones in the area.

Potential emissions to the water environment are controlled through the EASR permitting process. Appropriate bunding will be provided as required by SEPA, at present designed as a peripheral bund around the full site sized to contain the volume arising from the simultaneous catastrophic failure of two of the digesters. In addition, there will be local bunds to contain spills from chemical storage tanks and delivery areas. A Secondary Containment Assessment with spill modelling is being prepared. Treated liquors from the digestion process will be returned to the adjacent WWTW for blending prior to discharge through the existing outfall to the River Clyde, this will represent a minor increase in flow and meets current discharge licence parameters.

A drainage impact assessment is being prepared for the site and drainage options are being examined. It is anticipated that surface drainage from the site will be directed to a storage tank for testing prior to return to the treatment works for appropriate treatment.

Daldowie Ponds to the south of the site is shown as having a high risk of flooding on the SEPA flood risk maps. An area of the land being developed to the north of the site which is currently grassed is shown as having a low risk of flooding (0.1%p/a). The design has deliberately avoided

the area at high risk of flooding to the south of the site but does extend into the area at low risk of flooding to the north. As a result, a flood risk assessment is being prepared for the site and if necessary, the elements within at risk areas will be designed to be resilient to flooding or will be protected from flooding.

Methods to mitigate potential short-term impacts associated with protecting the water environment during construction will be covered in a Construction Phase Environmental Management Plan. This will include a range of environmental management and protection measures that will be adopted during construction to manage potential short-term impacts including controlling run-off to the water environment. These include:

- Pollution prevention and control measures;
- Incident reporting mechanisms;
- Water management, discharges and watercourse protection;
- Earthworks management, including storage of topsoil;
- Energy and water conservation measures;
- Sustainable procurement measures; and,
- Hazardous materials management and storage.

The screening opinion confirmed that there is potential for pollution to the water environment but that this was not likely to be significant "*it is considered that this potential impact will be minimised by appropriate design of the bioresource centre and operational activities can be acceptably controlled under the PPC regime*."

In relation to flooding the risk due to proximity to the River Clyde was noted but confirmed "*essential infrastructure developments of this type are considered to be a relatively low risk land use in that they can be designed to remain operational if the land floods, and they are unlikely to increase flood risk to other areas."*

Potential impact on the water environment is, therefore, screened **out** of the EIA but information will be provided with the planning application.

Land

The development area is low lying land adjacent to the River Clyde which is largely developed as a training centre with a collection of buildings and hardstanding. There are also 2 residential properties within the site. The northern area of development is currently amenity grassland bordered by woodland. The woodland continues up the eastern edge of the site between the development area and crematorium.

The underlying soil is Darvel brown earths - Fluvioglacial sands and gravels derived mainly from Carboniferous rocks. Site investigations are being undertaken to determine ground conditions and whether there is any contamination. This will inform any design mitigation required for protection of the soils and groundwater

The risk of land contamination from the operational bioresource centre will be managed through the SEPA permit process and the bunding and containment of areas with potential to contaminate soils will mitigate the risk. Soil and groundwater monitoring will be undertaken as required by the Regulations. An Environmental Accident Management Plan is also being developed.

The GCC EIA screening response acknowledges that "*The proposed development may lead to a risk of contamination of land or water from the release of pollutants during the operational phase of the proposed development*" but concludes that "*this potential impact will be minimised by appropriate design of the bioresource centre and operational activities can be acceptably controlled under the PPC regime*".

The anaerobic digestion process will result in generation of bioresource which will be dewatered for application to agriculture as a soil conditioner and fertiliser. This is currently SEPA's Best Available Technique for disposal of sewage sludges and GCC in their EIA screening response acknowledges. In relation to human health the response states "*the replacement of the existing BTC with a more modern bioresource centre will maximise the efficiency of the sludge processing, reduce CO2 emissions and minimise waste products generated. This shall be an improvement on the existing situation.".*

The proposed bioresource centre is a low carbon and low waste solution to the treatment of sewage bioresources. A waste management plan will be prepared for the remaining waste, such as spent containers and waste oils.

Any spoil generated during construction will be retained on site as far as practicable through cut and fill to minimise waste generated during construction.

The existing WWTW, BTC and proposed expansion site are designated as Green Belt and Green Network in the Glasgow City Development Plan 2017 which also identifies the SINCs. The GCC EIA Screening response stated in relation to land use that "*The proposed development is compatible with the existing WWTW complex and is a proposed extension of that use. Adequate construction management plans could help to control unacceptable impacts during the construction phase and potential impacts on sensitive receptors shall be closely controlled and monitored through the required PPC licence for the bioresource centre*". It concluded that "*the extension site is immediately adjacent to the existing WWTW and is subordinate to it. The scale of proposed development is not out of keeping with the existing complex and land use*."

Potential impact on land is, therefore, screened out of the EIA but information will be provided with the planning application.

Roads and Transport

The site has good transport links being adjacent to junction 3A of the M74. It is accessed via the A721 south which splits for access to the crematorium and access to the current training centre, Daldowie WWTW, the existing BTC and some residential properties. The 'buildouts' acting as traffic calming/speed restriction have been removed along the access road to the WWTW.

A transport statement is being prepared for the proposed development. It is expected that access to the development area for all vehicles will be restricted to the current access to the BTC site. Egress will be either via the current access road to the Training Centre or the current access to the BTC site. Existing traffic movements to the BTC and training centre would be replaced with movements for the new bioresource centre Current operational vehicle movements to the BTC and training centre are in the region of 41 per day. This could rise to around 71 per day. A transport statement is being prepared to accompany the planning application. Given the proximity to the M74 and M73 via a grade separated trunk road junction this change is not expected to have a significant impact on the local road network. Transport Scotland were contacted as part of the

pre-application consultation and stated that "*Given that these vehicles will be entering/ exiting the site via a grade separated trunk road junction, TS considers that an increase of 30 vehicles per day will not have a significant impact on the M74*".

During construction there will be a considerable rise in the number of vehicle movements to the site. At present locations within the existing Drax and WWTW sites, including existing office accommodation, are being examined for compound locations. The proximity to the M74 will limit the impact of this traffic on the local road network. In order to manage this a Construction Traffic Management Plan will be prepared for the development.

Potential impact on roads and transport is, therefore, screened out of the EIA but information will be provided with the planning application.

Built Heritage

There are no structures designated for their built heritage importance within the proposed development site. Some of the structures at Daldowie Crematorium are category B listed. These are set at a higher elevation than the proposed development site and are screened from it by a wide belt of woodland planting which spans crematorium land and the proposed development site and landform. As much of the existing woodland planting along the boundary between the site and the crematorium land is being retained as practicable so as not to adversely impact the setting of the listed buildings. The GCC Screening Opinion confirmed that ""*it is highly unlikely that the crematorium site shall be negatively impacted visually by the proposal due to the existing of dense forestry/ trees between it and the development site*."

The site was historically within Daldowie Estate and included Daldowie House and grounds. The crematorium and WWTW were built in the 1950s and the garden centre which became a training centre was constructed later and much of the woodland within the site has grown from nursery planting when it was a garden centre. The risk of encountering unrecorded archaeology during construction is reduced by the extent of previous development of the site. A Desk-Based Assessment will be commissioned in the first instance, with a Written Scheme of Investigation produced thereafter to confirm any areas requiring watching brief within the development site.

Potential impact on built heritage is, therefore, screened out of the EIA but information will be provided with the planning application.

Annex B. SR27 Investment

The investment associated with WCB is allocated across a number of Needs, and across the two main units of the planned infrastructure; the central Daldowie site, and the various Satellite sites. Together these assets form the full WCB system.

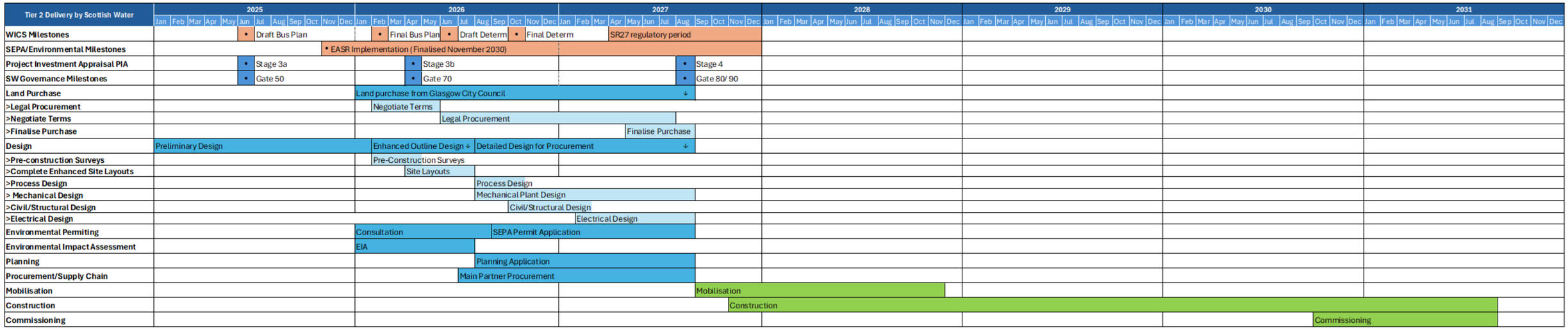
The details of this investment are set out in the table below.

Table 13: SR27 investments for West Central Bioresources

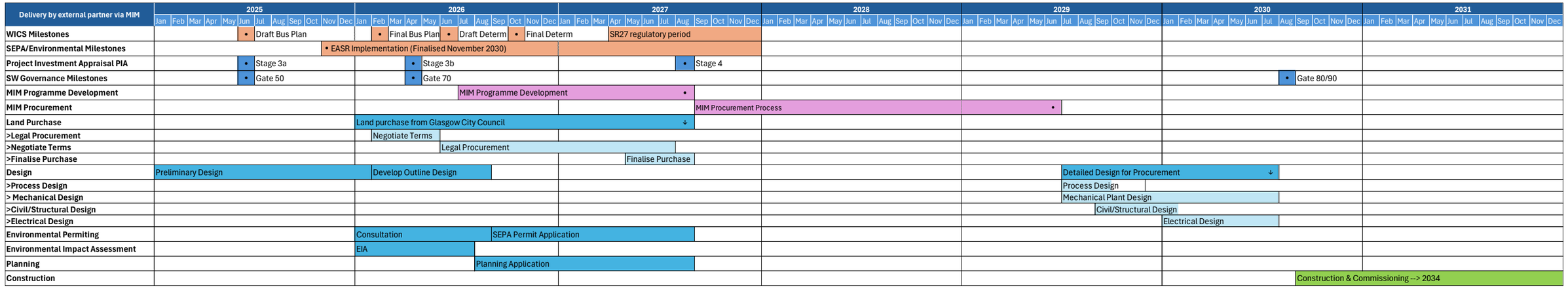
WCB unit	Investment Name	Investment Hierarchy	Investment Need	Proposed Investment (£m, 24/25)
WCB - Daldowie	West Central Bioresource	AR3	765	[redacted]
		Enhancement	807	[redacted]
	Sub-total			[redacted]
WCB - satellite system	Land Restoration Mitigation – Liming sites	AR3	765	[redacted]
	West Central System - Cupar - Cake Movement			[redacted]
	West Central System - Dunfermline - Cake Movement			[redacted]
	West Central System - Kirkcaldy - Cake Movement			[redacted]
	West Central System - St Andrew - Cake Movement			[redacted]
	West Central System - Cumnock - Conversion to dewatering			[redacted]
	West Central System - Dalderse - Conversion to dewatering			[redacted]
	West Central System - Girven - Conversion to dewatering			[redacted]
	West Central System - Kinniel Kerse - Conversion to dewatering			[redacted]
	West Central System - Meadowhead - Conversion to dewatering			[redacted]
	West Central System - Screening (WWTW)			[redacted]
	West Central System - Stirling - Conversion to dewatering			[redacted]
	West Central System - GGSM		695	[redacted]
	Sub-total			[redacted]
Grand Total				[redacted]

Annex C. Programmes

Expanded Timeline of Internally Funded Model



Expanded Timeline of MIM Model



Annex D. Additional Finance Material

ESA10, Eurostat/ONS guidance and finance models

To utilise a structure that sources private project finance to be 'off-balance sheet', meaning it would not count towards the SG's CDEL, is reliant on a technical assessment of long-term debt and borrowing measures using a classification under the European System of Accounts (ESA10) and through the application of Eurostat technical guidance, ultimately applied by the Office of National Statistics (ONS) to provide a ruling on the classification. The first stage is an assessment of whether the entity providing the private project finance is classified as public or private. If it is classified as public sector no further assessment is required and the funding will automatically be classified as 'on balance sheet.'

The next stage is to review the substance of the transaction and its specific commercial, legal and financing terms. This assessment is made under ESA10, applies the principles in the Manual of Government Deficit and Debt and follows the Eurostat Guidance published by the European PPP Expertise Centre (EPEC) known as the 'Guide'. There are 20 key automatic on balance sheet triggers in the Eurostat Guidance forming the initial assessment in this stage. However, the full assessment covering 16 themes and 70 tests in total is undertaken for each classification by ONS.

In summary, applying the 'Guide' covers four steps as below:

1. An assessment of contractual provisions that automatically trigger a classification as on balance sheet for Government
2. If no automatic triggers exist, evaluate the risk allocation. This examines construction, availability and demand risk. For off balance sheet classification, the SPV has to bear construction risk and either availability or demand risk
3. If the risk assessment is inconclusive to determine which parts has rights and most reward from asset use and exposure to most risks associated with the asset.
4. Finally, if economic ownership is inconclusive examine which party controls the asset specification and the services delivered

The above criteria are evaluated based on the combined effect of all contractual provisions weighted by their relative importance to determine whether the private project finance is classified as on or off government balance sheet.

We have therefore considered a range of financing approaches in conjunction with EY-Parthenon and briefly describe them below:

- **Scottish Water Funding:** Scottish Water funds projects by allocating capital from agreed revenue collected through customer charges and from Scottish Government loans. This option attracts the lowest cost of capital, is the least complex to implement and does not require any operational interface with a Project Finance structure. The assumption in the SR27 Final Business Plan is that WCB will be funded by this approach.
- **Direct Procurement for Customers (DPC)**: is an approach adopted by Ofwat for England and Wales for PR19, and in PR24 it became the preferred route for large (£200m+) capital projects where the project is distinct and separable from the water company's existing

network and operations. It is a competitive tender process in which a Competitively Appointed Provider (CAP) is selected to design, build, finance operate and maintain infrastructure for 20-30 years, before handing over the asset. All the organisations that have utilised this approach are privately owned and therefore the balance sheet classification has not been tested against the Eurostat guidance. As such this option was not considered for WCB.

- **Regulated Asset Base (RAB):** is designed to balance risk transfer by leveraging customer charges to finance the project, ensuring predictable revenue streams while minimising market risk. Under this model, the Special Purpose Vehicle (SPV) bears construction risks, which were distributed among the SPV, contractors, and customers. Operational risks are transferred to the SPV, which earns a regulated return based on asset performance, incentivising efficiency and reliability. Market risks are significantly reduced through a regulatory framework that guarantees stable income via customer charges.

Again, all the organisations that have utilised this approach are privately owned and therefore the balance sheet classification has not been tested against the Eurostat guidance. It is known that regulatory risks remained shared, making it more unlikely it would be categorised as 'off balance sheet'. As such this option was not considered for WCB.

- **Mutual Investment Model (MIM):** was developed by the Welsh Government and to date has been used to deliver 3 non-water social infrastructure projects and a major upgrade of the A465 road in Wales. It is a financing approach that brings together the public and private sectors to deliver large scale infrastructure projects. Under this model the private sector via a SPV is responsible for the design, construction, financing and maintenance of the asset throughout the contract term. In return the public sector body pays a fee to the private sector to cover the cost of construction, maintenance, financing, risk and profit via a service payment or unitary charge which is normally paid in equal instalments throughout the lifetime of the project. The service payment must be subject to revenue deductions for lack of availability or poor performance to manifest the transfer of risk. At the end of the agreement the asset is handed back to the public sector in a condition that meets predefined standards set out in the contract.

Taking the above into consideration, MIM funding is considered to be the most viable private finance funding option.

More about MIM

The MIM builds upon the principles established in the Standardisation of PFI contracts, Version 4 (SoPC4) which served as the industry standard framework for structuring private finance contracts from 2007. SoPC4 is widely regarded as best practice guidance and continues to influence public private partnership models. The main change to traditional PFI contracts is that MIM introduces the inclusion of a public sector equity stake of a maximum of 20% in the SPV. This gives the public sector a direct financial interest and formal governance role, including the right to appoint a director to the SPV Board. This ensures that public interest in embedded in the decision making process throughout the life of the contract.

As part of the development of the MIM for the Welsh Government projects, the Welsh Government sought a classification decision from ONS prior to commencing procurement. In December 2016 the ONS concluded that the MIM approach was likely to be classified as private sector balance sheet items meaning the projects would be off balance sheet for the public sector. However, the ONS also identified several areas requiring ongoing scrutiny to ensure this classification remains valid throughout the life of the contract. A key concern was the extent to which the public sector

is entitled to financial rewards such as gains from refinancing activities, third-party revenue generated by the asset and any financial returns flowing back to the public authority. ONS advised that these factors could potentially change the balance sheet classification if not carefully managed.

Despite Private Project Finance having a higher net present cost than Scottish Water funding, a MIM funded model can provide some wider benefits to multiple stakeholders if the contracts are executed in the right manner over and above enabling access to funding that might otherwise be unattainable. Scottish Water have considered these benefits in our assessment of the appropriateness of MIM as a funding option for WCB and note that some of these benefits will depend on the circumstances of each individual project. EY- Parthenon have supported and provided input in their practical experience of recent public private partnerships.

MIM can enhance risk management incentives given the isolation of a MIM project from the general funding approach for projects which focuses the management of risk into the SPV. As the SPV has not got a broader capital base then all the risks must be managed within its tightly constrained financial covenants. This leads to a higher level of financial jeopardy in the SPV than might be the case in Scottish Water and it is reasonable to expect an increase in focus on whole life project risk and therefore potentially leads to more certain outcomes that may flow to improved value for money, depending on the level of risk pricing attached to a project. Some of this risk transfer can be achieved with Scottish Water funded projects through procurement processes and the risk transfer is priced into the contract terms.

A MIM funded project could also enhance innovation through competition by bringing additional innovation to the design and delivery of projects. It affords an opportunity for new thinking to be introduced to the system and from there lessons can be applied to traditionally procured projects enhancing whole life thinking across the investment portfolio. Again, this can be achieved through procurement processes, and the relative advantage is hard to gauge in advance.

MIM funding approach may also enhance or maintain benefits delivered through the traditional procurement models if these benefits are explicitly included in MIM contracts. Assets built under MIM are subject to lifecycle maintenance, whole-life costing and performance based contracts. This helps to ensure the assets remains of good quality throughout its operational life and therefore protects public value. While this can also be delivered through Scottish Water funded and operated solutions, the commitment up front in a MIM structure has rigour and with performance deductions can be relied upon. The shadow side of this is that these operational solutions can be inflexible, and hard to change and the contracts are typically 25-30 years which is far shorter than the life of some of the assets.

MIM contracts can also be structured to include an obligation on the private partners to deliver a range of community benefits such as local job creation, apprenticeships and training. This could be extended to social enterprise involvements including community initiatives and environmental protections. Through these community benefit obligations, MIM may support broader wellbeing objectives including economic inclusions, social equity, environmental sustainability, public health and support for cultural and social infrastructure. Again, Scottish Water procured projects could seek this commitment, with a careful watch on value for customers money against the deliverables Scottish Water is charged with delivering.

Additionally, the public sector's equity stake and board representation give it a governance role and a share in any returns. This helps align private incentives with public interest. Reporting requirements and contract transparency will also be built into the model.

While there are opportunities for wider benefits from MIM there are also counter points. In addition to what is included above the cost in time and money to establish a MIM will be considerable, several £m and likely 2-3 years from design to financial close. WCB would be a first use case in Water and in Scotland, there is no standard contractual documentation to follow. MIM is also a new way for construction parties to engage with the public sector client and enhancing attractiveness to the investor market is essential. This could be helped with a wider programme

of construction in Scotland that could be funded by MIM but inevitably the burden on developing the markets will rest in the initial projects.

Finally, the internal management impacts of pursuing a MIM strategy will need to be considered. The procurement, project management and financial teams and processes necessary to address the new questions that MIM presents will need to be trained and resourced.

Overall, there are potential benefits in the cost certainty, protection of outcomes and innovation through the nature of the commercial contract with the Private Sector. There are some constraints on flexibility given the necessary long term nature of MIM contracts and opportunity to replicate some of the benefits through conventional procurement practice.

Welsh Government Projects

The summary below provides an overview of the commercial structure of the live MIM projects developed and implemented by the Welsh Government that have reached financial close (Table 14).

The live projects highlight three commonalities:

- Contract durations range from 25 to 30 years post-operations, similar to the durations of previous PFI contracts, indicating the market's willingness to still engage in longer-term Design Build Finance Operate Maintain contracts.
- The public shareholding is set at 15-20%, which aligns with the characteristics of the MIM.
- Service payments typically account for around 11% of the total capital value, with the exception of the A465 project, where the service payment is approximately 6% of the total capital value. This provides insight into the type of payment relative to capital value that market participants may expect when assuming the risks associated with the MIM. However, the service payment will be customised based on individual project scopes and designs.

Table 14: Summary of the Welsh Government MIM Projects

	Key Dates	Contract Term (years)	Public Sector Shareholder (Welsh Govt and Dvlp Bank of Wales)	Capital Value	Annual Service Payment
A465 Dualling	Financial Close: 2020 Construction Commence:2020 Operations Commence: 2025	30	15%	£590m	£38m
Velindre Cancer Centre (Cardiff)	Financial Close: 2024 Construction Commence:2024 Operations Commence: 2027 (planned)	25	15%	£312m	£33m
Sustainable Communities for Learning Programme - Flintshire School	Financial Close: 2022 Construction Commence:2022 Operations Commence: 2024	25	20%	£65m	£7m
Sustainable Communities for	Financial Close: 2022 Construction Commence:2022	25	20%	£53m	£6m

	Key Dates	Contract Term (years)	Public Sector Shareholder (Welsh Govt and Dvlp Bank of Wales)	Capital Value	Annual Service Payment
Learning Programme - 3 new primary schools	Operations Commence: 2025				

Scottish Government and Scottish Futures Trust Engagement

EY-Parthenon identified that for MIM to be an option for funding the WCB plant, strong support from the Scottish Government would be required ideally with a mapped programme of other projects in the Scottish public sector, with a firm timeline that would be tendered as MIM projects. Support from the Scottish Futures Trust (SFT) would also be seen by the construction and private finance partners as positive and increase their engagement.

Scottish Water have had a series of meetings with members of the Infrastructure Team at the Scottish Government and the SFT. Both bodies are supportive of MIM with the Cabinet Secretary for Climate Action and Energy formally requesting that Scottish Water should consider this model for MIM. The Scottish Government also expect to produce a wider programme of projects that could be funded via MIM in early January 2026. The SFT have also provided high level advice that for this project, given it is the first in Scotland and interfaces with a wider system, a market sounding exercise should be conducted. This advice has been taken forward in the engagement with EY-Parthenon.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Supply Chain

February 2026

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1 Executive Summary

As a regulated monopoly working on behalf of the Scottish People, it is vitally important that Scottish Water operates with a flexible and resilient supply chain, with the right capacity and capabilities, so that our customers receive the service levels, and the best possible value for money. Improving how we contract and engage with our supply chain will be the core basis of how we create great outcomes efficiently for customers; and our approach for SR27 builds on, and improves, from previous charge control periods.

This Technical Appendix brings together the evidence we have collected, and the analysis we have undertaken, to assess Scottish Water's supply chain approach. We set out our planned improvements, that will support our SR27 investment requirements, and our efficiency analysis, which is explained in more detail in the Efficiency Technical Appendix.

In this Technical Appendix, we explain:

- The supply chain context and current track record,
- Key changes in SR21 impacting our supply chain strategy,
- Future requirements and the case for change,
- The proposed SR27 Supply Chain approach, and our market testing of this approach,
- The new Enterprise model that will complement existing delivery approaches, and
- The benefits, risks and transitional approach to deliver this change.

We conclude that although our supply chain approach has been successful in SR21, there are opportunities to improve on this, through a new dynamic integrated model that will complement the existing successful supply chain relationships.

This Technical Appendix focuses on the assessment of Scottish Water's supply chain to ensure its readiness in terms of capacity, capability, and resilience in preparation for SR27 requirements. Through our market testing and independent 3rd party review processes we can confidently set out the existing approach, the case for change and underlying benefits that will be delivered.

Much of the evidence and analysis contained in this appendix has already been shared with the Water Industry Commission for Scotland (WICS) in relation to supply chain capacity, as we have sought to work collaboratively with the regulator to provide high quality and robust evidence.

2 Background

2.1 Context

Scottish Water are reliant on the supply chain to manage its existing asset base, to deliver improved levels of service for existing customers and to deliver services to new customers. We currently operate a dynamic and agile supply chain model (see below), which has served us and our customers well during SR21.

However, the increased level of investment for SR27, and the subsequent increased demand on the potential supply chain, comes at a time when other sectors are also increasing their planned infrastructure investments and delivery.

Therefore, we are changing and improving our supply chain model for SR27, to ensure that our investment plans can be achieved, that the Draft Ministerial Objectives 2027-33 are met, and that our deliver effective services and value for money for our customers.

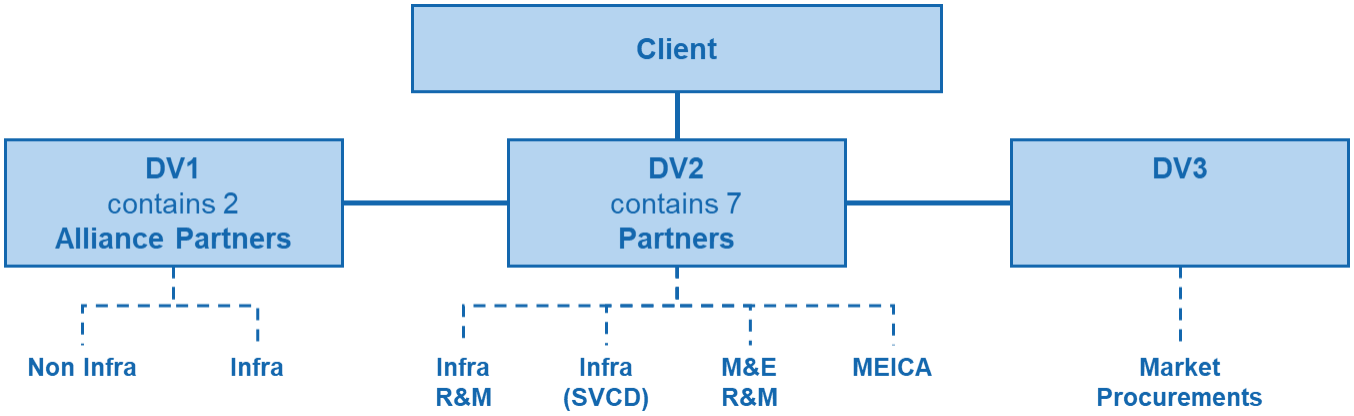

Figure 1: SR21 Dynamic and Agile Supply Chain Model

The above structure is further supported by:

- **Regional Contractor Services** - comprising 67 partner organisations,
- **Consultants** - consultancy support from 2 Alliances with 2 partner organisations in each, and,
- **Framework Suppliers** - 430 partner organisations across 220 frameworks

2.2 Our Track Record: How Have we Set Ourselves up for Success During SR21?

We have shown over SR21, and earlier periods, that we procure, and then work, responsibly and effectively with our supply chain to deliver positive outcomes, and value for money for our customers.

We will build on our strong position and track record here to deliver the new supply chain model required to ensure effective deliver of our planned SR27 investments.

Procurement and Supply Chain Business Plan objectives for SR21

The Procurement & Supply Chain (PSC) function within Scottish Water delivers a world class procurement service and is Platinum Accredited with the Chartered Institute of Procurement & Supply (CIPS), one of only 18 companies in the world and the only water company to have achieved this level.

To support Scottish Water's Purpose and Strategic Ambitions, we developed a business plan for SR21 with our mission being: "Through digitally enabled supply chain integration, we collaborate to create an efficient, sustainable and agile supply chain that delivers great value for Scottish Water and our customers, supporting a flourishing Scotland".

We will support Scottish Water's three Strategic Ambitions through delivering improvements in three key areas:

- **Procurement & Sourcing**: Ensuring Scottish Water has access to the goods and services it needs at the right time, to the right standard, representing value for money; delivered efficiently by a world-class procurement team.
- **Risk Management:** Ensuring structural, ethical, local, and global supply chain risks, including value for money, are effectively monitored, managed, and made visible to Scottish Water to enable a sustainable and agile supply chain.
- **Supply Chain Development:** Ensuring the Supply Chain remains fit for purpose through long term strategic alignment between Scottish Water & its supply chain partners.

2.2.1 *Procurement and Sourcing*

Scottish Water spends ~£1.4 billion per year in its supply chain, across capital and operational activities and the goods and services we receive for this are a critical enabler in supporting our ability to deliver our services to customers. The supply chain model above sets out our current structure and approach, and Figure 2 below details the categories and percentage of spend that make up ~£14 billion that goes through frameworks.

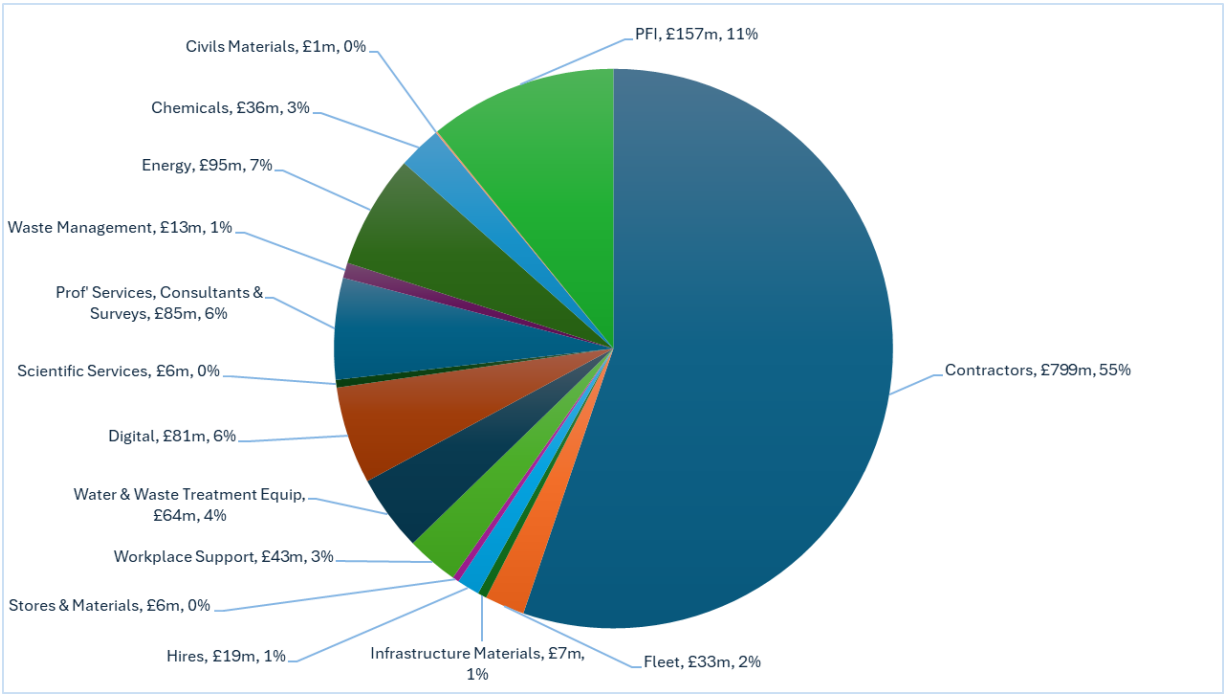

Figure 2: Our spend profile for Financial Year 24/25

Scottish Water has ~200 frameworks supported by ~440 suppliers, procured in compliance with the Utilities Contract (Scotland) Regulations 2016. Figure 3 below shows some key supply chain statistics.

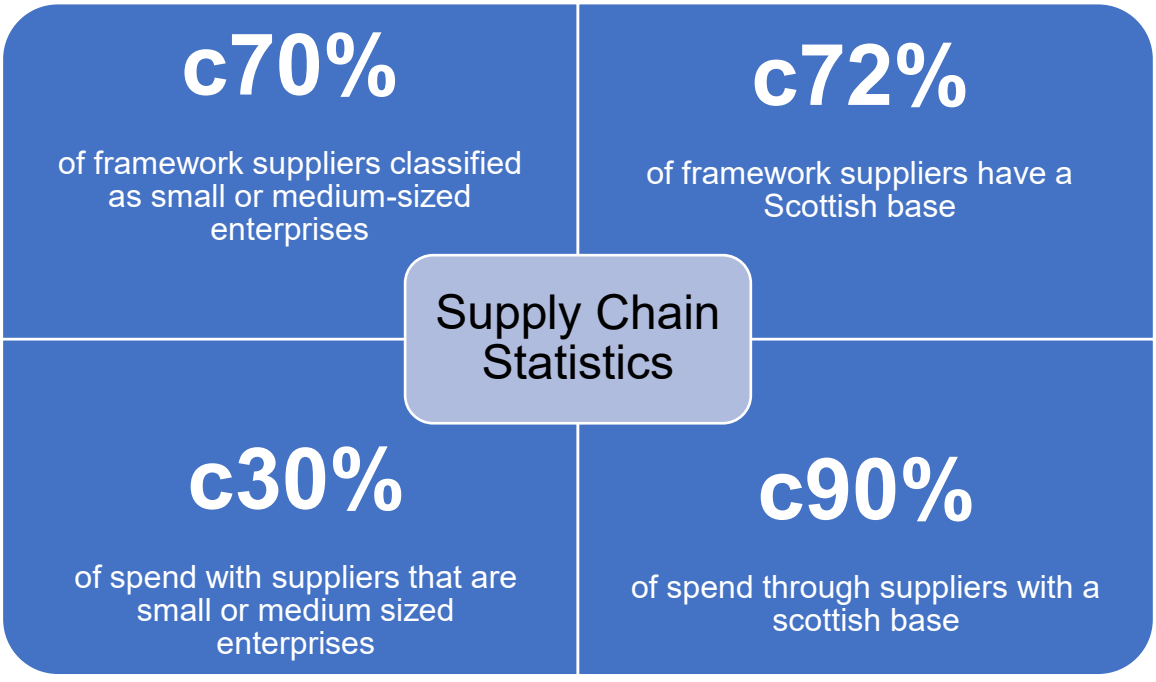

Figure 3: Overview of highlights of our successful use of frameworks in FY24/25

2.2.2 *Risk Management*

Scottish Water's PSC monitors and manages risk within its supply chain across three main areas: performance, structural, ethical and horizon scanning.

Performance Risks

PSC manages several performance risk elements across the supply chain. The commercial element to manage performance includes a range of value for money mechanisms and the ability of suppliers to deliver within agreed pricing, including the management and collection of volumetric benefits within our framework agreements.

Furthermore, PSC conduct price validation which involves annual exercises to verify that the pricing in our established frameworks is competitive within the current market. This takes place on a three yearly cycle to ensure all frameworks in scope are covered.

PSC also reports on 'Pound in the Ground' which is a measure which expresses the efficiency of Scottish Water's operational practices in construction projects by measuring Scottish Water's and our delivery partners' overheads for every £1 of construction. This is described separately in the Efficiency Technical Appendix.

In addition to the above value for money assurance activities, PSC presents a capacity and organisational health tracker covering Delivery Vehicle 1 (DV1) and Delivery Vehicle 2 (DV2) contractors to the Capital Investment Leadership Team on a quarterly basis. This includes a summary of the financial health of the organisations, their growth plans, and a narrative from the commercial team as to the health of the relationship. The contractors are awarded a Red, Amber, Green (RAG) status based on this information which is used to review forward work allocation. There is a different industry landscape in relation to risk with supply chain partners having a reduced risk appetite which has been recognised by Scottish Water and fed into SR27 planning.

Trading risk, whereby there is a potential risk of supplier insolvency, is also considered within the commercial element of supplier performance and management of this is supported by a subscription with Dun and Bradstreet which provides alerts on supplier financials and changing risk profiles. Where there is a significant risk to services, Scottish Water undertakes increased performance monitoring, conducts service continuity planning, and seeks legal advice if appropriate.

In terms of wider performance measures, PSC issues a monthly supply chain risk report to key stakeholders within the Leadership group, highlighting key performance risks within the supply chain including capacity constraints, extended lead times and quality issues, whilst also detailing the mitigation measures that PSC are exploring to manage and reduce these risks. Additionally, PSC undertake integrated supply chain management (ISCM) to understand suppliers' performance, and it provides an opportunity for stakeholders to provide feedback on potential supplier issues to ensure they are resolved.

Structural risks

We undertake an annual review of structural risks within our supply chain, considering supply chains which have no or extremely limited alternatives or competition, which could be further negatively impacted by mergers and acquisitions and / or which could be affected by geopolitical events. Risk velocity is also built into this analysis and these risks feed into our contingency planning.

Ethical risks

We support Fair Work First principles in supplier selection and contract management. Suppliers must comply with the Modern Slavery Act, the Human Trafficking and Exploitation (Scotland) Act,

or equivalent laws. In addition, suppliers with a turnover greater than £36 million must submit annual statements; smaller suppliers sign a yearly compliance declaration.

Ethical risks in the supply chain are reviewed annually, factoring in raw material origin, supply chain tiers, and commodity type. High-risk areas may be audited or mapped; random audits check controls in lower-risk areas.

Ethical standards are outlined in the Supplier Code of Conduct linked to our Terms and Conditions.

2.2.3 *Supply Chain Development*

Throughout SR21, we have continued to work to ensure that our supply chain remains fit for purpose, by building long-term alignment between us and our supply chain partners.

The most significant aspect of our supply chain development is the Future Supply Chain Design that we are conducting to ensure we are ready for SR27. This is described in greater details in Section 3.3.

2.3 What has Changed Since SR21

2.3.1 *Draft Ministerial Objectives 2027-33*

The Draft Ministerial Objectives for 2027-33, set out how we must lead work with partners, including its supply chain, to drive progress towards achieving the Water Sector Vision.

> *"(1) Scottish Water must lead work with partners (such as stakeholders, its supply chain, academia and consultants) and engagement with customers and communities, in order to make progress towards the realisation of the long-term vision of the water industry.*
>
> *(2) In doing so, Scottish Water must apply the place principle adopted by the Scottish Government and the Convention of Scottish Local Authorities, by taking an integrated, collaborative and participative approach to decisions about a place's services and assets, in order to maximise the impact of resources and to achieve better outcomes for people and communities.*"

In addition, we must work with our supply chain effectively to deliver the necessary services and infrastructure to meet the Draft Ministerial Objectives 2027-33 across all the other areas:

- Standards of service,
- Asset maintenance,
- Supporting Sustainable Economic Growth,
- Circular Economy,
- Drinking Water,
- Environment,
- Flooding and surface water management,
- Security and resilience,
- Climate change, adaption and mitigation, and,
- Private finance initiative funded projects.

2.3.2 *Forecast UK Investment is Significant*

There is ~£490bn of national infrastructure investment forecast in the UK over the next 10-15 years. ~£65bn of this investment is planned in Scotland across the energy, infrastructure and utilities sectors.

This huge level of investment in UK Infrastructure creates a seller's market, constraining supply, and giving the supply chain choice where they wish to participate. They have told us what is important to them – revenue certainty**,** risk, margin, talent retention, innovation, flagship projects to support their brand.

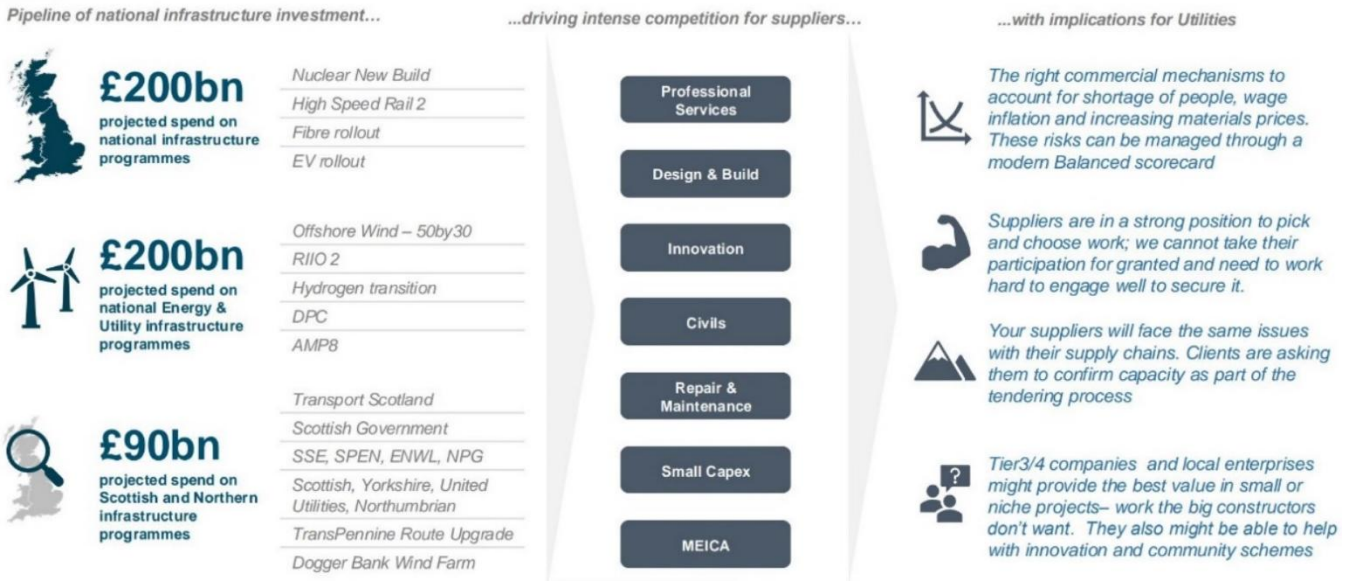

Figure 4: UK infrastructure overview[1]

With many of the UK water utilities having already awarded their frameworks for their next regulatory period, it is critical that we use the right market approach to ensure we have the right supply chain arrangements in place for SR27, that can deliver the necessary capacity and capability.

The Scottish construction market is also currently busy, with a peak forecast in 2030 and consistent demand until 2035. This could lead to regional constraints on certain skills areas, such as in commissioning, civil construction and general operatives. Although we believe that this risk is manageable through working closely with partners and creating a stable forecast of work. There is also a good level of sector loyalty, and our extension of our Delivery Vehicle 2 (DV2) will provide an initial base of capacity whilst we mobilise the Delivery Vehicle 4 Enterprise that will bring additional capability.

[1] 50by30: UK target to have 50 GW of offshore wind energy by 2030
RIIO2: Revenue = Incentives + Innovation + Outputs "2", Ofgem's price control framework
DPC: Direct Procurement for Customers, Ofwat's framework for price review
AMP8: Asset Management Period 8: regulatory investment period in England and Wales
SSE: Scottish and Southern Energy
SPEN: Scottish Power and Electricity Networks, the part of Scottish Power that owns and operates electricity networks in Central and Southern Scotland
ENWL: Electricity North West Limited
NPG: Northern Power Grid

It is estimated that we, Scottish Water, are responsible for ~14% of overall investment in Scotland and in a competitive market it is essential for us to be viewed as a good client to attract capacity with the right skills and experience. We can influence the national and regional market.

2.3.3 Our Initial Investment Scenarios Assumptions and Risk Considerations

During our investment planning, we reviewed three growth scenarios for SR27 - one at £8bn; one at £9bn and one at greater than £10bn (note these are in FY 23/24 prices). For the scenarios of ~£8bn and ~£9bn we believe that the supply chain would need to grow by between 1,000-1,600 people – i.e. from ~4,000 to 5,000-5,600 (not accounting for productivity gains). This would equate to approximately 2-3 additional civils and/or MECIA businesses and/or require organic growth.

Below we set out our supply chain requirement assessments of our current and potential future levels of assessment.

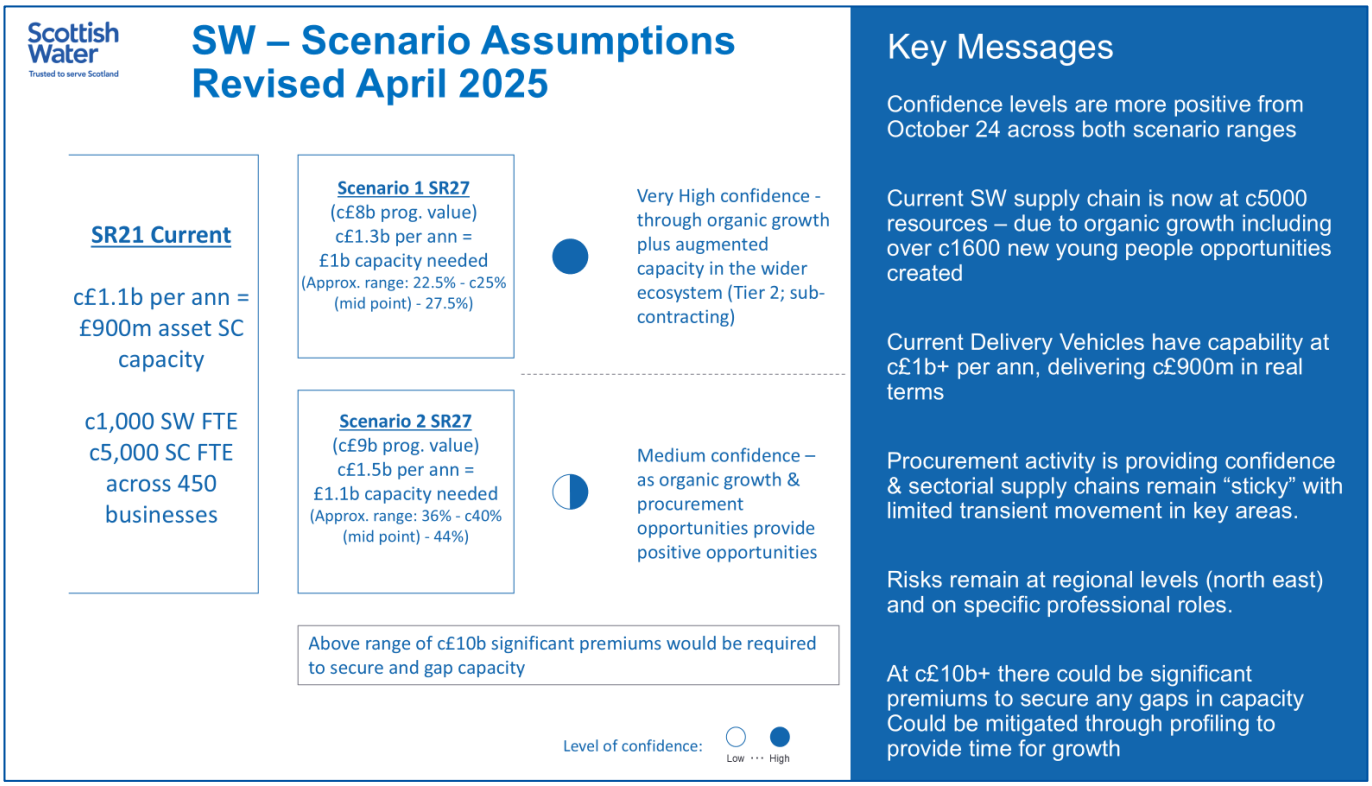

Figure 5: Our assessment of supply chain capacity in potential investment scenarios

If the investment is greater than £10bn, it is likely there could be cost premiums to secure the delta in required capacity. However, given these scenarios compared with wider investment, it is believed that this will have a minimal impact to the UK market.

We are aware that there will be specific constraints posed in Scotland, albeit these may be specific pinch points in certain areas and at certain times. For example, there is forecast to be capacity constraints in North-East Scotland with the power transmission upgrades, although the renewables sector is now seeing a downturn in requirements in certain areas. Figure 6 below, sets out an overview of the impact of constrained capital, rising costs, and labour shortages on Scotland's infrastructure outlook.

As part of the SR27 Final Business Plan review, the WICS have commissioned Turner & Townsend to undertake a review of supply chain capacity and as part of this, Scottish Water has positioned a response to several technical questions.

We have estimated that there is ~£200m of additional headroom in current supply chain capacity. However, it should be noted that this is based on current agreements with existing partners and does not reflect additional capacity that would be established via new agreements with existing partners and/or new agreements with new partners.

In Table 1 below, we highlight current spend by delivery route and our estimate of the potential capacity under SR21. This highlights that additional capacity primarily relates to elements of the DV1 and DV2 delivery routes. This provides us with confidence that along with some existing parts of our supply chain that will be extended, and new procurements that will add in additional capacity, we will be able to deliver the required capacity without additional market premiums. Although to deliver additional value and provide more assurance newer supply chain approaches will be required as noted later in the document.

Table 1: Estimated current capacity headroom by delivery route[2]

Delivery Route	Spend (FY24/25)	Potential Capacity (SR21)
DV1 non-infrastructure	£92m	£150m-£180m
DV1 Infrastructure	£108m	£150m-£180m
Major Projects	£41m	£41m
SW Environment, Planning & Assurance	£40m	£40m
SW Delivered	£455m	£455m
SW Managed Delivery (DV2)	£405m	£475m-£500m
Totals	£1.141bn	£1.311bn - £1.396bn

[2] Source: Scottish Water estimates

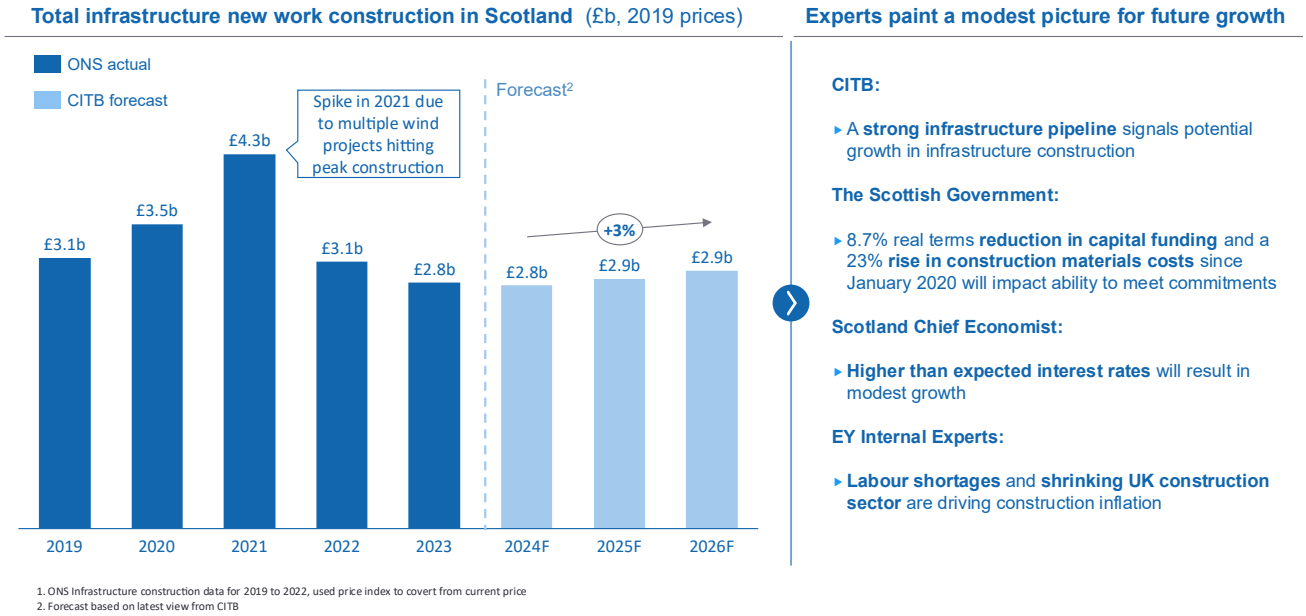

Figure 6: Experts acknowledge the impact of constrained capital, rising costs, and labour shortages on Scotland's infrastructure outlook[3]

There are also wider supply chain risks to consider e.g. wage inflation, increases in materials prices, lead times and labour availability. There are opportunities to mitigate these supply chain risks through the certainty of the programme which would enable us to plan and optimise resources, plant and materials and support forward planning our procurements, exploring opportunities to standardise products and make more use of digital engineering and nature-based solutions.

Whilst there is a good level of sector loyalty to Scottish Water, and we are seen to be a good client to work for (as evidenced in the recent British Water survey) the anticipated labour constraints make it essential for us to maintain this status and mitigate future impacts. Options being considered include encouraging organic growth in Scotland through skills academies for graduates and modern apprentices with support from other agencies, e.g. Scottish Enterprise and the Scottish Government, to encourage new entrants and indigenous growth. It is essential that the water industry in Scotland is seen as an attractive place to work that develops talent.

2.3.4 *Further Refinement of Investment Assumptions and Supply Chain Capacity*

Following on from discussions with WICS and their consulting representatives Turner & Towsend (T&T) on the forward SR27 supply chain capacity for the Scottish Water investment programme, we undertook a more detailed review and analysis of the forecasted supply chain capacity. This was set against the updated view of a c£8.3bn[4] pound investment programme.

The review utilised data provided by our existing delivery partners and information on our current supply chain as well as data provided by the bidders involved in the procurement of our new DV4 Enterprise.

[3] Sources: ONS, CITB, Scottish Government Infrastructure Plan Update, Chief Economist Outlook, EY-Parthenon research and analysis

[4] This is 2023/24 price base for the Draft Business Plan, proposed CPI+4%

We looked at a baseline view of capacity as well as a 'growth' view, again based on data provided by our partners, which allowed for organic growth during SR27.

The review highlighted that there are no major risks or concerns in terms of securing the necessary capacity to deliver the investment programme and Scottish Water has confidence that the required supply chain capacity will be available.

More details on this analysis can be found in the 'SR27 Supply Chain Capacity Report' which is included in the evidence folders with this submission, however the chart in Figure 7 below shows an overall view of capacity against the current view of the investment programme.

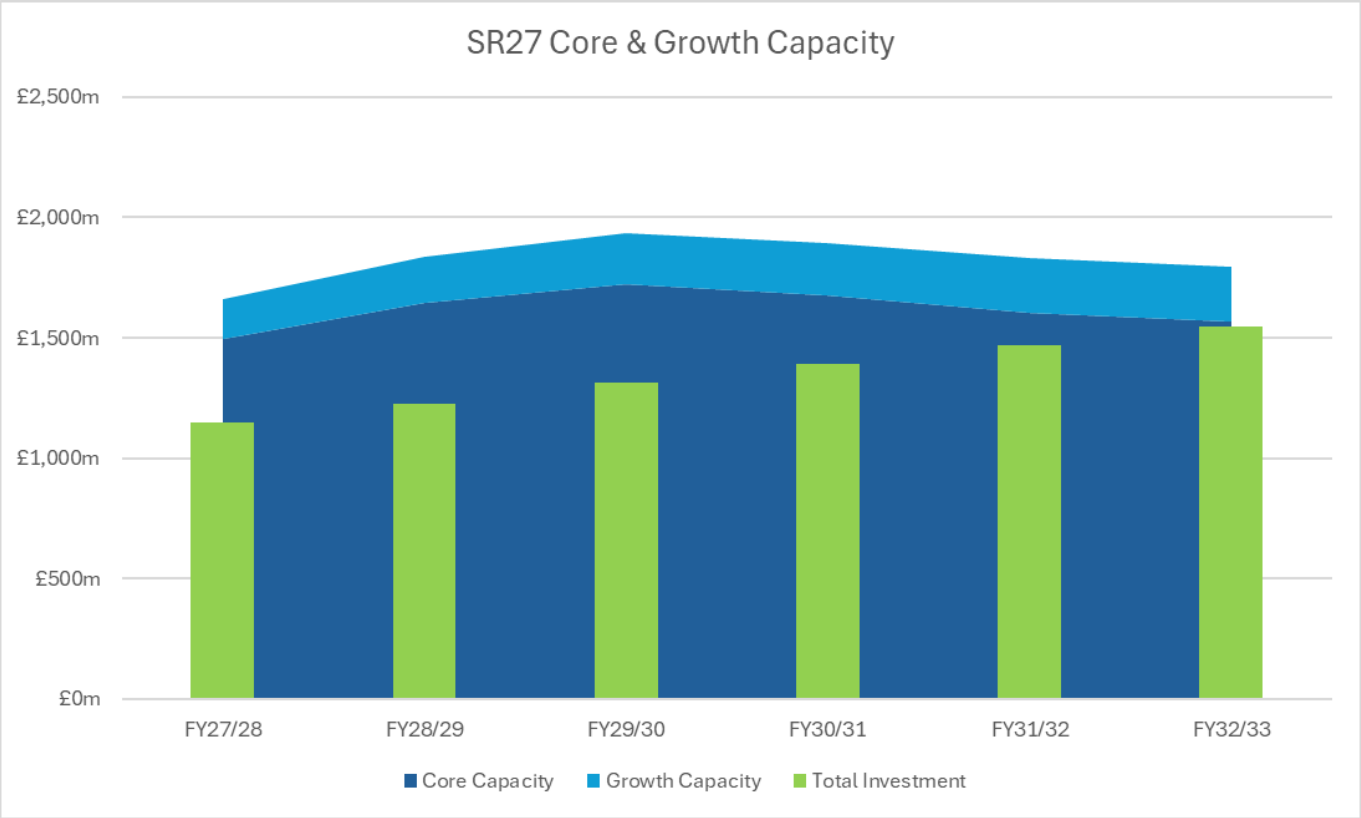

Figure 7: SR27 Supply Chain capacity against the current view of the Investment Programme

In December 2025, T&T, on behalf of the WICS, issued a draft report on the 'Efficient Size of Scottish Water's SRC27 Investment Programme'.

We have reviewed the report and note that the process of engaging with T&T has been beneficial overall and has helped to improve Scottish Water's approach to calculating and communicating capacity-related issues. The Report includes reference to the significant capacity evidence and related materials that were produced by Scottish Water and shared with T&T. In addition, Scottish Water fully agrees with the premise of the report, that a small investment programme may mean that Scottish Water cannot secure the benefits of scale in capital procurement and delivery, and that, conversely, a large investment programme beyond a specific size may become unmanageable given Scottish Water's internal capacity for asset management planning and delivery or the capacity of the supply chain. As noted by T&T, either scenario could result in investment not being delivered as efficiently as expected.

Scottish Water notes that T&T is clear in the report that its findings are based on a mixture of objective, subjective and anecdotal evidence. On this basis, it seems sensible that such findings must be treated with caution to ensure that uncertainties are fully recognised and that fair and

balanced inferences are drawn. Scottish Water disagrees with the overall conclusions in this draft of the report, and do not consider there to be sufficient evidence to justify the proposed confidence levels at different plan sizes. Scottish Water has provided a detailed response to T&T, detailing the areas of disagreement with the approaches and/or findings in its report.

Both the report by T&T (Efficient Size of Scottish Water's SRC27 Investment Programme) and our response can be found within the evidence folders supporting this Technical Appendix.

2.3.5 *We Need to Differentiate for SR27*

As we consider the market analysis, the risks, opportunities and our future supply chain requirements, we must ensure that the SR27 supply chain model supports our Strategic Ambitions and the Water Sector Vision. When considering Great Value and Financial Sustainability we must realise and evidence value for our customers and stakeholders and ensure our supply chain remains commercially sustainable.

For Service Excellence, the supply chain we create will need to continue to deliver investment with a clearer connection on outcomes, supporting our asset management approaches. It should also deliver excellent customer service and having a collective focus on improving safety, health and wellbeing in our industry. We will also need to continue our progress in targeting a 75% Reduction in Carbon Intensity of Investment, to continue our route map to Net Zero by 2040. This will require continually invigorating our approach to innovation, standardisation, and circular economy principles.

3 Our Approach to Delivering SR27 with our Supply Chain

We are recommending a bold "advanced partnering" DV4 Enterprise model for the replacement of our current DV1 delivery vehicle, and an extension of DV2 for three years, with the option to extend for a further three years until 2033.

The DV4 Enterprise will shift from fixed outputs to a more dynamic outcome-based set of measures, with partners incentivised against sub programme and Enterprise outcomes, and Scottish Water will have embedded resources within the Enterprise.

We acknowledge that there will be cultural and organisation adaptation risks which will need to be managed, however we need to address the growing demand on our resource, hence we are looking to find efficiencies compared to current arrangements[5].

3.1 Future Requirements and Case for Change

Our future requirements are significant, and there are several market challenges we must address and objectives to deliver. We are well placed, as an attractive partner, to effectively work with our supply chain to deliver more efficiently and faster to ultimately deliver value for money for our customers.

[5] Refer to the ***Technical Appendix 012 – Efficiency*** for further details

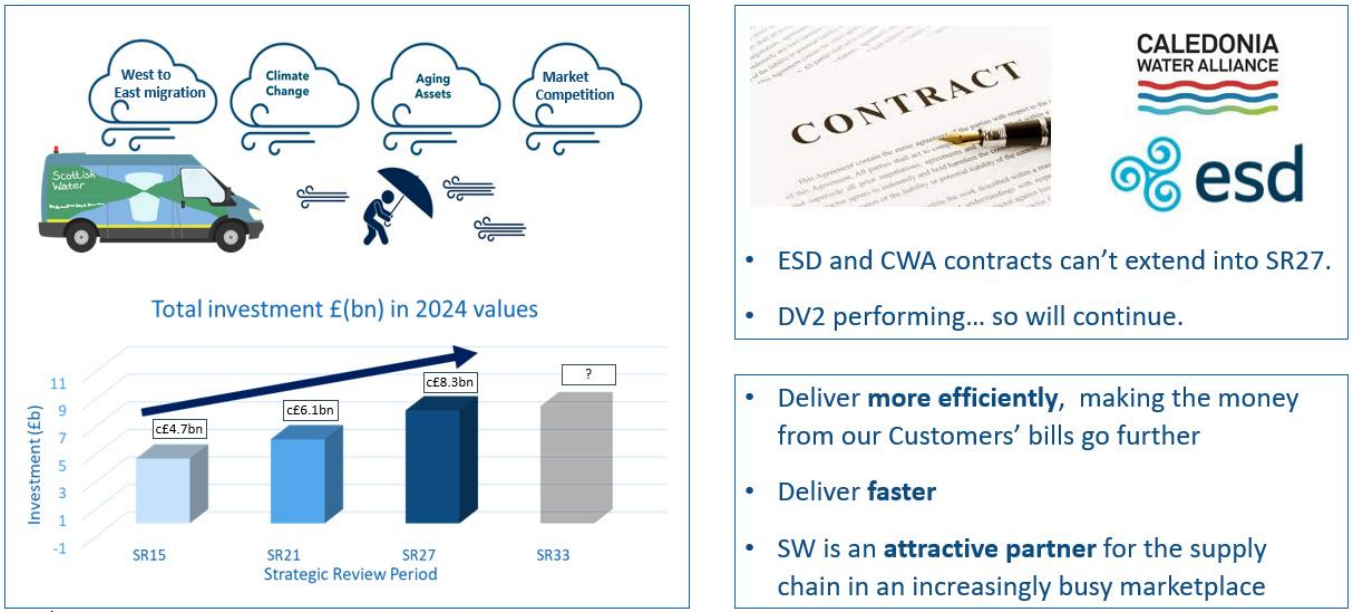

Figure 8: The Case for Change

Firstly, the market environment is changing and being seen as an attractive partner is critical. We are forecasting significant additional investment in SR27, set against a backdrop of existing challenges. Namely, West to East population migration, climate change, ageing Scottish Water assets, and market competition.

There are increasing market constraints due to growth in construction demand both in England and Wales and in Scotland – so not just a North to South risk of resource movement, but also across sectors in Scotland as well. Information from CECA (Civil Engineering Contractors Association), EY Parthenon, McKinsey & Company and other supply chain partners note that this is likely to lead to constraints on certain skills areas, such as in commissioning, and general operatives. This is compounded by increased market consolidation due to mergers and acquisitions and changing commercial risk appetite. Our challenges around our own unconstrained funding projections also play into these market complexities. Given this environment it will be important for us to differentiate ourselves as a client of choice.

We must ensure that we have sufficient capacity and capability available to use to deliver our plans for SR27, whether that be in-house, or through our supply chain.

With our supply chain partners there is also more opportunity for us to collectively share capabilities and be a sector that attracts talent in Scotland, potentially using the DV4 Enterprise to support a sector training academy, whilst ensuring this is complemented by best-in-class skills from the wider UK and Global markets.

Secondly, existing supply chain expiration. As we look ahead, a minimum of two thirds of our supply chain will require re-procurement by 2027. This was part of the SR15 and SR21 strategy to have an inflection point at this time to consider what would be needed in the future. We have no option but to consider what the right supply chain should be for the next period.

And thirdly, we must deliver more efficiently, providing value for money for our customers. We need to deliver on our climate change adaptation and deliver investment with the right asset

outcomes at an efficient cost. For this we will need transformational change that impacts across the business.

3.1.1 *Supporting our Strategic Ambition*

As we consider our future supply chain requirements, we must ensure that the SR27 supply chain model supports our strategic ambitions and vision as described in Figure 8.

When considering **Great Value and Financial Sustainability** we must realise and evidence value for our customers and stakeholders and ensure our supply chain remains commercially sustainable.

For **Service Excellence**, the supply chain we create will need to continue to deliver investment with a clearer connection on outcomes, supporting our asset management approaches. It should also deliver excellent customer service and having a collective focus on improving safety, health and wellbeing in our industry.

We will also need to continue our progress in targeting a 75% Reduction in Carbon Intensity of Investment to continue our route map to **Net Zero** by 2040[6]. This will require continually invigorating our approach to innovation, standardisation, and circular economy principles.

Figure 9: The SR27 Supply Chain Model: Supporting the Strategic Ambitions

From the forecast of SR27 work, we are assuming that we will require a balance of traditional Civil infrastructure & MECIA skills, augmented by digital and emerging Blue/Green capability. For SR27 we are assuming 90% of demand will utilise traditional construction skills and 10% on newer blue/green and digital approaches. We expect this to change in SR33 to 80% traditional 20% non-traditional asset-based outcomes. The move towards more outcome-based partnering will be a driver in unlocking our enablers.

The enablers are seen as crucial to the success of the proposed supply chain design. This includes enhanced partnering capabilities and a behavioural environment supporting closer resource integration, and a trading environment that also reflects and supports this approach, to

[6] For further information, see Our Routemap to Net Zero Emissions

position Scottish Water as a client of choice in a busy marketplace that delivers better value-for-money outcomes. Also, as we develop our Sustainability Strategy this ties in substantively to all our ambitions in this area.

3.2 Testing our Approach with the Market

The review started around two years ago. Our learnings from the benchmarking are that leaning further into a partnering environment will support our aspirations and requirements. We believe this differentiator will be critical in a very busy market. The high-level graphic in Figure 9 shows the journey of activity we have been on during the planning for the SR27 Final Business Plan.

In December 2023, Scottish Water's Board were presented with a range of options for the future supply chain design, and the outcome was to further explore the "Transform & Reform" option. EY Parthenon was commissioned to validate this option using their extensive experience, and in the context of the benchmarking, work undertaken by Scottish Water.

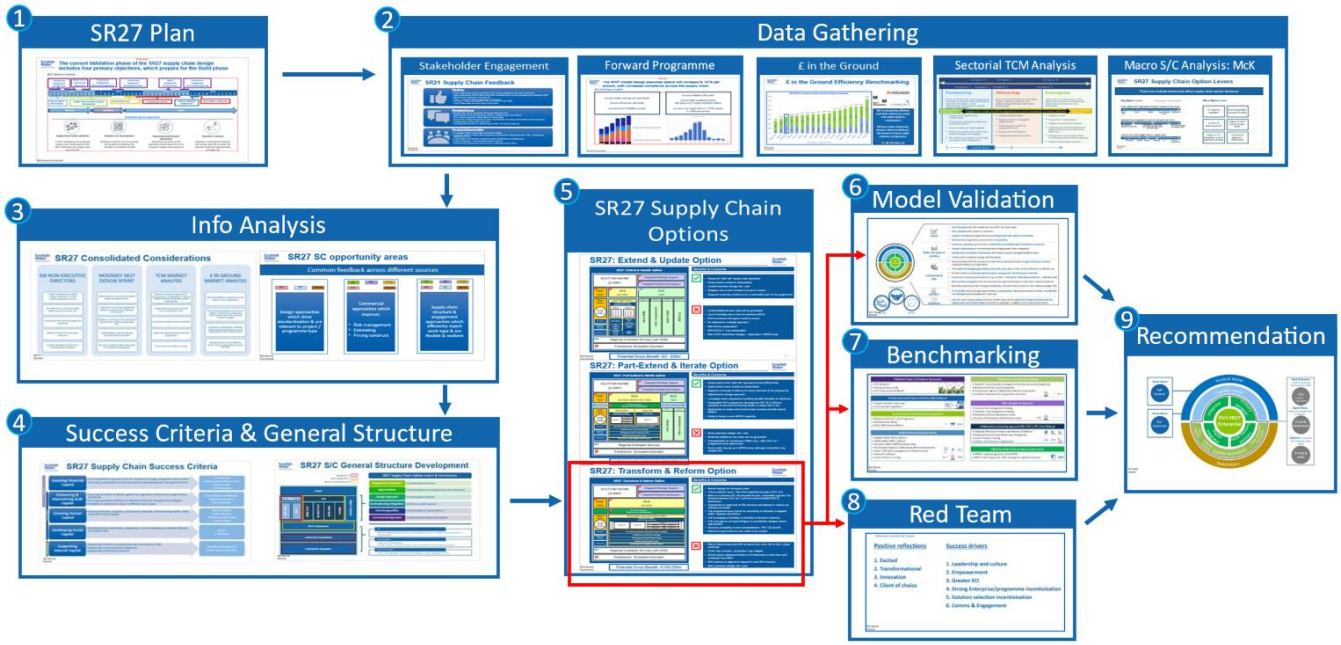

Figure 10: Review and validation for SR27

From the benchmarking exercise we found that Scottish Water is seen as a respected, progressive client. We have key opportunities to optimise our end-to-end cycle-time and overall productivity using lean techniques, digitisation and more integrated working. These techniques can be supported by improvements in the areas of design, standardisation, and transitioning from traditional construction to factory and production approaches. This approach could also provide health and safety benefits. Additionally, there are opportunities to keep improving the way that we trade through our commercial relationships, including how we estimate and price work and manage risk with our partners.

There is also more opportunity for us to collectively share capabilities across our supply chain partners and be a sector that attracts talent in Scotland, potentially using the DV4 Enterprise to support a sector training academy, whilst ensuring this is complemented by best-in-class skills from the wider UK and Global markets. This would help to address the known resource issues in the supply chain and creating additional resilience and sustainability of resources.

Several third-party commissions were engaged who supported on the creation of the plan and market overview options. See Figure 11 for details of the options considered, and the verification and testing undertaken.

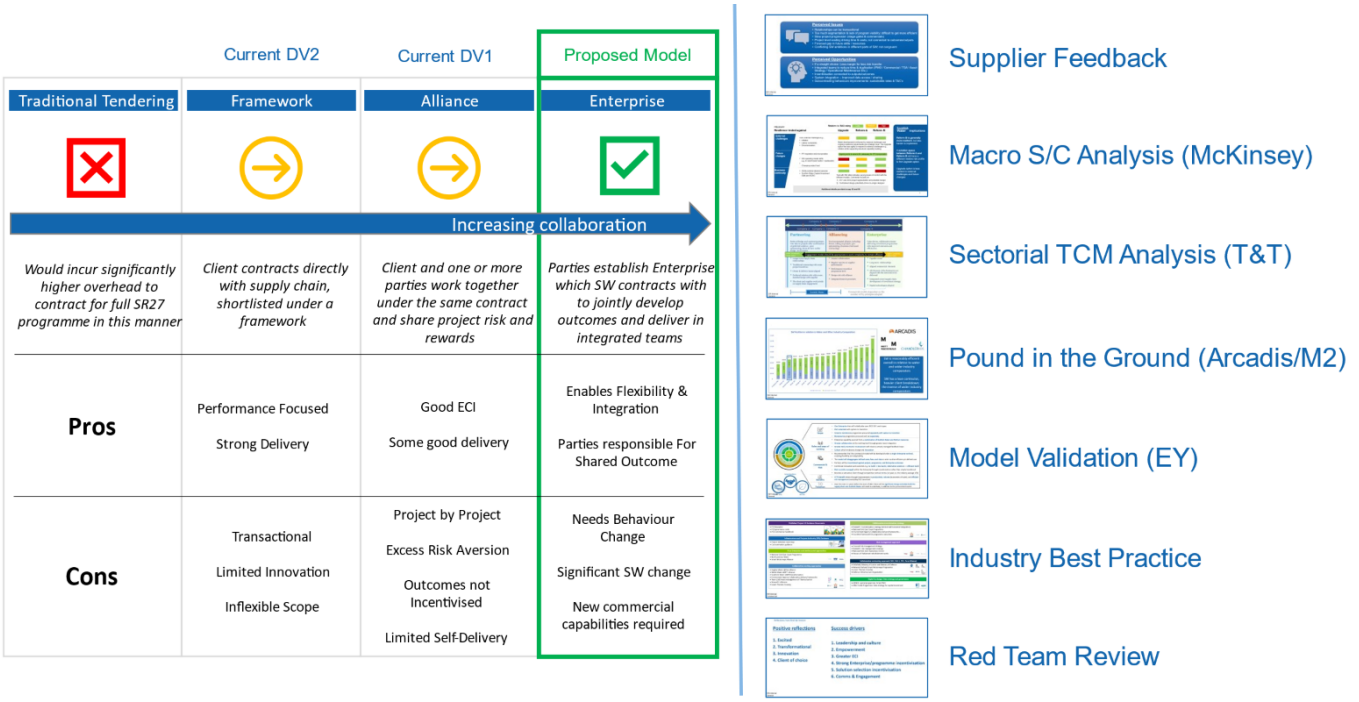

Figure 11: Options considered (left hand side), and verification and testing approaches (right hand side)

Several model approaches were considered during the validation phase, which was supported with a commission with EY Parthenon. To replace DV1 an Enterprise approach was considered the primary option. This model was constructively tested with a 'Red Team' which consisted of senior representatives from Stantec, Morrison Water Services, Cap Gemini and Chandlers. The intention was to gain feedback on the approach, understand any risks/concerns and further refine the final design.

Overall, the Red Team felt that this was an exciting concept, truly transformational and if implemented properly it would place us as being a 'client of choice'. They also provided feedback on areas to focus on which have been noted within our organisational readiness plan – such as the importance of leadership and culture; the correct level of decision-making empowerment for the Enterprise; the importance of Early Contractor Involvement (ECI) and of positioning programmes of work; and of communication and engagement. The specific feedback is set out below:

Positive reflections:

- **Excited:** The Red team were genuinely excited by the prospect of a Scottish Water Enterprise supply chain model
- **Transformational:** They believe it would deliver transformational change and allow investment to scale
- **Innovation:** They felt it would create opportunity for innovation and lean working
- **Client of choice:** The direction of travel would make Scottish Water a 'client of choice' if fully delivered

Success drivers:

- **Leadership and culture:** The Enterprise will need strong leaders to drive a more collaborative culture
- **Empowerment:** It would need an agreed level of empowerment from the Client to make decisions or where reach back is needed, clear governance/Service Level Agreement (SLAs)
- **Greater ECI:** The Enterprise will need to deliver on the promise of greater ECI throughout the project/programme lifecycle to deliver the innovation required to drive benefits
- **Strong Enterprise/programme incentivisation:** Substantial upside incentivisation from enterprise/programme fees needed to break the revenue-margin linkage and downside incentivisation needs to be limited to what they control
- **Solution selection incentivisation:** Partners should be involved early enough and incentivised to participate in solution selection conversations to drive no build → less build / alternative solutions → efficient build
- **Comms & Engagement:** Early communication and engagement with the supply chain and employees is critical to positioning the transition as an attractive opportunity

3.3 Our Recommended SR27 Supply Chain Design

It is estimated that we will require a total Supply Chain capacity of ~£1.3bn-~£1.4bn per annum (in FY23/24 prices). Specific supply chains and frameworks will continue to be procured for general Scottish Water requirements e.g., in Fleet, Property and Digital, (~£1.8bn over 6 years). Further information on the **Digital** supply chain and procurement is provided in Section 3.3.2.

Two major procurements will have been launched; one will procure advanced anaerobic digestion plants to support our **Bioresources** strategy for further information see the West Central Bioresources Technical Appendix and Water Environment Technical Appendix. The other will procure a programme of new **Ceramic Membrane** Treatment Works (see Water Quality Technical Appendix) (see Section 3.3.3 for further details).

For the **DV2** framework across the two investment lots, it is proposed that an initial extension for three years up to 2030 will be negotiated (~£1.25bn) with an option to extend for a further three years to 2033. For the two operational lots there will also be the opportunity to extend, however, we will also look at what improvements/changes may be required and if there are better options for specific workstreams. This will provide us with options to consider moving DV2 activity in full, in part or not at all to the Enterprise. Further information is provided in Section 3.3.1 below.

To replace DV1 it is recommended that we procure an Enterprise delivery model (~£5bn-£9bn over the 13 years), to be known as **DV4** (see Section 3.4 below for further details). This will initially undertake mostly higher value, higher complexity programmes, as well as being able to undertake the work within DV2 by around year three. The model, including details of the roles and responsibilities of the participants in the Enterprise is detailed in Figure 12 below.

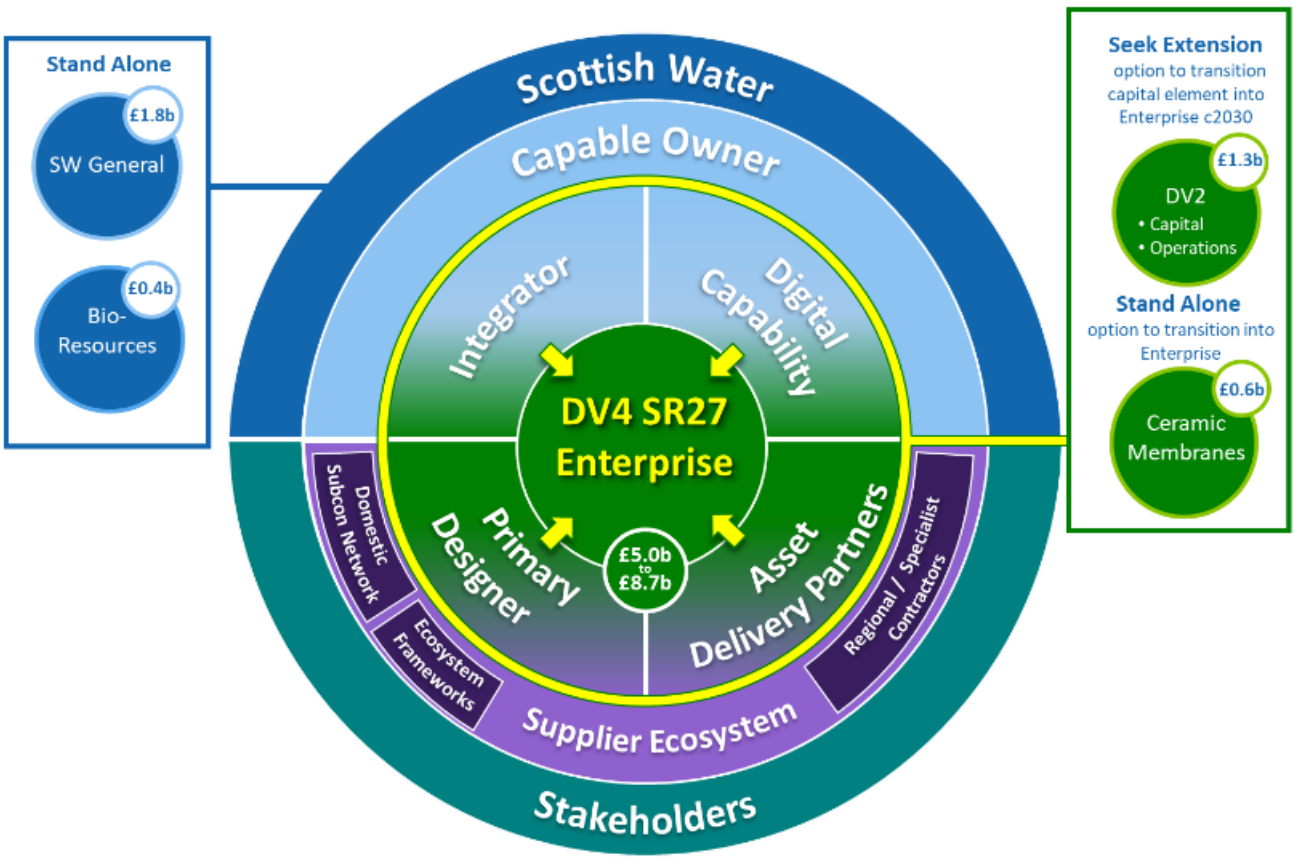

Figure 12: SR27 Supply Chain Proposal and Roles Overview

3.3.1 Delivery Vehicle 2 (DV2)

Scottish Water intend to extend DV2 for further three years until 2030, with an option for a further extension until 2033. This is due to current performance, which is positive, and the provision of continuity of capacity from a risk management perspective whilst establishing the DV4 Enterprise.

Scottish Water has commenced extension discussions with the seven construction partners that make up DV2. As part of our due diligence process for the extension, we are conducting a Price and Performance Review for each of the partners. This will review their performance against each of our three Strategic Ambitions (Service Excellence, Great Value and Financial Sustainability and Beyond Net Zero Emission) alongside Beyond Zero Harm.

We are also undertaking a benchmarking exercise with an external consultant to review DV2 rates against industry comparisons to ensure the framework still offers value for money. The results of the Price and Performance Review and extension proposal will go through Scottish Water governance, up to Board level, with the aim to have extensions for all lots fully signed by March 2026, one year ahead of the extension start date.

3.3.2 Digital

We have also launched the procurement of our new Digital Supply Chain for SR27. This will help us to deliver better business outcomes at lower costs and lower carbon emissions, it will be a more adaptive and agile model, providing new capabilities in Digital Engineering and AI and will help accelerate us towards our strategic ambitions. A current high-level view of this can be seen

in Figure 12 below. It is currently planned to have the new Managed Service in place by August 2026 to support an effective transition between SR21 and SR27.

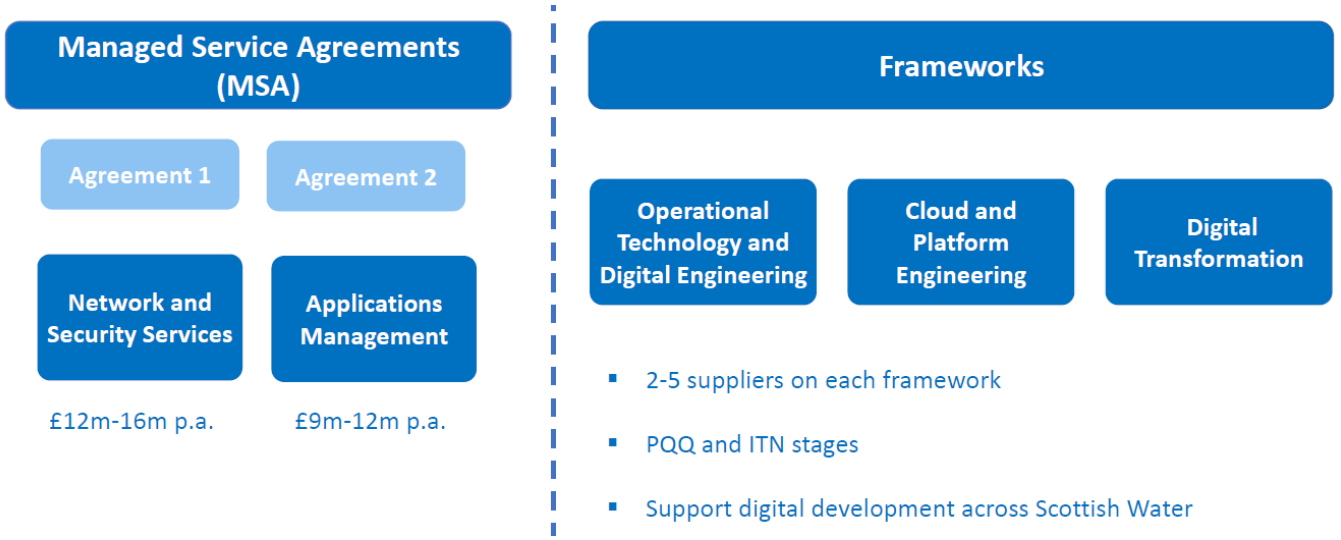

Figure 13: SR27 Digital Supply Chain Overview

3.3.3 Stand-Alone and Other

Scottish Water will also procure and/or extend supply chains that will cover investment requirements for Fleet, Property and other business wider requirements, as well as specific large complex procurements for Bio-Resources and Ceramic Membrane Treatment.

3.4 DV4 – Our Enterprise Delivery Model for SR27

This section sets out our plans and activities involved in the establishment of our new enterprise delivery model for SR27, DV4. This is a dynamic programme and will keep up updating WICS and other key shareholders through till SR27 Final Business Plan submission.

3.4.1 Enterprise Roles and Responsibilities

The Capable owner is a subset of Scottish Water, which will set the outcomes and the programme the enterprise needs to deliver.

The Integrator is assigned these outcomes and is required to plan, orchestrate resources, allocate work, commercialise and review the performance within the Enterprise. This will be primarily Scottish Water teams supported by other partners.

In terms of **Digital capability** – We recognise opportunities to improve the use of Artificial Intelligence, maximise the use of our systems to ensure we improve live data integrity and other approaches that could improve productivity and outcomes. There is also opportunity on the operational technology side by exploring the value from digital engineering. We are still considering the form this will take, although there is opportunity for this to be more Scottish Water-led, augmented by capabilities from other partners.

The Primary designer is an important change to our current design approach. It will provide full design oversight for the enterprise and would replace our current technical consultant's framework which will end in 2027. They will work closely with our Water and Waste Water

Directorates as well as our Technical Specification & Assurance team (TSA) on asset commissions bringing this knowledge into the Enterprise to support all specialist design in the supply chain together with the design and build asset delivery partners to further support the right outcomes being delivered. This will help us embed standardisation and explore nature-based solutions for the future. There will also be a focus on driving new innovations that will support positive outcomes on carbon, service and efficiency.

Our **Asset Delivery Partners** will require a range of capabilities such as MECIA, Civils and buildability design, where not supported by the primary designer, and will likely be a combination of medium and large partners from a trading and resource perspective that can bring the right balance of self-delivery capability that support modern methods of construction to deliver asset outcomes that work for customers.

Finally, surrounding the enterprise and all the other delivery approaches is a wider **supply chain ecosystem** where other **key suppliers**, our **regional partners** and **wider material and service frameworks** will be situated.

We also recognise that new requirements will emerge over time, such as the reach and acceleration of blue/green infrastructure solutions. These requirements and opportunities will emerge through our Climate Change Adaptation Plan and Climate Change Bill. These will have the option to be delivered within the Enterprise or as stand-alone procured partnering supply chains. It is anticipated that the range of potential partners and subsequent skills will be more diverse than current arrangements.

Table 2: Expected number of partner and procurement timing

Role	Number of partners	Launch date
Primary Designer	1-2	2024
Asset Delivery Partners	4-6	2024
Digital Procurement	2 + framework suppliers	2025
Ecosystem Frameworks	As Required	2025
Domestic Subcon Network	Unlimited	2026
New Regional / Specialist Contractors	TBC	2026
DV2	As per extensions	2025

3.4.2 Learning from Industry Best Practice

This has been created drawing on better practice in the market as shown in Figure 14.

Figure 14: Examples of industry best practice

Through the validation process we incorporated learnings gained from our experiences over the past 20 years of using different approaches and project outcomes, and the experiences of other organisations.

From National Grid we learned the importance of governance arrangements and clear roles and responsibilities within/outside the Enterprise.

From Sizewell C we learned the importance of commercials principals that will underpin the incentivisation strategy should support both horizontal and vertical integration to drive the right behaviours.

From Crossrail we learned establishing clear hierarchy of risks across the organisation, establishing ownership and creating a holistic portfolio level risk management framework, and from a wide range of references we also learned the importance of having client skin in the game and the importance of this for mobilisation and setting the drum beat of the Enterprise.

3.4.3 How this Compares to the Approach in SR21

The DV4 enterprise approach is a departure from transactional contracting and a natural evolution in our supply chain approach. Key partners will be part of planning and prioritisation of the programme through the Integrator; standardisation will be driven effectively through the primary designer; both operational and digital technology systems will be integrated effectively through the digital integrator; and all members of the DV4 Enterprise will be jointly incentivised to deliver asset outcomes. We will lead on the Integrator and Digital aspects.

The commercial approach will change significantly. We will adopt a cost reimbursable model and move away from on-cost allowances and target costs. It will be developed under a single Enterprise contract, enabling flexibility and adaptability where partners can change over time, due to performance and/or required capability. This will be a bespoke contract based on the tried and tested New Engineering Contract 4 (NEC4) Alliance model. Partners will be incentivised against sub programme, and Enterprise outcomes and the model will incentivise innovation. It will also

disaggregate defined costs, fees, and risks to drive more efficiency in defined cost. We will also retain a level of moderation to control a fair and reasonable return to the partners based on effort and outcomes. How risk is managed and priced will be considered during the procurement. It is intended that we will take a greater role in pricing risk rather than it being simply transferred to the market. This represents a more balanced approach to risk which makes us a more attractive client whilst offering best value for our customers.

The DV4 Enterprise will be dynamic and flexible to withstand internal and external future uncertainties, allowing new entrants to be procured and join the Enterprise to ensure the right mix of capability and capacity to match our needs. This will help improve our performance and delivering Service Excellence.

The contract term will be 13 years (vs. the industry average of eight) which will enable us to become a more attractive client and build on our current steady dependable partner brand. This would be the first one in Scotland of this type and scale, aligning to our Bold ambitions.

A features comparison between the current SR21 model and the new SR27 approach is noted in Figure 15.

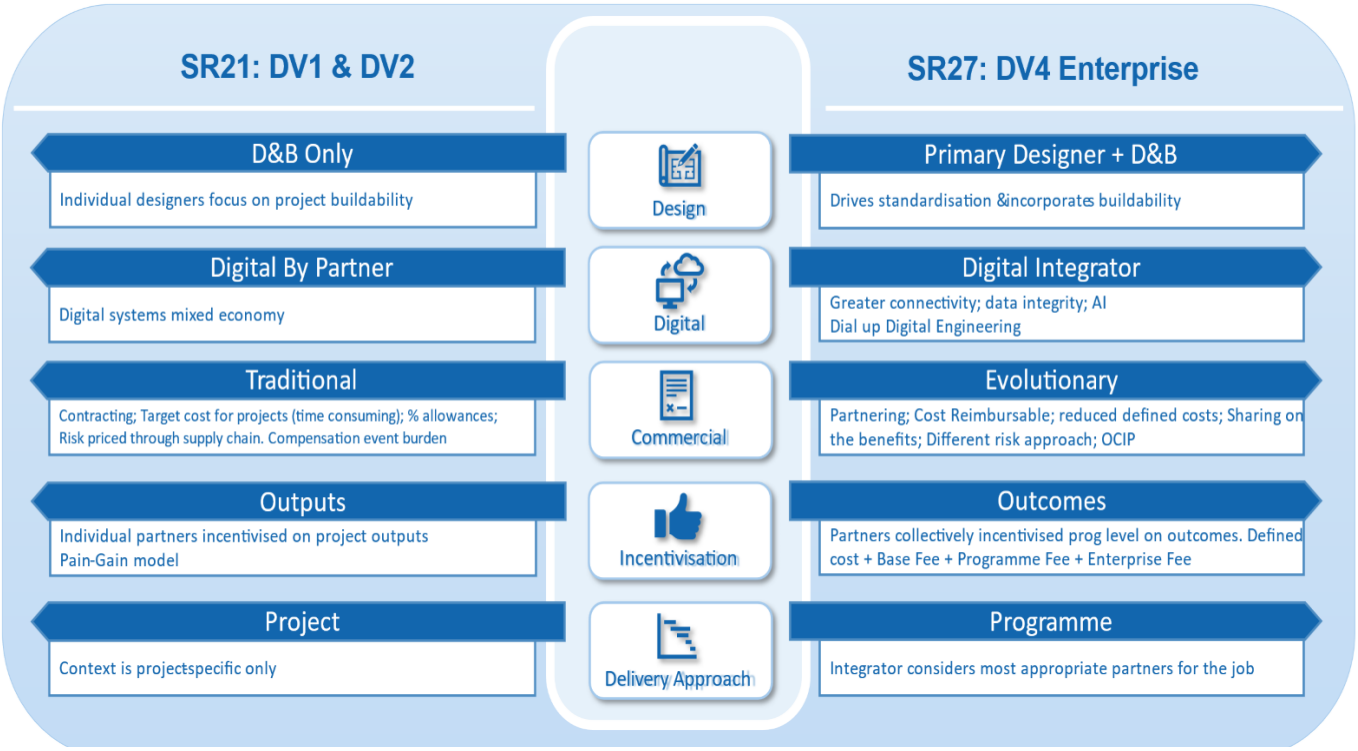

Figure 15: SR27 SR21 Features Comparison

The SR27 DV4 Enterprise proposal represents a step-change in approach which learns from and improves upon the SR21 DV1 & DV2 supply chain construct. Highlighted here are several examples of feature differences between the two supply chain approaches.

Design

The existing construct uses 3rd party design partners to support the requirements of our Water and Waste Water Directorates, with a hand over to Capital Investment delivery partners at Gate 50 to offer buildability input. The interface with the TSA team is at arm's length. This is currently undertaken on a project-by-project basis, which lacks cohesion and direction. In the Enterprise, the primary designer will coordinate design end to end, with a stronger interface to the TSA team,

and being a key partner commercialised through outcomes within the Enterprise. They will also support on the buildability design with the Asset Delivery Partners and specialist designers in the wider supply chain and consequently be able to drive our standardisation and nature-based solutions and create associated benefits.

Digital

Digital focus has been on streamlining Business to Business (B2B) data transfer and bringing in new systems to support investment delivery. In the new model there is opportunity to improve live data integrity and interfaces between the partners and Scottish Water systems, as well as using best in class tool kits to improve productivity and outcomes (digital rehearsals etc). There is also opportunity to leverage emerging benefits of AI and well as exploring the benefits of digital engineering supporting improvements in operational technology. Under the new approach this will be Scottish Water-led, with capabilities drawn in from the other Enterprise partners and the digital supply chain as appropriate.

Commercial

It is understood that the existing commercial approach is not producing appropriate behaviours with an increasing focus on passing risk through the supply chain tiers and excessive compensation events creating an administrative inefficiency. It is generally transactional and contractual on a project-by-project basis based on NEC option C target costs pain/gain with on cost allowances. The Enterprise proposes to address these behaviours whilst still aligning to the tried and tested NEC4 alliance partnering model. This would also include a re-balancing of risk through the removal of generic risk from asset delivery partners and moving some insurances to Scottish Water's Owner Controlled Insurance Programme (OCIP). The new model will use NEC4 option E cost reimbursable focusing on reducing defined costs with incentivisation on outcomes with base level of recovery and margin and an opportunity for more reward at a sub-programme and Enterprise level based on outcome performance.

Incentivisation

The current model is traditional in the way it uses pain-gain on a per-project basis. This lack of a holistic approach is driving inappropriate behaviours on some projects when they encounter difficulties. Instead, the Enterprise would adopt a cost reimbursable model with guaranteed base fee, allowing for a focus on reducing defined costs. Incentivisation is also applied through programme fees and Enterprise fees, giving all parties 'skin in the game' to deliver on programme outcomes rather than project-specific activities. This represents a more attractive proposition for the supply chain, who would see us as a 'client of choice'.

Delivery Approach

The current approach sees every project in isolation which is driving some unwanted behaviours and inefficiency. The proposed Enterprise Integrator would take a programme perspective when considering how best to achieve the outcomes specified by the Capable Owner. Taking this wider context into account will lead to greater efficiency and productivity.

3.5 Benefits Case

As we consider our future supply chain requirements and what changes might be required, we must ensure that the updated SR27 supply chain model supports our strategic ambitions and vision. This will include both financial and non-financial benefits. The implementation of an DV4 Enterprise model and the other supply chain elements are not solely focussed on financial benefits, it's also about improving our performance for our customers.

Our expectations and requirements on safety, health & wellbeing; net zero, and customer service will be set out during the procurement process and embedded within the contractual and incentivisation outcomes.

The main (non-financial, non-social value) benefits we expect from our recommended approach are:

- Deliver value for money our customers,
- Reduce delivery time leading to efficiencies,
- Lean, agile solutions driven by increased standardisation, and
- Increased use of the latest digital solutions and technology.

Full details of the deliverability efficiencies and financial benefits available are set out in the Efficiency Technical Appendix.

3.5.1 Implementation Cost

It is estimated that this will cost Scottish Water ~£10m to implement this model. This will include implementing the necessary cultural, process and organisational changes.

3.5.2 Social Value

Wider social value will also be generated with this new SR27 supply chain design sustaining over 14,000 direct and indirect employment opportunities. Included in this is over 1,500 new young people opportunities over the six years. Our procurement and partnering approach will also support the continued development to deliver excellent customer service and community engagement, and have a collective focus on improving safety, health and wellbeing in our industry. It will also support the Beyond Net Zero ambitions through the new primary designer approach and focus on innovation. These expectations will be set out during the procurement process and embedded within the contractual and incentivisation outcomes. The increase in Blue Green Infrastructure will also provide wider societal benefits.

- Sustaining ~14,000 jobs & 1,500 new young people opportunities
- Volunteering, educational and local community benefit
- Using Local SME's ~80% of supply chain
- Embedding Health, Safety & Wellbeing Values
- Supporting Fair Work First
- Supporting the 75% Reduction in Carbon Intensity of Investment
- Improving Community Engagement & Legacy

3.6 Risk and Mitigations

During the validation process, six primary risks were identified, and mitigation proposals developed. These were reviewed and validated with EY and the Capital Investment Leadership Team. Two key risks are worth highlighting; Firstly, the cultural adaptation required for advanced partnering approaches, and secondly, the organisational structural and process change risk. We will need to ensure it dedicates resources to manage this significant change whilst maintaining business as usual.

Additionally, there needs to be a strong leadership commitment and appetite to make these required cultural, structural and process changes. For example, teams such as the Technical

Standards Authority and their interface with the primary designer will be critical. Commissioning teams within specialist services in Capital Investment moving into the Enterprise and opportunities around early engagement with our treatment works operators and commissioning, as well as potentially closer integration with digital support will all need to be considered.

Table 3: Key Risk and Mitigations

Risk Description	Risk Mitigation
Cutover risk Delay in SR27 programme ramp-up may cause investment gap	Provide flexibility through extension of DV2. Complete SR27 procurement one year before end of SR21 period.
Resource planning risk SR27 drawing on SR21 resources may cause delivery constraints	Develop and communicate a clear transition path from current DVs to the Enterprise including specific resource requirements and backfills including 3rd party support.
Culture adaptation & organisational change risk Slow behavioural change may cause benefits to be eroded	Develop a clear transformation plan for cultural adaption for partnering environment and senior leader buy-in for appropriate business structural and process changes.
Communication & Engagement risk Lack of change clarity may cause loss of behavioural change traction	Develop a clear comms & engagement strategy to articulate the case for change, transition plan, and address concerns.
Supply chain structural risk Market changes and consolidation may strain delivery capability	Create a mixed economy of asset delivery partners within the enterprise to afford flexibility & resilience.
Market resource availability risk Supply chain resourcing constraints	Increase Scottish Water's attractiveness as a client through more collaborative early involvement, more appropriate risk balance, favourable incentivisation, culture and longer contract duration.

4 Conclusion

4.1 Recommendation

Our SR27 supply chain approach builds on SR21 and wider market benchmarking and learnings. It recognises the case for change that our supply chain needs to be reprocured, the complexity of the market environment that we are operating within, and the need to be more efficient to deliver best outcomes and value for customers and our supply chain partner businesses.

We believe this will feel different, in a good way, bold and inspiring with a mindset of partnering, not contracting. It will also contribute positively to effectively deliver our forward plans and support a flourishing Scotland.

4.2 Operational readiness

Operational readiness for SR27 will involve significant change activities over the next 2-3 years for Scottish Water. The model will draw on capability from a combination of Scottish Water and third-party resources, with leadership required to drive greater collaboration and integration at the working level, digital integration, and development of a culture that embraces change and innovation.

A programme of work, led by a General Manager from Capital Investment, will coordinate detailed design and operational readiness activities ahead of contract award in early 2026 and during contract mobilisation. This will ensure that that during transition there is no disruption to SR21 delivery or business performance.

It is critical that a strategy is in place to release capacity and capability from across the Scottish Water business, augmented where necessary, by specialist third party support. This structured transition affords a great opportunity for our people to engage in a more positive experience of change. The DV4 Enterprise model will better attract and retain talent in our own organisation and support the need for us to be a “client of choice” in a challenging marketplace. It should be noted that this will involve a significant, business wide change for us and our supply chain and the level of effort required to implement and sustain this should not be underestimated.

4.2.1 SR27 Transition Strategy

A programme of work to transition to SR27 will coordinate detailed design and operational readiness activities ahead of contract award to DV4 in early 2026 and align change activities associated with the DV2 extension. A General Manager within Capital Investment will work with Directorate Leadership Teams to ensure that during transition there is no disruption to SR21 delivery or business performance. More details of our transition strategy are set out in Figure 16 below.

The DV4 enterprise model represents a step-change in approach which learns from and builds upon the SR21 supply chain construct – moving towards delivery of programmes of work that are focussed on outcomes for our customers; employing innovative commercial arrangements that incentivise partners around aligned objectives; improving live data integrity and interfaces with partners and leveraging digital engineering and AI to improve productivity.

The enterprise model will better attract and retain talent in our own organisation and support the need for us to be a “client of choice” in a challenging marketplace. Maturing culture, behaviours

and leadership strength across our business is essential for integrated working and collaboration which is at the heart of the new model.

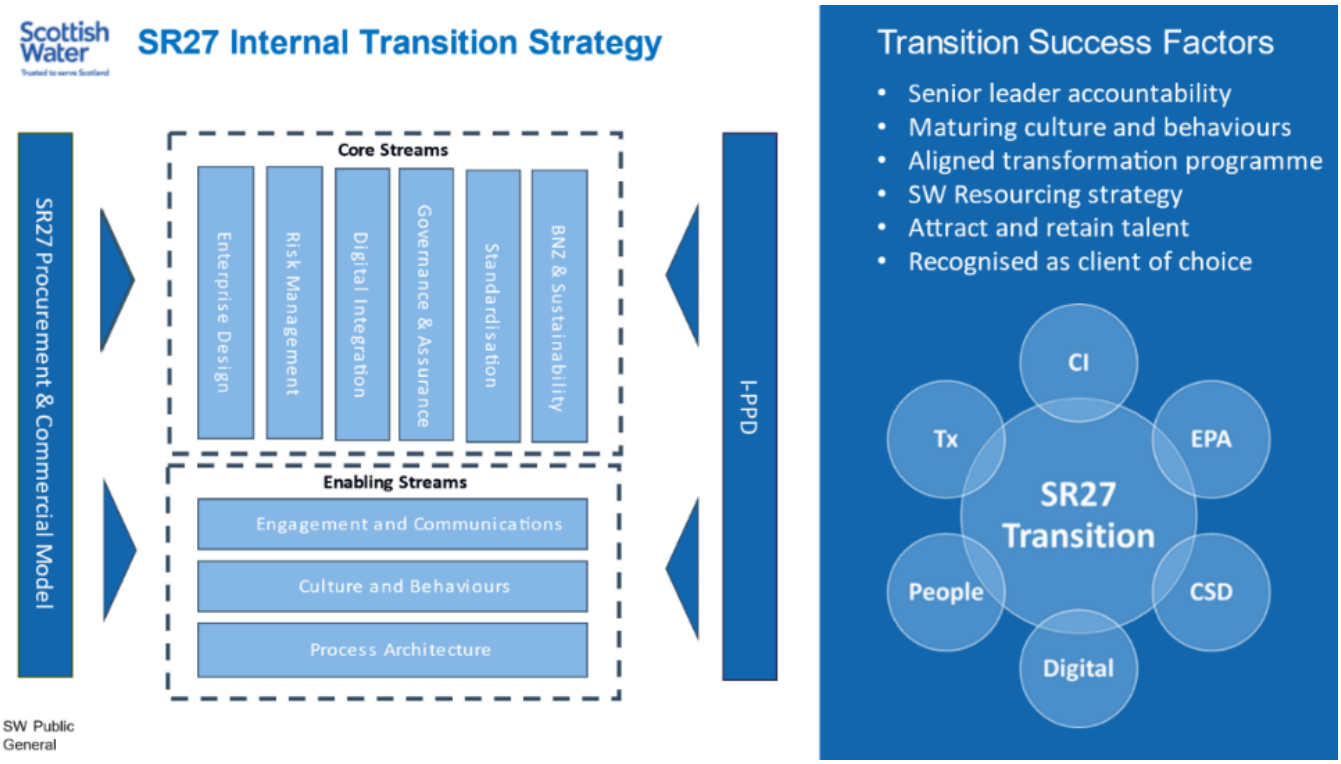

Figure 16: SR27 Internal Transition Strategy

4.3 Timeline

The overall timeline of the activities and plans described in this paper are set out below. We are currently on track, carrying out the ***Procurement Activities*** in the ***Build & Transition*** stage.

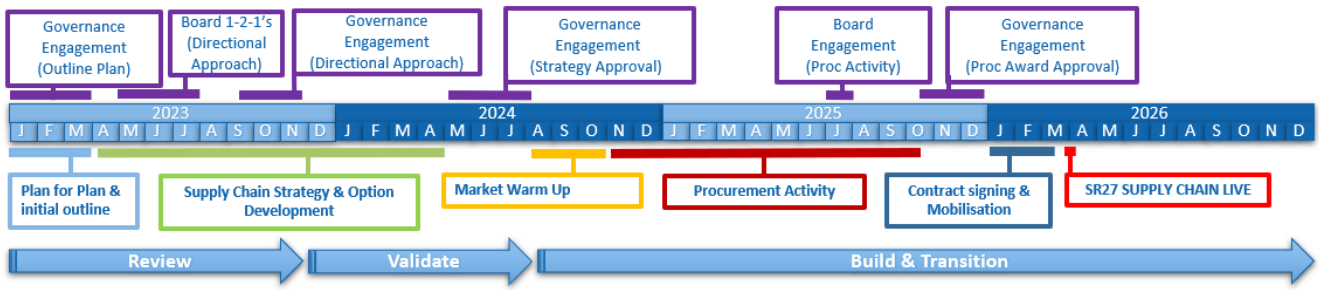

Figure 17: Overall timeline & next steps

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Efficiency

February 2026

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1 Executive Summary

As a regulated monopoly working on behalf of the Scottish People, it is vitally important that Scottish Water operates efficiently so that our customers receive the best possible value for money. Improving how efficiently we operate was a major focus in previous charge control periods, and significant improvements have been made.

This appendix brings together the evidence we have collected and the analysis we have undertaken to assess Scottish Water's current level of efficiency (relative to its relevant peers), Scottish Water's approach to estimating the efficient costs of projects in the SR27 Final Business Plan, and the level of future efficiency improvements that we will strive to achieve during SR27.

In this appendix, we explain:

- Scottish Water's operating cost efficiency evidence and assessment;
- Scottish Water's capital cost efficiency evidence and assessment;
- Evidence in relation to an appropriate 'Frontier' efficiency challenge during SR27;
- Proposals on the application of a 'totex' efficiency challenge in SR27;
- Evidence in relation to Real Price Effects (RPEs) and their inclusion within SR27; and
- The approach to ensuring the efficient pricing of the SR27 business plan.

We conclude from the various elements of our analysis that Scottish Water:

- remains efficient in relation to operating costs, is currently and will continue to be positioned at the top quartile of peers after taking account of certain items including Scotland-specific factors (in relation to the approach to capital maintenance and the impact of operating in the Highlands and Islands); and
- remains efficient in relation to capital costs overall – taking account of evidence in relation to direct, indirect costs, the SR21 improvements built into the post-efficient costs of the SR27 plan, and the suite of tools used to estimate investment costs used in the business plan.

We note the projection that Scottish Water will achieve its 1% pa Tier 1 cost efficiency challenge over SR21 without taking account of the high level of opex RPEs over the regulatory period. In addition, Scottish Water is implementing 1% pa[1] of additional SR21 capex efficiency savings, offset by only very conservative RPE assumptions versus the extreme price pressures seen over the SR21 period. Taking the evidence in the round, we propose that neither operating or capex costs should be subject to catch-up efficiency adjustments.

Following a consideration of economic data and regulatory precedent, including the CMA's provisional PR24 appeal finding that a 0.7% pa challenge level to be appropriate, we retain the proposal that a 0.8% per annum (pa) frontier challenge would be a challenging but appropriate level for SR27. We also propose that it would be correct to take account of RPEs when setting the SR27 price control and judging Scottish Water's performance over the period. We propose a mixed approach to RPEs, with an initial 0.2% ex ante adjustment and further ex-post consideration relative to efficiency performance.

[1] The total adjustment, net of RPEs, is 2.25%. This is discussed further in section 7.4

This Technical Appendix focuses on the assessment of Scottish Water's current efficiency (using predominantly historical data) and the technical exploration of future efficiency (relating to frontier shift and RPEs). Closely related to this are:

- Information relating to Scottish Water's past and forecast Transformation activities – which are included in the Innovation and Transformation Technical Appendix.
- Information relating to the assessment of efficient costs with large (>£6m) and very large (>£100m) projects – which are included in the relevant investment areas of the business plan and the related supporting evidence.

Much of the evidence and analysis contained in this appendix has already been shared with Water Industry Commission for Scotland (WICS), as we have sought to work collaboratively and to provide high quality and robust evidence. We received very helpful feedback on this evidence and analysis from WICS in both March and August and have endeavoured to update and improve our submission accordingly.

This Technical Appendix has been updated and restructured versus the Draft Business Plan version in response to feedback from stakeholders and to more clearly present our efficiency-related evidence.

2 Background

2.1 Context

Scottish Water was formed through the 2002 merger of three regional water authorities – creating a single, publicly-owned and accountable public corporation serving the whole of Scotland. As noted in our Long-Term Strategy (LTS), published in May 2025, at its formation Scottish Water's efficiency performance was poor compared to other UK water companies. Over the last 20 years we have significantly improved our efficiency – helped by effective independent regulation from our regulators.

Our economic regulator, the Water Industry Commission for Scotland (WICS) has commented on this improvement, stating that Scottish Water's customer service and operational efficiency are now "at least as good as those of the leading water companies in England and Wales."[2]

Despite this improvement, we must always push to ensure that our customers continue to receive the best possible value for money. In competitive markets, competition is the main driver of efficiency performance. Companies must push to either improve their service or lower their costs relative to competitors. Those who are inefficient risk being pushed out of the market. As a regulated monopoly, Scottish Water is not subject to this efficiency-promoting competitive tension. Instead, Scottish Water and WICS work hard to analyse and establish whether Scottish Water remains efficient relative to key peers and WICS sets efficiency improvement challenges to ensure that we continue to improve and become more efficient over time.

2.2 Our Approach to Assessing Efficiency in SR27

Our plan for collating evidence and assessing Scottish Water's current level of efficiency (and appropriate future improvements) was created in collaboration with WICS and submitted in October 2024. This plan helped to shape the requirements as laid out in the WICS SRC27 Final Methodology. The final methodology requests Scottish Water to provide evidence of underlying efficiency across operating and capital spending, with a number of specific requirements.

In relation to operating efficiency (opex), WICS requires that we conduct econometric analysis by applying Scottish Water data within models developed by Ofwat, including:

- the base expenditure models used by Ofwat in its 2019 price review (PR19) (as updated by Competition and Markets Authority (CMA) in the case of the four company referrals of Ofwat's Final Determinations); and
- the base expenditure models used by Ofwat in its 2024 price review (PR24), which were confirmed by Ofwat in its draft determinations on 11 July 2024.

WICS required that we make amendments to these models for capital maintenance and Private Finance Initiative (PFI) contracts and asked Scottish Water to triangulate the results to reduce the reliance on any one model.

In relation to capital efficiency (capex), WICS requires that we utilise a combination of different techniques, including:

- using external consultants to benchmark the direct construction costs within Scottish Water's most significant cost models (against equivalent models from UK water and sewerage companies of comparable scale and operating model);

[2] Encouraging better performance from Scottish Water | WICS

- benchmarking of Scottish Water's indirect and on-cost levels against those of companies in England and Wales, supported by three external cost consultants.
- benchmarking against Scottish Water's outturn costs of delivering similar projects in previous years, adjusting for capital price inflation and an assessment of productivity improvements.
- benchmarking Scottish Water's enhancement cost forecasts against data from companies in England and Wales using Ofwat's econometric benchmarking of enhancement costs; and
- conducting an external review of a sample of projects from Scottish Water's plan.

In relation to frontier efficiency and RPEs, WICS requires that Scottish Water provides an internal review of the likely scope for efficiency improvements over and above that captured in Scottish Water's baseline capital expenditure forecasts. This review should be based on evidence of the scope for productivity improvements from other comparable sectors, evidence of efficiency gains from Scottish Water's transformation programmes, and considerations for real price effects and risk allocations.

The following sections describe the work we have undertaken to meet these requirements, and propose Scottish Water's interpretation of the evidence in relation to our current and future levels of efficiency.

As required by WICS, the major elements of our early evidence and analysis in relation to opex modelling, capex benchmarking and RPE analysis were submitted to WICS in February 2025 (with further ad hoc sharing of evidence during the year in areas such as opex modelling and enhancement benchmarking). In addition, Scottish Water commissioned industry consultants, First Economics, to undertake a 'peer review' of our early evidence and analysis – the key findings of which are discussed within the relevant sections of this Technical Appendix. First Economics were chosen as they are experienced experts in UK regulatory price controls having worked extensively with both regulators and regulated companies on assessment of efficiency. Valuable feedback from both WICS and First Economics has been received, and we have incorporated questions and challenges from this into the evidence base and findings discussed in this Technical Appendix.

For note, some elements of the Scottish Water efficiency plan and WICS methodology requirements are presented in other areas of the business plan in order to improve the overall readability of the document, specifically:

- The operation costs assumptions for SR27 and the common finance model can be found in the Financial Strength Technical Appendix;
- The investment plan for SR27 can be found in the Investment Planning Technical Appendix;
- Information relating to Transformation projects, both the SR21 experience and our anticipated savings in SR27 is included in the Innovation and Transformation and Innovation Technical Appendix; and
- Evidence relating to the efficient costs associated with individual projects can be found in the relevant key investment Technical Appendices and individual investment evidence case documentation.

2.3 Challenges and Opportunities

Efficiency can be difficult to measure with certainty. Different companies have different mixes of costs, and definitions can vary. We have taken a lot of effort to try to ensure that our analysis is transparent and uses data and approaches that are 'apples-to-apples' wherever possible, but there are inevitable inconsistencies. Similarly, companies and regulators often must apply judgement when assessing data, triangulating from a number of sources and data types to build up an overall picture of efficiency. The assessments in this document reflect our best understanding of Scottish Water's efficiency position and potential.

It is well recognised (including by Ofwat, the CMA and other regulators such as Ofgem) that the stringency of the benchmark that it is appropriate to use when assessing the scope for catch-up efficiency will depend on the likely reliability of the modelling results.[3] Therefore, where we believe efficiency assessment can be more precise and reliable, such as in certain areas of econometric modelling, we have tended to focus on the upper quartile of efficiency performance as the appropriate benchmark for Scottish Water. This aligns with the requirement on English and Welsh companies, for whom upper quartile efficiency is set as the "catch up" efficiency target for their base costs. However, care is needed when interpreting individual models and results can vary significantly depending on the assumptions used.

Where we consider there to be less scope to be precise, or where data or approaches are less reliable, such as the benchmarking of capex costs, we have generally considered the average or median performance to be a more appropriate benchmark for Scottish Water. Here there is more scope for divergence across activities, categories and approaches, and so we believe that caution and judgement should be applied to help build a representative picture of efficiency.

In its feedback to the Draft Business Plan, WICS requested further evidence on the suitability of the median or average company performance as an efficiency benchmark. Our understanding is that this is an approach commonly used by utility sector regulators. For example, in the Final Determination of PR24, Ofwat's enhancement efficiency analysis and approach notes that 'Setting the efficiency benchmark at the company level recognises that companies have to deliver schemes of different scale and complexity…We generally set the benchmark based on the efficiency of the median company. That is consistent with the efficiency benchmark we apply in company level enhancement models.' Ofwat goes on to say that its approach to setting a median benchmark recognises that:

- the novelty of the scheme level enhancement modelling approach compared to company level modelling in PR19;
- the quality of the models; and
- more broadly the challenge for delivery and efficiency associated with the large size of the overall enhancement programme for the industry. [4]

Caution is also required when using forecasts (or when using historical data as proxies for forecasts where official forecasts are not available). This is particularly relevant in areas such as frontier shift, which considers economy-wide productivity improvement. Here, the choice of look-back period can drive very different levels of historical productivity gains over time. Using data from periods before the global financial crisis (GFC) in the late 2000s would tend to suggest higher levels of productivity gains are possible, while using data from periods after the GFC would suggest much lower levels of productivity gains are possible. Similarly, the anticipated impact of 'new' factors such as artificial intelligence may impact what appears to be a reasonable challenge

[3] See for example, CMA (April 2021) Ofwat Price Determinations: Final Report, paragraphs 4.491-4.494.
[4] Ofwat (2023), PR24 final determinations, Expenditure allowances – enhancement cost modelling appendix, page 28.

over SR27. Assessing RPEs will typically involve the use of historical average and/or official forecasts, and both sets of data may be different than outturn levels of RPEs. However, this risk can be mitigated via the inclusion of an 'ex-post' mechanism that adapts the assessment of efficiency during price control for outturn levels of prices.

Most opportunities in this area relate to Scottish Water's ability to outperform the frontier efficiency challenge, using general improvements and specific Transformation projects to drive higher savings that benefit our customers. As a publicly owned company, any upside from such savings are reinvested for our customers and do not lead to increased financial returns (as might be the case in private monopolies). These opportunities are discussed in more detail in the Transformation and Innovation Technical Appendix.

The inclusion of RPEs provides an opportunity for increased effectiveness of the charge control regime, allowing the regulator to take account and adjust for movements in Scottish Water's prices that are different to general inflation and do not reflect changes to the efficiency performance of Scottish Water. We discuss this potential further in the RPE section below.

3 Assessing Opex Efficiency

3.1 Opex Cost Efficiency Assessment

This section summarises the approaches and evidence used by Scottish Water in assessing Scottish Water's efficiency in relation to operating costs (opex), and its performance relative to other water companies in England and Wales. As agreed with WICS and laid out in its SRC27 Final Methodology, this work is primarily based on a range of econometric modelling that Ofwat and/or the CMA used in their assessments of cost efficiency at PR19 and PR24.

In our agreed workplan with WICS, we emphasised that we anticipated there to be factors that were specific to Scottish Water and that would need to be taken into consideration. These were:

- the policy focus on asset replacement in Scotland;
- the impact of the use of PFIs;
- the differing costs associated with operating across the Highlands and Islands of Scotland; and
- the differences in cost allocation approaches used in Scotland and England and Wales (England and Wales).

For example, the greater focus on asset replacement in Scotland has resulted in relatively high levels of capital maintenance in recent years compared to companies operating in England and Wales. Because these types of costs are included in Ofwat's modelling, this policy difference can tend to make Scottish Water appear to be less efficient (where other things would be equal). Adjusting for this allows more appropriate comparisons of underlying efficiency to be made.

The detailed economic modelling undertaken has already been shared with WICS and analysed collaboratively to help to ensure that models used are appropriate for a Scottish context. For ease of reading, this section of the Technical Appendix will focus on the high-level approach taken, the key findings of this analysis and Scottish Water's interpretation of those results. Further detailed information on the approach used in this analysis, Ofwat's models and their application in SR27 and the impact of Scottish Water-specific factors, is included in Annex A to this technical appendix.

3.1.1 Water

In relation to water opex analysis, we have utilised Ofwat's updated PR24 models which seek to explain all material difference in company costs through the inclusion of variables relating to scale, population density, treatment complexity and topography. As described in Annex A, we tested a number of different approaches and assumptions when adjusting for the impact that the different approach to asset replacement in Scotland can have on modelling results.

Our analysis finds that - after appropriate account is taken of asset replacement policy - Scottish Water wholesale water operating costs are around 2% higher than the upper quartile level (and broadly in line with the median level), in comparison to companies in England and Wales before considering the impact that serving the Highlands and Islands can be expected to have on the efficient costs of service provision. Our analysis finds that when appropriate modelling adjustments are made to take account of the Highlands and Islands impact, Scottish Water's costs are below the upper quartile level and significantly below the median level.

3.1.2 Waste Water

In relation to waste water opex analysis, we have utilised Ofwat's PR19 and PR24 models other than where the extent of PFI provision of relevant waste water services in Scotland raised material comparability constraints. As with water (and described in Annex A), we tested a number of different approaches and assumptions when adjusting for the impact that the different approach to asset replacement in Scotland can have on modelling results.

Our analysis finds that – after appropriate account is taken of asset replacement policy – Scottish Water wholesale waste water operating costs are at least 1% lower than the upper quartile level (and more than 10% lower than the median level), in comparison to companies in England and Wales. Compared to water costs, the impact of operation across the Highlands and Islands of Scotland has less of an impact on waste water costs due to role of septic tanks in more remote areas.

3.1.3 Peer Review Findings

First Economics found that it was content with the emerging view that Scottish Water 'is a relatively efficient, possibly frontier-defining' provider of water and waste water services and does not therefore need to take on a 'catchup' challenge in relation to its base costs. Details of First Economics' assessment and how this has been taken into account in our analysis (including through the consideration of a broader range of options when adjusting to reflect asset replacement policy in Scotland) are included in Annex A of this document.

3.2 WICS Feedback on Further SR21 Costs

In response to the Draft Business Plan, WICS questioned whether the increases in cost in the plan in 25/26 and beyond would push Scottish Water away from its currently assessed leading position relative to companies in England and Wales. We have reviewed this feedback and provide relevant evidence in Annex A of this Technical Appendix. In summary, we note that:

1) There are additional adjustments required to the England and Wales benchmarks to make them a fair comparison to Scottish Water (for example geographic effects particular to Scotland).
2) There are five specific cost impacts in the Scottish Water model that are out with the benchmark, being:
    a. A 2.3% cost modifier to reflect the net effect of Scottish Water's much higher number of water treatment works in the smallest band[5];
    b. The increase in employers NI enacted for the 25/26 year (circa £5m per year);
    c. The increase in electricity costs due to new non-commodity costs and levies which were not announced until mid-2025 (circa £8m per year); and
    d. Compliance with new EU regulation on urban wastewater treatment which has been adopted in Scotland, requiring significant additional operating costs (circa £7m per year from later 2026); and
    e. An adjustment to the 24/25 figures to treat septic tank costs consistently with the previous years in the analysis.

[5] The adjustment reflects that: (a) the modelled cost benchmark - because it is based on data for companies in England & Wales - implicitly assumes a much lower number of treatment works that fall into the smallest size band than Scottish Water operates in practice (given the extent to which Scottish Water serves relatively small remote communities); and (b) that the unit costs of operating very small water treatment plants are materially higher than those of operating plants in even the next largest size band. The way in which we determined the scale of this adjustment is set out in Annex A.

Once these factors are taken into account, Scottish Water would remain positioning in line with the upper-quartile efficient frontier (as shown by the darker bars being below the solid green line in Figure 1):

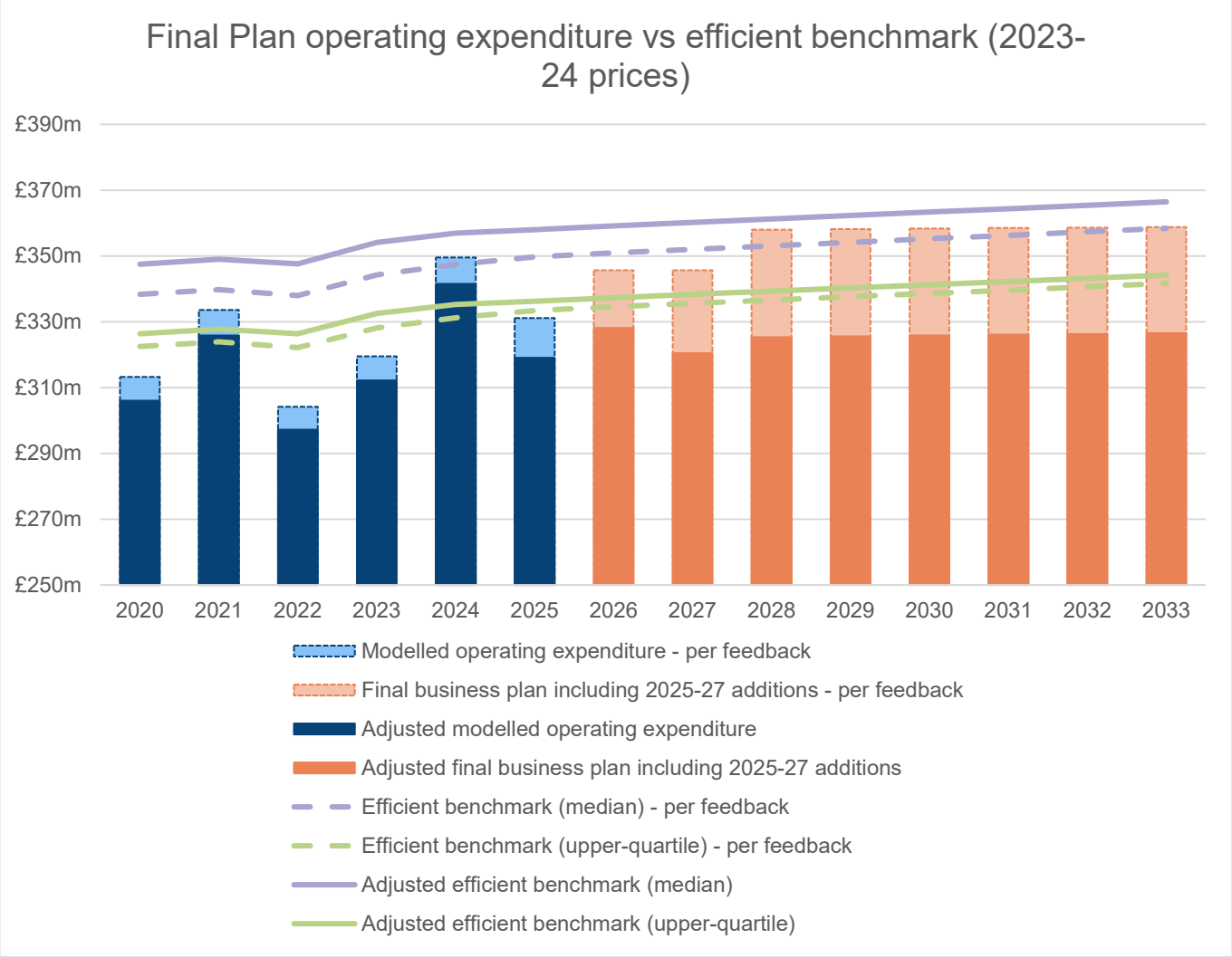

Figure 1: Final Plan operating expenditure vs efficient benchmark (2023-2024 prices)

3.3 Scottish Water Assessment on Opex Efficiency

In summary, our analysis indicates that Scottish Water's current underlying level of opex efficiency is likely to be in line with that of the leading companies in England and Wales (based on Ofwat's models with appropriate adjustments to improve comparability and reflect Scottish policy positions). As a result, Scottish Water proposes that the evidence supports no efficiency 'catch-up' requirement in relation to opex costs in SRC27.

4 Assessing Capex Efficiency

4.1 Capex Cost Efficiency Assessment

This section summarises the approaches and evidence used by Scottish Water in assessing Scottish Water's historical efficiency in relation to capital costs (capex).

Assessing capital cost (capex) efficiency is typically less suited to the economic modelling techniques used extensively in the assessment of opex efficiency (and discussed above). As noted in the Scottish Water efficiency work plan and the WICS Final Methodology, the Scottish Water approach uses different techniques and sources of evidence to assess efficiency – and combines these approaches to reach an overall assessment of Scottish Water's current capital cost efficiency position. In the sub-sections below, we present and discuss the analysis that has been undertaken to-date, including: [6]

- Using external consultants to benchmark direct costs;
- Benchmarking enhancement cost forecasts versus England and Wales companies using econometric analysis.
- Benchmarking costs against outturn project costs; and
- Using external consultants to benchmark indirect costs.

There are inherent difficulties in achieving like-for-like capital cost comparisons with relevant peers. Scottish Water considers that judgement should be applied when interpreting the results of this efficiency analysis. We note that Ofwat also flags issues when assessing efficiency at the company (rather than scheme) level, and that where it considers appropriate (such as in enhancement cost modelling) Ofwat 'generally sets the benchmark based on the efficiency of the median company'.[7]

The bulk of the evidence in this section of the Technical Appendix focuses on those areas of direct and indirect capex where it is practical to benchmark historical costs against related industry data. Evidence on the pricing approaches taken for individual projects and programmes (those >£6m and at or beyond Scottish Water's investment 'Gate' 50) are included in support of the investment programme and give additional insight into the efficient costs assumed within the SR27 Final Business Plan.

4.2 External benchmarking – Cost Models

4.2.1 Introduction

Cost models are used by Scottish Water (and other companies) to provide data on historical direct capex costs and to estimate future costs. Cost models are used by Scottish Water within pricing tools to provide investment teams with appropriate pricing data for projects.

While direct capex costs account for approximately 60% of the total investment costs within the SR27 Final Business Plan, cost models are typically used for earlier stage pricing of new work. These models give indicative pricing at early stages of an investment case and ahead of more bespoke 'market price' testing by Scottish Water's procurement teams. Cost models and the cost curves that they create have been used to price approximately 25% of the SR27 investment plan

[6] Please note – The efficiency plan and the Final Methodology include reference to an external review of a sample of projects. As communicated to WICS, upon further assessment we consider this analysis to be duplicative of the benchmarking assessments and/or other assessments with the Business Plan submission (such as the PIA review) and have not commissioned this work.
[7] Ofwat (2024), PR24 Final Determinations: Expenditure allowances – enhancement cost modelling appendix, page 28

(across the High Level Pricing Tool and Scottish Water's Prediction Models). The other methodologies used to price investments within the plan are discussed in more detail in the sections below.

To test that the data in Scottish Water's cost models is robust and represents efficient costs, Scottish Water commissioned specialist cost consultants, Cumming Group/ChandlerKBS (CG/CKBS)[8] to benchmark Scottish Water's latest generation (termed 'R2309') direct construction cost models and 'curves' against equivalent models used by water companies in England and Wales (of comparable scale and with suitably similar approaches to delivering capital investment projects). This process was used to assess the suitability of current R2309 cost models for Scottish Water's regulatory requirements and to help to assess Scottish Water's current level of capex efficiency position.

The original CKBS report has been shared with WICS. WICS asked a series of clarifying questions on the approach taken by CG/CKBS. Scottish Water has worked with CG/CKBS to clarify and provide additional detail on the approach taken. We have subsequently updated this section of the business plan (relative to the Draft Business Plan) to incorporate the issues and questions raised by WICS.

4.2.2 Definitions and Descriptions of Data Used

The key data sources and models used in this exercise are described below.

Asset Data:

There are two internal sources used to capture unit-level and yardsticks asset data across Scottish Water:

- Ellipse[9]: Scottish Water's enterprise asset management system (EAMS) for non-infrastructure assets; and
- Geospatial Information System (GIS) for infrastructure assets.

Cost Models:

This analysis utilises three sets of cost models:

- Scottish Water created models, termed 'R2309';
- CG/CKBS industry-level cost models; and
- CG/CKBS upper quartile-level cost models.[10]

Modern Equivalent Asset Value (MEAV):

Scottish Water developed the Modern Equivalent Asset Valuation (MEAV) process to provide a valuation of its assets. It represents the equivalent replacement cost of the asset and should reflect both the most technically up-to-date new asset and the most technically up-to-date method of constructing that asset. It does not consider demand.

[8] CG/CKBS are market leaders in providing Cost Intelligence Services to the water sector with expertise in cost intelligence services, cost management, project management and supply chain management with a proven track record spanning more than 20 years advising the major water companies, regulators and contractors. CG/CKBS have extensive knowledge and experience of the approach water and sewerage companies use to meet the various financial and regulatory requirements.
[9] Ellipse is being retired and replaced by Maximo in November 2025
[10] Upper quartile – costs achievable by the most efficient 25% of companies

Originally the MEAV was developed to solely provide a valuation to support the WICS Annual Return (Table H), but it has been adopted for other purposes as it remains Scottish Water's most comprehensive and detailed dataset of asset values.

Scottish Water provided CG/CKBS with 3 MEAV databases to be used in benchmarking the total direct costs of all the recorded assets.

- Non-infrastructure;
- Water-infrastructure; and
- Waste-infrastructure.

Level 0 Model

The Level 0 Model, introduced in 2019, is designed to project the replacement of assets as they reach the end of their useful lives. This approach provides a steady-state view of asset replacement needs —specifically, the annual investment needed to renew Scottish Water's assets as they become due for replacement on average and in the long-term. This is also known as the economic depreciation charge.

The Level 0 Model used the MEAV values from AR24 (the latest annual return available at the time of analysis) as an input. Level 0 analysis provides an indication of the steady state demand based on the expected lives of asset categories. This approach allows a comparison of the expected annual replacement expenditure whereas the MEAV provides an overall assessment of asset valuation without consideration of demand.

The Level 0 model assesses this demand for Category 2 assets – that is assets with a "finite" life assumption. Category 1 assets, including sewers, are excluded from this assessment as they have particularly long lifetimes (significantly more than 100 years) and we assume will be repaired and refurbished in perpetuity.

The High-Level Pricing Tool (HLPT):

The HLPT makes use of the Cost model suite to evaluate specific project details for projects at an earlier stage of development. This includes the application of delivery vehicle specific Prelims,[11] for instance supervision and administration, contractor's design, management fee and Optimism Bias.

4.2.3 Benchmarking Methodology

Following engagement on the potential approaches that could be taken to meet the WICS requirements, CG/CKBS agreed to providing Scottish Water with the following services:

- Benchmark current R2309 cost models against equivalent models used by water companies in England and Wales to assess the current level of capex efficiency.
- Confirm the suitability of the current R2309 cost models for Scottish Water's regulatory requirements by assessing the total cost variance on the Modern Equivalent Asset Valuation (MEAV) between the CG/CKBS Industry cost model, the upper quartile, and R2309.
- Confirm the suitability of the current R2309 cost models for Scottish Water's regulatory requirements by assessing the total cost variance on the Level 0 Model asset replacement forecast between the CG/CKBS Industry cost model, upper quartile, and R2309.

[11] Prelims are all the on-costs associated with delivery of the capital construction covering Delivery Vehicle costs (i.e. supervision and administration, accommodation and storage, design management fee), Scottish Water overheads (i.e. plan, prepare deliver, land, legal costs), risk etc.

Assessing Cost Models:

CG/CKBS state that its Cost Intelligence Database (CID) contains more than 20,000 cost models sourced from over 25 years of involvement supporting UK and Ireland water sector clients with cost intelligence activities. To create comparable data sourced from various years, regions and cost inclusions, cost models are normalised to the CID base parameters by applying adjustment factors and confidence grades based on the following key metrics:

- Normalisation
- Base Date
- Base Location
- Base Cost-Level
- Confidence Grading
- Source Data Age
- Source Data Points Quantity
- Source Data Modelling Methodology
- Source Data Total Cost Methodology
- Source Data Relevance
- Overall Source Weighting

The initial scope for the project undertaken by CG/CKBS specified that they were contracted to benchmark 100 of the R2309 cost models, assuming suitable industry comparator models could be identified based on established inclusion and exclusion criteria. Following investigations and alignment with the CG/CKBS CID, a total of ninety-eight (98) R2309 cost models were benchmarked. Fifty-five (55) of the models are used in one of Scottish Water's MEAV databases (Non-infra, Waste infra or Water infra). For clarity, Scottish Water create 233 cost models to support key business-wide requirements, principally MEAV, Business Planning and early-stage estimating.

Since MEAV and the Business Plan prediction models only use a sub-set of these cost models, Scottish Water requested that CG/CKBS focus on the cost models that were most relevant to assessing capex efficiency within the Business Plan. As a result, CG/CKBS also benchmarked several 'additional' cost models to bolster confidence in models used in early-stage estimates.

CG/CKBS were able to complete this analysis for 98 of Scottish Water's models. This process resulted in the assessment of 55 cost models - representing 83% of the MEAV and an additional 43 models that are used in Scottish Water's High Level Pricing Tool.

Each R2309 cost model were benchmarked against the CG/CKBS industry average cost model and the upper quartile cost model.

CG/CKBS industry cost models are derived from combining cost models from multiple sources using the confidence weightings. Regression analysis uses the weighted-average costs at key sizes within the yardstick range to derive CG/CKBS industry and upper quartile cost models. The upper quartile represents the costs achievable by the most efficient 25% of companies. It is calculated by adding half the difference between the industry average and minimum to the minimum value, placing it midway between the industry average and minimum reflecting a level of efficiency that is more challenging than the industry average but less stringent than the absolute minimum.

The figure below shows an example of a cost model showing industry average and upper quartile positions.

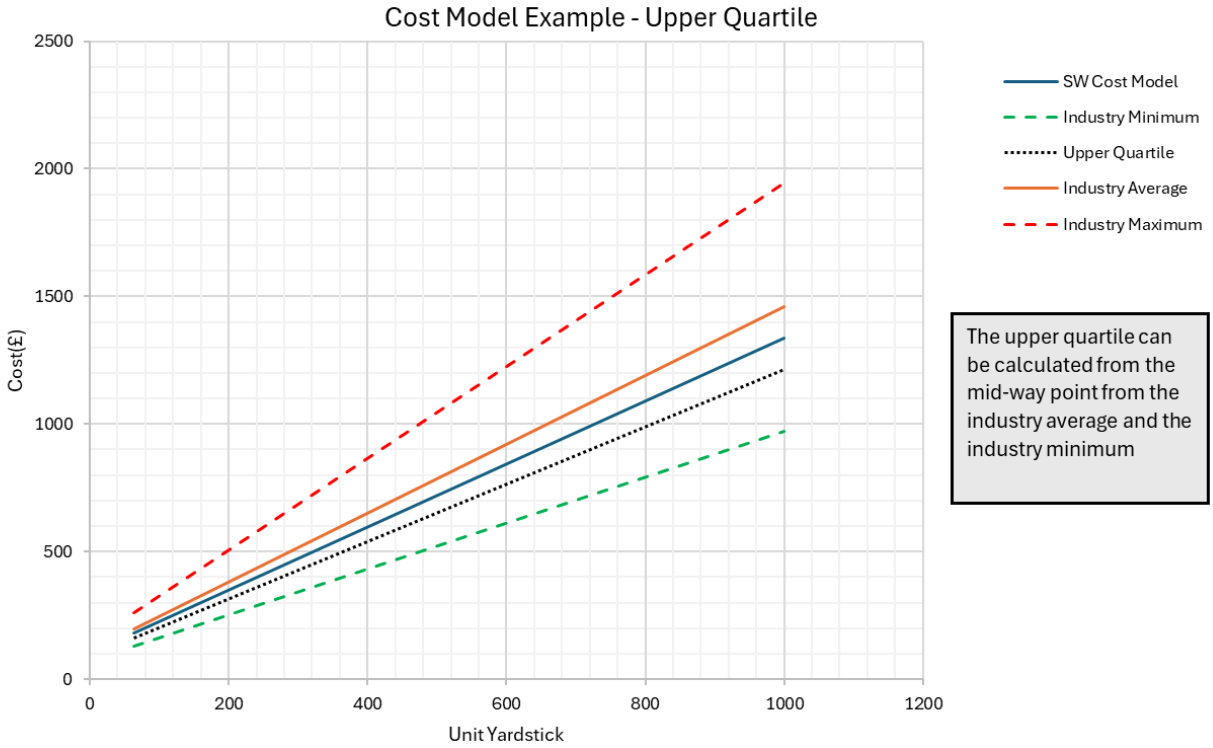

Figure 2: Cost Model Graph Example

Over 20,000 cost models were available and aggregated by CG/CKBS into industry average models. For the benchmarking analysis, only those models closely aligned to Scottish Water's asset definitions and scope inclusions/exclusions were selected, resulting in coverage of approximately 83% of the overall MEAV. Direct capex cost comparisons across companies and sectors are inherently challenging due to differences in asset definitions, operational contexts, and sector-specific factors. Additionally, there is not a fully comprehensive cost model offering to support all Business Plan activities.

As part of Scottish Water's long-established MEAV methodology, we sometimes use a combined cost model to price assets when it offers a more accurate or representative valuation. This approach is applied in situations where individual cost models may not fully capture the complexity or diversity of the asset base. By using a robust combined model, we ensure that our asset valuations remain both reliable and aligned with best industry practices. This methodology alignment was applied when cost models were used as an input to MEAV, not for individual cost model comparison. This approach has no material impact on the capex efficiency assessment.

The R2309 cost models, indexed to October 2022, were adjusted to the MEAV base date, March 2024 using CPI, and the CID cost models were adjusted to the MEAV base date, March 2024, using BCIS Civil Engineering – Water and Sewerage Cost Index (WSCI). Due to the difference in the recorded inflation for CPI and the WSCI over the period October 2022 to March 2024, the

R2309 cost models were inflated by more than the CID cost models from the R2309 cost model base date.[12]

4.2.4 Update Between Draft and Final Report

For clarity, the original remit for the works undertaken by CG/CKBS was to provide external cost assurance on the R2309 cost models, specifically those utilised within MEAV process to assess the 'materiality' of any variance against the industry average. However, as the project progressed, it became evident that while comparing individual unit cost models and aggregated direct capex costs was beneficial for unit-to-unit benchmarking, this approach did not adequately evaluate likely SR27 capex efficiency, as it did not fully consider the scopes of work Scottish Water will undertake in SR27.

Consequently, on Scottish Water's instruction, the CG/CKBS paper was revised to incorporate the analysis and results of the Level 0 work within the main body of the document, rather than retaining them in the Addendum. These updates were included in the final version of the paper provided to the WICS.

As discussed above, a MEAV weighted approach would give a lot of weight to very long-life assets that do not typically form major elements of ongoing investment plans. Scottish Water has applied the Level 0 overlay in order to better represent the types of spending that we would expect to feature most heavily in future investment plans. However, while more applicable, the Level 0 approach does not perfectly reflect the likely investment requirements at any time, or the SR27 investment plan that has subsequently been decided upon. Its use as an overlay does exclude the waste water infrastructure costs that were identified as significantly higher than average in CG/CKBS's initial MEAV-based analysis.

We have investigated this issue further to understand the potential impact on the assessment of the efficiency of the SR27 plan. Our analysis suggests that a very small proportion of the investment in the SR27 Final Business Plan, approximately £45m, has been estimated using these higher cost waste infrastructure cost models.

Scottish Water acknowledges that it has more work to do to understand the drivers of higher costs in areas such as civils and waste water infrastructure – and an improvement plan in this area will be enacted over the SR27 period.

[12] CG/CKBS inflate the CID cost models using the BCIS WSCI index, while Scottish Water inflates the R2309 cost models using the CPI index, both to the MEAV base date of March 2024. Because the R2309 models were inflated by a greater amount than the CID models, this affects the calculated variances: when Scottish Water's costs are lower than the industry or upper quartile, the variance appears smaller; when Scottish Water's costs are higher, the variance appears larger. If the alternative inflation method were used, these effects would be reversed.

Table 1: R2309 benchmarking results against industry average cost performance

Source: CKBS (2025) R2309 Cost Model Assurance & Benchmarking Report

Category	AR24 (adjusted)	CKBS Benchmark	Benchmark Variance
Civils	£ 83,458,916	£ 74,847,742	11.5%
MEICA	£ 151,982,420	£ 153,394,386	-0.9%
Distribution	£ 74,891,368	£ 96,855,831	-22.7%
Trunk	£ 33,538,541	£ 33,674,638	-0.4%
Cess and Septic Tanks	£ 877,251	£ 1,132,655	-22.5%
Total	**£ 344,748,495**	**£ 359,905,252**	**-4.2%**

Table 2: R2309 benchmarking results against industry upper quartile cost performance

Source: CKBS (2025) R2309 Cost Model Assurance & Benchmarking Report

Category	AR24 (adjusted)	CKBS Benchmark (Upper Quartile)	Benchmark Variance (UQ)
Civils	£ 83,458,916	£ 60,626,034	37.7%
MEICA	£ 151,982,420	£ 124,272,145	22.3%
Distribution	£ 74,891,368	£ 81,820,370	-8.5%
Trunk	£ 33,538,541	£ 28,181,548	19.0%
Cess and Septic Tanks	£ 877,251	£ 902,681	-2.8%
Total	**£ 344,748,495**	**£ 295,802,778**	**16.5%**

The AR24 (adjusted) column and CG/CKBS benchmark represents the amount of investment required per year, on average and in long term to replace our assets using R2309 cost models compared to 'industry' benchmarks from CG/CKBS.

The rationale for the weighting of expenditure is linked to the number of assets requiring replacement across Civils, MEICA, and other categories and therefore their respective asset lives. Level 0 analysis is an intentionally high-level approach that delivers a top-down view of asset replacement liability, providing a broad approximation of the level of investment required to replace the Scottish Water asset base effectively over the long term. In contrast, the MEAV approach calculates the one-time cost of replacing all assets, without considering demand or replacement timings, and is therefore less suitable for benchmarking capex efficiency in the context of SR27 activities.

As shown in the tables above, the result of the Level 0 Steady State Valuation of Replacement Demand analysis shows that Scottish Water cost models benchmark -4.2% lower (more efficient) compared to the industry average, and a +16.5% higher (less efficient) than the industry upper quartile.[13] Scottish Water cost models benchmark in line or below industry average costs across all categories other the Civils, where cost models are 11.5% higher than industry averages. We explore potential reasons for this differential position in the sections below.

4.2.5 Analysis of Cost Model Benchmarking Results and Peer Review Findings

As noted above, we consider the Level 0 analysis to be more relevant as this approach assesses Scottish Water's efficiency, taking into account the categories of spend more applicable for SR27

[13] The calculation approach used was updated to reflect WICS feedback, changing the figures from 4.4% variance to 4.2% variance versus the industry benchmark and from 14.2% to 16.5% for the upper quartile benchmark.

and beyond. Within this, we note that there are areas of variance within the overall position of 4.2% lower capex costs as measured against the industry average.

Peer review findings

First Economics found that, for the most part, Scottish Water's costs compare favourably to CKBS's average benchmarks. The one exception was civils expenditure, where Scottish Water's costs appeared to be higher than the average benchmark. First Economics interpreted this as a directional signal that further investigation was needed in this particular area.

First Economics noted that it may be that there are company- or location-specific factors that mean that Scottish Water's unit costs are naturally higher than its peers. Alternatively, further analysis may identify that there is scope for Scottish Water to match the lower unit costs that other companies appear to be achieving. In the latter case, First Economics noted that it would expect Scottish Water to take on an appropriate 'catch up' target in relation specifically to civils enhancement costs.

In relation to the appropriate benchmark for such exercises, First Economics noted that Ofwat does benchmark certain types of capital unit costs, but its PR24 enhancement cost models are not as well regarded as its base cost models. First Economics was supportive of the approach that Scottish Water took in relation to benchmarking by specialist engineering consultants and noted that the results of this benchmarking have to be treated with a good deal of caution due to the difficulties that there are in making like-for-like comparisons. As a result, First Economics agreed with Scottish Water that in this instance it is better to focus on Scottish Water's positioning versus the median/average cost benchmark rather than an upper quartile benchmark.

In the sections below, we consider the company and location specific factors that may have impacted the relative positioning of Scottish Water's historical civils cost models.

Highlands and Islands Factor

As noted in the Draft Business Plan, we have investigated the potential impact of 'Highland and Island' impacts on Scottish Water's capex cost efficiency – and whether this could have a disproportional impact on civil cost categories. We have collated a range of evidence that, in aggregate, suggests that operating in the more remote locations in Scotland leads to higher costs. As with our analysis in the operating efficiency space, we believe that this impact is likely to extend further than experienced by other Water and Sewerage Companies (WaSCs) – but note that the nature of this evidence and analysis means that this is difficult to prove definitively.

Our analysis of this impact has considered prices in 'Non-remote' and 'Remote' areas on the following basis:

Table 3: Categorisation of Remote vs Non-Remote

Categories	Locations
Non-Remote	Central Belt, North-East, South-East, South-West
Remote	Argyll & Bute, Highlands & Islands, Northern Isles, Western Isles

DV1 Design and Build Contractor - Example

An example of the Highlands and Islands impact can be found in the pricing used by one of the DV1 Design and Build Contractors. For SR21, while this contractor provided tendered rates for labour, plant, and materials, target prices could not be agreed due to higher forecast costs in certain remote locations. Consequently, a commercial methodology with defined rules was adopted for setting target prices.

The contractor stated that contracted rates are sustainable within Scotland's 'central belt', but remote northern and island areas present greater cost challenges. To address this, the contractor engaged local Regional Contractor Service frameworks for 32 projects. Market testing revealed that sub-contract target prices in these areas are over 57% higher than the prices used within Scottish Water's Benchmark Estimating Software (BES) system.

A comparison of the contractor's rates indicates that labour costs are approximately 40% higher and plant costs around 20% higher in the Northern Isles compared to the Central Belt, with material costs also showing significant variation between the two locations. Tendered Rate comparisons are shown in the table below, with prices indexed to July 2025.

Table 4: Tender price increase in rural locations

Description (unit of measurement)	Central Belt Rate	Northern Isles Rate	% uplift
Civils Ganger (hour)	£30.85	£43.43	+41%
Civils Banksman (hour)	£20.91	£29.43	+41%
JCB 3CX (hour)	£52.81	£58.09	+10%
Dumper 3 Tonne (hour)	£32.14	£35.35	+10%
500mm Dia. SDR17 Water 6m Length (metre)	£691.56	£822.89	+19%
Granular Backfill (m^3)	£28.19	£56.97	+102%

Continuing this analysis, we have taken 11 DV1 projects located in remote areas and 're-priced' these as if they were delivered in the Central Belt. This involved excluding remote island-specific costs such as travel, accommodation, subsistence, TTU transportation including police escort, off island haulage & disposal etc. This analysis shows that even with these inclusions, delivering these projects in a remote location requires a 7.4% cost uplift compared to equivalent projects in the Central Belt, reflecting additional labour, plant, material mark-ups, and other remote working expense.

A similar pattern appears to be emerging in the tender process for Scottish Water's latest delivery vehicle, DV4 – which will begin operations during SR27. Recent market testing via the ITN2 tender process has shown that pricing for remote locations (as defined in Table 4 above) showed an average premium of 14.2% across 10 bidding contractors.

It appears logical that a Highlands and Islands premium would have a disproportionate impact on civils costs. As an example, we would expect MEICA costs to be dominated by prices of equipment 'at the factory gate'. In contrast, civils work tends to require proportionally more labour, plant and aggregate costs that are likely to be more influence by localised pricing and remote premiums.

Data availability and application

We note that there are significantly fewer data-points available in this database for analysis of civil engineering expenditure. For example, there are only 5 Scottish Water data points available for storm water tanks, as these are long-life (c80 year) assets that Scottish Water do not build or replace regularly. As a result, data here may be dominated by esoteric cost issues rather than being reflective of Scottish Water's overall cost performance. We note that there may have been

periods of particularly high costs for certain activities due to temporary factors – and that if activity is concentrated in these periods, it may suggest a cost position that is not reflective of current trends.

We also note that Civils cost models are not used extensively within the overall pricing approach used for the SR27 Final Business Plan. Our analysis of current investment projects and pricing approaches suggests that Civils costs models have been used to price approximately £143m of investment within the SR27 Final Business Plan.

Further analysis

We recognise that cost model data suggests that Scottish Water faces higher than industry average costs in Civils and Waste Water Infrastructure. While in this section we have explored the potential reasons for this difference, we have also created an internal task force to conduct a deep dive into these areas to understand further why these activities in Scotland may have different characteristics to the costs and activities in the benchmark data. This taskforce may also draw on external experts and our external partners to better understand these issues. We expect the taskforce to be able to provide further information to WICS in the first half of 2026 and ahead of publication of Draft Determinations.

4.3 Econometric Benchmarking

In line with the SR27 Final Methodology and our cost efficiency workplan, we have sought to assess the efficiency of our SR27 enhancement cost forecasts where feasible by using Ofwat's econometric benchmarking of enhancement costs for companies in England and Wales. We have focused our attention on the set of enhancement cost econometric benchmarking models that Ofwat used in PR24. These models were developed following review and further consideration of the approaches that were used at PR19, and the scope for improvements.

In order to support this benchmarking activity, the data tables that form part of our SR27 final business plan submission include, where relevant, values for a range of variables that can allow for those Ofwat models to be applied. The process of developing that underlying dataset highlighted some material challenges in terms of generating reasonably comparable data in some areas, and we have engaged with WICS to try to provide practical and sufficiently robust ways of generating the required modelling inputs where feasible. In line with the SR27 data table guidance, the enhancement areas where we sought to identify and provide data for use in enhancement cost econometric benchmarking were as follows:

- Phosphorus removal
- Sanitary permit tightening
- Storm overflows
- Water resources (and in particular, water interconnectors)
- Leakage
- Investigations
- Lead pipe replacement
- Metering
- Continuous river water quality monitoring
- Flow monitoring at wastewater treatment works
- Event duration and flow monitors for wastewater pumping station emergency overflows
- Chemicals removal

Using Ofwat's benchmarking models was not feasible in some of the areas identified above because of the scope the SR27 plan:

- Our plan includes no new water interconnector projects.
- Our plan includes no planned relevant investigations for the water service.
- Scottish Environmental Protection Agency (SEPA) is responsible for monitoring and reporting on continuous river water quality, and so enhancements related to this do not form part of our SR27 plan.

Also, Ofwat did not apply benchmarking modelling approach when assessing costs associated with Event Duration Monitors as it found there to be too much variation in the scope covered under this line to enable robust comparison of costs and driver data.[14] In line with that, we do not include Scottish Water's forecast costs associated with Event Duration Monitors in the set of benchmarking assessments shown below. We note that forecast SR27 expenditure on Event Duration Monitors for wastewater pumping station emergency overflows is around £1.9 million, which accounts for only around 0.2% of the overall SR27 expenditure forecast for the areas listed above where we have sought to apply Ofwat's benchmark modelling.

We comment further on the relevant data and on our benchmarking assessments below in relation to the different areas shown above in Annex B. Where it is feasible and informative to do so, we consider the efficiency of Scottish Water's enhancement cost forecasts in two ways:

- By comparing Scottish Water's forecast costs in the relevant enhancement area to the level implied by Ofwat's models as calibrated based on England and Wales data;
- By including Scottish Water data in the dataset and re-running Ofwat's models and then repeating the above comparison using the re-calibrated models.

For most of its PR24 enhancement cost benchmarking, Ofwat used the efficiency of the median company as the relevant benchmark, including to take account of the novelty and quality of the models. We have considered the efficiency benchmark in line with Ofwat's approach and therefore focus on comparisons with median company performance below.

The scope for benchmarking enhancement costs in an effective manner is complicated by the range of different projects that can be included within a given enhancement area (such as 'storm overflows'). While Ofwat's enhancement cost models seek to take account of some relevant characteristics they adopt relatively simplified approaches such that the implications of differences in scale and complexity between specific projects may not be captured in an effective manner. Ofwat's PR24 approach included taking the implications of the scope for such differences into account by:

- Assessing efficiency in each enhancement area at the aggregated company – rather than the project – level to recognise that companies have to deliver schemes of different scale and complexity.
- Setting allowances in each enhancement area on the basis of identified efficiency benchmark (as opposed to the amounts requested by companies).

The second point above means that the funding implications of being identified as having costs that exceed the efficiency benchmark in one enhancement area can be offset by cost being identified as falling below the efficiency benchmark in other area, with the overall efficiency challenge effectively determined by the weighted average of the impact of applying efficiency benchmarks across the set of enhancement areas. This is an important part of the process as it recognises that the specific characteristics of a company's enhancement programme in a given enhancement area may tend to make it appear more or less efficient in that area. Ofwat's

[14] Ofwat (December 2024) PR24 Final Determinations Expenditure allowances - Enhancement cost modelling appendix, p175.

approach lessens the risk of this adversely impacting on funding levels (and the implied efficiency of the overall programme) by applying a consistent approach across a wide set of enhancement areas, such that overall efficiency benchmark is effectively determined as the net effect of the assessments in each area across the enhancement programme.

The table below summarises our assessments based on Ofwat's enhancement models, with further detail provided in Annex B. The table shows whether Scottish Water's forecast costs have been identified as below/in line with the efficiency benchmark implied by the application of Ofwat's models (shown in green), or above that benchmark (shown in amber). The table also shows the overall level of enhancement expenditure that Scottish Water has identified as required in each area and shows this as a percentage of total SR27 expenditure forecast across this set of enhancement areas. The impact on these percentage figures of excluding mains replacement is also shown to recognise that this expenditure does not relate to enhancement (and – as discussed further in Annex B – was included to provide greater transparency of costs that have relevance to leakage reduction).

Table 5: Summary of enhancement benchmarking assessments based on Ofwat's PR24 modelling

	Implied Scottish Water efficiency relative to benchmark	Forecast SR27 expenditure (£m)	As % of total modelled enhancement expenditure	% excluding mains replacement
Phosphorus removal	Costs below/in line with benchmark	44.9	5%	9%
Sanitary permit tightening	Costs below/in line with benchmark	6.7	1%	1%
Storm overflows	Costs below/in line with benchmark	268.8	33%	53%
Leakage (Mains replacement)	Costs below/in line with benchmark	314.4	38%	
Lead	Costs above benchmark	36.0	4%	7%
Metering	Costs above benchmark	67.0	8%	13%
Flow monitoring at wastewater treatment works	Costs below/in line with benchmark	65.2	8%	13%
Chemicals removal	Costs below/in line with benchmark	16.8	2%	3%
Total		**819.7**	**100%**	
Total excluding mains replacement		**505.3**		**100%**

As can be seen, we have found Ofwat's benchmark modelling to indicate that Scottish Water's forecast costs are below, or in line with, the efficient benchmark used by Ofwat at PR24 in all but two of the areas considered above, and in relation to 88% of the overall level of expenditure forecast across this set of areas (80% if mains replacement is excluded).

We comment in further detail on the lead and metering findings (where costs were identified as above the benchmark level) in Annex B, but note that:

- 97% of forecast lead expenditure relates to lead communication pipe replacement: while the forecast unit cost of Scottish Water's planned SR27 replacements is around 9% above the benchmark level used by Ofwat, there was quite a wide variation of implied unit cost levels across companies in England and Wales, and 6 companies had forecast unit cost levels that are higher than the SR27 forecast level for Scottish Water. We note that Ofwat's benchmark models effectively assumed that all relevant factors that might affect the efficient level of costs could be adequately captured through the use of a single variable:

the number of lead communication pipes to the be replaced. Ofwat's approach would therefore be expected to inevitably provide only an approximate view, and we note that there is a clear engineering and economic logic for expecting geographic dispersion to affect the level of efficient costs.

- While the unit costs of Scottish Water's planned lead supply pipe replacements are materially higher than the benchmark levels used by Ofwat, the Scottish Water replacements account for less than £1 million in total and relate to relatively small pilot programmes that seek to improve information on effective lead reduction strategies.
- While Scottish Water's forecast metering unit costs are identified as materially above the benchmark, comparisons with recent smart metering deployment in England and Wales are challenging due to the absence of household metering in Scotland and its impact on efficient cost levels. The price of a smart meter will vary depending on technology and whether additional hardware is required to boost the signal, which may be necessary in several areas across Scotland. Our NHH rollout is relatively low volume and geographically dispersed, significantly affecting install cost efficiency and network economics (e.g., the ratio of comms gateways to meters achievable in a geographic area). We consider these factors mean that the efficient unit costs for the relevant meter installations and upgrades Scotland would be expected to be materially higher than the benchmark levels identified in Ofwat's modelling based on England and Wales data.

The above comments highlight some reasons why applying Ofwat's modelled benchmarks may not give a reliable view of the efficiency of Scottish Water's unit cost forecasts for lead pipe replacement and metering, and therefore that the results implied by these models should not be interpreted in isolation. However, as was noted above, the way in which Ofwat applied its benchmarks when determining funding levels took account of the potential for idiosyncratic factors to influence the reliability of model results for a given company in a given area by setting funding allowances equal to the benchmark across a range of enhancement areas. This reflects the fact that the implications of different idiosyncratic factors can be expected to balance out across companies to some extent when a broader range of activity is considered. That is, Ofwat approach did not involve applying its efficiency benchmarks to specific enhancement areas in isolation and instead results in a broader weighted average efficiency benchmark being applied across enhancement areas.

In line with that, we consider the enhancement benchmarking results summarised in Table 5 above to show that Scottish Water's SR27 enhancement cost forecasts are, overall, below or in line with the set of modelled benchmarks that Ofwat used at PR24.

4.4 Benchmarking Outturn Costs

As noted in the Draft Business Plan, Scottish Water have begun to benchmark outturn project costs and consider ways in which this data can be analysed to further support the overall assessment of historical and ongoing capex efficiency. An initial iteration of this analysis is shown below.

R2309 cost curves have been benchmarked against Scottish Water outturn costs for similar projects delivered in previous (pre-SR21) years, with adjustments for capital price inflation (CPI) and productivity improvements. The analysis covers 75 outturn projects, totalling £125 million across all major project types. All project costs were rebased to the R2309 cost model as of October 2022 using CPI indexation and have been adjusted to take account of project specific costs and to focus on the cost of 'new build' activity. On this basis, adjusted outturn costs across the 75 projects analysed were 3.65% lower than suggested by the cost models.

This analysis is currently being developed to include SR21 outturn projects and broaden the assessment to total costs. We would be keen to share this analysis with WICS as it develops over the SR27 period. At this stage, this analysis (in aggregate) helps to support the assessment that the cost models used by Scottish Water when pricing new work are in line with historical project pricing, taking account of inflation.

Table 6: Construction level comparison (project specific costs removed)

Construction Level Comparison (project specific costs removed)				
Item	**Cost Curve Cost**	**BES Cost, less project specific costs**	**variance (£)**	**variance (%)**
UID (3 Projects)				
Cost Curve Scope	£1,878,285	£1,346,448	£531,837	28.32%
Site Specifics	£319,309	£11,127	£308,182	96.52%
Construction Total	£2,197,594	£1,357,575	£840,019	38.22%
Wastewater Infrastructure (23 Projects)				
Cost Curve Scope	£13,511,974	£12,470,292	£1,041,681	7.71%
Site Specifics	£0	£181,662	-£181,662	-
Construction Total	£13,511,974	£12,651,954	£860,019	6.36%
Wastewater Non-infrastructure (15 Projects)				
Cost Curve Scope	£9,107,966	£9,395,374	-£287,408	-3.16%
Site Specifics	£3,825,346	£2,164,233	£1,661,112	43.42%
Construction Total	£12,933,312	£11,559,608	£1,373,704	10.62%
Water Infrastructure (25 Projects)				
Cost Curve Scope	£20,588,740	£20,899,938	-£311,198	-1.51%
Site Specifics	£0	£420,578	-£420,578	-
Construction Total	£20,588,740	£21,320,516	-£731,776	-3.55%
Water Non-Infrastructure (9 Projects)				
Cost Curve Scope	£9,728,528	£10,767,415	-£1,038,887	-10.68%
Site Specifics	£4,280,552	£3,277,562	£1,002,990	23.43%
Construction Total	£14,009,080	£14,044,977	-£35,897	-0.26%
TOTALS	£63,240,699	£60,934,630	£2,306,069	3.65%

4.5 Other Pricing Methodologies Used in SR27

As noted above, cost models are used to price a relatively small amount of the total investment in the SR27 Final Business Plan. Other cost methodologies and approaches used are generally harder to benchmark directly as they are more bespoke in nature. In the sections below we describe these methodologies and explain how they are used to support the efficient pricing of the business plan.

4.5.1 Run Rate Costs

Run rate costing is used as the predominant tool for approximately 34% of the investment in the SR27 Final Business Plan. This methodology is often the most appropriate where there are readily identifiable market rates for products and services, and where Scottish Water buys many of the same type of input. It is typically applied to less complex construction costs and other business costs such as fleet and IT.

Given the nature of these costs, which can be more liable to vary with current market conditions, pricing via historical cost curves or other benchmarking approaches is more likely to give an inaccurate representation of the costs that can reasonably be achieved 'today' (even taking general levels of inflation into account).

Where a run-rate methodology is applied, costs are estimated by extrapolating from recent projects or programmes of similar scope and by market-testing through procurement activities – helping to ensure that Scottish Water is achieving the efficient market price in these areas.

4.5.2 Benchmark Estimating Software (BES)

BES is Scottish Water's costing tool used for detailed estimating of projects at later stages of development. BES has been used to price approximately 8% of the investment in the SR27 Final Business Plan.

The software houses the current framework rates for both Scottish Water's procured Delivery partners and Scottish Water's procured material providers. BES uses this granular level of detail to provide robust Bills of Quantities for Projects, either as evolutions of the HLPT cost assessment or as new estimates.

BES helps to ensure that the costs used in the SR27 Final Business Plan are efficient by utilising labour, plant and material framework (e.g. scrapers, chemical dosing) rates and prices following robust tendering exercises under procurement governance. In addition to the market testing element, Scottish Water also carries out its own internal and external benchmarking reviews to ensure we are achieving best value.

4.5.3 Market Frameworks

Scottish Water is constantly checking market prices and validating prices assumptions used in its investment plans. Scottish Water will carry out approximately 30 major procurement exercises each year. The size and timing of each framework will vary depending on the nature of the framework.

In addition, Scottish Water also carries out price validation analysis annually on circa £100m of a basket of goods made up of a wide range of materials and plant categories. Scottish Water frameworks will typically make up 30-50% of a Delivery Partners price so Scottish Water through its market testing and validation is directly impacting and influencing the prices that Scottish Water can achieve.

The outcome from the annual market testing and price validations are fed directly into BES so we are continually updating and feeding our base costs with market tested rates from our partners and frameworks and thus ensuring we are always costing our programmes and projects with efficient rates and prices.

4.5.4 Tender Efficiency Factor

Tender Efficiency Factor (TEF) is a contractual mechanism that Scottish Water has successfully applied to the larger supply chain partners throughout SR15 and SR21 and this has been applied particularly in the Alliances. TEF is applied at the Target Price setting stage and is a bid percentage that a partner has committed to at tender stage.

The Alliances have committed to set percentages savings to be applied to Target Prices on an annual basis. The purpose of the TEF was to drive efficiency on the cost elements that can be directly control and impact, i.e. all people costs and programme durations, noting that 30-50% of a Delivery Partner's price is made of Scottish Water framework prices which they do not control but have the responsibility to manage.

TEF is only used on larger NEC option C contracts and applies a discount to the Target Price. Actual costs are reimbursed within a robust set of defined cost rules. The TEF sets a tension on the Target Price and partners are incentivised to deliver actual costs on a project to outperform the Target Price and drive gain share.

In addition, we note that across SR15 and SR21 there has been limited gain share across the Alliances. In fact, there has been in some instances significant pain share absorbed by the Alliances. This is another aspect and mechanism that Scottish Water has used to help to ensure that customers benefit from efficient investment.

4.6 Indirect Costs

4.6.1 Introduction

Scottish Water incurs capex costs outside of the direct costs examined in the preceding sections. Indirect costs are generally all costs that are not construction labour, plant or materials and typically include elements like design, project & programme management, construction management, site preliminary costs and management fees. These indirect costs represent approximately 40% of the total investment costs within the SR27 Final Business Plan.

4.6.2 Approach to Benchmarking Scottish Water's Indirect Costs

To assess the efficiency of Scottish Water's indirect costs, Scottish Water has commissioned three specialist consultants, CKBS, Arcadis and Mott MacDonald to undertake benchmarking of Scottish Water's Indirect or 'On-Costs'. This analysis was conducted in October 2023.[15]

Scottish Water currently hold a data set of 984 projects totalling approximately £2.1bn from 2015 onwards. However, to ensure the analysis more accurately reflects Scottish Water's current position, whenever we benchmark ourselves, we use all available data from the previous 3-year period only. In this instance that was 190 projects at a total of approximately £450m from April 2020 onwards, all of which was provided to the Consultants. Across the sample provided we determined that for every £1 of direct cost there is £0.72 of on costs.[16]

We observe that there is a variation in the level of on-costs across different work types. This can be due to a number of factors such as the relative complexity of the solutions being developed, the level of external stakeholder engagement or the amount of investigations & modelling required up front to ensure sufficient understanding of the problem. It is therefore also useful to look at how representative the sample set is relative to activity across SR21. This comparison is set out in 7 below.

[15] This analysis has been separately shared with WICS.
[16] Across the total data set of £2.1b the equivalent figure is £0.70 of on-cost for every £1 of direct cost.

Table 7: Proportional split of spend by work type

Source: Scottish Water analysis

Work Type	% by Value in Sample Benchmarked	Adjusted for approximate % by value across SR21
Waste Water Infrastructure	15.3% @ £1.89	16.5% @ £1.89
Waste Water Non-Infrastructure	22.9% @ £1.80	26.3% @ £1.80
Water Infrastructure	36.2% @ £1.65	22.0% @ £1.65
Water-Non Infrastructure	25.6% @ £1.68	35.3% @ £1.68
Overall, Pound in the Ground	£1.722	£1.738

It can be seen above that if we adjust for the differences between the sample make up and the approximate SR21 make up (currently forecast) it adds £0.016 to our pound in the ground analysis. This suggests that the sample period will have some impact on this analysis, but that this impact is limited and should not have a material impact on our assessment of the benchmarking exercise outcomes.

It should also be noted that risk is always excluded from this type of benchmarking exercise. Risk is not an on-cost as when risks do materialise the cost is generally spread across both direct and indirect costs. In addition, there can be wide variations in the level of risk included by different organisations in their estimates due to their differing risk appetites and delivery approaches – making objective benchmarking impractical.

We are also cautious about analysis of sub-categories of costs, as the combination of sample period variance and decreasing sample size is likely to risk misleading inferences that are not representative of overall efficiency.

4.6.3 Benchmarking Results

All three consultants replicated Scottish Water's assessment of Scottish Water's Indirect costs as being at £0.72 for every £1 of direct construction cost across the sample provided and therefore, this was the figure to benchmark against available industry data.[17]

CKBS benchmarked Scottish Water's Indirect Costs as being approximately £0.04 below comparator companies (note, there is a drafting error in their report provided which incorrectly states this figure as £0.02).

Mott MacDonald's analysis showed Scottish Water as having lower Indirect costs than all of their comparator companies – positioning Scottish Water as being 33% below the water industry average of £1.09 for every £1 of direct cost.

[17] It should be noted that the Arcadis main report presents a figure of £0.85 for Scottish Water's Indirect costs. However, this figure was derived from their own proprietary analytics engine which was not in line with the approach undertaken by Mott MacDonald, CKBS or Scottish Water. The Arcadis appendix shows the results of their analysis using the same approach as the other two consultants and shows Scottish Water costs at £0.72.

Arcadis's analysis suggested that Scottish Water's Indirect Costs were approximately £0.13 lower than the industry average of £0.85.

These results are summarised in Table 8 below.

Table 8: Summary of Indirect Benchmark Results

Source: Scottish Water analysis of CKBS (C), Arcadis (A) and Mott MacDonald (M) data

Scottish Water Data	CKBS Benchmark	Mott MacDonald Benchmark	Arcadis Benchmark
£0.72	£0.76	£1.09	£0.85

The consultants noted that care is needed in interpreting the findings, as the programme delivery approach choices made by companies can substantially shift where costs are recorded – with no direct impact on relative efficiency. On this basis, we consider it to be most appropriate to consider the overall on-costs, rather than the split between client and contractor costs. For example, CKBS note that many large water companies adopt an alliancing approach to programme delivery that will shift the risk and accountability for programme delivery to the contracting entity. This will often increase construction on-costs whilst decreasing the client on-costs. As an example of this, within Scottish Water we allocated almost all early project development costs incurred prior to agreeing a target price with our delivery partners as Client On-costs. However, we understand that water companies that have large alliances in place may allocate a lot of the same early project development costs as Contractor On-Costs as it is undertaken by the alliance partner. This operational choice does not have an obvious impact on overall efficiency as measured by the overall cost to deliver.

4.6.4 Addressing WICS/WSP Feedback

In response to the Draft Business Plan, WICS requested that Scottish Water provide further detail on their approach to benchmarking indirect costs. In addition, WICS engaged with specialist consultant, WSP, to conduct a range of assessments on elements of Scottish Water's business plan, including the approach to evidence supporting the assessment of indirect cost efficiency.

The WSP report stated that Scottish Water's benchmarking shows directional alignment but lacks robustness in cost taxonomy and risk exclusion. WSP stated that client overheads are above industry norms, while contractor costs are lower. WSP suggest that a cost challenge of £8 million to £26 million should be considered by WICS, with recommendations for clearer cost categorisation and inclusion of risk costs.

In response, while there were some useful recommendations in the WSP report that Scottish Water will build into continuous development plans in this area, we have some concerns about the analysis and recommendation of a cost challenge in this area. In this area of analysis there is the potential to conflate cost allocation with cost efficiency, and we are concerned that the WSP approach does not take adequate account of the evidence described above that demonstrates that Scottish Water is more efficient than industry benchmarks once both client and contractor costs are taken into consideration.

We address the main issues raised by WSP, as well as provide more detail on the approach used, in the sub-sections below:

Definition of metrics

WSP note that all three consultant reports used by Scottish Water use a broadly consistent approach to calculating Scottish Water's 'pound in the ground' data but differ in detail and robustness. WSP raise the issues around Arcadis' conflicting estimates (addressed above) and argue that CKBS benchmarking lacks transparency in key cost assumptions, which may distort comparator benchmarks.

In response, we note the observation that different consultants (and underlying companies in the consultants' datasets) take different approaches. While it is reasonable to assume that consistency in this area would improve the accuracy and potential detail of benchmarking exercises, it is not clear that WSP's preferred approaches are necessarily superior to those used by the expert consultants working for Scottish Water. We will, however, consider these issues when assessing future assignments in this area of analysis.

Assumptions and exclusions

WSP note that Risk costs are excluded from Scottish Water's 'pound in the ground' data, but Risk cost impact and comparator treatment remains unclear. WSP also note that project outlier exclusions are inconsistent across reports, potentially affecting benchmarking accuracy**.**

In response, we note that Risk costs are deliberately excluded from this analysis for two key reasons. Firstly, we cannot know the Risk cost approach taken by companies in the benchmark, and so looking to exclude Risk costs from both Scottish Water and comparator data is a deliberate attempt to aid assessment of relative efficiency. Secondly, Risk costs would need to be allocated between direct and indirect costs, and it is likely that this would be applied in proportion to non-risk cost allocations. As a result, adding in Risk costs would not materially change the relative efficiency assessment within this exercise. We will continue to assess best practice in this area when conducting further analysis such as this and will update the approach to Risk if there is an industry consensus on an appropriate approach.

Alignment of cost taxonomy

WSP note that high-level cost categories are aligned across the Scottish Water's consultant's respective reports, but the cost sub-categories vary. WSP recommend that better definition and consistent application of cost taxonomy elements are needed for accurate benchmarking.

In response, we note the observation that different consultants (and underlying companies in the consultants' datasets) take different approaches to sub-categories of costs (i.e., exactly what each category of cost is called and includes). While it is reasonable to assume that consistency in this area would improve the accuracy and potential detail of benchmarking exercises, the approach used by other industry players is neither uniform nor under the control of Scottish Water. This is why Scottish Water, and its consultants have generally considered higher level cost categories – which should be adequately comparable and offer appropriate insight into relative efficiency.

Normalisation and data aggregation

WSP notes that data aggregation for Scottish Water's 'pound in the ground' data is applied consistently across all three reports, but that the application of time series normalisation is not clearly or consistently implemented. WSP notes that all three reports recognise time-series, delivery model, and technology normalisation, yet none implement full adjustments across all

three. Chandler KBS applies a robust weighted average method with confidence grading, while Arcadis and Mott MacDonald offer limited detail.

In response, we note the potential to standardise the request of consultants when conducting this type of analysis in the future. We note that CKBS are highlighted as applying a superior approach – and that CKBS also find Scottish Water's total indirect costs to be lower than industry averages.

Statistical analysis and representation

WSP notes that while the reports apply averages, medians, quartiles, and weighting for data characteristics and confidence, they do not use inferential statistical methods (e.g. Student's t-distribution) to test if differences between Scottish Water and comparators are statistically significant.

In response, we note that the three consultants used by Scottish Water have undertaken analysis using a range of industry standard methodologies. Absolute comparability between companies and datasets is often difficult, but we will raise this issue when scoping future work in this area to assess whether the type of analysis suggested by WSP would be proportional and have costs that represented value for money for customers.

Outcomes and comparability of results

WSP notes that Scottish Water's delivery model consistently shows a reversed cost profile compared to industry norms with higher client on-costs and lower contractor on-costs, and that this reflects a strategic choice to internalise more design and management responsibilities, shifting costs from contractors to the client. WSP note that Scottish Water favours client-led design and programme management, often using framework contracts and local supply chains. WSP also note that implementation of Delivery Vehicle 4 (DV4) may potentially impact cost elements. Finally, WSP note that while Scottish Water maintains strong cost efficiency across all project types and sizes, efficiency declines as project scale increases. WSP concludes that elevated client costs are driven by overheads and not contractor inefficiencies.

In response, we suggest that these findings directly clash with WSP's overall assessment that Scottish Water should face a cost challenge in relation to indirect cost benchmarking. A strategic allocation decision means that Scottish Water has proportionately higher client costs and proportionately lower contractor costs (relative to industry averages). Put another way, Scottish Water keeps more costs 'in house' and outsources less to contractors. This deliberate allocation decision does not mean that the 'in house' costs are inefficient simply because they are, in absolute terms, higher than average, just as Scottish Water's contractor allocated costs are not efficient simply because they are materially lower (in absolute terms) than industry averages. This conflation of allocations and efficiency appears to be at the core of WSP's concerns, and clashes with the assessment that 'Scottish Water maintains strong cost efficiency across all project types and sizes', as demonstrated by lower total costs when compared to total industry cost benchmarks.

We do note WSP's assessment that relative efficiency falls as project scale increases – and initiatives such as the development of DV4 are directly aimed at ensuring improved efficiency is achieved when delivering large projects and programmes.

4.7 Further Capex Efficiency Adjustments for SR27

In the Draft Business Plan, Scottish Water proposed an efficiency adjustment to account for efficiency gains that were not yet captured in cost models. As noted above, the R2309 cost models based on outturn project costs from SR10 and SR15 (indexed for inflation). This means where efficiency improvements are achieved over the course of SR21, these will need to be captured in order to reflect the best estimate of efficient costs within the SR27 Business Plan.

While SR21's Final Determination only required an opex efficiency challenge, Scottish Water has also sought to achieve a 1% pa improvement in capex efficiency over the period.

To estimate the value of the 'run rate' efficiency gains from SR21, in the Draft Business Plan we made the following simplifying assumptions:

- Average capex efficiency improvement over SR21 of 1% pa. Within this we made the following sub-assumptions:
  - 50% of project costs are estimated using cost models with data from SR10 and SR15, and so 100% of the anticipated SR21 efficiency gain needs to be captured – i.e., a 6% saving.
  - 50% of projects are costed using other methodologies that more quickly update for efficiency gains already achieved (such as run rates), and that we are roughly half way through the price control period, such that 50% of the 1% pa efficiency gains need to be captured in this adjustment, i.e. a 3% saving.

  As a result, we apply a 4.50% (50/50 weight of 6% and 3% savings) efficiency improvement adjustment.
- A capex RPE 0.50% pa assumption for SR21, applied in a similar weighted approach as described above, offsetting efficiency improvements by a total of 2.25%. This would roughly equate to COPI NWI RPE evidence over the period but is significantly below our 1.6% bottom-up estimate of RPEs over the SR21 period.

These adjustments led to a 2.25% efficiency adjustment (4.5% cumulative efficiency minus 2.25% cumulative RPE effects) in the Draft Business Plan.

For the SR27 Final Business Plan, we must consider if and how to update this assessment. There are several factors that would suggest that the SR21 'run rate' efficiency adjustment should be lower in the SR27 Final Business Plan than was initially estimated in the Draft Business Plan. Specifically:

- As the business plan has matured, it is clear that less than 50% of the plan is based on cost models used in earlier stage pricing tools and approaches.
- Further assessment of RPEs over the SR21 period to date and forecasts suggest that relevant costs have increased by significantly more than 0.5% when using a bottom up approach. In fact, RPEs on this approach are estimated to be 1.6% - which would have more than overwhelmed any efficiency benefit achieved.

Taken together, there appears to be justification for no net SR21 'run rate' efficiencies to be applied to the pricing of the SR27 investment plan. This finding would broadly match the CMA's recent finding that there is evidence that supports the view that productivity improvements for water companies have been in line with the wider economy over the recent period and have been close to zero.[18]

[18] CMA (2024), PR24 Appeal, Volume 1: Background chapters and base costs, page 80.

4.8 Capex Efficiency – Scottish Water Overall Assessment

4.8.1 Direct Costs

Scottish Water has examined direct capex costs in a number of ways – and these suggest that Scottish Water in broadly in line with industry levels of efficiency. The CKBS analysis of cost models used in earlier stage price estimation shows that Scottish Water models are 4.2% lower than the industry in aggregate – although higher than industry in civil costs. We have explored the data and location-based reasons why this may be the costs – concluding that there are significant premiums involved when working in remote highland and island locations.

We have also examined enhancement cost benchmarking, concluding that SR27 enhancement cost forecasts are, overall, below or in line with the set of modelled benchmarks that Ofwat used at PR24.

We have provided further information on the use of run rate methodologies, BES and market frameworks that help to ensure that the pricing for the bulk of the investment plan uses direct evidence of market pricing to ensure that projects and programmes within the SR27 Final Business Plan are costed efficiently. This should be considered alongside the project and programme level investment case evidence that has been submitted as part of the SR27 Final Business Plan.

At the request of WICS, Scottish Water has provided further evidence that median or average comparisons are likely to be the most appropriate regulatory approach in this area – reflecting the inherent difficulties and inaccuracies associated with comparing different levels and types of investment activities across companies.

Taking account of this evidence and analysis in the round, Scottish Water considers the evidence to support the view that its capex costs and the investment in the SR27 Final Business Plan are appropriately efficient.

However, we note that within this broadly average position there are areas where Scottish Water is currently operating at higher cost than industry averages (such as waste water infrastructure). While we believe that there are likely to be Scotland-specific reasons for this – we acknowledge that this requires further investigation and an improvement plan in order to ensure that costs in Scotland in these areas are a low as they can be. As noted above, we have created an internal task force to conduct a deep dive into these areas to understand while these activities in Scotland may have different characteristics to the costs and activities in the benchmark data. This taskforce may also draw on external experts and our external partners to better understand these issues. We expect the taskforce to be able to provide further information to WICS in the first half of 2026 and ahead of publication of Draft Determinations."

4.8.2 Indirect Costs

We have presented three different 'industry' figures calculated by the expert consultants, which we note have a wide range of outcomes depending on the sample benchmark data available. Unlike the econometric analysis we have undertaken to assess opex cost efficiency, where we have directly comparable data from Scottish Water and all England and Wales companies, the consultants undertaking this analysis only have access to data from companies that they have engaged with directly. Therefore, while broadly comparable, they are all looking at different mixes of organisations and potentially work types within those organisations. This is one of the main

reasons Scottish Water works with multiple consultants to give us access to a broad dataset on which to conduct benchmarking exercises. On this basis, we consider it to be most insightful to aggregate the analysis conducted by all three consultants and assess Scottish Water's 'On Cost' position in the round.

If we look across the three benchmark data sets produced by the consultants in October 2023, the average total On-Cost for benchmark Water and Sewerage Companies (WaSCs) was £0.8819 for every £1 of direct construction cost, which is £0.16 higher than Scottish Water's On-Costs (using the same time period).

Alternatively, looking at Scottish Water's position against all the available WaSC comparator data provided by the consultants, it places us second, behind the best performing comparator of £1.63. This can be seen in Figure 3 below. It should be noted however that due to the data being anonymous, which is a requirement of the data being shared with us, it is possible that the 3 consultants have some overlap between the WaSCs in their data sets so these may not be 11 unique comparator organisations.

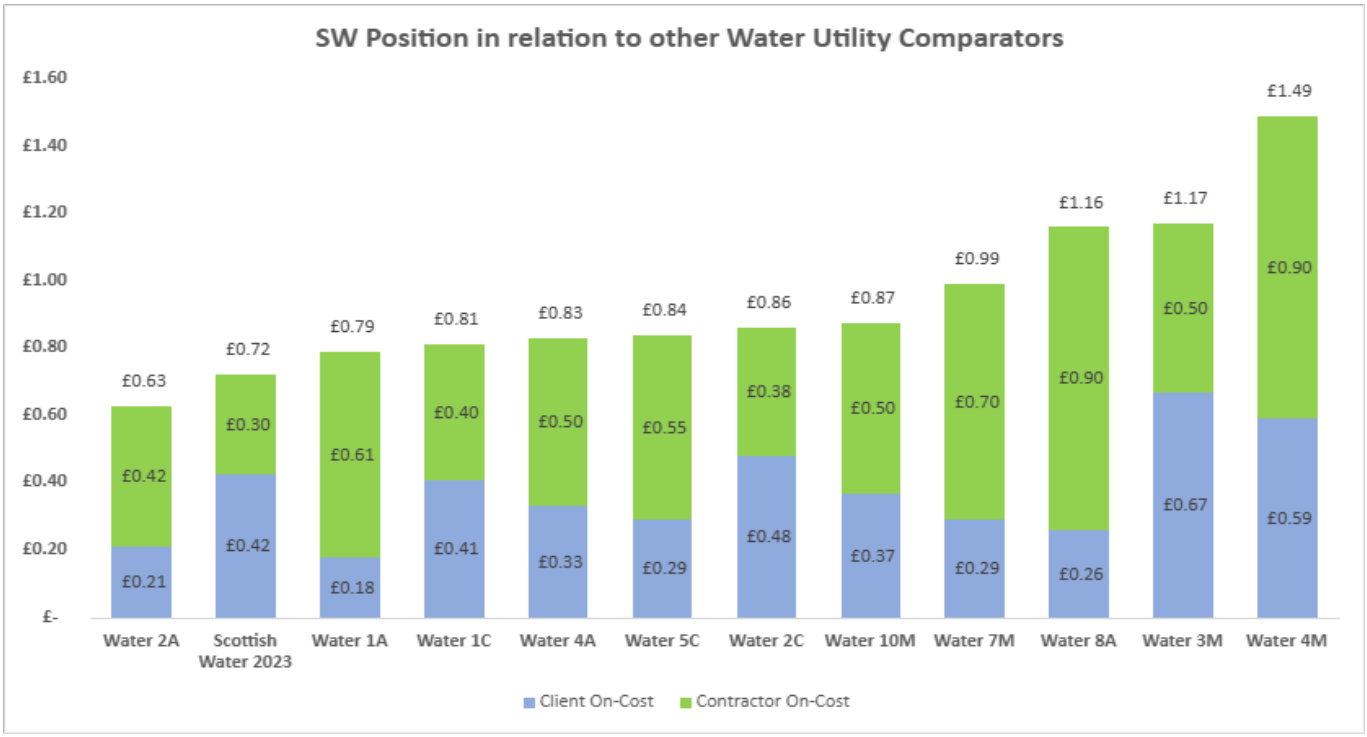

Figure 3: Scottish Water aggregate of three benchmarking findings

Source: Scottish Water analysis of CKBS (C), Arcadis (A) and Mott MacDonald (M) data

Taking account of this evidence and analysis in the round, Scottish Water do not consider there to be sufficient evidence to justify any catch-up efficiency in relation to indirect capex costs.

However, we note that it may be helpful to commission updated analysis on an ongoing basis, building in relevant feedback from WSP's recent assessment, to ensure we can provide an expanded and improved dataset to WICS during SR27.

[19] This is simply taking an average of all WaSC data points in Figure 4 including Scottish Water but excluding 'Water 4M' as it is such a significant outlier. If Scottish Water is excluded, the average of the other companies (still excl Water 4M) is £1.90.

4.8.3 SR21 Run Rate Efficiencies

Scottish Water notes the substantial SR21 'run rate' efficiency assumption that was included in the Draft Business Plan, and that further analysis suggests that this may significantly over-estimate the value of efficiency gains over the period. In fact, there is evidence to support no efficiency gain over the SR21 period given the lack of overall productivity improvement across the economy and because of the very significant RPE effects witnessed during this regulatory period.

However, Scottish Water also recognises that the evidence, in the round, points to Scottish Water being in a position of broadly average efficiency in relation to the industry, especially in relation to direct capex costs. With this in mind, and despite evidence suggesting little scope for net efficiency gains over SR21, Scottish Water propose to continue to apply the 2.25% efficiency adjustment suggested in the Draft Business Plan to ensure that customers pay for only efficient costs of investment.

Given the CMA's assessment of little or no productivity gains achieved at England and Wales companies over this period, this should reflect a step change in Scottish Water's capex efficiency position relative to peers and backward looking evidence (such as the cost model assessments).

On the basis of the updated Business Plan, this adjustment will reduce the cost of investment paid for by customers by a further £190m.

Details on the frontier efficiency gains that Scottish Water expects to achieve during SR27 (over and above this £190m adjustment) are detailed in the next section of this Technical Appendix.

5 Our Approach to Frontier Efficiency Challenge in SR27

5.1 Frontier Efficiency Challenge

The 'frontier' efficiency challenge is a feature of price control regulation that allows the regulator to ensure that all companies, even those currently considered to be efficient, continue to improve over time to drive customer benefit. Economy-wide data on productivity levels is typically used when estimating an appropriate efficiency challenge level.

The setting of a frontier efficiency challenge typically involves using historical trends to support forecasts over the price control period – and so requires judgement to be applied. In the UK, this has led to recent disagreements between regulated companies and their sector regulators – with companies pointing to evidence showing significant falls in the rate of economy-wide productivity improvements since the global financial crisis (GFC) in the late 2000s, and sector regulators typically basing challenge levels and higher assumptions of future productivity based on either longer-term averages or an anticipated 'rebound' in productivity in future years. This difference in perspective has been raised in the current appeals of PR24 at the CMA.

In considering an appropriate efficiency challenge level, we have taken account of the evidence submitted in the PR24 price control (and related appeal) processes. This includes evidence from Ofwat, the regulated water companies in England and Wales, the respective economic consultants used by both and the analysis of the CMA. This analysis incorporates data from the European Commission's Capital, Labour, Energy, Materials and Services (KLEMS) database (covering the EU, UK, US and Japan). We have also considered data from UK-specific sources such as the Office of National Statistics (ONS), the Office of Budget Responsivity (OBR) and the Scottish Government.

In the Draft Business Plan, Scottish Water proposed a 0.8% pa efficiency challenge. In the sections below, we have updated the evidence base to take account of recent announcements from the CMA and the ONS.

5.1.1 Relevant Evidence

England and Wales Company Evidence

A consortium of water companies commissioned Economic Insights to provide a report on the scope for frontier shift at PR24. In April 2023, Economic Insights published a report that considered a number of different periods measurement periods and comparator sets to provide a range of productivity growth estimates.[20] Relative to the analysis by Europe Economics and CEPA (for Ofwat) which is described below, Economic Insights used a different set of comparator industries – and varied inclusion across its calculation approaches.

Based on this evidence, in Economic Insight calculated several potential frontier efficiency challenge ranges, as shown in Table 9.

[20] Economic Insight (2023), Productivity and Frontier Shift at PR24.

Table 9: Economic Insight proposed frontier efficiency challenge ranges by scenario

Source: Economic Insight (2023)

Scenario	Range
Sensitivity range	0.1% - 1.1%
Plausible range	0.3% - 0.8%
PR24-focused range	0.3% - 0.7%

Economic Insight presented a 'plausible range' of 0.3% - 0.8% p.a. and recommended a 'PR24 focused range' of 0.3% - 0.7% pa, plus an overall 'sensitivity range' of 0.1% - 1.1%. In March 2024, Economic Insight published a further report which stated that 'drawing on a range of data sources, the UK's actual productivity performance has declined since our April 2023 report', and that 'This might provide some reason for considering values towards the lower end of our previously recommended range.[21]

England and Wales Business Plan Challenge Levels

WaSCs in England and Wales provided a range of frontier efficiency challenge levels in their business plan submissions, ranging from 0.45% to 0.8%. The unweighted average of the figures proposed was 0.59%. Only Thames Water proposed a challenge level below the 0.5% midpoint of the Economic Insight 'PR24' range (0.3%-0.7%). All other companies proposed levels at or above the midpoint of the 'PR24' range, with two companies proposing levels above this range. The efficiency challenge levels proposed by the WaSCs in England and Wales business plans is shown below in Table 10.

Table 10: England and Wales WaSC frontier efficiency challenge proposals

Source: CEPA 2024

Company	% per annum
Thames	0.45%
South West	0.50%
Southern	0.50%
Welsh	0.50%
Wessex	0.50%
United Utilities	0.55%
Hafren Dyfrdwy	0.61%
Severn Trent	0.61%
Yorkshire	0.70%
Anglian	0.80%
Northumbrian	0.80%

Ofwat PR24 Decision

Ofwat based their position on work undertaken by economic consultancies Europe Economics and CEPA. Based on a June 2024 report by CEPA, Ofwat estimated that an annual productivity challenge in the range of 0.8% – 1.2% was supported by the evidence, choosing a point estimate of 1.0%. Ofwat's Final Determination stated that that evidence may have supported a more stretching challenge of up to 1.2% per annum [22] [23]

[21] Economic Insight (2024), Further Evidence on Frontier Shift at PR24, Page 6
[22] Ofwat (2025), PR24 Final Determinations: Expenditure allowances, Page 261
[23] CEPA (2024), PR24 Draft Determinations: Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism, Page 88.

Both CEPA and Europe Economics disagreed with the analysis by Economic Insight that underpinned the submissions of (some) England and Wales companies – questioning factors such as Economic Insights' choice of comparators, the exclusion of 'value-add'-based figures and its focus on data from the post-GFC period.

In relation to gross output measurements and the comparator set used by Ofwat and the CMA in PR19, CEPA's analysis of EU KLEMS data to 2023 showed an (unweighted) average range of 0.1% - 0.7%, with figures depending on the time period chosen. The unweighted average of the four highest performing industries was 0.5% - 1.7%. This information is shown in Table 11.

Table 11:CEPA analysis of historical productivity growth in EU KLEMS data

Source: CEPA 2024

Industry	1996 - 2008	2009 - 2019	1996 - 2019
Chemicals and chemical products	1.8%	2.5%	2.1%
Construction	-1.0%	-0.2%	-0.4%
Machinery and equipment	1.9%	-0.8%	0.9%
Manufacturing (and associated)	1.4%	-0.2%	0.9%
Professional and Administrative (and associated)	-0.5%	-0.3%	-0.3%
Total Manufacturing	1.6%	-0.4%	1.1%
Transportation and Storage	-0.2%	-0.8%	-0.3%
Unweighted average	**0.7%**	**0.1%**	**0.6%**
Unweighted average of 4 highest performing industries	**1.7%**	**0.5%**	**1.3%**

CEPA also analysed KLEMS data on a value-add basis, finding unweighted average productivity growth estimates of 2.5% for 1996 – 2008, 1.5% for 2009 – 2019 and 1.7% for 1996 – 2019. CEPA state that based on its analysis of EU KLEMS data, it found that the scope for frontier productivity growth was 0.5% - 1.2%. However, CEPA concluded that there are inherent limitations in any approach that relies exclusively on analysis of historical productivity growth rates to set the potential for productivity growth over future periods given important changes in the regulatory framework and the opportunities presented by the introduction of new technologies, such as artificial intelligence. CEPA suggested a more plausible range was 0.8% - 1.2%, as 'we find no evidence to suggest that the scope for frontier shift during PR24 is substantially different from that which other UK regulators have set in recent decisions, which cluster around 1%'.[24]

Regulatory precedent challenge levels

Ofwat, Ofwat's economic consultants and WICS have all referenced regulatory precedent when considering their efficiency challenge levels. A selection of recent regulatory decisions in this area is included in Table 12.

[24] CEPA (2024), PR24 Draft Determinations: Frontier Shift, Real Price Effects and the energy crisis cost adjustment mechanism, Pages 79 – 81.

Table 12: Recent regulatory precedent levels of frontier efficiency challenge

Source: CEPA 2024

Recent regulatory decisions in other sectors	Challenge Level
Ofwat PR24	1.0%
Ofgem RIIO-2	1.0% to 1.05%[25]
UREGNI GT22	0.8%
Civil Airports Authority H7	1.0%
Competition and Markets Authority review of PR19 decisions[26]	1.0%
Ofwat PR19	1.1%

This evidence demonstrates that there is now a body of regulatory precedent that is clustered around a 1% efficiency challenge.

CMA PR24 Provisional Determinations

In relation to frontier efficiency, the CMA assessed the economic data from Ofwat and the water companies, and the consequent methodological issues.[27] The CMA concluded that productivity in the water industry appeared to follow a similar path to that of the wider economy, and consequently that that forecasts of changes to productivity for the wider economy were likely to also apply to the water industry.[28]

The CMA calculated the change in productivity for each water company for each year between 2013 and 2024 based on the econometric models that Ofwat produced and new models the CMA created for this appeal. The CMA concluded that there had been little or no productivity growth in either water or waste water activities over this period, which was in line with the performance of the wider economy.[29]

Within the appeal water companies had raised a number of reasons why their productivity performance might in fact be lower than that of the wider economy.[30] For example, it was suggested that productivity would be hindered by having to rapidly increase the rate of investment, and that water industry technology is relatively stable so would not see the same productivity gains as the wider economy. However, the CMA did not support those arguments[31].

The CMA therefore looked at recent productivity data and forecasts to assess likely future productivity gains, noting that the ONS productivity reports shows no growth over the last year and that the Bank of England forecast suggests productivity growth of 0.27% from 2025 to 2027 with higher growth in later years. The CMA noted that while Office of Budget Responsibility (OBR) forecasts show a similar pattern, the OBR had stated that "Successive past forecasts for trend productivity have proven to be too optimistic as productivity growth has continued to disappoint the uncertainty around our productivity assumption remains high."

[25] The initial proposal in RIIO2 was 1.25% but this included a 0.2 percentage point 'innovation uplift' that the CMA found to be an error, so the effective figure was 1.05%.
[26] CMA (2021), Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations Final report, March 2021, p233
[27] CMA (2025): Water PR24 References, Provisional Determinations Volumes 1-5, October 2025, available online at Water PR24 price redeterminations - GOV.UK.
[28] *Ibid*, Volume 1, Section 4.159, page 83 with further details in Volume 5, Appendix C, Estimating water sector productivity changes.
[29] *Ibid,* Volume 1, Section 4.156, page 79, with further details in Volume 5, Appendix C, Estimating water sector productivity changes.
[30] *Ibid*, Volume 1, Sections 4.165 *ad seq.*, with further details in Volume 5, Appendix C, Estimating water sector productivity changes.
[31] *Ibid*, Volume 1, Section 4.173, page 85.

Reviewing these forecasts and other evidence in the round, the CMA provisionally concluded that a 0.7% Frontier efficiency challenge is appropriate for the PR24 control period. This decision will be revisited in the CMA's Final Determination, which must be delivered by 17 March 2026.

Other evidence on productivity

Scottish Water analysis of data provided by the UK ONS also shows that there has been a significant change in the trend of overall productivity growth in the UK since the GFC. Immediately prior to this period, productivity growth was trending at ~1.9%. Since 2010, trend labour productivity growth (note, not total productivity) has been only ~0.5% (see Figure 4) growth in Scotland has fallen in a similar way, dropping from a 5-year average growth level of 1.8% between 2007 – 2012 to only 0.2% between 2019 and 2024, as shown in a chart from the Scottish Government report "Labour productivity statistics: 2024" (see Figure 5).

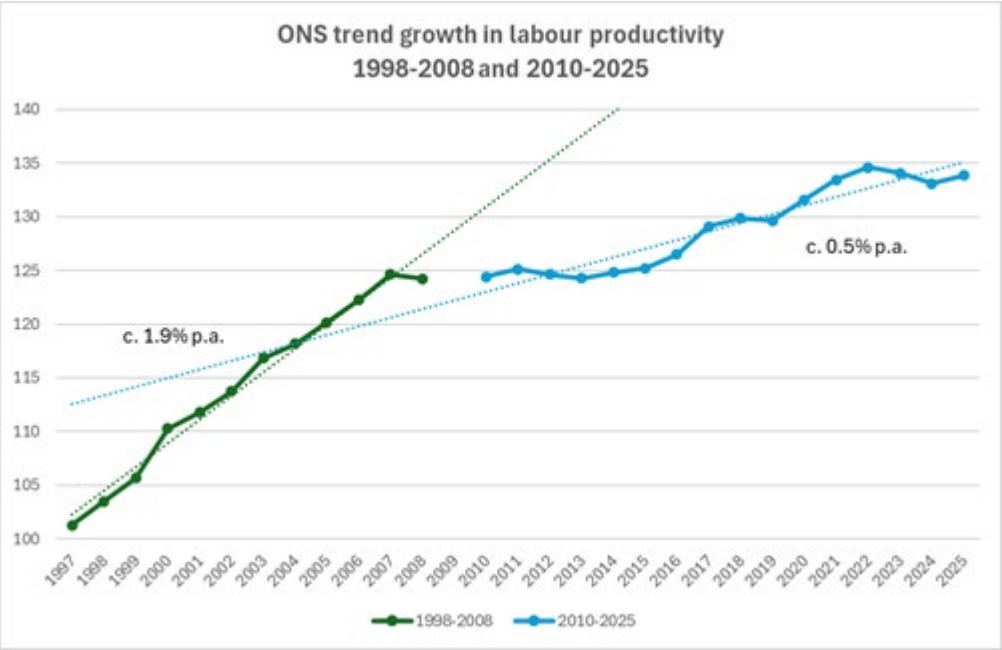

Figure 4: ONS data on trend labour productivity growth

Source: Scottish Water analysis of ONS data.

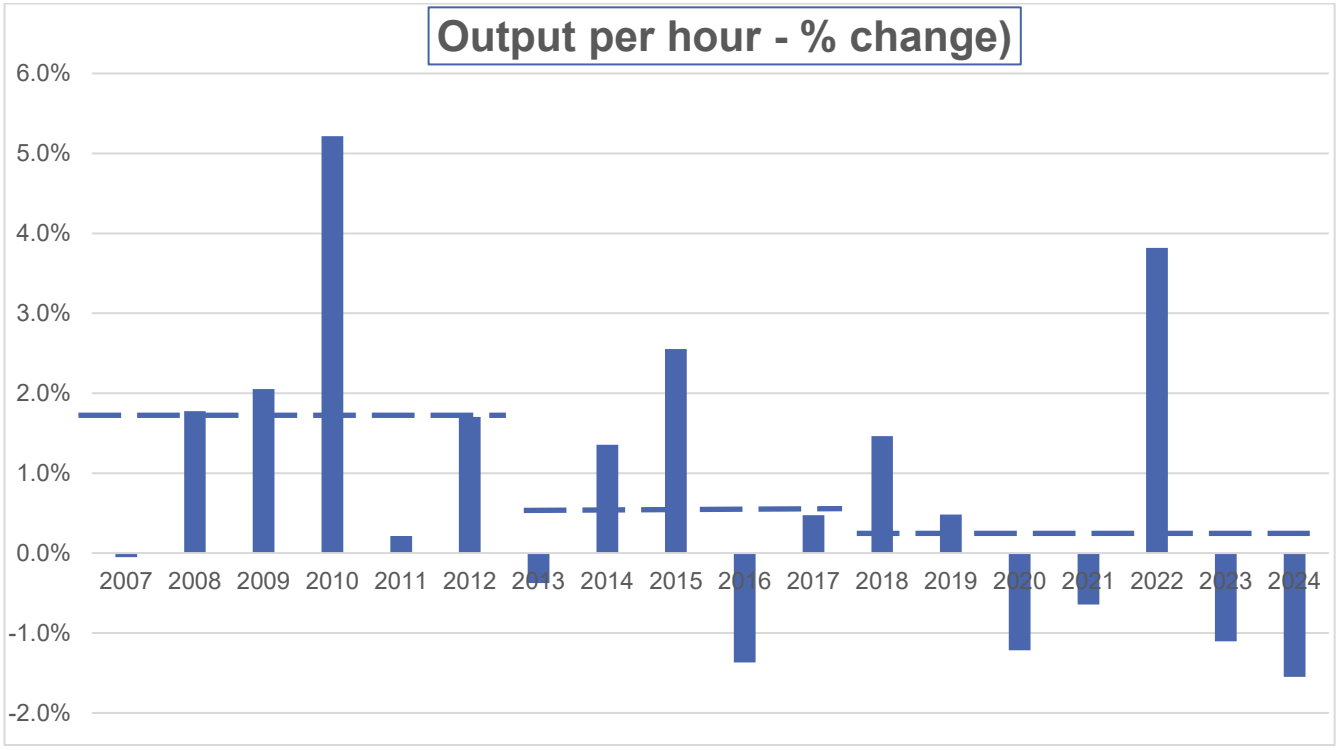

Figure 5: Scottish Government data on labour productivity growth in Scotland

Source: Scottish Government (2025)

In November 2026, the OBR published updated productivity forecasts for the UK. In this publication, the OBR downgraded its medium-term forecast of total factor productivity from 1.1% to 0.8% pa. Within this, the OBR noted that total factor productivity was forecast to grow from 0.3% in 2026 to 0.8% by 2030.[32]

5.1.2 Peer Review Evidence

First Economics noted that it had become common practice in UK regulation for regulators to expect infrastructure companies to improve their productivity at a rate of 1% per annum. First Economics stated that that this 'rule of thumb' is based on the productivity growth achieved in comparator industries prior to 2008. First Economics stated that water companies and their contractors are not immune from the factors that have driven lower productivity growth, and that there was 'ample reason' for Scottish Water to incorporate annual productivity improvement of noticeably less than 1% per annum into its SR27 plan.

5.1.3 Scottish Water Assessment of the Evidence

It is clear from the evidence provided by both companies and regulators that productivity trends have fallen materially since the GFC in the late 2000s. As a result, focusing on data from as far back as 1996 may not be representative of likely productivity levels during SR27. In February 2025, the UK Government noted that 'the pre-pandemic trend of sluggish productivity growth has continued, if not further deteriorated',[33] while in November 2026 the OBR downgraded its near-term forecast of total factor productivity to 0.3% and its medium term forecast to 0.8%. On this basis, even if the 1% figure used by regulators in recent years was 'correct' at the time of those decisions, a lower figure may now be appropriate.

[32] OBR (2025), Economic and fiscal outlook, page 26
[33] House of Commons Library (2025), Productivity.

More generally, while we consider regulatory precedent to be extremely important – we believe that the objective evidence holds greater weight. We note CEPA's analysis that the range justified by KLEMS data alone would sit in a range of 0.5% - 1.2% (0.85% midpoint), while the unweighted average for the 2009 – 2019 period would be 0.1%. Even focusing on the unweighted average of the 4 highest performing industries in CEPA analysis would suggest an annual figure of only 0.5%.

The CMA in its Provisional Determinations notes these post-GFC productivity trends, productivity improvements for water companies have been in line with the wider economy over the recent period and have been close to zero. We note that the CMA has provisionally decided that, considering evidence in the round, 0.7% is an appropriate annual frontier efficiency challenge level for WASCs in England and Wales.

In assessing and updating an appropriate and stretching frontier efficiency challenge for the SR27 Final Business Plan, we have taken into consideration a range of factors, including:

- Our assessment of current opex and capex efficiency described above, which suggests that Scottish Water's current costs are efficient and that no catch-up efficiency is required;
- Our assessment of data and analysis generated as part of the PR24 evidence base, including Economic Insight's analysis of a 0.3% - 0.8% plausible range and CEPA's 0.5% - 1.2% KLEMS data-based range;
- Recent regulatory precedent with decisions (including Ofwat's PR24 and Ofgem's RIIO-3 decisions) clustered at or around 1.0%;
- The CMA's view in its Provisional Determinations that a 0.7% challenge level is appropriate;
- Recent UK-specific data from the ONS suggesting trend productivity growth of c. 0.5% and the OBR's downgraded forecast of medium term total factor productivity of 0.8%; and
- Read-across from Scottish Water's SR21 Transformation programme and provisionally anticipated savings during SR27 –details of which can be found in the Transformation and Innovation Technical Appendix.

In line with the position taken in the Draft Business Plan, Scottish Water propose that a stretching 0.8%[34] frontier efficiency challenge level would be appropriate for the SR27 period. We note that this would position Scottish Water's challenge level above the 0.7% pa level just signalled as appropriate by the CMA, and well above recent trend productivity growth evidence. However, Scottish Water recognises that WICS will consider efficiency in the round and that it is extremely important that Scottish Water continues to achieve material efficiency gains in order to provide Scottish customers with great service at an appropriate and efficient cost.

We estimate that a 0.8% pa challenge would lead to a 2.8% average challenge level over the SR27 period.[35] Applied to a total investment spend (excluding transformation costs) of £8.46bn, this would equate to Frontier Efficiency savings of £237m (capex) and £82m (opex) over the SR27

[34] Net of any spend-to-save or transformation expenditure.

[35] This represents the simplified average over the period of a growing and compounding 0.8% pa Frontier efficiency challenge, where the challenge level is 0.8% in year one rising to a total of 4.8% (6 x 0.8%) in year 6. This simplified approach to modelling the impact of frontier efficiency on capex costs is helpful for planning and scenario analysis purposes, and allows direct comparison to the approach taken in the draft business plan. Once efficiency requirements (including RPE assumptions) are confirmed in the Final Determination, it is likely to be beneficial to apply a more granular and bottom-up process in the SR27 Delivery Plan and subsequent efficiency assessment processes. A more sophisticated methodology for calculating frontier efficiency savings within the investment plan is likely to result in a smaller 'cash' level of saving for any given level of efficiency challenge (due to the compounding impact of savings year-on-year that are not captured in the simplified methodology). At the margin, this may have an impact on the outcomes and outputs that can be delivered within any charge profile – and this impact would be called out by Scottish Water in the Delivery Plan.

period – a total saving for customers of £319m. Without this saving, customer bills would need to rise by CPI +4.08% rather than the CPI +3.3% that we have proposed.

We also propose that the frontier efficiency challenge should apply across most spending categories (i.e., both opex and capex) but should not apply to cost areas completely out of Scottish Water's control (such as the regulators' charges, interest costs, PFI costs and local authority rates). We discuss the practical application of a 'totex' efficiency challenge further in the section below.

5.2 Applying a 'Totex' Efficiency Challenge in SR27

This section explores how the frontier shift efficiency challenge should be applied in SR27. It sets out reasons why WICS should adopt a 'totex' (total expenditure)-based frontier efficiency challenge for Scottish Water for SRC27 and discusses how such an approach could be applied and relevant performance monitored. We conclude that a 'hybrid' model with some segregation of opex and capex challenges may be a preferable solution that manages the risk of unintended outcomes.

Options for applying a frontier shift challenge

The frontier shift challenge provides an important means through which the regulatory framework can incentivise ongoing efficiency improvements throughout SR27 and reflect the scope for achieving those improvements in the amounts that our customers pay. However, its effectiveness in generating desirable incentives for improvement will depend on both:

- **The level at which the efficiency challenge is set**: in particular, the extent to which the assumed cost savings are likely to be achievable through the securing of genuine efficiency improvements.
- **How it is applied**: what is the challenge applied to, and how will performance in meeting it is likely to be assessed, can affect the behaviours the challenge is likely to encourage.

Our assessment of the appropriate level at which to set a frontier efficiency challenge for SR27 is set out above. Our focus in this section is on how the frontier efficiency is applied. However – as highlighted further below – the level at which the challenge is set can affect the likely importance of decisions on how that challenge is applied, because it can affect the risks of unintended consequences under different approaches.

We have identified three broad options for applying the frontier shift challenge:

- **Option A – Disaggregated**: under this approach, the frontier shift challenge would be applied separately to each relevant category of costs. Importantly, this approach would include the challenge effectively being applied to opex on a stand-alone basis, with performance subsequently assessed on that basis also.
- **Option B – Totex-based**: under this approach, a single frontier shift challenge would be applied across all of Scottish Water's planned expenditure (other than some specific excluded items, such as business rates), and performance would be assessed on that same expenditure basis.
- **Option C – Hybrid**: under this approach, a totex-based frontier shift challenge would be applied, but a 'backstop' challenge would also be applied to opex. As set out below, this could provide a means of guarding the risks associated with options A and B.

We highlight the key risks associated with these options below before setting out our assessment that Option C looks likely to provide the most effective means of managing and balancing those risks.

5.2.1 Identifying Key Risks

Our assessment of the above options has been informed by consideration of the following two key sources of risk:

- Risks of undesirable behaviours being encouraged
- Circumvention risks

These are discussed in turn below.

Risks of undesirable behaviours being encouraged

Our assessment is that the key risks here relate to the potential for undesirable opex reduction incentives to emerge. That is, while there will be scope for some degree of opex efficiency improvements over time, there is a risk that incentives to reduce opex could encourage behaviour that goes beyond this and results in reductions that would not benefit customers. For example, it may encourage short-term responses that could tend (if pursued over time) to 'hollow-out' relevant capabilities in an undesirable way or discourage efficient responses that would otherwise have resulted in an increase in measured opex. While we would seek to guard against such behaviours emerging through the strategic and management approaches we adopt, we consider it important to try to structure the regulatory framework such that it can be expected to operate 'with the grain' of desirable incentives and behaviours, and to avoid the emergence of tensions which could undermine those efforts.

We note that in its SR27 Methodology WICS identified that there are circumstances in which it can be efficient for opex levels to increase (after account has been taken of relevant inflationary pressures), for example, because of opportunities to use operating cost-based solutions that would be more efficient than more traditional capex alternatives, or to support other desirable opex-demanding activities (such as partnership working or spend to save initiatives). We welcome WICS's comments on providing the scope for such initiatives to be identified and taken into account through relevant change procedures, and consider that for the arrangements to be supportive of such approaches, it will be important that the overall framework is not unduly focused on an opex-reduction (rather than a broader efficiency) benchmark.

Option B – the use of a totex-based approach – provides one way of addressing the above concerns. It maintains a clear focus on the need to deliver material cost reductions over time (other things equal) but provides greater flexibility in terms of how improvements in cost efficiency might be delivered. It guards against the risk of encouraging undesirable reductions in opex by allowing the frontier shift challenge to be met in a broader range of ways that may include a greater focus on delivering capital rather than operating cost efficiencies. The benefits of adopting this kind of more flexible approach are widely recognised by economic regulators, and we note that Ofwat applies a totex-based approach.

Our assessment that the appropriate level of frontier shift challenge to apply in SR27 is 0.8% incorporates the evidence base that was generated in Ofwat's PR24 process (and assumes that this is a totex-style target). Importantly, though, that evidence seeks to assess the overall extent to which water companies might be expected to achieve ongoing efficiencies, by reference to observed productivity levels over time and in other sectors that can provide a relevant comparator.

That is, the PR24 evidence provides a basis for judging what an appropriate totex-based frontier shift challenge might be. That does not imply that the same level of ongoing efficiency improvement should be expected, or required, across all categories of cost. In particular, it does not imply that it would be appropriate to require that same level of cost reduction from opex.

Our assessment – including based on our experience with developing transformation initiatives during SR21 – is that the balance of where it will be possible to deliver cost efficiency improvements from is likely to be tipped towards capital as opposed to operating expenditure. As a result, we would expect a totex-based assessment of the scope for Scottish Water to deliver ongoing efficiency improvements to overstate the likely scope for opex efficiency improvements to some extent. This raises a further source of concern in terms of the risk that a separately applied opex-based frontier shift challenge could be set at a level that may tend to encourage undesirable behaviours.

Circumvention risks

Applying a totex-based frontier shift challenge to Scottish Water may, however, raise other concerns related to circumvention risks. The opex-related concerns that were described above stem from the scope for the frontier shift challenge to generate powerful cost reduction pressures, with that making it important to consider the risks that those pressures encourage undesirable behaviours. A concern with a totex-based approach is that in providing more flexibility in terms of how the required cost reductions can be delivered, it may end up effectively weakening the overall cost efficiency challenge that is being faced.

The underlying concern here is that the arrangements might allow Scottish Water to manage the constraint that a totex-based frontier shift challenge would put on expenditure in part by effectively reducing the scope or quality of what the capex programme delivers in some way that is difficult to monitor. The risk therefore is that monitoring difficulties could allow the intended frontier shift challenge to effectively be circumvented to some extent. Mitigating this risk is the increased clarity in SR27 in relation to investment planning, identified and forecasted outcomes and the construction of an updated performance framework that incorporates and targets these outcomes.

In addition, the regulatory approach in Scotland facilitates a high degree of openness, engagement with the regulator and stakeholders and scope for broad scrutiny. However, we recognise that the deliberately flexible and evolving nature of the capex programme will inevitably leave some risk that a totex-based frontier shift challenge could end up being dampened to some extent as the programme evolves but would expect this to lessen over time as the framework develops.

5.2.2 Our Proposed Approach

Option C – the hybrid approach – provides a means of taking the above risks into account in a balanced way. It involves two frontier shift challenges being set, and being used for performance monitoring:

i. **A totex-based challenge**: this would set out the overall ongoing efficiency challenge to be applied when setting Scottish Water's expenditure allowances and that would be used when assessing performance through SR27.

ii. **A separate opex challenge**: this would provide a backstop in that it would ensure that a material frontier shift challenge was applied to opex but would not be the primary basis for setting the frontier shift challenge (which would be the totex-based challenge).

Critically, the opex challenge could be set at a lower level than the totex challenge such that the arrangements would provide the desirable benefits that flexibility provides for (and mitigate the risk of encouraging undesirable opex reduction activity), while providing a safeguard against that flexibility unduly dampening pressures to improve opex efficiency. This would recognise that the evidence base has been focused on a totex- rather than an opex-based question, and that – given the risks of undesirable outcomes resulting from applying the challenge to a narrower category of costs (i.e. opex) – a relatively high evidential bar (in terms of what level of opex reduction is likely to be achievable and efficient) should be required if setting the level of a separate opex-based challenge.

The case for adopting this kind of two-tier approach to the frontier shift challenge is likely to depend to some extent on how stretching the challenge is. That is, the more stretching the challenge, the more important the scope for flexibility is likely to be in terms of how that challenge can be met, and the greater the risks of undesirable outcomes emerging if that challenge is applied on a stand-alone basis to opex.

5.2.3 How Would this Approach be Applied in Practice

The separate opex challenge described above could be applied in a broadly similar way to the efficiency challenge that was applied to Tier 1 costs in SR21. That is:

a) A defined level of allowed opex can be determined when the SR27 price control is set, that takes account of the assumed stand-alone frontier shift challenge to be applied to opex.
b) This would provide an opex baseline against which future outturn levels could be compared, after relevant adjustments to reflect CPI, relevant real price effects, and other adjustments that may be required for consistency (e.g. to reflect scope changes differed from what had been assumed in the baseline).

In principle, this same approach could be used to apply and monitor performance against a totex-based frontier efficiency challenge. The key difference is that step (b) raises a range of more difficult issues that would need to be addressed, because (in line with the comments on circumvention risks above) the potential for (in)consistency issues to arise is much greater when capex is included in the assessment. In practice, though the complexity of this is not something that is introduced by the inclusion of a totex-based frontier shift. That is, there is a need in any event for an effective means of showing what the capex programme is delivering and for how much in a context where the programme itself is flexible and involving. We are engaging with WICS to try to improve the framework for doing this, and the application of a totex-based frontier shift challenge would form part of that broader assessment because it would have been applied when the baseline expenditure allowances were set (against which outturn spend will need to be assessed after appropriate consistency adjustments are made to reflect the factors noted in (b) above.

6 Our Approach to Real Price Effects in SR27

6.1 Introducing Real Price Effects

This section summarises the approaches and evidence used by Scottish Water in assessing the historical scale of RPEs and considers how these might best be applied during SR27. This work has been developing throughout the business planning process, and this section includes updated data relative to what was discussed in the Draft Business Plan and previously shared with WICS.

The base measure of inflation in SR27 is the Consumer Price Index (CPI), the commonly used measure of inflation in the UK. CPI is measured and published by the ONS.[36] CPI is a weighted sum of a basket of goods and services purchased by households, with the weights reflecting the proportion of those goods and services in a consumer's overall expenditure. The ONS also publishes the price indices for each of the goods and services that make up this basket.

There is now extensive regulatory precedent of economic regulators recognising that companies may face input price inflation that is different from general economy-wide consumer price inflation. Appendix 7 of the WICS Final Methodology provides examples of the regulatory precedent in these areas across previous SRCs by WICS, decisions from Ofwat and the CMA in the England and Wales water sector and decisions from Ofgem in the electricity and gas transmission and distribution price controls in Great Britain. In addition, a similar approach has been taken by the Utility Regulator in Northern Ireland.

In each case, the regulator has sought to identify cost categories:

- that make up a significant proportion of total opex and/or capex; and
- which have had a price profile that is markedly different from the reference inflation index.

In some cases, regulators have made an ex-ante (upfront) adjustment to the price settlement so that the likely negative impacts of RPEs on companies' opex or capex cost allowances are mitigated. In other cases, regulators have deployed "in-period" or ex-post (at the end of the control period) true-ups to adjust allowances or the assessment of achieved outcomes once outturn inflation is calculated. In each case, the regulator's assessment of a regulated company's efficiency performance takes account of the impact of RPEs.

Some of the components of CPI are also present in Scottish Water's opex and capex cost bases, although their contributions to Scottish Water's overall expenditure are very different. Other components have no clear read-across. For example, electricity and gas costs form around 3.9% of the weighting in aggregated CPI, while direct energy costs comprise around 11% of Scottish Water's opex costs and 8% of capex costs. Consequently the (efficient) rate of cost inflation experienced by Scottish Water may be very different from inflation measured via CPI. In addition, Scottish Water's opex and capex cost outturn inflation levels are likely to be different from each other.

To calculate the rate of historical opex inflation that we have been experiencing, we have examined published price indices for the kinds of underlying labour, materials[37] and services that we purchase, combined with weights derived from actual operating costs.[38] To calculate historical

[36] Inflation and price indices - Office for National Statistics
[37] The 'materials' category comprises physical goods and materials used in daily operations and capital investment. As noted below, we have used the Department for Business and Trade (DBT) construction materials index to track cost pressures in this area.
[38] This evidence base can be further developed by Scottish Water to incorporate the average industry cost mix.

capex inflation, we have used relevant published price indices combined with analysis of the cost category weights at companies in England and Wales. Where costs do not sit within an identified category, these have been categorised as 'other' and are assumed to have grown in line with CPI.

In relation to time periods for historical averages, we have typically relied on data from 2014 onwards. We note WICS feedback that data from 2009 should be considered. Comprehensive data availability issues make this feedback difficult to comply with. However, an increased focus on forecasts rather than historical estimates when assessing appropriate RPEs for the SR27 period should mitigate any issues around access to longer time series for certain cost categories (such as COPI).

To calculate forecasts levels of RPEs for both opex and capex that would apply over the course of SR27, we have included forecasts of key costs where they are available. Where official forecasts are not available (or forecasts do not extend over the whole of the SR27 period) we have typically assumed that historical premiums over CPI persist. The difficulty of accurately predicting RPEs in advance can be addressed by combining ex ante (in advance) and ex post (after the event) approaches, and we discuss this in further detail below.

6.1.1 Opex RPEs

Since the Draft Business Plan was submitted, Scottish Water has undertaken further analysis of opex cost inflation. The workings of this analysis have been submitted to WICS in a separate Excel document. Within this analysis, we have taken account of feedback received from WICS, specifically to focus energy cost analysis on the Department for Energy Security and Net Zero (DESNZ) large users price index.

Our bottom-up analysis demonstrates that opex cost categories have risen significantly higher than CPI inflation over recent periods. In the five years from 2015 – 2019, which covers a period of generally muted inflation prior to Covid and the sharp rise in energy prices, the weighted opex cost categories rose by 0.54% higher than CPI pa on average. The 2019 – 2024 period experienced much sharper rises in energy and material costs, and this saw weighted opex cost categories rise by 1.48% higher than CPI pa on average. Including short-term forecasts, we expect weighted opex cost categories to rise by 1.07% higher than CPI pa over the SR21 period.

Table 13: Opex cost category rises

Opex cost element	Index	Weight	2015-2019 average	2019-2024 average	2015-2024 average
Labour	KAC7 - public sector wages[39]	44.0%	2.13%	4.43%	3.28%
Energy	DESNZ - large users[40]	11.0%	4.48%	18.82%	11.65%
Chemicals	FSQ7[41]	5.3%	1.51%	4.43%	2.97%
Materials	DBT - construction materials[42]	1.4%	1.99%	6.80%	4.39%
Others	CPI - D7BT	38.3%	1.60%	4.53%	3.07%
CPI	CPI - D7BT		1.60%	4.53%	3.07%
Weighted Annual Cost			2.15%	6.08%	4.12%
Weighted Annual RPE vs CPI			**0.54%**	**1.48%**	**1.02%**

Following feedback from First Economics and WICS, we have undertaken further analysis to identify forecasts for key opex costs.

Our opex cost forecasts are shown in the table below:

Table 14: Opex costs forecasts

Opex cost element	Index Ref (historical data)	Assumed Weight	2025	2026	2027	2028	2029	2030	2031	2032	Forecast Estimate for SR27
Labour	KAC7 - public sector wages	44.0%	4.30%	2.60%	2.60%	2.70 %	3.10 %	2.21 %	2.21%	2.21 %	2.50%
Energy	DESNZ - large users	11.0%	4.83%	12.44 %	12.22 %	2.82 %	3.74 %	3.77 %	- 0.65%	2.01 %	3.99%
Chemicals	FSQ7	5.3%	- 3.19%	1.82%	1.62%	1.60 %	1.75 %	1.90 %	1.90%	1.90 %	1.78%
Materials	DBT - construction materials	1.4%	0.23%	2.85%	2.69%	2.62 %	2.52 %	3.32 %	3.32%	3.32 %	2.97%
Others	CPI - D7BT	38.3%	3.25%	2.00%	1.75%	2.00 %	2.00 %	2.00 %	2.00%	2.00 %	1.96%
CPI	CPI - D7BT		3.25%	2.00%	1.75%	2.00 %	2.00 %	2.00 %	2.00%	2.00 %	1.96%
Weighted Annual Cost	-	100%	3.50%	3.41%	3.28%	2.39 %	2.67 %	2.30 %	1.81%	2.11 %	2.43%
Weighted Annual RPE vs CPI	**-**	**100%**	**0.24%**	**1.39%**	**1.51%**	**0.38%**	**0.66%**	**0.29%**	**-0.18%**	**0.10%**	**0.46%**

[39] We consider that public sector wage increases are the closest comparator to the wage pressures that Scottish Water experiences. They are often quoted by trades unions in negotiations over Scottish Water pay awards.
[40] Following feedback from WICS, we have used this index instead of the consumer based index used in the draft business plan.
[41] This timeseries is a component of the Producer Price Index (PPI), which measures changes in the price of chemicals inputs to manufactured goods.
[42] This time series is produced by the Department for Business and Trade (DBT) and measures changes in the price of inputs to construction materials. This index has been updated from previous analysis which focused on costs relating to DIY materials. The DBT index is still not a perfect proxy for Water Company costs, but is considered to be a more appropriate cost index to use.

On a bottom-up basis, we estimate that opex RPEs will be 0.46% over the SR27 period. On this basis, we suggest that 0.5% would be an appropriate estimate of the total impact of opex RPEs over the SR27 period. This would be roughly in line with the level observed in the 2015-2019 period shown in Table 14 above.

6.1.2 Capex RPEs

Since the Draft Business Plan was submitted, Scottish Water has undertaken further analysis of capex cost inflation. The workings of this analysis have been submitted to WICS in a separate Excel document. Within this, we have further considered the approach to estimating average cost category weights (based on England and Wales averages) and the approach to forecasting.

Our bottom-up analysis demonstrates that capex cost categories have also risen significantly higher than CPI inflation over recent periods. In the five years from 2015 – 2019, which covers a period of generally muted inflation prior to Covid and the sharp rise in energy prices, the weighted capex cost categories rose by 1.25% higher than CPI pa on average. The 2019 – 2024 period saw weighted capex cost categories rise by 1.60% higher than CPI pa on average. Including forecasts, we expect weighted capex cost categories[43] to rise by 1.60% higher than CPI pa over the SR21 period.

Table 15: Capex cost rises

Capex cost element (average E&W weights)	Index	Assumed Weight	2015-2019 average	2019-2024 average	2015-2024 average
Labour	K5CD - construction wages	44.6%	3.65%	4.03%	3.84%
Energy	DESNZ - large users	8.2%	4.48%	18.82%	11.65%
Chemicals	FSQ7	2.7%	1.51%	4.43%	2.97%
Materials	DBT - construction materials	32.0%	1.99%	6.80%	4.39%
Others	CPI - D7BT	12.5%	1.60%	4.53%	3.07%
CPI	CPI - D7BT	-	1.60%	4.53%	3.07%
Weighted Annual Cost	-	-	2.87%	6.20%	4.54%
Weighted Annual RPE vs CPI	**-**	**-**	**1.25%**	**1.60%**	**1.42%**

Following feedback from First Economics and WICS, we have undertaken further analysis to identify forecasts for key capex costs.

Our capex cost forecasts are shown in the table below:

[43] We note that these figures are dependent on the price indices used. For example, for the Final Business Plan we have updated the material index used to a construction material price index from the Department for Business and Trade. This updates the previous data, which was focused on DIY material costs. We consider the DBT index is likely to be more representative of the materials costs faced by Scottish Water.

Table 16: Capex cost forecasts

Capex cost element (average E&W weights)	Index Ref (historical data)	Assumed Weight	2025	2026	2027	2028	2029	2030	2031	2032	Forecast Estimate for SR27
Labour	K5CD - construction wages	44.6%	4.30%	2.60%	2.60%	2.70%	3.10%	2.21%	2.21%	2.21%	2.50%
Energy	DESNZ - large users	8.2%	4.83%	12.44%	12.22%	2.82%	3.74%	3.77%	-0.65%	2.01%	3.99%
Chemicals	FSQ7	2.7%	-3.19%	1.82%	1.62%	1.60%	1.75%	1.90%	1.90%	1.90%	1.78%
Materials	DBT - construction materials	32.0%	0.23%	2.85%	2.69%	2.62%	2.52%	3.32%	3.32%	3.32%	2.97%
Others	CPI - D7BT	12.5%	3.25%	2.00%	1.75%	2.00%	2.00%	2.00%	2.00%	2.00%	1.96%
CPI	CPI - D7BT	-	3.25%	2.00%	1.75%	2.00%	2.00%	2.00%	2.00%	2.00%	1.96%
Weighted Annual Cost	-	-	2.71%	3.39%	3.28%	2.57%	2.79%	2.66%	2.30%	2.51%	2.69%
Weighted Annual RPE vs CPI	-	-	**-0.53%**	**1.36%**	**1.50%**	**0.56%**	**0.78%**	**0.65%**	**0.29%**	**0.50%**	**0.71%**

On a bottom-up basis, we estimate that capex RPEs will be 0.71% over the SR27 period. On this basis, we suggest that 0.7% would be an appropriate estimate of the total impact of capex RPEs over the SR27 period.[44] This would be materially lower than the historical levels observed since 2014.

WICS has also asked Scottish Water to consider the use of published indices in order to index capital projects costs. We note that Ofwat use a number of indices for its ex-post true up mechanisms (such as the COPI new works infrastructure (NWI) measure) for capex material costs.

Since the Draft Business Plan was submitted, Scottish Water has undertaken further analysis of COPI-based cost inflation. The workings of this analysis have been submitted to WICS in a separate Excel document. This analysis is primarily of benefit for considering historical averages, as there are no official forecasts of COPI inflation indices. Historical levels of COPI and its sub-indices are shown in the table below:

[44] For note, this figure would be 0.6% pa when using the DIY index of material prices.

Table 17: Further analysis of COPI-based cost inflation

Capex cost element (COPI Approach)	2015-2019 average	2019-2024 average	2015-2024 average
COPI			
All construction	2.27%	4.35%	3.31%
All new works	2.74%	5.03%	3.89%
All new works - infrastructure	**2.30%**	**5.02%**	**3.66%**
All repair and maintenance	1.42%	3.07%	2.25%
CPI	1.60%	4.53%	3.07%
RPE Versus:			
All construction	0.66%	-0.18%	0.24%
All new works	1.12%	0.48%	0.80%
All new works - infrastructure	**0.69%**	**0.47%**	**0.58%**
All repair and maintenance	-0.18%	-1.40%	-0.80%

COPI-based analysis demonstrates that capex cost have also risen significantly higher than CPI inflation over recent periods. In the five years from 2015 – 2019, COPI NWI rose on average by 0.69% more than CPI. Over the 2019 – 2024 period, COPI NWI rose on average by 0.47% more than CPI inflation.

COPI NWI may have the benefit of relative objectivity, but it may also be a poor proxy of the specific cost categories used by water companies. COPI metrics are also subject to regular updating and so would recommend that longer-term averages rather than single year measures are used when considering COPI as a RPE calculation tool. On balance, Scottish Water would recommend that a bottom-up analysis approach is agreed with WICS to ensure that a transparent approach to assessing RPEs is developed for SR27. For the sake of conservatism (in favour of the consumer), we do use a COPI NWI-based 0.5% RPE estimate when considering Scottish Water's anticipated capex efficiency gains over SR21.

6.2 RPE Implementation Options

Scottish Water considers that appropriate objectives when applying an RPE measure should be:

1) to seek to ensure that an efficient company can reasonably expect to have sufficient funds to deliver the outputs required within the Final Determination; and
2) to establish a reasonable basis for identifying the scale of exogenously driven cost growth over the price control period.

Ofwat and other relevant regulators have recently used a combination of mechanisms to help to deal with the effects of RPEs, and that the approach used has often varied between price control periods.

Following feedback from WICS, it is clear that revenue focused adjustments are not appropriate for this regulatory regime. As a result, we focus on the potential application of cost-focused adjustments.

Cost-focused adjustment

Cost-focused adjustments acknowledge ex ante that the costs to deliver the determination may vary in a way that does not match the path of CPI (and thus there may be over or under collection of funds relative to the cost of delivery). This type of approach could be operationalised by:

1) Making projections of RPEs over the period 2027-33 and factoring an appropriately sized allowance into the final determination such that there would be a reasonable expectation that the price control would provide sufficient funds (on average) for the agreed outputs to be delivered; and/or
2) WICS could define the RPE calculation methodologies on an ex-ante basis and assess Scottish Water's performance taking into account the outturn level of RPEs on an annual or whole control period basis.

The cost-focused approach has the benefit of relative simplicity for Scottish Water, the regulator and customers over the price control period, and does not require changes to the charge path to adjust for RPEs during the price control. The key downside of a cost-led approach is that if RPEs are greater than the level of any ex-ante RPE adjustment that has been made, there will be insufficient funds to achieve the outputs suggested in the Final Determination.

Scottish Water Assessment and RPE proposal

It is now established regulatory practice to take account of the category-adjusted cost inflation faced by regulated companies when setting price controls. Scottish Water has collated evidenced that shows historical trends of opex and capex inflation levels outstripping CPI across reasonable measurement timeframes. To minimise the potential negative impact of these differentials, we consider it to be important that RPEs are taken into account within the SRC27 price control process.

Scottish Water also note that RPEs are a new regulatory tool being considered for SR27 and forecasts of inflation are intrinsically uncertain. As described above, forecasting 'full cost' RPE estimates for the SR27 period, we currently consider 0.5% for opex and 0.7% for capex to be reasonable. However, until WICS have had an opportunity to fully consider our analysis and data, we have taken a more conservative approach when applying RPE impacts within the business plan.

We have proposed a 0.2% pa RPE level for both opex and capex, which roughly approximates to the weighted impact of our estimate of approximately 0.5% labour cost premiums in our forecast models, with a weighting of approximately 40% for both opex and capex. The rationale for this approach is described below.

The 0.5% labour cost growth above CPI estimate is based on OBR wages and salaries growth forecasts from March 2025, followed by estimates based on the 10-year average premium of public sector workers to CPI. We have checked this estimate against average public and construction wage growth relative to CPI. These averages are shown in the table below.

Table 18: Estimate against average public and construction wage growth relative to CPI

Cost category	ONS time series	Code	2015-2019 average	2019-2024 average	2015-2024 average
Average over relevant period					
Opex	Public sector wages	KAC7	2.13%	4.43%	3.28%
Capex	Construction sector wages	K5CD	3.65%	4.03%	3.84%
Difference from CPI					
Opex	Public sector wages	FSQ7	0.52%	-0.10%	0.21%
Capex	Construction sector wages	FSQ7	2.05%	-0.50%	0.77%
Average difference from CPI			**1.29%**	**-0.30%**	**0.49%**

Labour cost growth is the cost category where we have the clearest visibility into cost pressures – with limited scope to achieve cost rises that are lower than CPI (i.e., apply real wage reductions to the Scottish Water workforce). This is in contrast to energy, materials and chemical costs that are often subject to international supply and demand dynamics that can lead to material divergence between price movements and the UK CPI level.

There is a risk associated with not including explicit ex ante estimates of chemical, energy and materials RPEs. Looking at the average inflation data in the table below, we can see that while chemical can be volatile in year, over longer periods chemical costs have tended to rise broadly in line with wider CPI inflation. Materials costs (as measured by the DBT index) rose more than CPI over the 2015 – 2019 period but rose significantly more than CPI during the higher inflationary 2019 -2024 period.

Table 19: Average inflation data

Cost Element	Index	2015-2019 average	2019-2024 average	2015-2024 average
Chemicals	FSQ7	1.51%	4.43%	2.97%
Materials	DBT - construction materials	1.99%	6.80%	4.39%
CPI	CPI - D7BT	1.60%	4.53%	3.07%

Over the same periods, energy costs have increased significantly faster than CPI. As suggested in WICS response to the Draft Business Plan, we have used the Department for Energy Security and Net Zero large users price index.

Table 20: Energy Cost Increases

Cost Element	Index	2015-2019 average	2019-2024 average	2015-2024 average
Energy	DESNZ - large users	4.48%	18.82%	11.65%
CPI	CPI - D7BT	1.60%	4.53%	3.07%

We are conscious that the significant rise in energy prices has been significantly influenced by geo-political issues and international price of gas – issues that are extremely hard to predict in advance. We also note that the CMA has provisionally looked to take energy costs into account

within its efficiency modelling.[45] While energy costs have the potential to lead to very significant RPE impacts, we propose that it would be prudent for Scottish Water and WICS to consider whether the CMA's provisional approach is confirmed and would be a better way to incorporate the impact of energy cost inflation within the regulatory regime.

On balance, we believe that a cautious 'labour only' approach is appropriate as we develop the use of RPEs within the regulatory framework in Scotland.

Ex ante RPE estimates are a tool that can help to ensure that the Scottish Water business plan (and ultimately the WICS Final Determination) as accurately as possible assess the outputs and outcomes that can be achieve for a set amount of funding. However, they are estimates and there are no guarantees that the path of inflation of key cost categories will progress as predicted. Cost inflation may ultimately be higher or lower than predicted (and could be higher or lower than CPI). As a result, we also propose that whatever the ex ante approach chosen by WICS, an ex-post 'true up' should be adopted to ensure that actual inflation is captured and uses to assess Scottish Water's performance. This is not a revenue-focused adjustment (as discussed in the Draft Business Plan) and will not lead to additional revenues for Scottish Water (if RPEs are higher than anticipated) but will help to paint a more accurate picture of Scottish Water's performance over the period. For example, higher RPEs may help to define and explain the amount of buying power that was 'lost' to RPEs, and the impact that this would be expected to have had on the delivery of outcomes and/or frontier efficiency improvements. We suggest that this should be applied on a rolling or long-term average basis, to avoid the impact of year-to-year volatility.

While this ex post assessment could be conducted relative to COPI NWI, we propose that a more accurate 'bottom-up' approach should be agreed and implemented. While COPI NWI has the advantages of relative simplicity and objectivity, the costs represented are not well aligned with the costs faced by water companies, and the historical evidence suggests that COPI NWI would under-represent the RPEs faced by water companies.

To summarise, we are currently proposing that:

1) An initial 0.2% pa ex ante RPE estimate is included in the assumptions underpinning the SR27 Final Business Plan – largely reflecting anticipated increases in labour costs in excess of CPI;
2) Further RPE estimates could be included on an ex ante basis within the WICS Final Determination, based on WICS's assessment of our RPE forecasts and analysis and/or their own calculations. The approach to energy cost RPEs may depend on further development to the CMA's approach to base modelling; and
3) A methodology for calculating RPEs should be agreed so that RPEs can be appropriately considered on an ex post basis within WICS's assessment of Scottish Water's outcome and efficiency performance during SR27.

This combined approach means that the SR27 Final Business Plan will reflect approximately £60m of anticipated cost headwinds that Scottish Water may face, whilst leaving an opportunity for the regulator to consider whether further headwinds should be built in upfront or considered when assessing Scottish Water's efficiency performance and delivery of outcomes over the SR27 period.

[45] CMA (2025), PR24 - Provisional Determinations Volume 1, Section 4

7 Efficiency of the SR27 Investment Plan

7.1 Context

This section summarises the approaches and evidence used by Scottish Water to ensure that capital cost estimates used in the SR27 business plan are efficient. Much of the material in this section was discussed with WICS in September at a dedicated workshop on tools, techniques and governance approach used when pricing the SR27 plan.

7.1.1 Tools Used when Costing the SR27 Plan

The Final Business Plan includes capital investment of £8.09bn. The plan includes ~1,800 individual budget lines, underpinned by our costing process and methodologies. These budget lines are validated by our in-house Cost Intelligence team using a variety of methods, depending on need and the maturity of the activity where costs are being estimated. Our tools and approaches include:

Cost Intelligence Team Tools:

Cost curves

The R2309 cost models are based on historical levels of spend (as discussed in Section 4 above in relation to capex efficiency). The R2309 cost models, released in September 2023, cover new work types at unit level and reflect the actual costs that Scottish Water has incurred undertaking investments principally in the last two regulatory periods (SR10 and SR15).

A Cost Model is an algebraic equation derived from historic data and used to estimate the cost of a process component based on a given yardstick. Each Cost Model is an equation representing the best fit regression line obtained from each process component dataset of Yardstick Values and Costs;

We create and use Cost Models to allow Scottish Water to produce Capital Project Estimates for Investment/Business planning using our Benchmark Estimating Software (BES) BES and High-Level Pricing Tool (HLPT). We also use the information in the cost curves to inform our asset stock valuation process (MEAV) that are used in regulatory and financial reporting and various internal planning models.

As a general principle, as the cost models themselves have been assessed and show Scottish Water's outturn costs (in the period covered) to be lower than industry average, the tools that are built on these cost models are deemed to provide cost estimates that are reflective of efficient costs. Below, we discuss the further updates that are made to estimates in the Business Plan to take account of further efficiency improvements made over SR21 and anticipated to be made in SR27.

Related Models

A series of internal models use the information in the cost models as an input:

- The High-Level Pricing Tool (HLPT) makes use of the Cost model suite to evaluate specific project details for projects at an earlier stage of development. This includes the application of delivery vehicle specific Prelims,[46] for instance supervision and administration, contractor's design, management fee and Optimism Bias.

[46] Prelims are all the on-costs associated with delivery of the capital construction covering Delivery Vehicle costs (i.e. supervision and administration, accommodation and storage, design management fee), Scottish Water overheads (i.e. plan, prepare deliver, land, legal costs), risk etc.

- Benchmark Estimating Software (BES) is the corporate costing tool used for detailed estimating of projects at later stages of development. The software houses the current framework rates for both Scottish Waters procured Delivery partners and Scottish Water's procured material providers. BES uses this granular level of detail to provide robust Bills of Quantities for Projects, either as evolutions of the HLPT cost assessment or as new estimates.
- The primary prediction models that use the Cost model outputs are Asset Stewardship Model (ASM), Asset Risk Models (ARM) and Strategic Intervention Model (SIM). These models utilise corporate data to develop statistical models to forecast deterioration and the interventions that will be required as a result of deterioration. The models enable Scottish Water to understand how different factors will influence deterioration and assess the impact policies will have on demand. These analytical model output at an asset level, and typically the forecasts are aggregated to different levels based on need (e.g., management approaches). No additional risk or optimism bias adjustments are made at this stage.

Run Rate Estimates:

Run Rate methodologies are used to assess costs that cannot practically be benchmarked in line with the approaches described above – which generally rely on long-term historical costs adjusted for inflation. This methodology is typically applied on less complex construction methodologies and other business costs such fleet and IT costs.

Given the nature of these costs, which can be more liable to vary with current market conditions, pricing via historical cost curves or other benchmarking approaches is more likely to give an inaccurate representation of the costs that can reasonably be achieved 'today' (even taking general levels of inflation into account).

Where a run-rate methodology is applied, costs are estimated by extrapolating from recent projects or programmes of similar scope and by market-testing through procurement activities.

Informed Judgement:

Costing based on assessment of similar activities and budgeted allocation. This method is typically used for solutions that either have no precedent (new technologies and innovation) or are difficult to quantify (inspections and repairs). This process will often involve drawing on external expertise and consultant support in order to assess efficient costs.

SR27 Business Plan contains a mixture of named high profile projects (e.g. Glenfarg, West Central Bioresources) and budget categories that will rely on bespoke pricing data and external expertise when estimating costs. As SR27 starts, actual projects designs, scopes, needs will evolve and move through Scottish Water's Project Investment Appraisal with a process to ensure we are proving efficiency throughout project lifecycle.

Optimism Bias

Optimism bias is a calculated factor adjustment applied to early-stage estimates in the HLPT, to account for lack of design maturity and scope uncertainty. This evidence-based factor is calculated by comparing cost movement over a range of actual out-turn projects to their early stage estimates priced by Cost Intelligence Estimating teams. It is reviewed regularly and can be tailored based on certain information e.g. delivery vehicle.

The project maturity determines the likely confidence of pricing generated, driven by the certainty of scope and level of detail available. As the project progresses these are refined firming up the LBE (Latest Best Estimate). To account for immature scope at early-stages of the planning

process, Optimism Bias is applied and to allow for the level of detail at the point of estimating request estimate grading classes are applied.

Optimism Bias adjustment looks to redress the identified tendency across the industry to under-cost projects at early stages of the process. The Scottish Water approach is derived from the HM Treasury Green Book approach for appraisal of public spending. Examples of these are detail changes, limited buildability input, lack of insight to site conditions including temporary works, etc.

7.1.2 Building an efficient SR27 Business Plan

Our approach for SR27 is built on the capex efficiency assessment above, which suggest that capex costs are currently below industry average (in aggregate).

The Arrowhead of Cost Certainty shown below demonstrates how confidence ranges narrow as a project matures. Projects are categorised using the Project Grading definition that explains the level of detail to determine an Estimating Class. These are based on the class estimating framework published by the Association for the Advancement of Cost Engineers.

Our approach to costing individual projects adapts to the relative maturity of the scope of the project and the planning process. We assess this maturity according to an ascending series of project lifecycle points know as 'Gates'. The maturity in the level of scope and cost certainty as a project develops is shown graphically below in Figure 5.

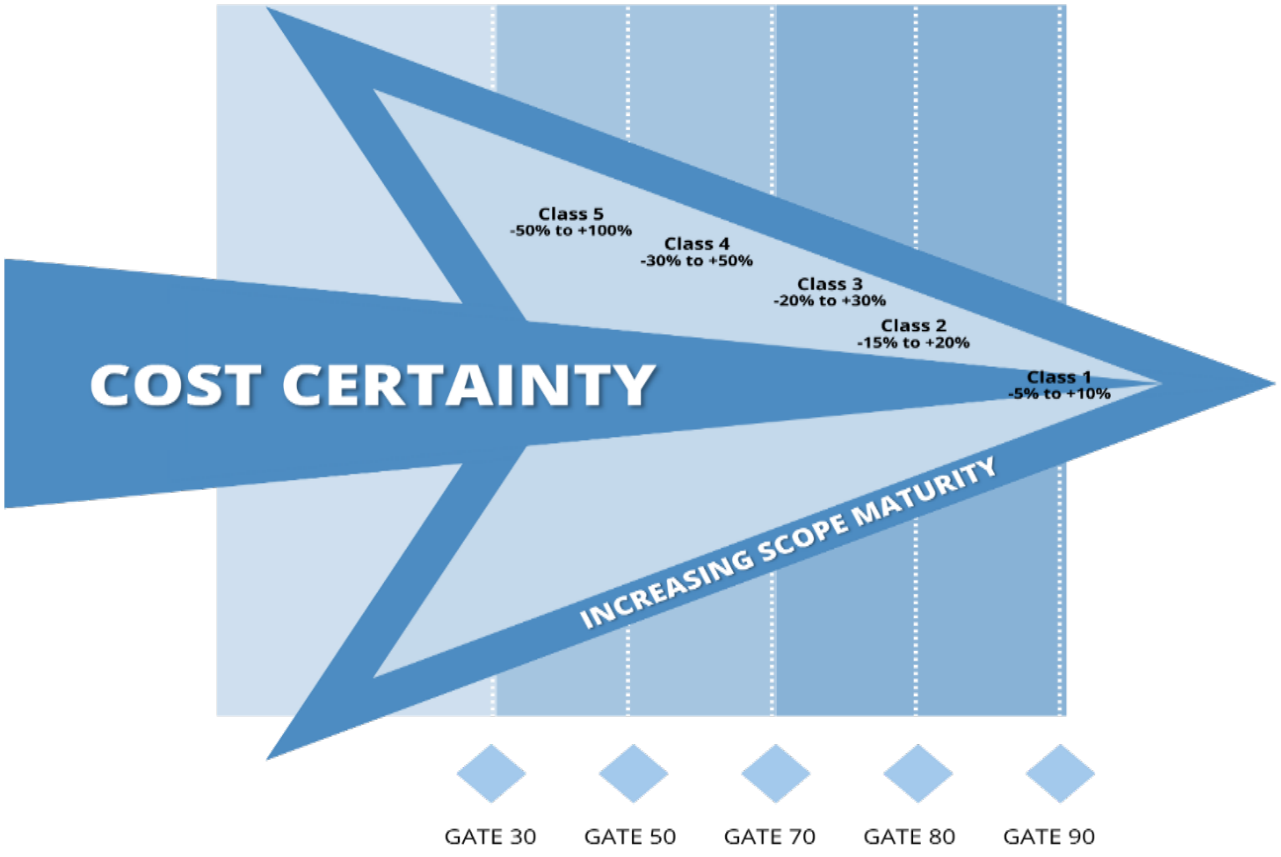

Figure 6: Evolution of Cost certainty as project matures

Source: Scottish Water

Scottish Water Project Lifecycle process

Scottish Water makes use of multiple tools in the costing approach, as well as supplementary information, to form a robust view of the cost of a project at each 'Gate'. As projects progress through the Gates, our information on scope and project specific factors becomes more accurate and precise, and so the tools that we use vary accordingly. Figure 6 lays out the typical life cycle of an investment appraisal and highlights the tools typically used at each stage.

Gate	Gate 30	Gate 40	Gate 50	Gate 70	Gate 80/90	Gate 110
Costing Method	Order of magnitude Indication of potential cost	Range of costs Based on experience and info gathered	High Level Pricing Tool (HLPT) Optimism bias applied Estimating range applied	HLPT BES routines BES Bottom Up Optimism Bias applied Range Applied	BES routines BES bottom up	Compensation events priced and out-turn cost data captured

Figure 7: Scottish Water's Lifecycle Costing Process

Source: Scottish Water analysis

Note: Compensation events are a mechanism to pay contractors extra time and/or money for dealing with unexpected changes for which they are not at risk.

Stage 1 Gate 30: Initiation

Gate 30 is the initiation step where project priority needs are assessed. Cost estimates can be created using a combination of cost models, analytics prediction models and expert input from the Cost Intelligence team. The costs of projects are aligned to the SR27 Business Plan and follow Scottish Water internal Project Investment Appraisal (PIA) processes.

Stage 2 Gate 40: Option Appraisal / Stage 3a Gate 50: Option Confirmation

At Gates 40 and 50 projects are primarily costed using the HLPT, which uses R2309 cost models used for business planning to maintain link between stages.

At this stage, adjustments are made to build in project-specific factors, including:

- graded optimism bias adjustments based on historical cost movement between Gate 40 and Gate 110. This mechanism is reviewed periodically and the adjustment altered to account for the improving dataset;
- site-specific scope requirements identified as well as land purchase and specific third-party cost considerations; and
- Confidence grading based on the level of available information.

Stage 3b Gate 70: Project promotion

As projects develop and the exact scope matures, cost estimates are updated through a combination of:

- updates HLPT cost estimates reflecting increasingly accurate information about the project;
- Bottom-up pricing of inputs, using bills of quantities, delivery vehicles labour, plant, material costs using Scottish Water's BES tool; and
- Optimism bias adjustments, but at lower levels of variance reflecting the increased certainty of the project scope;

Where applicable, we can use external benchmarking or other inputs in order to improve the quality of or cost estimates as project details are confirmed. Project specific risk register costs are also included at this stage.

Stage 4 Gate 80: Commitment Project approval / Gate 90: Commitment Delivery approval.

At Gate 80, projects are more developed and will predominantly use the more detailed and sophisticated BES system to develop a full Bill of Quantities valuation including:

- Market quotes for specialist equipment and materials
- Primary contractor involvement providing a buildability challenge on identified, developing temporary work scope and site-specific information.

Stage 5 Gate 110: Outturn/Financial Close out

This stage of the process captures the agreed scope and final cost of the project. This is priced in BES with final quality assured unit level datapoints added to our existing model dataset to support next the generation of cost models.

7.2 Scottish Water's Approach to Pricing Risk

Scottish Water takes a formulaic approach to pricing risk within investment projects, based on market testing and contractual arrangements with our current supply chain partners. This approach will remain similar under Delivery Vehicle 2 (DV2) but will develop for DV4 as we move to an enterprise model with a more mature and integrated approach to incentivisation and risk sharing.

Currently, Scottish Water takes responsibility for elements such as the high-level scope and base data associated with a project, the validity of initial asset condition surveys, the risk of non-approval by statutory bodies and changes in law, policies and procedures. Scottish Water is also exposed to the costs of changes in WICS, SEPA or Drinking Water Quality Regulator (DWQR) requirements. Our delivery partners take responsibility for elements such as design and construction, ground conditions, contamination, legislative changes relating to employment and health and safety, subcontractor performance and any pricing errors or omissions in delivery partners pricing and design.

Under this approach, both parties take account of and price their respective risks. Scottish Water's approach is to mitigate risks where possible or ensure that these risks are reflected in the cost of work carried out in the earlier stages of a project.

Our approach is to provide our delivery partners with a standard 3% risk allowance to cover the cost of the factors described above, with additional adjustment made to reflect the specific features of each project (if appropriate). For example, we may need to factor in the cost of risks

associated with access restrictions, any specific planning restrictions and any temporary works required to deliver a project.

While risks should be increasingly well understood and accurately priced as we go through the Stage/Gate process described above, some uncertainty is likely to persist late into planning and execution of projects. For example, at Gate 90 we are still likely to face risks in relation to the impact of adverse weather conditions and other operational constraints to the timing of projects. We assess the level of risk to be included at Gate 90 based on historical data. For our larger projects, we can also deploy addition tools and analysis, such as Monte Carlo simulations, to assess and price remaining risks at this Gate.

At Gate 90, each project has fully costed risk register which is used throughout the construction phase of a project to manage and mitigate remaining risks through to Gate 110 (close out). Depending on the size and nature of the project, the combined risk provision at G90 is generally between 5% and 10%, and we understand that these levels are in line with normal industry practices. These remaining risks are then actively tracked and managed through to the completion of the project.

More information on our developing approaches in relation to DV4 are available in the Supply Chain Technical Appendix.

7.3 Capex Efficiency to Market Across all Gates

Scottish Water's Cost Intelligence teams have several tools available to assess and monitor the efficiency and appropriateness of our costs estimates as capital projects move through the project lifecycle.

Scottish Water has a team dedicated to Project Investment Appraisals (PIA's). These investment appraisals help decision makers in the Investment Group[47] to understand the potential effects, trade-offs and overall impacts of options by providing an objective evidence base for decision making across all Gates.

Cost Intelligence supports this PIA process by providing estimates, as outlined above, for each of the Gates and can also provide a Process Change Analysis (PCA) showing both the cost and scope change between the Gates as the project matures.

In addition to this internal governance/sign-off, Cost Intelligence can provide further external support tools to test project efficiency to market as follows:

- comparing costs to an external cost curve library (provided by AECOM)
- utilising external project benchmark support from AECOM
- utilising additional peer-to-peer project benchmarking data (collated and provided by Turner & Townsend)
- utilising expert cost consultant framework support where additional skills or experience would be additive to Scottish Water's internal assessments.

[47] The Investment Group (IG) is an internal governance body accountable for approving the Investment Strategy. It provides assurance that the Total Investment Portfolio is balanced and on course to deliver the Investment Strategy, from both a near and long-term perspective. It is accountable for amending the Investment Strategy to ensure agreed outcomes are achieved for customers.

This offering can be provided for all projects, but is likely to be used for complex, high profile and high value projects.

7.4 Efficiency Adjustments in the SR27 Business Plan

In total, we have made an efficiency adjustment of £427m to convert our pre-efficient cost estimates to the 'post-efficiency' figures presented in the Business Plan and Data Tables (excluding Transformation cost recovery).

As discussed in the capex section above, we continue to apply a net SR21 'run rate' efficiency adjustment of 2.25% (based on 4.5% savings minus 2.25% RPE impact), applied to the pre-efficient investment plan of £8.46bn - amounting to £190m of savings for customers.

To this £190m figure, we add on the impact of a 0.8% pa frontier efficiency challenge during SR27, applied as 2.80% (the average total saving required across the period) of the overall cost of the plan rather than as an increasing annual requirement. Applying this total efficiency benefit to the pre-efficient investment plan of £8.46bn amounts to a further £237m of required savings.

£190m of 'SR21' savings and £237m of SR27 anticipated efficiency improvements leads to an overall adjustment of £427m to our pre-efficient cost estimates. This figure does not include the impact of recovering transformation spend and is not 'netted off' by implied RPE impacts.

Further detail of how this efficiency benefit has been applied to the pricing of individual projects and programmes is available in the commentary to Table 5.

7.5 Continuous Improvement

We are constantly looking to improve confidence and refinement of our cost model offering by increasing the quantity and relevance of quality approved data included. As more up-to-date data becomes available, the models will reflect actual modern equivalent replacement, changes in delivery methods (e.g. slip line/modular construction off-site), customer partnership working, SR21 delivery partnerships, aid understanding extent of transformation initiatives (e.g. getting to site/off site in half the time), impacts of net zero commitments etc and provide the opportunity to retire older data.

Over time, this larger selection of data will enable more meaningful, refined and detailed cost models to be created to support future business-wide requirements.

Scottish Water is also developing and encouraging the development of standard design and Proven Design. This allows us to develop cost model and builds that represent these typical interventions solutions and embrace the innovations of the delivery partners.

Scottish Water has engaged with multiple companies to provide benchmarking data and comparisons in a reciprocal manner. This provides another source of cost evaluation, allowing for a more comprehensive evaluation of cost.

As noted above, Scottish Water has also formed a task force to consider the company and Scotland-specific reasons why specific cost models appear to be higher cost than industry averages.

8 Conclusion

8.1 Summary of Efficiency Position in SR27

In the sections above we detail the efficiency evidence and analysis we have used when considering Scottish Water's efficiency position for SR27.

In relation to opex costs, we consider there to be sufficient evidence that Scottish Water is currently operating efficiently versus key peers (once appropriate adjustments are made to ensure comparability and take account of Scotland-specific factors), and we expect this efficient performance to continue in SR27. Further information on opex costs during the period are detailed in the Finance Technical Appendix.

In relation to capex costs, we have examined a range of historical cost and benchmarking analysis and consider there to be evidence, in the round, that Scottish Water continues to operate efficient direct and indirect capex costs. Scottish Water has also maintained a 2.25% adjustment to capex costs to reflect SR21 'run rate' efficiency gains. As discussed above, the CMA has found minimal net productivity savings at the companies in England and Wales (and broader UK economy) over this period, while RPE impact analysis shows that RPEs over the period could be higher than the efficiencies targeted. Taken together, this 'step' adjustment supports the view that capex costs within the business plan are more efficient than the cumulative historical evidence would suggest.

Taken in the round, we consider there to be sufficient evidence to support the ongoing view that Scottish Water is operating and investing efficiently, and that it would be inappropriate to apply any catch-up efficiency challenge over SR27.

We have considered evidence on the appropriate frontier efficiency challenge for Scottish Water during SR27. Taking account of the latest economic data and the provisional decision of the CMA to impose a 0.7% pa challenge within the PR24 appeal process, we have concluded that current trend data is not supportive of the regulatory precedent of a c1% efficiency challenge. We consider a figure of 0.8% to be ambitious but realistic and appropriate for SR27, noting that this remains above the level suggested by the CMA. We have laid out a range of ways that this efficiency challenge could be applied and believe that a totex or hybrid approach would be most appropriate for SR27.

We have also investigated the presence of RPEs, finding it likely that Scottish Water's (efficient) costs are likely to deviate from broader CPI inflation over the course of SR27. To best enable Scottish Water to deliver the agreed investment programme and to help WICS accurately assess Scottish Water's performance, we propose that RPEs are taken into consideration on both an ex-ante and ex-post basis, and will continue to engage with WICS through the determination process on how this feature can be best integrated into the price control.

Annex A: Supplementary Information on Opex Benchmarking

Introduction

In this annex, we set out how we have assessed Scottish Water's current level of operating expenditure (opex) efficiency to understand its performance relative to other water companies in England and Wales drawing on a range of econometric modelling that Ofwat and/or the CMA used in their assessments of cost efficiency at PR19 and PR24.

We engaged extensively with WICS in order to develop a shared understanding of the dataset and some of the methodological adjustments that would be expected to provide for more reliable results when applying these econometric models to Scottish Water.

The benchmarking analysis in our Draft Plan focused on a backward-looking assessment of the efficiency of Scottish Water's outturn opex levels relative to companies in England and Wales, based on the period 2018/19-2023/24. This kind of backward-looking analysis is commonly used by regulators to assess the case for applying a catch-up efficiency adjustment when cost allowances are being set. Our assessment was based on two main types of analysis (together with some broader cross-checks):

- The application of Ofwat/CMA water and wastewater models with some adjustments to allow for more reliable comparisons with Scottish Water; and,
- Assessing the implications of the nature of the geographic dispersion of the population in Scotland (relative to that in regions served by companies in England and Wales) for the interpretation of model results (i.e. the Highlands and Islands effect).

We welcome the feedback WICS provided on the analysis we included in our Draft Business Plan (and on earlier emerging analysis that we shared in the development of the Draft Plan), and that the findings from WICS's analysis of modelling for the 2018/19 to 2024/25 period were consistent with Scottish Water's opex efficiency being broadly in line with the upper quartile level over that period.[48] The WICS feedback included comments that:

- Scottish Water could seek to develop its own operating expenditure-only efficiency models further.
- Scottish Water should provide further evidence on the impact of geographical dispersion on Scottish Water's costs. If Scottish Water considers that revised operating expenditure-only efficiency models do not appropriately account for Scottish Water's geographic dispersion, it could propose a post-modelling adjustment analogous to a 'special factor' adjustment.

We address these comments when setting out our opex efficiency results and assessments below.

In its feedback, WICS used the modelling referred to above as a basis for forecasting an efficient benchmark for opex levels and identified this as raising questions over whether opex additions that were proposed in our Draft Business Plan in 2025-26 and 2026-27 represent efficient expenditure. We comment below on the use of modelling results to forecast an efficient benchmark level for opex. The underlying drivers of opex additions are considered in detail in the Finance Technical Appendix.

Our Approach

In line with WICS's expectations in its SR27 Methodology, we developed a workplan for assessing the case for an opex catch-up efficiency adjustment which sought to draw upon econometric benchmarking that has been undertaken by Ofwat and/or the CMA when seeking to assess relative efficiency across water companies in England and Wales. This analysis has focused primarily on using the 'base cost' econometric benchmarking models that Ofwat and the CMA

[48] SR27 WICS feedback on Draft Business Plan, paragraph 4.6.27.

applied at PR19, and the equivalent models that Ofwat applied in its recent PR24 Final Determinations. Ofwat defines 'base costs' as comprising opex and capital maintenance, and – as set out further below – our analysis has included consideration of factors that might affect the inferences that it is likely to be reasonable to draw from the results of this modelling when assessing Scottish Water's relative efficiency with respect to opex (including the policy on asset replacement that has applied in Scotland since 2015) .

As a cross-check, as part of our Draft Business Plan analysis, we also considered how Scottish Water's opex levels have evolved relative to companies in England and Wales since 2015. This recognises that in its analysis for the SR15 price review, WICS identified Scottish Water's performance with respect to cost efficiency as broadly on a par with that of the leading companies in England and Wales, following significant improvements during SR10.[1] The catch-up efficiency challenge that had been set at SR10 was informed by the WICS's use of Ofwat's PR04 and PR09 econometric opex benchmarking models. Those models have not been used by Ofwat for around 15 years, and – as above – our primary focus has been on Ofwat's (and the CMA's) more recent modelling. Nevertheless, considering relative movements in opex levels since 2015 provided a way of taking the results of that earlier benchmarking work into account indirectly to some extent, as well as more generally giving a view on how the scale of changes in Scottish Water's opex over the past c10 years compares to that of companies in England and Wales. We found this analysis to broadly support the findings of our econometric benchmarking. We have not considered or sought to develop it further here, as we consider the econometric analysis set out below as likely to provide a more robust overall basis for assessment.

The diagram below summarises the key different steps involved in our modelling work. The first step (A) was to work with WICS to develop an agreed underlying dataset that could be used to generate model results. Where possible we have used available data from Scottish Water's Annual Returns and Regulatory Accounts. For a small number of the metrics required to run Ofwat's models it has been necessary to make a number of assumptions in order to generate usable values. For these metrics we have worked with WICS and agreed practical approaches that have allowed the models to be run, with potential reliability issues then able to be considered when results are being interpreted.

Overview of key modelling steps

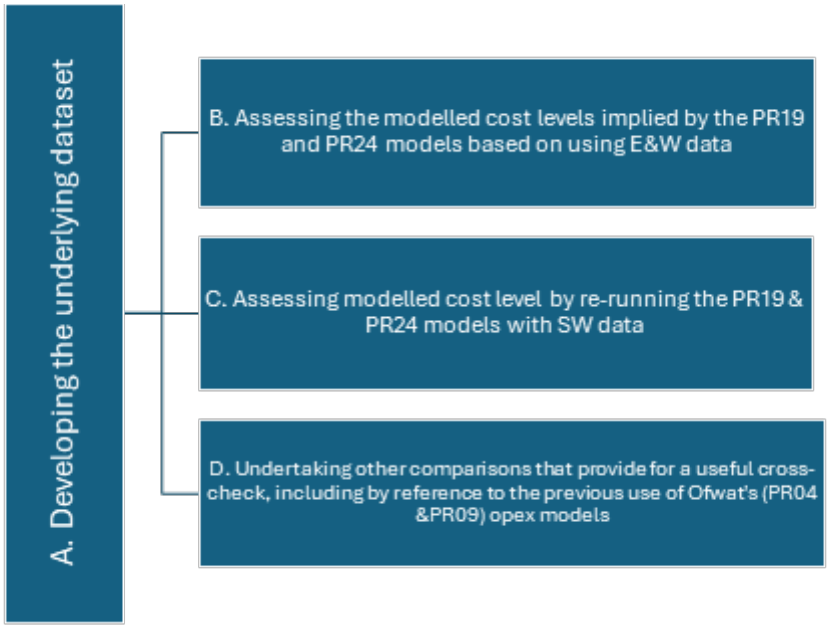

Figure 8: Overview of Key Modelling Steps

We have used the PR19 and PR24 base cost models in two different ways, as reflected in (B) and (C) in the above diagram:

- We started by considering the models as calibrated using England and Wales data and considered what they would imply for the relative efficiency of Scottish Water's costs, given the relevant levels for Scottish Water over the past five years of the different explanatory variables used in those models. This provided a relatively 'hands off' way of using the models.
- We have also re-run (and as a result recalibrated) the models with the relevant Scottish Water cost and explanatory variable values added to the dataset, and (as set out further below) with some different variants considered. This provided a flexible way of identifying how sensitive the modelling results were to the inclusion of Scottish Water data and to some relevant adjustments.

While there are a wide range of possible modelling approaches that could be adopted, we note that Ofwat's framework has been developed following considerable consultation and has been subject to review by the CMA (including in relation to matters such as the most appropriate functional form to adopt when modelling). While that framework was developed by reference to circumstances in England and Wales, we have considered it likely to be more productive and informative to focus our attention on seeking to identify and appropriately test and interpret the results implied by these existing models than to seek to develop a wide range of alternatives (beyond the matters that we have considered below).

In our workplan for opex efficiency, we identified six cross-cutting issues as meriting careful consideration in the modelling process and/or when model results were being interpreted and assessed:

- **Capital maintenance levels**: given the policy on asset replacement that has been applied in Scotland since SR15.
- **The implications of PFI contracts**: as a significant portion of waste water services in Scotland are, and have been, provided by third parties under long-term PFI contracts.

- **Impacts of geographic dispersion**: testing the extent to which the models can be expected to take account of nature of the geographic dispersion of the population in Scotland and impacts this can have on the efficient costs of service provision.
- **Cost allocation issues**: and how they might impact on the weight that should be put on different model results.
- **Special factors**: whether there are other factors that might justify specific (positive or negative) adjustments being made to, or when assessing, model results.
- **Model reliability considerations**: how the likely reliability of different model results should affect interpretations with respect to relative efficiency.

We show how we have taken these issues into account (where relevant) in our assessment of water and waste water cost efficiency below.

For our Draft Business Plan assessment, we found it appropriate to treat our overall catch-up efficiency assessment as having two steps:

1. Assessing whether or not the range of evidence considered supports the view that it would be appropriate to apply a catch-up efficiency adjustment when setting Scottish Water's opex allowances for SR27.
2. If a catch-up efficiency adjustment is identified as appropriate in relation to water or waste water opex, assessing what the scale of that adjustment should be.

These steps were separated to try to avoid the risk of applying an unduly mechanistic approach in a context where there are a range of different factors and sources of evidence that are relevant to consider. This is particularly so in relation to waste water services, where – as described further below – the significant role that has been played by PFI providers over time raises some material comparability challenges. While, through engagement with WICS, we have sought to identify practical and reasonable ways of taking these issues into account in our quantitative assessments, we nevertheless consider this to be relevant context when seeking to interpret the results of those assessments, and related sources of information.

Our overall assessment is that the evidence set out below does not support the view that it would be appropriate to apply a catch-up efficiency adjustment when setting Scottish Water's (water or waste water) opex allowances for SR27. In line with WICS feedback on the analysis in our Draft plan, we have now also provided a quantified assessment of this.

Our Assessment of Water Costs

After providing an overview of Ofwat's wholesale water models below, we describe how we have used them, the main results we have found, and some supporting analysis we have found helpful when seeking to interpret and cross check those results. We then set out our overall assessment with respect to catch-up efficiency.

Ofwat's Wholesale Water Base Cost Models

We focused our attention on Ofwat's wholesale water base cost models, with this allowing for the benchmarking of a high proportion of relevant water service costs while avoiding significant comparability issues that would be expected to arise in the consideration of retail services (including because of the extent of differences in billing and metering arrangements).

Ofwat's wholesale water models seek to explain differences in relevant costs between companies by reference to the following four underlying factors, which have been identified as providing a reasonable reflection of relevant engineering and economic drivers:

- **Scale**: costs would be expected to increase with scale

- **Density**: more densely populated areas can provide scope for lower unit costs and the more efficient utilisation of resources (e.g. with reduced travel times and duplication of depots and spare parts). However, companies in highly dense areas can also face a more complex operating environment and factors that can tend to increase costs (e.g. higher property and labour costs and congestion).[2]
- **Treatment complexity**: water treatment costs will be affected by the types of treatment that are required.
- **Topography**: this can have a material impact on pumping requirements.

At PR19, Ofwat (and then the CMA) used five wholesale water models which sought to take account of the above cost drivers. Two of those models sought to directly assess wholesale water costs (and differed because they used a different metric to seek to take account of treatment complexity). The other three models assessed costs on a more disaggregated basis: two assessed what Ofwat refers to as Water Resources Plus, which includes water resources and treatment costs (and as with the wholesale water models, they differed in the metric they included for treatment complexity). The other model assessed the costs of treated water distribution. The metrics included in these PR19 models are summarised in the table below.

Table 21: Explanatory variables included in PR19 base cost models: wholesale water

	WRP1	WRP2	TWD1	WW1	WW2
Ln (number of properties) [Scale]	X	X		X	X
Ln (length of mains) [Scale]			X		
Ln (weighted average density)	X	X	X	X	X
Ln (weighted average density)^2	X	X	X	X	X
% of water treated at complexity levels 3-6	X			X	
Ln (weighted average treatment complexity)		X			X
Ln (number of booster pumping stations per length of main) [Topography]			X	X	X

Source: information from: FM_WW2_FD.xlsx

For PR24 wholesale water modelling, Ofwat used the same basic approach as at PR19 but sought to identify whether there were other explanatory variables that were likely to help better capture the underlying engineering and economic drivers of cost it had identified (i.e. scale, density, treatment complexity, topography). Ofwat's PR24 models include different metrics in relation to two of those underlying drivers: density and topography.

Ofwat's PR19 models used a density metric which calculated the weighted average density across the different Local Authority Districts (LADs) – or proportions of them (where a LAD crossed company boundaries) – that had been identified as falling within each company's service provision area. Having identified some accuracy concerns over its PR19 LAD-based weighted average density metric, one of the explanatory variables Ofwat decided to use for PR24 was a LAD-based weighted average density metric that was determined using more granular underlying

density data, categorised by what are referred to as Middle Super Output Areas (MSOAs). In practice, this means that Ofwat can be viewed as having included its five PR19 wholesale water models within its set of PR24 models (albeit with a more refined basis for calculating LAD-based weighted average density figures). Given this, we focused our attention only on the PR24 models and treated this as effectively encompassing the consideration of Ofwat's PR19 models.

Ofwat's set of PR24 models also included the following alternative density measures:

- An MSOA-based weighted average density measure (that is, rather than using MSOA data to generate a LAD-based measure, that data was used to directly calculate weighted average density figures).
- The number of properties per length of mains: Ofwat noted that this is an intuitive measure that does not rely on ONS data, but also that is less exogenous than (than its other density metrics) and may not capture density differences between companies as well.[3]

As was shown above, Ofwat's PR19 modelling sought to reflect relevant differences in topography between companies by including the number of booster pumping stations per length of main as an explanatory variable. Ofwat's set of PR24 models included this metric, but also (as an alternative in some models) included Average Pumping Head for Treated Water Distribution.

Including the above variants (and in different combinations) across the different levels of aggregation used in Ofwat's modelling (that is, as above, Water Resources Plus, Treated Water Distribution and Wholesale Water), resulted in the increase from the 5 wholesale water models used at PR19 to the 24 models used at PR24.

Identifying Relevant Data for Scottish Water

In order to apply the models, it was necessary to identify data for Scottish Water in relation to:

- Relevant costs; and,
- Each of the explanatory variables used in Ofwat's models.

We engaged with WICS to develop an agreed set of data in relation to the above that could be used when running the Ofwat models.

With respect to relevant costs:

- In line with Ofwat's approach, we excluded a small number of cost lines from the measure of base costs to be used for modelling (most notably, local authority rates).
- Ofwat includes a small number of enhancement cost lines in its analysis such that it refers to its modelling as 'base plus' (i.e. to reflect that some costs are included in addition to base costs). We engaged with WICS to agree a practical means of seeking to reflect this (in particular in relation to growth).
- Ahead of 2021-22, Scottish Water's Regulatory Accounts (Table M18) did not report costs in way that showed outturn capital maintenance levels for Wholesale Water (or indeed, Water Resources or Distribution). Information on outturn levels of capital maintenance had been reported in Table G1 of the Annual Return, but that information does not provide a breakdown of Water Service capital maintenance between Water Resources and Distribution, and significant portion (around 10-20% between 2011-12 and 2020-21) of capital maintenance is attributed to 'Management and General' and not allocated between water and waste water. We engaged with WICS to agree reasonable allocation assumptions that would allow relevant cost figures to be identified for Water Resources Plus, Distribution, and Wholesale Water for each of the years included in Ofwat's analysis.

With respect to the explanatory variables used in Ofwat's models:

- Other than for Ofwat's weighted average density metrics, all of the inputs we used when applying or re-running Ofwat's wholesale water models were calculated on the basis of Scottish Water's Annual Return information. For the number of booster pumping stations, it was necessary to interpolate between published information in 2010-11 and 2015-16, but otherwise all relevant data was drawn directly from published Annual Returns.
- We engaged with WICS to agree an approach that followed Ofwat's generation of MSOA-based weighted average density figures, but used Intermediate Zone data for Scotland, and allowed for what look to be reasonable equivalents to Ofwat's LAD-based and MSOA-based weighted average density metrics to be generated.

We viewed the cost allocation issues highlighted above – that is, the need to use some relatively crude assumptions to identify separate capital maintenance figures for Water Resources Plus and Distribution ahead of 2021-22 – as providing support for the view (explained further below) that we should focus our attention on what Ofwat's models might imply for wholesale water costs overall (rather than seeking to draw inferences from the results of Ofwat's disaggregated models when viewed in isolation). While we consider wholesale water and waste water costs separately below, we also note that – given the need for an allocation assumption to generate separate water and waste water base cost figures ahead of 2021-22 – it is likely to be appropriate to consider the implied efficiency position across water and waste water together as a cross-check on the potential implications of this.

There are two cost allocation issues (over and above points noted above) that we identified as having a potentially material bearing on the comparisons described above:

- Allocations of capex between capital maintenance and enhancement
- Scottish Water's attribution of repair and renewals spend over time.

We note that the Regulatory Accounting Guidelines in England and Wales appear to have been interpreted in a way that could result in some expenditure that would be classified as asset replacement expenditure by Scottish Water (and therefore treated as capital maintenance in our assessment) being classified as 'enhancement' by companies in England and Wales. For example, in its PR19 submissions, Yorkshire Water described its interpretation of enhancement expenditure for AMP7 (i.e. the forthcoming regulatory period) as being: *AMP7 efficient expenditure if enhancement activities are undertaken less AMP7 efficient expenditure if enhancement activities are not undertaken*.[4]

However, this would imply that asset replacement (which may be needed to support the delivery of an enhancement, but which does not itself directly provide for that enhancement) would be classified as enhancement unless the company would have expected to have undertaken it in the absence of the enhancement: so asset replacement spend that was brought forward as a result of undertaking enhancement projects would – on this interpretation – be classified as 'enhancement'. This could differ from the Scottish Water approach, which begins by assessing asset replacement spend, and only identifies capital expenditure as enhancement where it results in the provision of something additional.

We have not been able identify the extent to which this interpretation is applied in England and Wales and might impact on how capex is classified. We note, though, that where applied it would tend to distort the comparison between Scottish Water and companies in England and Wales by resulting in the relative scale of Scottish Water's recorded base costs being overstated to some extent. We note that our opex only modelling runs (described below) provide a way of testing the

extent to which this might affect the identified results (although separately identifying and comparatively assessing opex levels inevitably raises other allocation questions in a context where a totex framework has been applied in England and Wales over the last 10 years).

Scottish Water refined its approach to identifying and attributing repairs and renewals spend in SR21, and we consider this to have provided a more accurate basis for identifying opex levels from 2021-22 onwards. However, that means that there is a degree of difference between the way in which Scottish Water's opex figures have been prepared pre- and post-2021-22. The effect of this change was to reduce Scottish Water's reported opex to a limited extent, and in line with that, we consider that the opex figures ahead of 2021-22 are likely to be overstated to a limited degree.

We have not explicitly taken this into account in our econometric modelling (although recognise this alongside other potential sources of 'noise' when interpreting results). However, because Scottish Water continues to report what its level of opex would be on an SR15 basis (i.e. the basis that applied before the refinement), then this allows the scale of the difference to be identified and taken into account in 2021-22 through to 2023-24. Given this, and in order to try to provide for consistency over time, we take this issue into account when comparing relative movements in opex over time against companies in England and Wales (as not to do so would tend to dampen the Scottish Water increase to some extent). As highlighted below, we do this by assessing Scottish Water's relevant opex over time consistent with the SR15 basis of preparation.

Our Approach to using the PR24 Wholesale Water Model Results

Each of Ofwat's models allows a modelled level of cost to be generated for each company for each year in which relevant data is available, and for this to be compared to the company's outturn level for that year. This relationship can be described by what Ofwat refers to as an 'efficiency score', calculated as outturn cost divided by modelled cost: a value of 1 would arise if the level of outturn costs was equal to that predicted by the model; a value of less/more than 1 would arise if outturn costs were lower/higher than that predicted by the model.

Ofwat used the results of its 24 PR24 models to generate what it refers to as a 'triangulated' view of the efficiency score for wholesale water for each company. This involves using the different models (taking account of their scope and similarities/differences) to generate an overall weighted average efficiency score across the whole set of models. Ofwat then assessed the need for a catch-up efficiency challenge by reference to the distribution of these triangulated efficiency scores across companies over the most recent 5 year period for which data is available (i.e. 2019-20 2023-24). In particular, it identified the upper quartile (UQ) level of efficiency score (the level which 25 per cent of companies had a lower score than) and used this as its benchmark. That is, company efficiency scores were compared to the Upper Quartile level.

We have adopted the same general approach below when presenting modelling results of focusing on the 'triangulated' view across the set of Ofwat's 24 wholesale water models. The use of this averaged view recognises that specific models may tend to under- or over-recognise relevant factors, and combining results across a range of models which adopt different approaches can help generate more balanced results overall, and lessen the risk that identified differences in efficiency scores between companies result from limitations in the modelling process as opposed to differences in underlying efficiency.

In line with this, when presenting results below, we show how Scottish Water's implied efficiency scores compare to the Upper Quartile and to the median level (the level of efficiency score that

half of companies have a higher and half a lower value than). As we noted in our workplan for opex efficiency, it is well recognised (including by Ofwat, the CMA and other regulators such as Ofgem) that the stringency of the benchmark that it is appropriate to use when assessing the scope for catch-up efficiency will depend on the likely reliability of the modelling results, such that the use of a Upper Quartile benchmark would typically imply a relatively high degree of confidence that identified differences between modelled and outturn cost levels relate to efficiency rather than, for example, to limitations of the modelling related to the omission of a relevant variable. We discuss the relevance of this to the interpretation of different model results in our overall assessment below.

Our modelling results ahead of any adjustments: wholesale water

The table below summarises our initial base cost modelling results for Scottish Water using the two approaches that were described above: identifying the levels of modelled cost implied for Scottish Water based on Ofwat's coefficients; re-running and re-calibrating the models after adding Scottish Water cost and explanatory variable information to the dataset. The efficiency scores (and comparisons) shown follow Ofwat's FD approach of determining and using (for the purpose of identifying the relative rankings of companies) average efficiency scores over the 5-year period 2019-20 to 2023-24 (and the same approach is used in all subsequent tables showing efficiency scores). As can be seen in the table, under both approaches, this initial assessment implies that Scottish Water's relevant costs are materially higher than the Upper Quartile or median benchmark.

Table 22: Summary of base cost modelling results for wholesale water ahead of any adjustments

	Using Ofwat's coefficients (E&W data only)	Re-running the models to include SW data
Scottish Water's Efficiency score	1.31	1.25
• Relative to the median level	1.23	1.17
• Relative to the UQ level	1.32	1.27

Source: Scottish Water analysis

Notes: All scores here and in subsequent tables calculated on the basis of the most recent 5 years in line with Ofwat's approach.

This starting point (which implied that Scottish Water's costs may be around 30% than the upper quartile performance in England and Wales) is unsurprising given the focus that there has been on asset replacement in Scotland since SR15. In particular, we note that a consensus emerged during the SR21 review process over the need for higher levels of asset replacement expenditure, and Scottish Water's levels of capital maintenance have increased since then in line with that intended policy change.

This means that one would expect Scottish Water to have had relatively higher levels of capital maintenance (which, as noted above, is included in Ofwat's measure of base costs) in recent years for deliberate policy reasons. WICS explicitly recognised this issue in its SR27 Methodology, and in our workplan we set out three different ways in which we planned to take it into account:

- Considering what post-modelling adjustments might be appropriate when the base costs results implied for Scottish Water when using Ofwat's coefficients are being assessed, in order to reflect the different policy approach to asset replacement in Scotland.

- Re-running Ofwat's models but making a pre-modelling adjustment to Scottish Water's base cost data that aims to neutralise the effect of capital maintenance on Scottish Water's efficiency score. In particular, re-running the models after replacing Scottish Water's outturn capital maintenance spend with the median and the lower quartile level across England and Wales companies.
- Re-running Ofwat's models but using only opex levels as the relevant measure of costs (and therefore stripping capital maintenance spend out for all companies).
- These approaches – and their impact on identified efficiency scores – are considered in turn below.

Post-modelling adjustments to take account of asset replacement policy in Scotland

A comparison of the scale of asset replacement activity between Scottish Water and companies in England and Wales would ideally be based on relevant activity levels, such that the extent of relevant asset replacement could be compared directly. In practice, however, the scope for undertaking this kind of direct comparison in a reliable and informative way is currently very limited. While there is comparative data available on mains renewal rates (and we note that Ofwat made use of this data in its FD cost adjustment claim process), as discussed further below, this does not provide a reliable basis for seeking to calibrate the overall wholesale water impact of Scottish Water's asset replacement activity, which has affected a much broader range of assets. In the absence of practical and effective activity-based options for comparing asset replacement activity, we have focused our attention on comparisons between capital maintenance spend levels.

The graph below compares Scottish Water's capital maintenance levels since 2011-12 with the median level for water companies in England and Wales. The comparison is presented on £/connected property basis to take account of relevant scale differences, with the number of connected properties having been the primary scale driver Ofwat has used in its wholesale water base cost modelling. The relationship with the median level is relevant to consider as this would be expected to have impacted on the level of capital maintenance that will have been treated, implicitly, as efficient within Ofwat's calibration of modelled costs.

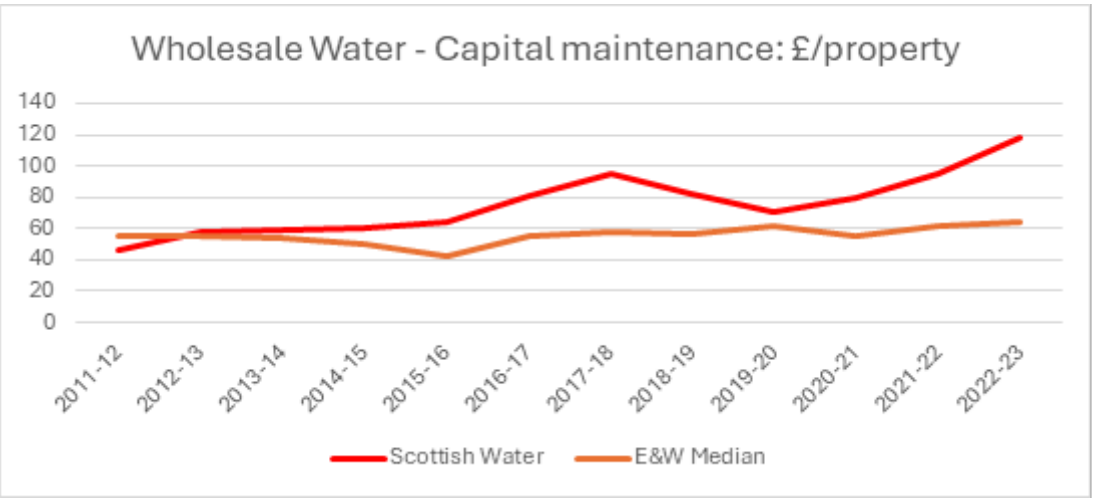

Figure 9: Scottish Water analysis based on Scottish Water Annual Returns and Ofwat's PR24 wholesale water modelling dataset

In line with that, identifying the difference between Scottish Water's levels of capital maintenance per property and the median levels in England and Wales provides a basis for making a post-modelling adjustment to seek to control for the impact of Scottish Water's asset replacement

policy on implied efficiency scores (some potential alternative approaches to making this adjustment are considered below). The left-hand column in the table below shows (as in the table above) the unadjusted view of Scottish Water's implied efficiency score based on Ofwat's PR24 wholesale water models, using Ofwat's coefficients. The next column then shows how that efficiency scores change when Scottish Water's capital maintenance levels are assumed to be consistent with the median level of capital maintenance per property observed in England and Wales.

Table 23: Impact of post-modelling adjustments on results using the PR24 wholesale water models (£/property basis)

	PR24 models triangulated – Ofwat coefficients	With Scottish Water capital maintenance set in line with E&W:	
		Median £/property	Lower Quartile £/property
Scottish Water Efficiency Score	1.31	1.03	0.95
• Relative to median level	1.23	0.99	0.91
• Relative to the UQ level	1.32	1.04	0.97

Source: Scottish Water analysis

This adjustment was made by removing Scottish Water's actual capital maintenance spend from its total level of base plus costs for each year, and adding back an amount[6] calculated as follows:

- For each company in England and Wales (using Ofwat's PR24 FD cost assessment dataset),[7] the level of capital maintenance per property was identified for each relevant year.[8]
- The median level of capital maintenance per property in England and Wales each year was multiplied by the number of connected properties that Scottish Water served in that year in order to generate a form of 'normalised' value for Scottish Water.

The table above provides an indication of the extent to which adjusting for capital maintenance differences – in light of the different asset replacement policy that has applied in Scotland – can have a major bearing on Scottish Water's efficiency score and on its implied relative efficiency. That is, Scottish Water changes from appearing to have costs that are 23% higher than the median to costs that are just below the median, and that are only 4% (as opposed to 32%) above the upper quartile.

In practice, though, consideration of differences in capital maintenance levels between companies also has relevance for the question of whether Upper Quartile is likely to provide an appropriate benchmark, or whether the median would be more appropriate in this context. The graph below highlights the extent to which lower efficiency scores can be associated with companies that have relatively low levels of capital maintenance per property. It is notable that four of the five companies that were identified as most efficient in Ofwat's PR24 Wholesale Water base plus cost analysis (with efficiency scores below the Upper Quartile level) had levels of capital maintenance

per property that were in the lower quartile for England and Wales. Given this, there looks to be a material risk that the upper quartile benchmark would not provide a reasonable reflection of efficient costs that included undertaking levels of capital maintenance consistent with the median level per property that has been observed in England and Wales in recent years.

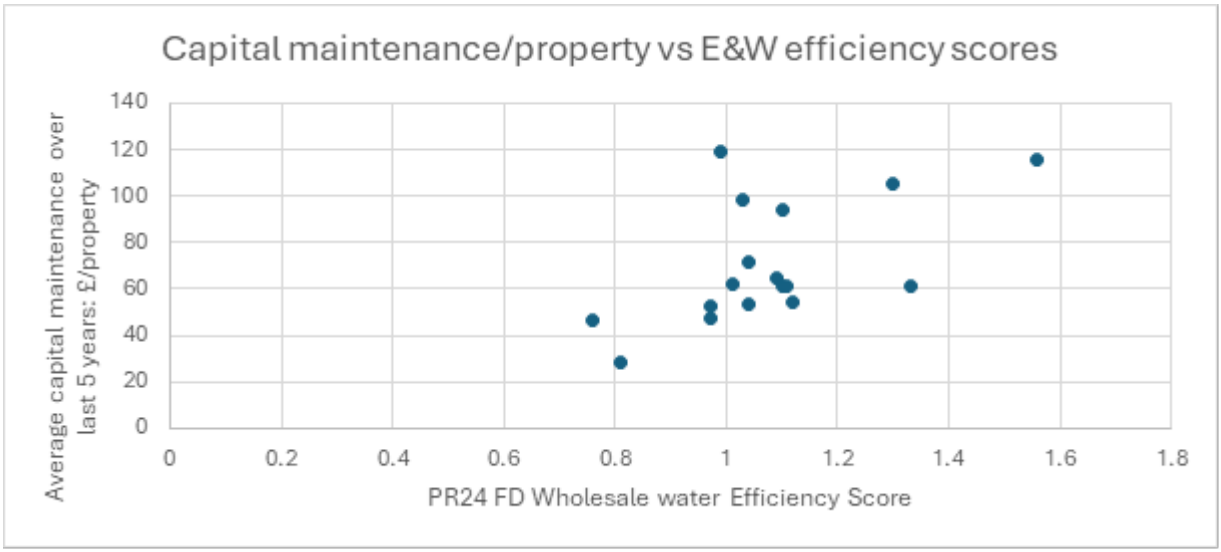

Figure 10: Scottish Water analysis - Capital maintenance/property vs England and Wales efficiency scores

The relevance of that for assessments in England and Wales would depend on how one interprets the implications of observed capital maintenance levels when assessing forward-looking allowances, in a context where there has been, and will continue to be, considerable scope for there to be differences between the levels of base cost funding that companies can recover in a given regulatory period, and the actual levels of costs that they incur in that period. That is, companies (in England and Wales) may benefit as a result of underspending their allowances in some years but may then have to fund shortfalls in others. It is notable, for example, that while Southern Water's level of capital maintenance per property has been well above the England and Wales median level in recent years (and indeed has exceeded the level spent by Scottish Water over the past 5 years), Ofwat has explicitly noted that Southern Water's associated totex overspend can be explained by the costs it has incurred delivering its turnaround programme. The scope for this kind of highly material under- or over-spend does not arise under the framework within which Scottish Water operates given its public ownership and the limited extent of its equity buffer.

Given this, as well as considering the effects of an adjustment based on the median level of capital maintenance per property in England and Wales, we have considered how the implied efficiency scores would be affected by an adjustment to bring Scottish Water assumed capital maintenance spend per property in line with the Lower Quartile (LQ) level observed in England and Wales each year. We have viewed this as an alternative way of taking account of the risk – highlighted above – that upper quartile efficiency scores may be materially affected by the performance of companies with relatively low levels of capital maintenance spend. As noted above, one way of taking account of that risk would be to put more weight on the median (rather than the Upper Quartile) efficiency score when comparing performance. The alternative of adjusting Scottish Water's capital maintenance levels to reflect Lower Quartile levels in England and Wales provides a way of recognising this risk while continuing to focus attention on the Upper Quartile efficiency score benchmark. As was shown in the right hand column of the above table, on this basis (i.e. with a Lower Quartile capital maintenance per property based adjustment to capital maintenance), Scottish Water's efficiency score is below the Upper Quartile level (even before the geographic dispersions issues described below are taken into account).

In its feedback on this analysis, WICS has raised questions over the whether some of the different combinations of capital maintenance per property and efficiency scores for companies in England and Wales (that can see in the scatter graph shown above) may affect the appropriateness of seeking to 'normalise' Scottish Water's capital maintenance levels in the ways described above, and whether it may be appropriate to consider other adjustment methods. We have considered this matter further but have not identified ways of taking differences in levels of capital maintenance activity into account in a more effective manner (beyond the analysis set out below). While median and lower quartile-based capital maintenance adjustments inevitably provide an imperfect and approximate basis for assessment, we continue to view them as a means of allowing informative comparisons. In line with that, we present the results we identified when adopting these approaches below. At the same time, in recognition of the WICS feedback of this point, in our overall assessment we focus primarily on the results set out below of our opex-only modelling (which excludes capital maintenance spend and therefore avoids the need to adjust for relevant differences in relation to it)

The Impact of Alternative Options when Making a Capital Maintenance Adjustment

Given the scale of the capital maintenance adjustments made under the median and Lower Quartile approaches described above (which result in reductions to Scottish Water's assumed base plus costs of 20-30%) we considered whether there might other approaches that could be viewed as more appropriate. We viewed this as important to consider given the extent to which differences in approach might affect identified efficiency scores.

We began by considering capital maintenance levels per connected property (as above) because it looked to provide a reasonable way of taking account of differences in scale between companies. Underpinning this was the fact that Ofwat used 'number of connected properties' as the primary scale variable in most of its PR24 wholesale waste water models. That is, this approach can be understood as broadly aligning with the basis upon which Ofwat took account of differences in scale between companies in its modelling.

However, feedback during the peer review process raised questions over whether there might be ways of better reflecting the relationship between relevant costs and scale that were being captured in Ofwat's models, and in line with this we considered some potential alternatives. It is notable that in 6 of its 24 wholesale water models – the treated water distribution models – Ofwat used a different scale variable: length of mains. This raises the question of how the use of this variable might affect the capital maintenance adjustment described above. The table below shows the impact on the assumed level of capital maintenance of adjusting the Treated Water Distribution value by reference to the England and Wales median spend per length of mains rather than per property. The per property approach is retained for the Water Resources Plus (i.e. resources and treatment) adjustment because that is the scale driver used in all of Ofwat's Water Resources Plus models.

Table 24: Capital maintenance levels implied by different adjustment assumptions

	Scottish Water Capital Maintenance £m (average 2019-20 to 2023-24)	Difference from Outturn
Outturn - Wholesale Water	£274m	
Top-down view		
Based on E&W median per property – Wholesale Water	£173m	£100m
Bottom-up view		
Based on E&W median per property – Water Resources Plus	£64m	
E&W median per length of mains – Treated Water Distribution	£149m	
Bottom-up view – Wholesale Water	£213m	£60m
Triangulated view		
Average of top-down and bottom-up view (in line with Ofwat model weightings)	£193m	£80m

Source: Scottish Water analysis based on Scottish Water Annual Returns and Ofwat's PR24 wholesale water modelling dataset from: PR24-FD-CA03-Base-costs-water-model-1.xlsx

We note that the bottom-up view results in a significantly higher assumed level of capital maintenance for Scottish Water (£20m per year on average). This arises because of the weight that is put on the length of mains based treated water distribution figure, and the fact that – on average over the past five years – the median spend per length of mains has actually been higher in England and Wales than it has in Scotland. Thus, while Scottish Water's level of capital maintenance has been increasing in SR21, setting its capital maintenance in line with the England and Wales median per length of mains over the past five years actually results in assuming that Scottish Water's Treated Water Distribution capital maintenance is higher than the outturn level. In part, this is likely to stem from the more reactive approach (with responses triggered by information on identified problems) that has typically been taken to managing the condition of underground assets in recent years, with this meaning that changes to Scottish Water's asset replacement policy have impacted mains replacement levels more gradually than is the case for a range of other types of asset. This underpins why (as noted above) comparative information on mains renewals rates, while available, does not provide a good reflection of how Scottish Water's asset replacement policy has impacted on its overall levels of capital maintenance activity. Further information on Scottish Water's approach in this area can be found in the Investment Planning and Water Continuity Technical Appendices.

In practice, though, the bottom-up view puts much more weight on length of mains than Ofwat does in its triangulated wholesale water modelled cost figures. That is, costs are effectively treated as driven by the number of connected properties to a much greater extent than would be implied by looking at the bottom-up view alone, because connected properties is the scale variable that Ofwat uses in all 12 of its 'top down' wholesale water models (as well as the 6 Water Resources Plus models). The 'triangulated view' shown in the table calculates the assumed capital maintenance level in a way that can be understood as mirroring the weightings Ofwat used when

generating triangulated efficiency scores for wholesale water. That is, Ofwat put 50% weight on its (top-down) wholesale water models, which used the number of connected properties as the scale driver, and 50% weight on the sum of the outputs from its Water Resources Plus models (which also used the number of connected properties as the scale driver) and from its Treated Water Distribution models (which used length of mains as a scale driver).

In line with comments from the peer review process, we also considered whether Ofwat's use of natural logs in its modelling (such that it was modelling log-linear rather than linear relationships) might affect the most appropriate way to seek to capture relevant capital maintenance differences. We found there to be significant reliability concerns over the use of approaches that sought to use natural log values for the purpose of making this capital maintenance adjustment (and note that the approaches we considered would have implied that a much larger downward adjustment to Scottish Water's capital maintenance figures would be appropriate).

Overall, we identified the triangulated view (described above) as the approach that was likely to be best aligned with the cost-scale relationships being captured in Ofwat's models, and we use that approach (where relevant) in all of our assessments below. This was consisted with the feedback we received through the peer review process. The table below shows Scottish Water's efficiency scores under the post-modelling adjustment approach (i.e. based on Ofwat's PR24 coefficients). Our results under the pre-modelling adjustment approach (which incorporates Scottish Water data and re-runs the Ofwat models) are shown in the next section.

Table 25: Implications of applying a triangulated capital maintenance adjustment on efficiency score based on post-modelling adjustment approach

	PR24 models triangulated – Ofwat coefficients	**Triangulated adjustment with Scottish Water capital maintenance set in line with E&W**	
		Median £/unit	Lower Quartile £/unit
Scottish Water Efficiency Score	1.31	1.09	0.98
• Relative to median level	1.23	1.02	0.97
• Relative to the UQ level	1.32	1.10	1.00

Source: Scottish Water analysis

As can be seen in the table, applying a median-based adjustment on the triangulated basis implies that Scottish Water's costs are 2% and 10% higher than the median and Upper Quartile benchmarks respectively (ahead of the consideration of Highlands and Islands impacts). When a lower quartile-based adjustment is made to capital maintenance, Scottish Water's efficiency score implies upper quartile performance. In line with our comments above – on the relationship between capital maintenance levels and efficiency scores in the England and Wales modelling – when comparing base cost levels, we consider that the most reliable view (ahead of the consideration of Highlands and Islands impacts) is likely to be provided by:

- Comparing Scottish Water's efficiency score, after adjusting capital maintenance to align with the lower quartile level in England and Wales (using the triangulated approach), to an Upper Quartile benchmark: the results above show Scottish Water's costs to be in line with the Upper Quartile benchmark; and,

- Comparing Scottish Water's efficiency score, after adjusting capital maintenance to align with the median level in England and Wales (using the triangulated approach), to a median benchmark: the results above show Scottish Water's costs to be 2% above that base costs benchmark, which implies an average annual difference of around £9m/year. That is equivalent to an opex efficiency 'gap' of around a 5% (note that this is higher than the c2% base costs 'gap' shown in the table because the measure of base costs exceeds relevant opex (it also includes capital maintenance and limited enhancement spend)).

Our focus on these benchmarks as likely to be the most reliable is consistent with the feedback we received in the peer review process.

Pre-Modelling Adjustments to take Account of Asset Replacement Policy in Scotland

The table below shows the results of re-running the PR24 models, with Scottish Water data added to the dataset, but with two alternative pre-modelling adjustments having been made on the same (triangulated) basis as described above:

- Scottish Water's outturn level of capital maintenance each year has been adjusted so as to be in line with the median level of capital maintenance in England and Wales
- Scottish Water's outturn level of capital maintenance each year has been adjusted so as to be in line with the lower quartile level of capital maintenance in England and Wales

This pre-modelling adjustment approach allows Scottish Water's cost and explanatory variable data to inform the modelling process and so may result in modelled outcomes that better reflect Scottish Water's circumstances, relative to the post-modelling adjustment approach described above.

Table 26: Results of re-running the PR24 models, with Scottish Water data added to the dataset

	Scottish Water outturn capital maintenance adjusted to be in line with E&W levels using a triangulated approach based on:	
	E&W Median	E&W Lower Quartile
Efficiency score	1.06	0.99
• Relative to median	1.01	0.95
• Relative to UQ	1.07	1.00

Source: Scottish Water analysis.

The results shown in the table are very similar to the equivalent results based on post-modelling adjustments that were shown above but imply slightly better Scottish Water performance. In line with our comments above, we consider the use of the upper quartile benchmark when capital maintenance is normalised in line with the England and Wales lower quartile level (when Scottish Water's relative efficiency score is 1.00), and the median benchmark when capital maintenance is normalised in line with the England and Wales median level (when Scottish Water's relative efficiency score is 1.01), as likely to provide the most reliable view.

When considered together, the post modelling and pre-modelling adjustment results therefore imply that – ahead of the consideration of Highlands and Islands impacts – Scottish Water's base costs are 0-2% higher than relevant England and Wales benchmark levels. That is equivalent to a 'gap' of around £0-£9m/year, which – in line with our comments above on the relationship between base costs and opex – is equivalent to an opex efficiency 'gap' of 0-5%.

Re-running the Models using only Opex

The assessments set out above are all based on modelling 'base costs' which – as noted above, includes opex and capital maintenance – and therefore require some means of controlling for differences in capital maintenance policy to be applied in order to generate more meaningful results from a comparative efficiency perspective. A different way of generating a basis for assessing comparative opex efficiency is to start stripping capital expenditure out of the analysis such that the benchmarking models are used to compare only opex levels.

The table below shows the results of re-running the PR24 models but using only opex for all companies. In order to undertake this modelling, it is necessary to identify which cost lines it is appropriate to include and exclude for companies in England and Wales in order to – as far as possible – provide for a like-for-like comparison. This is not immediately straightforward because the separate identification of costs to be included in opex modelling is not something that Ofwat has needed for around 15 years, given its focus on totex (i.e. total expenditure) and base cost modelling over that period. In its feedback on the analysis in our draft plan, WICS identified some England and Wales cost lines that it may be appropriate to include or exclude from the scope of what should be treated as opex. We have engaged with WICS to agree appropriate ways to take account of these points and the results shown below reflect these refinements.

Our opex-only modelling implies a Scottish Water efficiency score that is around 3% lower than the median and around 2% above the Upper Quartile level, which equates to a difference from the Upper Quartile benchmark of around £4 million/year. We note that this is consistent with although at the lower end of) our assessments above using base costs (with post and pre-modelling adjustments) rather than (only) opex. That is, the 2% 'gap' from the Upper Quartile benchmark identified here falls within the 0-5% range for the opex 'gap' that was identified above using base cost (rather than opex only) benchmarking as likely to provide the most reliable assessment.

Table 27: Models re-run using opex only

	Models re-run using opex only
Scottish Water Efficiency Score	1.08
• Relative to median	0.97
• Relative to UQ	1.02

Source: Scottish Water analysis

Potential Developments to the Opex-only Models

As was noted above, in its feedback on our Draft Business Plan, WICS commented that we could seek to develop our own operating expenditure-only efficiency models further. In its comments on the analysis included in our Draft Business Plan, WICS noted a particular concern of over the statistical performance of some of the opex-only models – in particular, the Treated Water Distribution models – and questioned whether there may be scope for adjustments to be made to the opex modelling to improve that performance.

We have sought to address these comments in three main ways:

- By considering the case for including a different density metric (weighted by area rather than by population) in the opex-only treated water distribution models.
- By exploring the scope for including other variables that may better capture the implications for water treatment costs of supplying the Highlands and Islands

- By testing the sensitivity of our opex-only results to a set of model variations, and in particular to the application of adjustments in line with those that have been considered in the CMA's redetermination process in England and Wales.

As discussed further below, in the section on geographic dispersion:

- We consider the inclusion of a density variable weighted by area rather than density to be well-founded in terms of economic and engineering logic, and to align well with the underlying objectives of Ofwat's modelling approach. We also found its inclusion to improve model performance to some extent in Treated Water Distribution models. We set out below how we have sought to incorporate this within the modelling framework in a balanced way as a means of reflecting the impact that geographic dispersion has on Scottish Water's treated water distribution costs.
- We have not identified any additional variables as adequately reflecting the impact of geographic dispersion on water treatment costs. We did not consider that density measures (whether weighted by population or area, or otherwise defined) would be likely to provide an effective means of capturing relevant cost impacts, and have not identified any of the economies of scale variables that have been considered in an England and Wales context as likely to do so either. Given this we have an alternative means of adjusting for this cost impact.

We have not found the base cost modelling specification adjustments proposed by companies in England and Wales that are seeking redeterminations from the CMA to have a material impact on model results, or to point to likely improvements. We have sought to consider the implications of applying the base cost modelling approaches that the CMA adopted in its provisional determinations. In practice, however, it has not been feasible to do this in a reliable manner in a context where the information that has been made publicly available on new data lines and variable specifications has been limited and not straightforward to reconcile. We will consider the extent to which further developments in the CMA's approach are likely to provide an additional useful reference point when published.

Impacts of Geographic Dispersion

The use of density metrics in Ofwat's models

As was noted above, one of the four key underlying cost drivers that Ofwat's wholesale water modelling seeks to reflect is population density, and all 24 of its PR24 models include density variables. The emphasis that Ofwat put on including, and seeking to develop, density metrics in its modelling stems from the strong underlying engineering and economic rationales that can be identified as to why it would be expected to affect the efficient costs of service provision.

When seeking to identify and select appropriate density variables for modelling the costs of companies in England and Wales, key considerations will be the extent to which different variables can be expected to capture differences between those companies that relate to density, that are likely to materially affect efficient costs and that are not likely to be adequately captured or off-set in some other way. A challenge when seeking to apply Ofwat's models to Scottish Water is that the form of geographic dispersion that Scottish Water faces – in particular when serving the Highlands and Islands – differs considerably in some respects from that faced by companies in England and Wales, and this can have a material bearing on the efficient costs of providing relevant services.

Our assessment is that the density variables that Ofwat included in its PR19 and PR24 models are highly unlikely to provide a sufficient means of reflecting that difference or its implications.

The graphs below highlight the extent to which the choice of density variable can have a major bearing on how Scottish Water's geographic dispersion is being characterised and taken into

account within the modelling. The first graph shows how companies compare on one of Ofwat's two 'weighted average density' metrics both of which weight density (within different smaller areas inside company boundaries) by population. It is notable that on this measure Scottish Water could be understood as being 'average' in terms of its density characteristics, sitting as it does in the middle of the distribution.

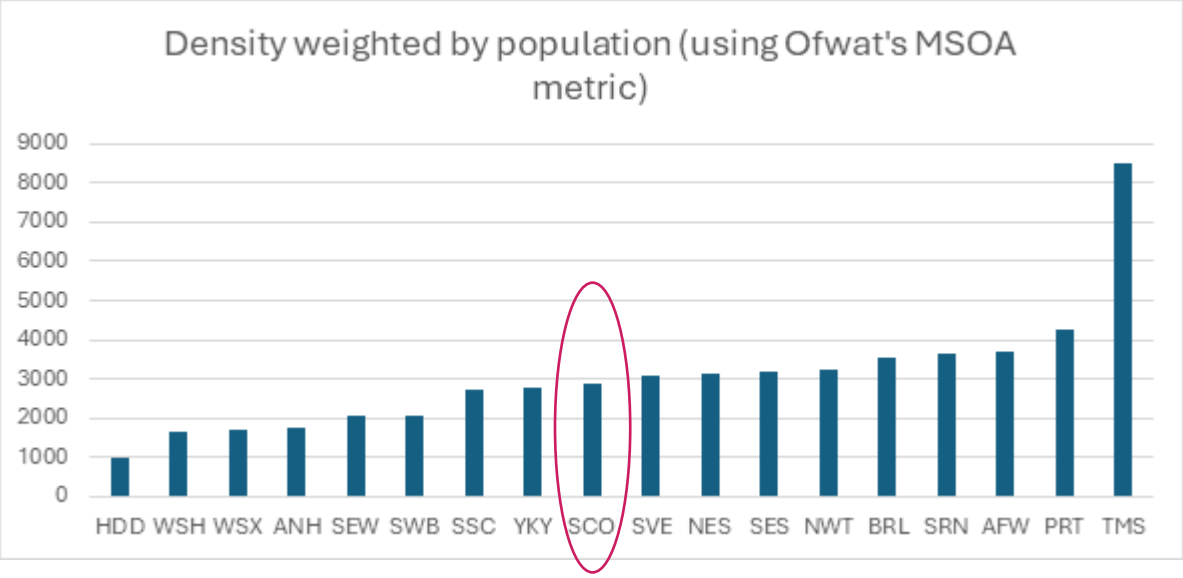

Figure 11: Density weighted by population (using Ofwat's MSOA metric)

However, the above characterisation clearly does not capture the extent of geographic dispersion that Scottish Water faces and how much that differs from the position typically faced by companies in England and Wales. This can be seen immediately if one instead compares density measures that are not population weighted. As can be seen in the graph below, Scottish Water serves the area with the lowest population density and with a density figure that is less than half that of any WASC in England and Wales. From this perspective, then, Scottish Water is clearly not in (or anywhere close to) the middle of the distribution.

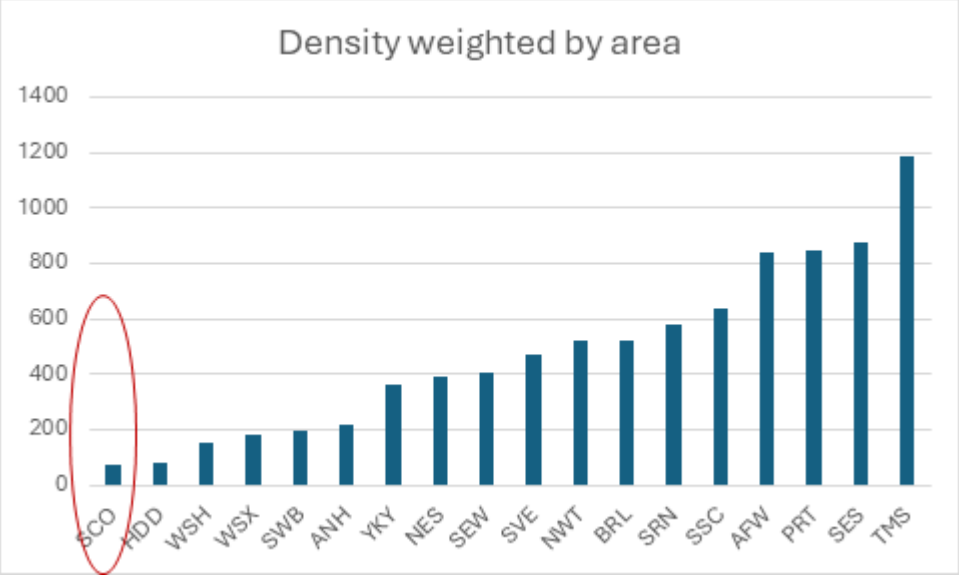

Figure 12: Density weighted by area

Source: Scottish Water analysis based on MSOA_area_density_derivation_v2.0.xlsx

In its comments on our emerging analysis, WICS noted that Ofwat's MSOA-based density metric is only used in 8 of Ofwat's 24 wholesale water models and that Scottish Water has a value that

is below the median for the density measures used in the other models. While we recognise that limitations – in terms of assessing Scottish Water's costs – of the density measures used in Ofwat's other wholesale water models are a little less pronounced that in the models using the Ofwat's MSOA-based density metric, we consider them to remain highly material.

The graph below – which plots population against area served – further highlights the extent to which the conditions that Scottish Water faces are substantially different to those faced by companies in England and Wales with respect to geographic dispersion. The extent of this difference is not captured by any of the density metrics used in Ofwat's models.

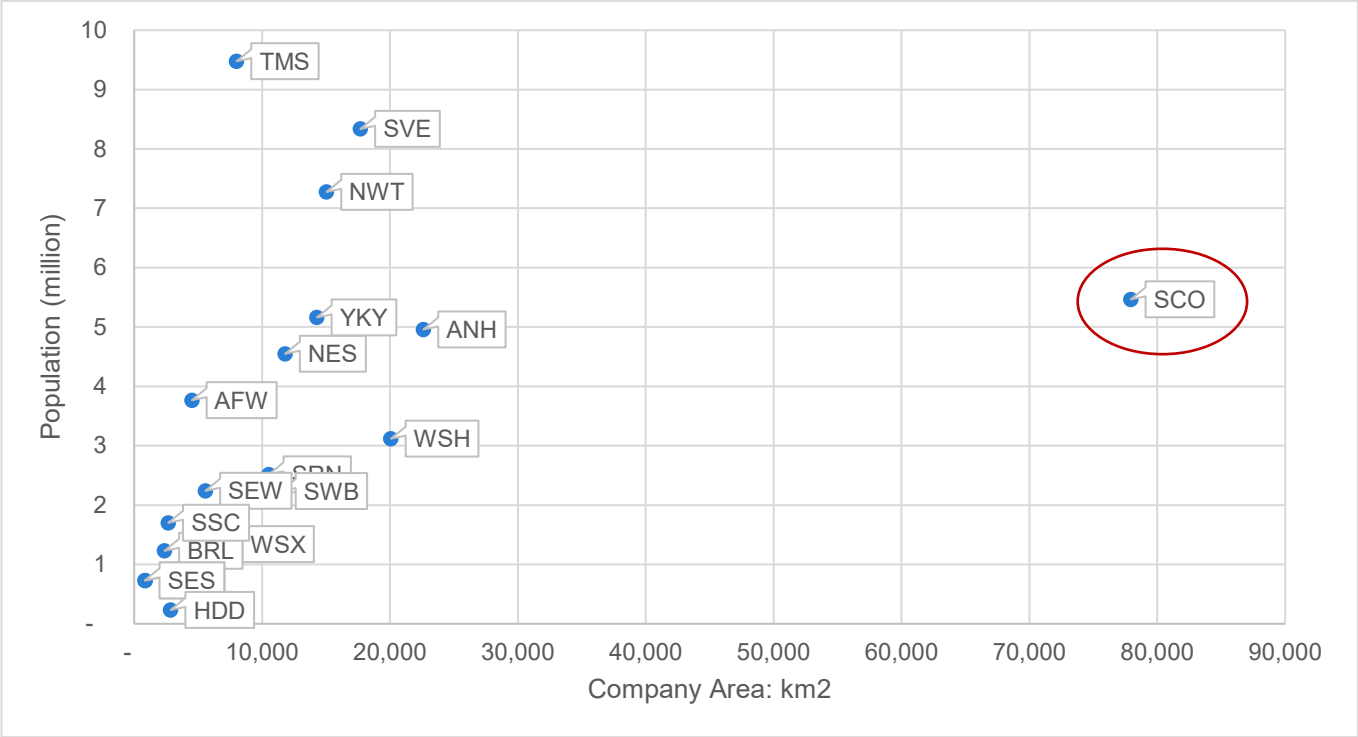

Figure 13: Population vs Area Served: Scottish Water compared with companies in England and Wales

Of course, in developing its models, Ofwat would have had no reason to seek to reflect the circumstances of Scottish Water, and it is notable that the way in which other companies are distributed is much more stable across the two density measures that were shown above (i.e. weighted by population and by area). While there are some changes in the ordering, the characterisation of relative density/scarcity between companies is broadly similar across the two metrics for companies in England and Wales where that is demonstrably not the case for Scottish Water.

Given the above, when using Ofwat's models to assess the efficiency of Scottish Water's costs we have considered the extent to which it may be appropriate to include a different density measure: specifically, density weighted by area rather than by population. In its comments on our emerging analysis, WICS noted that a measure of density weighted by area would put a high weight on areas of Scotland where Scottish Water has no assets and as such might be expected to over-estimate predicted costs.

We recognise that there is a risk of this and have taken account of that by only seeking to use this density metric where it improves model performance, and – in line with Ofwat's general approach – have considered its implications within a broader basket of model results. In practice, which has meant using the area weighted density measure in 4 treated water distribution (TWD) models only, with Ofwat's properties per length of main density measure retained in the other two TWD models, and all of Ofwat's density measures retained in all other models.

In line with the description of the set of wholesale water models provided earlier, that approach can be understood as putting a one third weight on models that use this alternative density measure (and two thirds weight on models using Ofwat's density metrics), when estimating efficient TWD costs.[49] The impact of this approach on Scottish Water's implied wholesale water efficiency score is shown in the table below. As can be seen, on this approach, Scottish Water's wholesale water opex levels are in line with the upper quartile level.

Table 28: Scottish Water's implied wholesale water efficiency score

	Opex only modelling with partial inclusion of area-weighted density metric in TWD models
Scottish Water Efficiency Score	1.05
• Relative to median	0.93
• Relative to UQ	1.00

The improved assessment of Scottish Water's relative efficiency (compared to the results shown earlier) arises from its efficient treated water distribution costs being identified as around £4m per year higher than was the case when Ofwat's density metrics were used in all models. Our assessment is that this provides a balanced approach with respect to TWD costs. The overall effect of adopting this approach on Scottish Water's modelled wholesale water opex allowance – before and after the application of a relevant Upper Quartile or median efficiency benchmark is shown in the table below, together with the relevant outturn levels of Scottish Water's opex. For ease of viewing, the table shows annual average levels over the five year period that was used to assess opex efficiency. The relevance of changes in particular years is considered later in this Annex.

Table 29: Modelled allowances based on opex-only modelling: annual average for 2019/20-2023-24 in 2023/24 prices

	Using Ofwat models	With partial inclusion of area-weighted density metric
Scottish Water modelled allowance (before efficiency benchmark applied)	£181m	£184m
Adjustment for UQ	1.055	1.052
Adjustment for median	1.113	1.137
Scottish Water modelled allowance: UQ	£190m	£194m
Scottish Water modelled allowance: median	£200m	£210m
Scottish Water relevant outturn opex	£193m	£193m

[49] This follows because the different density metrics are used in two thirds of TWD bottom up models, but not at all in the estimation of TWD costs using top-down (ie Wholesale Water) models, and a 50% weighting is given to bottom-up and top-down models.

The results shown in left hand column are consistent with those that WICS used for the same period in its feedback on our Draft Business Plan, but as highlighted above takes no account of the implications for the efficient level of opex of the much greater extent of geographic dispersion of customers in Scottish Water's supply area relative to those of companies in England and Wales. Our assessment is that the approach shown in the right hand column provides a reasonable and conservative means of taking into account the implications of that geographic dispersion for opex levels associated with Treated Water Distribution. Water Treatment opex implications are considered below.

8.1.1 The impact of geographic dispersion on water treatment costs

The above section provided a way of taking account of the impact of geographic dispersion on differences in TWD costs within the modelling framework. In line with WICS feedback, we have also explored options for capturing the impact of geographic dispersion on Scottish Water's wholesale water treatment costs within the modelling framework. However, we have not identified any metrics that look likely to provide a reliable means of doing that.

We initially sought to do this through the inclusion of alternative or additional variables within the relevant models. However, we have not identified any metrics that look likely to provide a reliable means of taking the implications of geographic dispersion on water resources and treatment opex into account.

A key underlying issue here is the extent to which Scottish Water supplies water to remote communities.

Remoteness

The Scottish Government's Urban-Rural classification includes explicit consideration of the extent to which areas can be regarded as remote.[9] In particular, in addition to using a population-based urban/rural categorisation of areas similar that used by the ONS for England and Wales, the classification includes an assessment of accessibility, and in particular includes the following 3 categories:

- **Accessible**: areas within a 30 minute drive time of a Settlement with a population of 10,000 or more.
- **Remote**: areas that have a drive time between 30 and 60 minutes from a Settlement with a population of 10,000 or more.
- **Very Remote**: areas that are more than a 60 minute drive time from a Settlement with a population of 10,000 or more.

The development and usage of these categories reflects the relevance of having a coherent means of considering remoteness in a Scottish context. In line with, the Scottish Government produces information on the extent to which the populations in different council areas (and a range of other relevant area classifications) are fall into categories that include: remote small towns; very remote small towns; remote rural; and very remote rural. The table below shows the percentage of the population identified as living in a remote (or very remote) area in a number of council areas.

Table 30: Percentage of the population identified as living in a remote area

	% of population classified as remote (based on 2022 data)
Argyll and Bute	72%
Highland	43%
Na h-Eileanan Siar	100%
Orkney Islands	100%
Shetland Islands	100%

Source:Scottish+Government+Urban+Rural+Classification+2022+-+Census+2022+Population+Estimates+Tables.xlsx

It is recognised that rural communities can face a 'remoteness premium' for some goods and services, and while this raises a range of fairness and consumer protection concerns, it is also understood to be related in part to factors such as transportation costs and lower density (which may then, for example, increase the costs of making some services available).[10]

Remoteness and economies of scale

A key relevant driver of cost is that the efficient water treatment plant size for serving remote communities can be very small, and the cost of operating those plants much higher than average (with little opportunity to benefit from economies of scale).[50] The graph below shows the number of water treatment plants in the smallest size category by company, and the average size of plants in that category. As can be seen, Scottish Water is a significant outlier with a much larger number of plants (127) than all companies in England and Wales: the company with the next largest number of works in the smallest band is Severn Trent with 25 (and Bristol and SES have no works in the smallest band).[51] Also, the average size of treatment works within this band is lower than that for all companies in England and Wales.

We considered whether including the area weighted density measure described above in Ofwat's resources and treatment models might provide an effective means of taking this into factor into account. However, we were not satisfied that the resulting models were providing sufficiently reliable results (given their poorer performance in the model reliability tests that Ofwat used in tis PR24 model selection process). Some companies in England and Wales have argued that it is appropriate to include one or more variable aimed at seeking to capture economies of scale impacts, and we note that the Ofwat took account of some economies of scale issues in cost adjustment claims, and that CMA included such a variable in the modelling it used in its provisional redeterminations. We also note that Ofwat's wastewater models already include variables which seek to directly take account of economies of scale (rather than relying on such impacts to be sufficiently reflected indirectly through, for example, density metrics, or taken into account separately).

However, we have not identified model variables that look likely to provide an effective means of reflecting the (as shown in the graph) very different circumstances that Scottish Water faces relative to companies in England and Wales. For example, we note that some companies in England and Wales have proposed the use a measure of weighted average treatment size (similar to the WATS measure that is included in some wastewater models). In practice, though, any approach that used a volume of water based approach to weighting would be expected to result

[50] The costs of delivering a secure service can also be increased when there is more limited scope to utilise necessary back-up capacities and capabilities in more flexible ways (given relevant accessibility and travel/response time constraints).
[51] In practice, the graph above understates the extent to which Scottish Water is an outlier to some extent, because the smallest size band identified in Ofwat's data is <2 Ml/d, whereas the smallest size band identified in Scottish Water's Annual Return submissions is <=1 Ml/d.

in very little account being taken of Scottish Water's small works. That is, the issue here is not that Scottish Water supplies an unusually high proportion of its Distribution Input through very small treatment works: a number of companies in England and Wales supply a higher proportion in this band (although for all companies this proportion is relatively low). Rather, the issue is that the unit costs of operating very small works are significantly higher than that of all larger works categories, and Scottish Water operates more than 5 times as many of the smallest works as the company with the next largest number.

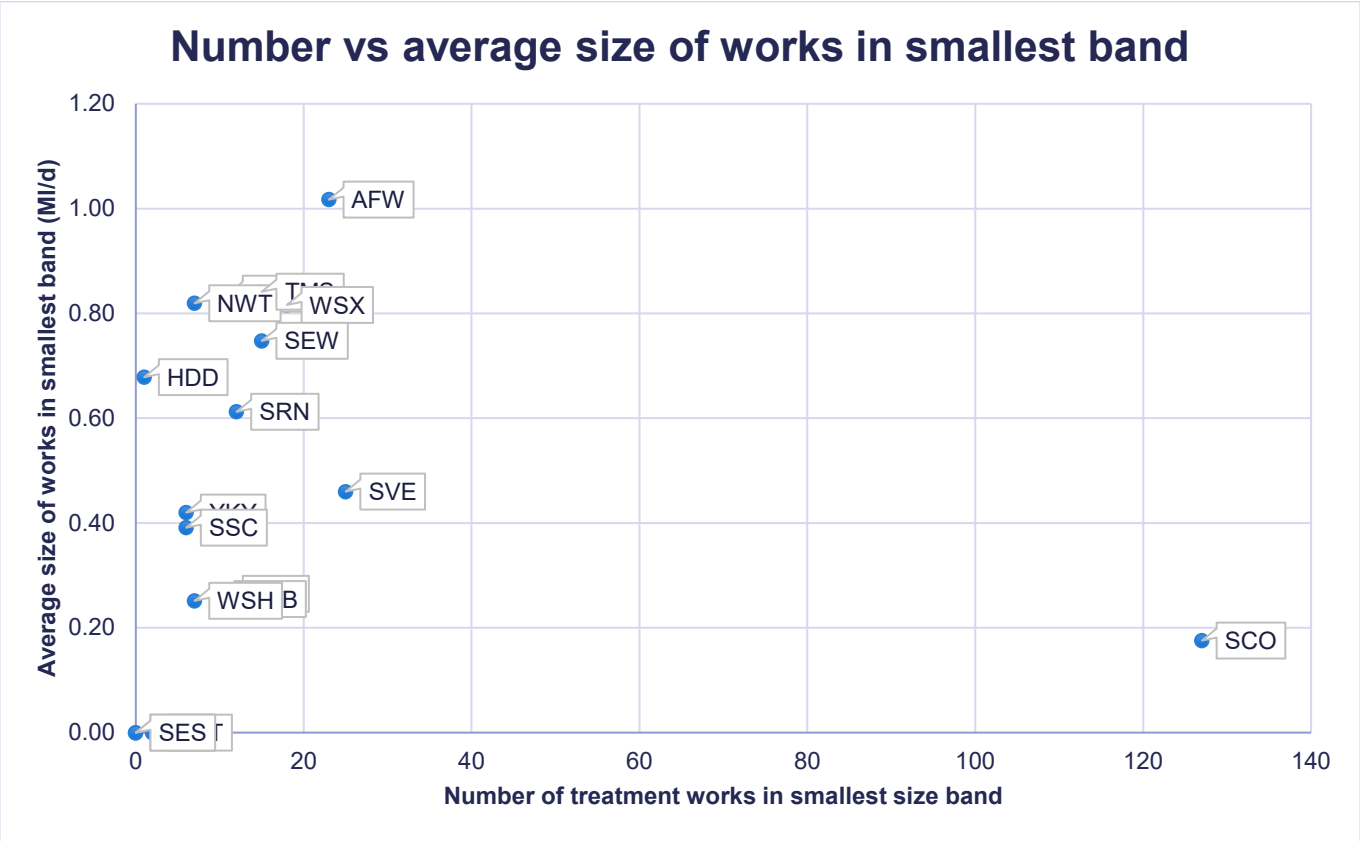

Figure 14: Number vs average size of works in smallest band

While we have not identified a variable that looks likely to provide an effective way of capturing the differences described above, we consider that treatment of septic tanks in the wastewater modelling (described below) provides useful reference point in terms of how the impact of this factor can be taken into account in a way that does not distort the assessment of relative efficiency. For septic tanks, we agreed with WICS that we should remove the impact of septic tanks from the assessment, and we have identified what the impact would be of adopting a similar approach here.

The table below provides an initial indication of the scale of the impact the operation of very small works has on Scottish Water's opex levels.[52] As can be seen, water treatment works with a capacity of less than or equal to 1 Ml/d account for only around 1.2% of Distribution Input, but have made up around ten times that share (11.5%) of treatment works opex.

[52] Our Draft Business Plan analysis also included consideration of the extent of difference between opex levels per connected property between different Scottish Water areas. We found this to provide further support for the materiality of geographic dispersion in terms of its impacts on relevant costs. We have not considered that further here as we have not identified an effective basis for comparing these differences with those found within company areas in E&W.

Table 31: Initial Indication of scale of impact the operation of very small works has on Scottish Water's opex levels

Size of works	Number	% of Distribution Input	Water Treatment works opex, £m
<= 1 Ml/d	127	1.2%	£10.4m
Total (all sizes)	229	100%	£90.1m
% <= 1 Ml/d	55%		11.5%

Source: Scottish Water analysis based on Scottish Water Annual Return 2024, E4.28 – E4.39

We considered a range of ways in which Scottish Water's opex levels (and opex efficiency) could be identified in a way that excluded the effect of this much larger number of very small works, and consider the following two approaches to provide a reasonable basis for understanding relevant impacts:

- Using the England and Wales median of: the number of water treatment works that each company operates that falls within the smallest size band, divided by that company's total distribution input.
- Using the England and Wales median percentage of treatment works that were in the smallest size band.

We consider that approach A above is likely to provide a reasonable way (recognising different overall scale impacts) of estimating the average extent to which the costs of operating treatment works in the smallest size band were taken into account in the cost modelling. However, we also considered there to be merit in approach B.

The table below shows how Scottish Water compares with the England and Wales median under these two approaches based on 2023/24 data.

Table 32: Scottish Water comparison with the England and Wales median

	Number of Treatment Works in smallest size band	As a % of SW number
Scottish Water	126	100%
E&W median:		
• Approach A	20.6	16%
• Approach B	30.7	24%

Given the above, we consider it reasonable to treat Ofwat's water resources plus and wholesale water models (which are the set of models used for the assessment of treatment costs) to have been calibrated – in terms of cost allowances – consistent with Scottish Water having around an 80% lower number of treatment works falling into the smallest size band than it has in practice (this being the mid-point between the percentages implied by the approaches A and B). In line with our comments above, we consider this likely to be a conservative estimate, because the upper threshold for the smallest band of works in Ofwat's data (<2 Ml/d) is double that used in Scottish Water's Annual Returns (<=1 Ml/d).

Excluding 80% of Scottish Water's water treatment works in the smallest size band from the analysis would result in the removal of around £8,3m of water treatment opex from the analysis in 2023/24, which is equivalent to excluding around a 4% of the level of wholesale water outturn opex that was used to generate the results shown thus far.

If applied in isolation, that adjustment could overstate the impact on opex levels arising from Scottish Water's much larger number of smaller works, as the Distribution Input associated with the proportion of works (and costs) that have been excluded would not have been explicitly accounted for elsewhere. We have taken account of this potential off-setting effect by calculating how much lower Scottish Water's modelled allowance would be if the number of connected properties was reduced in line with the potentially unaccounted for level of Distribution Input associated with the excluded portion of works in the smallest size band (based on the average DI of those works).

We identified this offsetting effect to be around £1.2m in 2023/24 (in 2023/24 prices), such that the net effect of excluding this portion of Scottish Water's smallest treatment works from the modelling is around £7.1m, which is equivalent to around 3.5% of wholesale water outturn opex included in the modelling results shown thus far.

We considered whether there may be other implications for modelled costs that should also be taken into account, and that might affect the scale of this adjustment, but have not identified any such adjustments as necessary. We note that, in principle, the removal of works (and the costs of operating works) in remote locations would – in principle - be expected to affect the population density that it would be appropriate to use (as the remaining area to be served would effectively be more densely populated on average). However, because the focus of our attention here is Water Resources Plus and Wholesale Water models (and not Treated Water Distribution models, which were considered above), and the population density metrics weight density in particular localities by population, in practice, this potential interaction is immaterial (and indeed it is the absence of any material interaction with other model variables that this exclusion is seeking to take account of).

The implications of excluding a portion of Scottish Water's smallest treatment works from the analysis, in the way and for the reasons described above, are shown in the table below. The top part of the table shows the modelled cost levels that were identified above after the application of an upper quartile and a median benchmark. The adjustment is then applied by reducing the level of relevant outturn opex by 3.5% in line with the net impact identified above (this is the only adjustment made because – as set out above – the scope for an impact on modelled allowance levels has already been taken into account and netted off). Scottish Water's implied efficiency scores given the revised relevant opex value are then shown.

Table 33: Modelled allowances based on opex-only modelling: annual average for 2019/20-2023/24 in 2023/24 prices

	Using Ofwat models	With partial inclusion of area-weighted density metric
Scottish Water modelled allowance: UQ benchmark	£190m	£194m
Scottish Water modelled allowance: median benchmark	£200m	£210m
Scottish Water relevant outturn opex after small works exclusion	£187m	£187m
Implied efficiency score relative to: • UQ benchmark	0.98	0.96
• Median benchmark	0.94	0.89

Our assessment is that the figures set out in the right hand column provide for a reasonable and balanced assessment. We consider their overall implications further in the final part of this Annex.

Special factor adjustments

In the above section we set out how we have sought to take geographic dispersion issues into account within the modelling framework that WICS and Scottish Water have been applied. In doing that did not identify either the approach we have taken to Treated Water Distribution or that which we have taken to water treatment as giving rise to a 'special factor' adjustment. That is, while in both cases, our approach clearly departs from that applied by Ofwat in relation to England and Wales, we regard both approaches as concerned how that modelling framework should be adapted in order for it to be suitable for use in relation to Scottish Water. Through working collaboratively with WICS, we identified some Ofwat models as unlikely to be informative (for example, because of the implications of PFI provision), and have identified some activities (notably in relation to septic tanks) where exclusion from the economic benchmarking is likely the most appropriate framework design choice (given the risks of comparisons being otherwise subject to material distortions).

However, we note that it would be possible, from a different perspective, to view either or both of the above approaches as 'special factor' or 'cost adjustment' claims. Given that, the table below provides some commentary on why – if these approaches were to be viewed from that perspective – we consider that the relevant criteria should be identified as satisfied. The table shows and provides comments on Ofwat's PR24 cost adjustment claims criteria.

Table 34: Comments on Ofwat's PR24 cost adjustment claims criteria

Criteria	Comment
Unique circumstances	We consider there to be compelling evidence that Scottish Water faces unique circumstances with respect to geographic dispersion relative to companies in E&W and note that: • Scottish Water's population density is significantly lower than that for E&W (see density graphs). • Scottish Water's operating area is almost three times that of Anglian Water, the largest company area in E&W • Scottish Water provides services to 58 inhabited islands • The metrics used in Ofwat's econometrics provide and inadequate means of reflecting substantial differences such as these related to geographic dispersion (see density comparisons above). • Scottish Water has more than five times the number of treatment works in the smallest size band than the company with the next largest number in E&W. • Scottish Water's Annual Return data shows the extent to which its opex is impacted by the operation of the water treatment works in the smallest band.
Management control	The circumstances described above materially affect the efficient costs of operation because they significantly limit the scope for economies of scale and scope. Serving customers in remote areas gives rise to considerable constraints associated with distance and associated transportation/travel times and costs.
Materiality	Impact on costs is highly material (see Annual Return data on costs of operating smallest treatment works and cost differences between Areas)
Adjustment to allowances	Scope for being captured (or partially captured) by other variables has been carefully considered, as has potential for using alternative variables. Implicit allowances/scope for offsetting impacts has been assessed and taken into account.
Cost efficiency	Relevant cost data from Annual Returns and/or Regulatory Accounts so has been subject to audit/assurance. There has been significant and constructive engagement throughout the process of developing cost assessment.
Need for investment (where appropriate)	N/A
Best option for customers (where appropriate)	N/A
Customer protection (where appropriate)	N/A

Our Overall Assessment in Relation to Wholesale Water Opex

Given the above, our assessment is that Scottish Water's current level of wholesale water opex efficiency is likely to be in line with that of the leading companies in England and Wales, and therefore that Scottish Water should not adopt a "catch-up" efficiency challenge for the SR27 period in relation to wholesale water opex. We comment on this further below where we consider the implications of our analysis for overall (i.e. water and wastewater) opex levels

Our Assessment of Waste Water Costs

Overview

After providing an overview of Ofwat's wholesale wastewater models below, we describe how we have used them, the main results we have found, and some supporting analysis we have found

helpful when seeking to interpret and cross check those results. We then set out our overall assessment in relation to the appropriateness of applying a catch-up efficiency adjustment when setting Scottish Water's opex allowances for SR27.

Ofwat's wholesale water base cost models

As with water, we focused our attention on Ofwat's wholesale wastewater base cost models, with this allowing for the benchmarking of a high proportion of relevant wastewater service costs while avoiding significant comparability issues that would be expected to arise in the consideration of retail services (including because of differences in levels of metering).

Ofwat's wholesale wastewater models seek to explain differences in relevant costs between companies by reference to underlying engineering and economic drivers of cost. At PR19, Ofwat used 8 different models to assess wholesale wastewater costs:

- **2 Sewage Collection (SWC) models**: which sought to reflect differences in the costs of operating and maintaining the sewerage network.
- **2 Sewage Treatment (SWT) models**: which focused only on differences in sewage treatment costs.
- **2 Bioresources (BR) models**: which assessed the costs associated with sludge.
- **2 'Bioresources plus' (BRP) models**: which assessed the combined costs associated with sewage treatment and sludge.

The explanatory variables that Ofwat used at PR19 are shown in the table below. After each of the explanatory variables (in the left-hand column, in square brackets), we have included an indication of the underlying cost driver that each variable can be understood as seeking to capture. As with the wholesale waste water models, scale, density, topography and treatment complexity can be understood as key underlying drivers. It is notable, though, that the waste water models also include variables (related to the size of treatment works) which seek to reflect the extent to which companies are likely to benefit from economies of scale. In Ofwat's wholesale water models, the scope for economies of scale was effectively treated as sufficiently reflected through the inclusion of density metrics. The higher costs of transporting waste water tends to mean that the efficient size of waste water networks is smaller than is the case for water networks and that economies of scale can merit closer and more direct attention (although, as was highlighted above, economies of scale are also important in relation to water treatment works).[13]

Table 35: Explanatory variables included in PR19 base cost models: wholesale waste water

Explanatory variables [indication of underlying cost driver]	SWC1	SWC2	SWT1	SWT2	BR1	BR2	BRP1	BRP2
Ln (Sewer length) [scale]	X	X						
Ln (Pumping capacity/Sewer length) [topography]	X	X						
Ln (Properties/Sewer length [density]	X							
Ln (Weighted Average Density)		X			X			
Ln (Load) [Scale]			X	X			X	X
% of load treated in bands 1-3 [Economies of Scale]			X		X		X	
% of load treated in band 6 [Economies of scale]				X				X
% of load with an ammonia consent <3mg/l [treatment complexity]			X	X			X	X
Ln (Sludge produced) [Scale]					X	X		
Ln Number of Sewage treatment works per property) [Density]						X		

Source: Information from: FM_WWW2_FD.xlsx

The CMA reviewed Ofwat's approach to assessing wholesale waste water base costs and used the same set of models (with an additional year of data that had become available) in its PR19 redeterminations.

For PR24, Ofwat made a range of changes to its approach to modelling wholesale waste water base costs, including the following:

- Bioresources costs were assessed separately, and the bioresources plus models were not used to provide a form of 'top down' assessment.
- Two new 'Waste water Network Plus' (WWNP) models were introduced to provide a 'top-down' assessment jointly of sewage collection and treatment costs.
- A new Urban Rainfall metric was introduced that was intended to take account of the impact that rainfall levels can have on sewage collection costs. The measure is based on a calculation of the total amount of rainfall falling across each company's urban MSOAs, with this intended to reflect that a greater the volume of inflows to the drainage and sewerage networks, can mean that larger network and storage assets are needed, and higher pumping and capital maintenance costs may result.
- As with wholesale water, Ofwat used more granular underlying density data, categorised by Middle Super Output Areas (MSOAs), to generate weighted average density metrics that were viewed as more accurate than the figures used at PR19.
- Ofwat developed a new 'Weighted Average Waste Water Treatment Works Size' (WATS) metric that it used as an explanatory variable in place of the '% of load treated in band 6'

measure that it had used at PR19 (where band 6 is the largest category of works), as it was viewed as better way of reflecting differences between companies in terms of the size of works.

The explanatory variables that Ofwat used at PR24 for wastewater network plus (i.e. sewage collection and treatment) are shown in the table below. SWC1 is the same as it was at PR19, other than it also includes Ofwat's new Urban Rainfall metric. SWC2 and SWC3 can be viewed as the same as SWC2 at PR19, other than that they include the new Urban Rainfall metric, and that they each include one of Ofwat's more refined MSOA-based weighted average density measures. The two new networks plus models include (some) variables from the sewage collection and treatment models and differ only in terms of the metrics used to seek to reflect economies of scale.

Table 36: Explanatory variables included in PR24 base cost models: wholesale waste water network plus

Explanatory variables [indication of underlying cost driver]	SWC1	SWC2	SWC3	SWT2	SWT3	WWNP1	WWNP2
Ln (Sewer length) [scale]	X	X	X				
Ln (Pumping capacity/Sewer length) [topography]	X	X	X			X	X
Ln (Properties/Sewer length [density]	X						
Ln (Weighted Average Density – LAD from MSOA)		X					
Ln (Weighted Average Density - MSOA)			X				
Ln (Urban Rainfall MSOA/Sewer Length)	X	X	X			X	X
Ln (Load) [Scale]				X	X	X	X
% of load treated in bands 1-3 [Economies of Scale]				X		X	
Ln (Weighted Average Treatment Size) [Economies of scale]					X		X
% of load with an ammonia consent <3mg/l [treatment complexity]				X	X	X	X

Source: Information from 'Coefficients' tab of: PR24-FD-CA08-Base-costs-wastewater-model-3-Network-Plus.xlsx

For bioresources, Ofwat based its PR24 assessments on 4 unit cost models, the explanatory variables from which are shown in the table below. Bioresources costs include sludge transport, treatment and disposal costs. Because these models sought to estimate unit costs, scale is already taken into account in the assessment. Ofwat identified the key drivers of bioresources unit costs as: economies of scale in sludge treatment; and the location of sewage treatment works relative to sludge treatment centres (which causes differences in efficient sludge transport costs).

Ofwat's modelling treated population density and the size of sewage treatment works as largely exogenous variables that can be used to proxy these cost drivers.

Table 37: Explanatory variables included in PR24 base cost models: bioresources unit cost models

	BR7	BR8	BR9	BR10
% of load treated in bands 1-3 [Economies of Scale]	X			
Ln (Weighted Average Density – LAD from MSOA)		X		
Ln (Weighted Average Density - MSOA)			X	
Ln Number of Sewage treatment works per property) [Density]				X

Source: Information from 'Coefficients' tab of: PR24-FD-CA93-Base-costs-wastewater-model-3-Bioresources.xlsx

Identifying Relevant Data for Scottish Water

As with wholesale water, in order to apply Ofwat's models, it was necessary to identify data for Scottish Water in relation to:

- Relevant costs; and,
- Each of the explanatory variables used in Ofwat's models.

We engaged with WICS to develop an agreed set of data in relation to the above that could be used when running the Ofwat models. However, as WICS identified in its methodology, the fact that a range of waste water services are provided under PFI contracts needed to be taken into account in this process. Given the importance of this factor, the following begins by setting out how we have taken account of PFIs when identifying relevant data, and the impact this can have on the interpretation of results. We then identify other key assumptions and considerations – including our approach to septic tank costs – that affected our identification of relevant data.

Taking account of PFIs

The table below provides an indication of the extent to which different waste water activities are provided through PFI contracts rather than being directly provided by Scottish Water. Scottish Water is responsible for almost all sewers in Scotland, and in line with that we have treated PFIs as having no material impact on the explanatory variables included in Ofwat's sewage collection models. By contrast, the vast majority of sludge-related services have been undertaken by PFI providers, and it is notable that 2 PFI plants – Daldowie and Seafield – have accounted for more than half of Scotland's sludge over the past five years. Scottish Water's role in the provision of sludge services increased in 2023-24 following the expiry of PFI contracts relating to facilities in the Aberdeen and Highland regions (and Scottish Water adopted the relevant assets and service provision requirements) and is expected to get much larger when the Daldowie PFI contract ends in 2026. However, as discussed further below, the limited extent to which Scottish Water has been providing sludge services over the historical period assessed by Ofwat raises some immediate question marks over the likely usefulness of Ofwat's bioresources models when seeking to assess Scottish Water's cost efficiency relative to companies in E&W.

Table 38: Percentage of different waste water activities accounted for PFI providers as indicated by some relevant metrics

	2019-20	2020-21	2021-22	2022-23	2023-24
Sewage Collection: sewer length	0.4%	0.4%	0.4%	0.4%	0.3%
Sewage Treatment: estimate of annual average connected population served	45%	44%	45%	45%	37%
Bioresources: Amount of sewage sludge	86%	86%	89%	81%	76%

Source: Scottish Water analysis based on Scottish Water Annual Return data

As shown in the table, the provision of sewage treatment services sits between sewage collection and sludge, in that that around 45% of customers had been served by PFI providers until 2023-24 when that dropped to 37% as a result of the Aberdeen and Highland PFI contracts coming to an end and the relevant services being taken on by Scottish Water.

The primary approach we took in relation to PFIs was to seek to exclude the costs and services that related to them from the dataset to be used for modelling (although, as discussed below, we considered PFIs to also have a significant bearing on the extent to which some Ofwat models were likely be informative). In terms of costs, which meant focusing on Scottish Water's relevant base costs, excluding the costs of securing and managing PFI services. This was straightforward to identify from Scottish Water's regulatory accounts, where PFI costs are separately identified.

For most of the explanatory variables used in Ofwat's models, it was also straightforward to identify relevant values, because Scottish Water's Annual Returns provided information on Scottish Water's waste water assets that could be used (for example, on sewer length, and the load treated at different sizes of sewage treatment works). The number of properties served by Scottish Water – as opposed to PFI – operated sewage treatment works is not directly reported in Annual Returns, but information on the estimated populations served by Scottish Water and PFI providers is reported and was used to generate what we would expect to be reasonable estimate of the relevant number of properties. Identifying appropriate population density measures for that portion of Scotland served by Scottish Water raises some more challenging issues (as population density can vary significantly between areas), but we agreed with WICS to use the relevant Scotland-wide variables in our analysis as a starting point.

Data related to septic tanks

We agreed with WICS that we should remove septic tanks and associated costs from the benchmarking in a context where there could otherwise be significant comparability issues with England and Wales when metrics that used the number of Waste Water Treatment Works were being used. The impact of excluding septic tanks on the number of sewage treatment works (and on the measure of opex used in the modelling) is shown in the table below.

Table 39: Adjustments to remove septic tanks from the benchmarking (2023-24)

	Number of Sewage Treatment Works	Relevant Sewage Treatment Opex
Total including Septic Tanks	1838	£172.7m
Septic Tanks	1177	£4.3m
Total excluding Septic Tanks	661	£168.5m

Source: Scottish Water analysis based on Scottish Water Annual Return data

The removal of septic tanks from the assessment is also highly relevant to taking account of the geographic dispersion of Scottish Water's customers. As was set out above, the need to supply remote communities has a significant impact on wholesale water costs, including because of the resulting extent of small scale works that are needed to provide appropriate treatment for the supply of drinking water, and the need for local distribution assets which supply a relatively small number of customers. However, for waste water treatment, the use of septic tanks is an alternative means of providing waste water services that avoids the localised provision of transportation and treatment assets (with tankers used instead to empty septic tanks periodically and to transport waste for appropriate treatment elsewhere). We comment further on the relevance of remoteness to wholesale waste water costs below.

Urban rainfall

As was noted above, Ofwat introduced a new Urban Rainfall metric in its PR24 modelling that was intended to take account of the impact that rainfall levels can have on sewage collection costs. Given the information provided with Ofwat's PR24 Draft Determination, we did not identify a reliable way of generating an equivalent set of figures for Scottish Water that could be used for this metric. However, WICS identified that some additional information Ofwat published with its Final Determination provided a practical means through which urban rainfall figures could be generated for Scottish Water. We engaged with WICS on this and agreed that we would use estimates of urban rainfall levels for Scottish Water based on the Ofwat approach as a reasonable starting point.

Ammonia consents

As was shown above, Ofwat's waste water models include the percentage of load with an ammonia consent <3mg/l as a treatment complexity variable in a range of waste water models. We could determine the value of this metric for Scottish Water directly from Scottish Water's Annual Returns in relation to large sewage treatment works, but Annual Returns include information on the load at treated at smaller treatment works with an Ammonia consent <5mg/l (rather than 3mg/l). In order to address this difference in a proportionate way, we reviewed Scottish Water asset database information to identify what proportionate of small treatment works load was subject to an ammonia consent <3mg/l, and used this to estimate the relevant amount of load (in addition to directly reported load from large treatment works) that should be included for this metric in each year of the modelling period.

Other relevant data and allocation issues

The following cost allocation issues that were highlighted above in relation to wholesale water were also relevant to our development of a dataset for wholesale waste water:

- Ahead of 2021-22, Scottish Water's Regulatory Accounts (Table M18) did not report costs in way that showed outturn capital maintenance levels for Wholesale Waste water, Sewage Collection or Sewage Treatment. As with wholesale water data, we agreed some simple

allocation assumptions that could be used to generate the cost figures needed for modelling purposes.

- Allocations of capex between capital maintenance and enhancement: as noted above, there is a question over the extent to which Scottish Water's approach to allocating capex between capital maintenance and enhancement is consistent with that applied by companies in England and Wales.
- A change to Scottish Water's attribution of repair and renewals spend from 2021-22 onwards is taken into account below when changes in wastewater opex over time are considered.

Our Approach to using the PR19 and PR24 Waste Water Models

As was noted above, for our wholesale water assessment we focused only on Ofwat's PR24 models, because we considered it reasonable to view that set of models as effectively encompassing Ofwat's PR19 models (with a more refined approach to calculating the relevant weighted average density figures). This was not the case for waste water modelling and given this we have considered the results of the PR19 and the PR24 models in our assessment.

As with wholesale waste water, our starting point was that we should try to make use of the full set of Ofwat's waste water models where possible, and that we should focus our attention on the overall 'triangulated' results that come from the application of those models. That approach recognises the risk that individual models may tend to result in too much weight being put on some factors and not on others, and that taking a more aggregated view will tend to lessen that risk. That is, combining results across a range of models which adopt different approaches can help generate more balanced outcomes and lessen the risk that identified differences in efficiency scores between companies result from limitations in the modelling process as opposed to differences in underlying efficiency. Also as with wholesale water, we considered that more aggregated assessments would be likely to be less affected by some of the cost allocation issues referred to above (in particular, given assumptions it had been necessary to make regarding allocations between business areas).

However, we identified the extent of services that have been provided under PFIs as meaning that the following sets of Ofwat models were highly unlikely to provide an informative basis for comparison when assessing Scottish Water's costs:

- The PR24 (and PR19) Bioresources models
- The PR19 Bioresources plus models
- The PR24 Network Plus models

Our concerns with respect to usefulness of these models for assessing Scottish Water's costs are set out below.

Ofwat's bioresources models

We have not found Ofwat's PR24 bioresources models to provide a useful way of seeking to assess the efficiency of Scottish Water's sludge costs in a context where:

- Over the period covered by Ofwat's modelling the vast majority of sludge-related services have been undertaken by PFI providers (as highlighted in the table earlier). Given this, the benchmarking would involve comparing the residual (i.e. non-PFI) provision of sludge services by Scottish Water with the overall costs faced by companies in England and Wales across all of the assets used to provide the relevant services. Notably, Scottish Water's costs would not include the costs of Daldowie or Seafield which, as was noted above, have accounted for more than half of Scotland's sludge over the past five years. Given that Ofwat has identified economies of scale as one of two key drivers of

bioresources unit costs, comparing Scottish Water's bioresources costs to those of companies in England and Wales (which will relate to their overall portfolios of relevant assets) looks unlikely to provide a balanced basis for comparison.

- Ofwat's modelling treats energy generation income (and implied energy generation income (e.g. where use is made energy on site)) as a negative cost. Given this, the implied efficiency of a company will be heavily affected by the extent to which its sludge processing plants have been developed to generate energy. With energy price increases over recent years, this has a major impact on the implied net (i.e. after taking account of energy income) costs of providing bioresources services. While this may align with Ofwat's assessment objectives (in the context of its views on a developing bioresources market), it looks unlikely to provide an effective basis for assessing the comparative efficiency of the set of sludge services in Scotland that are not provided under PFI agreements.

- Ofwat's bioresources models are, in any event, highly simplified, as can be seen in the table earlier seeking to explain all differences in efficient unit costs between companies using a single explanatory variable related to density or economies of scale. While that may have been viewed as providing a sufficient basis for capturing relevant differences between companies in England and Wales, it does not look to provide a sufficient basis to assess the efficiency of Scottish Water's levels of sludge opex (including given the factors highlighted in (i)).

- The extent of geographic dispersion of waste water customers in Scotland can be expected to have a significant upward impact on Scottish Water's sludge transportation costs (including in relation to the collection of waste from highly dispersed septic tanks). As was highlighted in relation to wholesale water, the density metrics that Ofwat has used in its modelling do not provide an effective means of reflecting the substantially different circumstances that Scottish Water faces, relative to companies in England and Wales, with respect to the provision of services to remote communities.

- As relevant PFI contracts come to an end, Scottish Water's sludge costs have been and will be subject to large percentage step increases because of the size of PFI assets relative to that of those that Scottish Water had/has been operating. This creates a significant source of 'noise' that can be expected to further complicate comparative analysis (including because of the potential impact of transitional expenditure requirements).

The PR19 bioresources plus models

The PR19 bioresources plus models sought to provide a more aggregated basis for modelling a significant portion of wholesale waste water costs (to help generate what Ofwat referred to as a 'mid-level' view) by modelling sewage treatment and bioresources costs together. However, as can be seen in the table presented earlier (which showed the variables included in the PR19 models), Ofwat did this by applying two models that used the same set of explanatory variables it had identified as appropriate for its two sewage treatment models, but with sewage treatment and bioresources costs assessed in aggregate. This approach can be understood as taking account of the scale of bioresources activities that a company undertakes by reference to its scale of sewage treatment activity (through the inclusion of the sewage treatment works 'load' metric in the models).

While this may have provided a convenient way of seeking to take account of levels of bioresources costs when making comparative assessments between companies in England and

Wales, it can be expected to result in a distorted view if used to assess Scottish Water. For Scottish Water, the sewage treatment works 'load' metric would not be expected to provide a good proxy for the scale of the bioresources activities it – as opposed to PFI providers - undertakes. In particular, this would tend to implicitly treat Scottish Water as providing a larger amount of sludge services than it does in practice, because – as was shown earlier – PFIs accounted for around 45% of sewage treatment services in Scotland in four of the past five years, but more than 80% of sludge services in those years.

The PR24 Network Plus models

A similar form a scaling problem arises when seeking to apply the PR24 Network Plus models to Scottish Water. As was shown above, those models seek to assess sewage collection and sewage treatment costs together but do so through the inclusion of sewage treatment works 'load' as a means of taking account of scale. While the amount of load treated by Scottish Water's works provides a reasonable way of reflecting the scale of its sewage treatment activities, it does not sufficiently capture the extent of its sewage collection activities. The extent of this issue is highlighted in the table below which shows how many more properties Scottish Water provides sewage collection services to, as opposed to sewage treatment services. As can be seen, between 2019-20 and 2022-23, the total number of properties that Scottish Water provided sewage collection services to was around 80% higher than the number of properties it provided sewage treatment services to.

Table 40: Scale difference between Scottish Water's Sewage Treatment and Sewage Collection activities

	2019-20	2020-21	2021-22	2022-23	2023-24
Number of properties served by Scottish Water's sewage treatment works	1.4m	1.4m	1.5m	1.5m	1.6m
Total number of properties connected to Scottish Water's waste water services	2.6m	2.6m	2.6m	2.7m	2.5m
Difference	1.2m	1.2m	1.2m	1.2m	1.0m
As a percentage of the sewage treatment properties total	81%	80%	81%	80%	60%

Source: Scottish Water analysis based on Scottish Water Annual Return data

Given this, applying the PR24 Network Plus models to Scottish Water would involve implicitly assuming that its sewage collection network was, and the costs associated with were, significantly smaller than they are in practice. We have not identified a practical way of taking this scaling issue into account while applying Ofwat's Network Plus models and given that have not found these models to provide a reliable basis for assessing the efficiency of Scottish Water's costs.

We have focused our attention on the sewage collection and sewage treatment models

Given the above, we have focused our attention on Ofwat's sewage collection and sewage treatment models. In line with the general approach described above, we have focused on aggregated and triangulated efficiency score assessments, and therefore on what – in PR24 – Ofwat described as its 'bottom-up' Wastewater Network Plus assessment, which generates a view of modelled costs by summing the averaged views of the results from the sewage collection and sewage treatment modelling. This approach involves using results from:

- 4 of the 8 PR19 waste water models (not using the 2 bioresources models or the 2 bioresources plus models); and,
- 5 of the 7 PR24 waste water network plus models (not using the 2 'top down' network plus models or the separate bioresources models).

This inevitably means that less of a cross-check is provided for on model results, and so the risk of identified differences between companies reflecting factors other than differences in efficiency is likely to be greater than under Ofwat's broader set of models. We note, though, that while Ofwat's results show some material company specific differences between Ofwat's PR24 bottom up estimate of modelled costs, and the top down view it generated through applying its Wastewater Network Plus models, there is not a material difference on average. Given this, there does not appear to be a reason to have a specific prior expectation that the bottom up approach which we focus on below would imply a higher or a lower efficiency score than would have arisen from a triangulated view of the kind Ofwat used (if that had been possible to generate), although as noted above that may have been the case.

Our Modelling Results Ahead of any Adjustments: Wholesale Waste Water

The table below shows the Network Plus efficiency score we identified for Scottish Water, and how it compares to the median and upper quartile (Upper Quartile), based on the PR19 and PR24 sewage collection and sewage treatment models. For the PR24 models we show the results based on the coefficients Ofwat identified in its Final Determinations based only on data from England and Wales, together with the results from re-running Ofwat's models after including Scottish Water data. For PR19, we have re-run the models after including Scottish Water data.[15]

Table 41: Summary of modelling results for Wastewater Network Plus ahead of any adjustments

	PR19 With Scottish Water data	PR24 Ofwat coefficients	PR24 With Scottish Water data
Scottish Water Efficiency Score	1.17	1.07	1.09
• Relative to the median level	1.15	1.05	1.06
• Relative to the UQ level	1.16	1.06	1.08

Source: Scottish Water analysis

As can be seen, these initial results show a fairly significant difference between the PR19 and PR24 modelling, with Scottish Water's costs to be between 6% and 16% higher than the upper quartile levels implied by running Ofwat's models, depending on which models and approach is used. We assessed the impact that the policy towards asset replacement that has been applied in Scotland in recent years was likely to be having on these results by using the same broad approach as we did for wholesale water: i.e. considering how the results were affected by different post- and pre-modelling adjustments.

Post-modelling Adjustments to take Account of Asset Replacement Policy in Scotland

As with wholesale water, while – in principle – physical measures of activity would ideally use to provide a comparison between capital maintenance levels in Scotland and in England and Wales, in practice, available data does not provide a reliable basis for such a comparison. Given that, we focused our attention on assessing differences in capital maintenance spend.

For wholesale water, our starting point was to use levels of capital maintenance per property as a reasonable basis for comparison. This approach followed from Ofwat's use of the number of connected properties as a scale driver in most (18 out of 24) of its wholesale water models. We then refined this by using a triangulated approach which also took account of Ofwat's use of length of main in its other 6 wholesale water models. That is, we sought to align our approach to the use of scale drivers in Ofwat's models.

Ofwat has not used the number of connected properties as a scale driver in any of its Wastewater Network Plus models. Instead, in its PR19 and PR24 models, Ofwat used:

- Length of sewer as a scale driver in its sewage collection models; and,
- Load as a scale driver in its sewage treatment models.

Given that, we treated these metrics as providing a reasonable basis for identifying differences in spend levels between Scottish Water and companies in England and Wales. However, we also consider below the impact of comparing capital maintenance on a per property basis (as an alternative we considered during our assessment process).

The graph below compares Scottish Water's levels of sewage collection capital maintenance per km of sewer since 2011-12, with the median level for water companies in England and Wales. As in the assessment of wholesale water costs, the relationship with the median level is relevant to consider as this would be expected to have impacted on the level of capital maintenance that will have been treated, implicitly, as efficient within Ofwat's calibration of modelled costs. For Sewage Treatment, an equivalent comparison per unit of load also shows a significant upturn in Scottish Water's capital maintenance per unit since 2020-21.

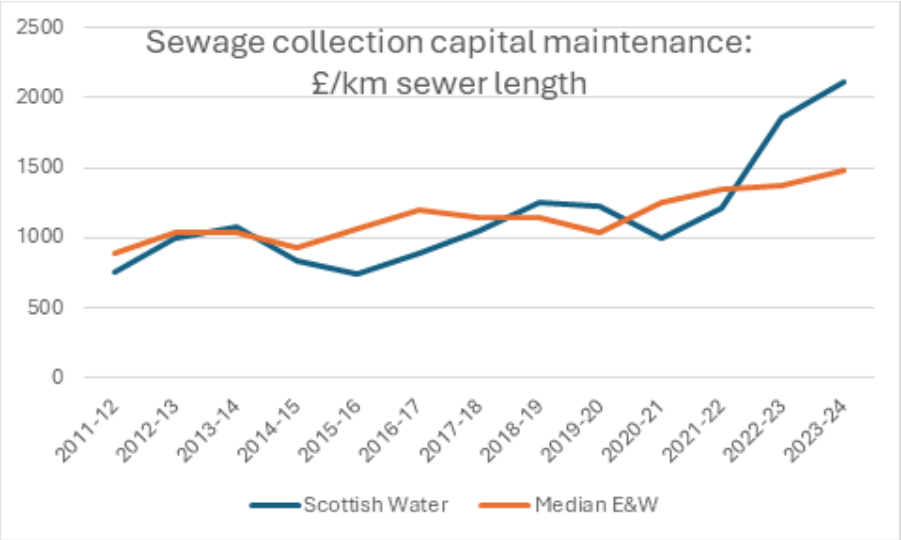

Figure 15: Sewage collection capital maintenance: £/km sewer length

Source: Scottish Water analysis based on Scottish Water Annual Return data and PR24-FD-CA06-Base-costs-wastewater-model-1.xlsx

We sought to control for the impact of Scottish Water's asset replacement policy on its implied efficiency score by adjusting Scottish Waters's reported outturn costs such that the capital maintenance part of those costs was equivalent to that which would be implied had it spent in line with the England and Wales median level (on a per sewer length basis for sewage collection, and on a per load basis for sewage treatment). As with wholesale water, we also considered the effects of making an equivalent adjustment based on the lower quartile level of capital maintenance per unit in England and Wales, given the potential for this to impact on modelled values and on the upper quartile benchmark.

The table below starts by showing Scottish Water's implied efficiency score based on using Ofwat's PR24 sewage collection and sewage treatment model coefficients to generate a bottom-up Network Plus efficiency score (in line with the figures that were shown in the middle column of the table above). It then shows how the efficiency score changes when Scottish Water's capital maintenance levels are assumed to be consistent with the median and lower quartile levels observed in England and Wales on the basis described above.[16] As can be seen, on this basis, Scottish Water's Efficiency Score falls to below the upper quartile level (implying upper quartile performance) when the impact of asset replacement is taken into account in the manner described.

Table 42: Impact of post-modelling adjustments on Scottish Water's bottom-up Wastewater Network Plus results using Ofwat's PR24 models and coefficients: with sewer length/load-based adjustments

	PR24 Ofwat coefficients	**With Scottish Water capital maintenance set in line with E&W based on spend per km of sewer/unit of load:**	
		Median	Lower Quartile
Scottish Water Efficiency Score	1.07	0.88	0.81
• Relative to the median level	1.05	0.86	0.79
• Relative to the UQ level	1.06	0.89	0.82

Source: Scottish Water analysis

The table below shows the equivalent comparison when the adjustment to reflect asset replacement policy is based on spend per number of properties rather than the sewer length and load metrics referred to above. As can be seen, this generates similar results with Scottish Water shown as having upper quartile performance.

Table 43: Impact of post-modelling adjustments on Scottish Water's bottom-up Wastewater Network Plus results using Ofwat's PR24 models and coefficients: with per property based adjustments

	PR24 Ofwat coefficients	With Scottish Water capital maintenance set in line with E&W based on spend per property:	
		Median	Lower Quartile
Scottish Water Efficiency Score	1.07	0.94	0.85
• Relative to the median level	1.05	0.92	0.83
• Relative to the UQ level	1.06	0.95	0.85

Source: Scottish Water analysis

Given the models that our assessment is based on, we have used sewer length and sewage treatment works load as appropriate bases for making pre-modelling adjustments (the results from which are set out below).

Pre-modelling Adjustments to Take Account of Asset Replacement Policy in Scotland

The table below shows the results of re-running the PR19 and PR24 sewage collection and sewage treatment models, with Scottish Water data added to the dataset, and with two alternative pre-modelling adjustments having been made consistent with the two post-modelling adjustments considered above: i.e. setting Scottish Water's capital maintenance levels in line with the England and Wales median and lower quartile (Lower Quartile) levels on the basis described above. As can be see, the results from applying these pre-modelling are similar to those identified above using the post-modelling adjustments. In particular, the results – based on the PR19 and PR24 models – imply upper quartile performance when the impact of asset replacement is taken into account.

Table 44: Scottish water bottom-up Wastewater Network Plus efficiency scores after pre-modelling adjustments for asset replacement policy

	Scottish Water capital maintenance set in line with E&W median		Scottish Water capital maintenance set in line with E&W LQ	
	PR19	PR24	PR19	PR24
Scottish Water Efficiency Score	0.98	0.91	0.91	0.84
• Relative to the median level	0.91	0.88	0.84	0.81
• Relative to the UQ level	0.98	0.90	0.91	0.82

Source: Scottish Water analysis

Re-running the Models using only Opex

The table below shows the results of re-running the PR19 and PR24 sewage collection and sewage treatment models but using only opex for all companies (as opposed to the 'base cost plus' values that Ofwat used which included opex but also capital maintenance and some limited enhancement spend). In its comments on our Draft Business Plan analysis WICS identified some England and Wales cost lines that it may be appropriate to include in the scope of what should be treated as opex for England and Wales companies. We engaged with WICS to agree appropriate ways to take account of these points and have taken them into account in our updated analysis.

On an opex-only basis, our modelling shows Scottish Water's as an upper quartile performer. The results are similar under the PR19 and PR24 models, and similar to the that implied by the PR19 base cost models (shown above) when Scottish Water's capital maintenance was adjusted to be in line with the England and Wales median (the PR24 models showed a lower efficiency score following that adjustment).

Table 45: Scottish water bottom-up Wastewater Network Plus efficiency scores when models re-run on an opex only basis

	Sewage collection and sewage treatment models re-run using opex only	
	PR19	PR24
Scottish Water Efficiency Score	0.96	0.98
• Relative to median	0.86	0.88
• Relative to UQ	0.97	0.99

Source: Scottish Water analysis

Impacts of Geographic Dispersion

The impact of the geographical dispersion of customers that Scottish Water faces is less pronounced for waste water services than it is for water services, in large part because the scope for using septic tanks in more rural and remote areas. As was noted above, we agreed with WICS that septic tanks should be removed from modelled costs in order to avoid potential distortions (although, as noted above, the dispersion of septic tanks would separately impact on sludge transportation costs). Also, Ofwat's wastewater models include variables that seek to directly reflect the scope to which companies are likely to be able to benefit from economies of scale in wastewater treatment. We note that the findings of our modelling suggest that there are not material additional issues related to geographic dispersion that need to be taken into account.

Our Overall Assessment in Relation to Wholesale Waste Water Opex

Given the above, our assessment is that Scottish Water's current level of wholesale waste water opex efficiency is likely to be in line with that of the leading companies in England and Wales, and therefore that Scottish Water should not adopt a "catch-up" efficiency challenge for the SR27 period in relation to wholesale wastewater opex. We comment on this further below where we consider the implications of our analysis for overall (i.e. water and wastewater) opex levels.

Our Overall Assessment of Opex Efficiency

The above sections set out separate water and wastewater assessments of Scottish Water's opex efficiency, based on applying Ofwat/CMA benchmarking models for wholesale water and wastewater in a way that takes appropriate account of key features of the context within which Scottish Water operates that have a material bearing on that benchmarking (including the role of PFI provision, differences in asset replacement policy, and the substantially different extent of geographic dispersion faced by Scottish Water). In this section, we bring these separate bits of analysis together to give an overall view of Scottish Water's opex efficiency, in line with the approach WICS adopted in its feedback on our Draft Business Plan.

The following starts by setting out our overall assessment of Scottish Water's opex efficiency based on evidence up to 2023/24, which was the most recent year for which Ofwat had published a full cost assessment dataset for companies in England and Wales when we undertake our benchmarking analysis. In line with the approach that Ofwat has typically taken, we have assessed the question of whether a catch-up efficiency adjustment should be applied to Scottish Water's opex based on an the most recent 5 year period. As set out below, and consistent with the analysis in our draft business plan and the analysis that WICS provided in its feedback on our draft plan, that 'backward looking' assessment shows Scottish Water's opex efficiency to have been in line with upper quartile performance.

In its feedback on our Draft Business Plan, WICS also used the water and wastewater modelling approaches described above to generate a forecast of what an efficient level of opex would be for Scottish Water over the final years of SR21, and during SR27. The WICS feedback used that forecast as a basis for reviewing the levels of Scottish Water had identified as required in those years, and raised concerns over some upward adjustments to opex that Scottish Water had identified as needed over the next couple of years, and the extent to which those adjustments could affect the overall assessment of Scottish Water's opex efficiency. Detailed evidence on drivers of changes to opex requirements is provided in the Finance Annex. We comment below on how we consider such adjustments to relate to the assessment of opex efficiency, and in particular to the benchmarks that Scottish Water and WICS have developed using Ofwat's econometric models.

Scottish Water's current level of opex efficiency

The table below brings together the results of water and wastewater modelling, and – in line with the approach adopted by WICS in its feedback on our Draft Business Plan submission – focused on the results of opex-only modelling. The results shown in the left hand column align with those that WICS identified in its feedback. We have shown the average position over the five year period 2019/20 to 2023/24 (rather than individual years) as this aligns with the way in which catch-up efficiency is typically assessed. We comment on forecast movements in opex levels in specific years below.

Table 46: Modelled opex allowances (water and wastewater) based on opex-only modelling: annual average for 2019/20-2023/24 in 2023/24 prices

	Before changes to address impact of geographic dispersion on wholesale water opex (consistent with analysis in WICS feedback)	After changes to address impact of geographic dispersion on wholesale water opex
Scottish Water modelled allowance: UQ benchmark	£326m	£330m
Scottish Water modelled allowance: median benchmark	£341m	£351m
Scottish Water relevant outturn opex	£324m	£318m
Implied efficiency score relative to: • UQ benchmark	0.99	0.96
• Median benchmark	0.95	0.90

As can be seen in the table, Scottish Water's opex levels are identified as in line with that of top performers in England and Wales even before the adjustments are made to reflect the impact of geographic dispersion on Scottish Water's costs (i.e. in the left hand column). This aligns with the analysis WICS presented in its feedback on our Draft Business Plan. While we welcome the assessment WICS made, we consider it important – for the reasons that were set out above – that appropriate account is taken of the implications of the substantially different geographic context within which Scottish Water operates (in particular on wholesale water opex). We consider that to be particularly important if – as in the WICS feedback – these modelling results are used to project forward, as it affects the assumed starting point. The right hand column shows that when account is taken is taken of this, then Scottish Water's opex is identified as around 4% more efficient than the upper quartile level over the period shown.

The implications of future cost increases for benchmarking results

In its feedback on our Draft Business Plan, WICS used the results of its modelling to forecast an efficient benchmark through to the end of the SR27 period and used this to compare Scottish Water's forecast levels of opex over that period. WICS observed that, when Scottish Water's proposed opex additions for 2025/26 and 2026/27 are taken into account, the Scottish Water's forecast opex is above the efficiency benchmark from England and Wales when considered on the basis of Upper Quartile and on average performance. The WICS view replicated in the figure below.

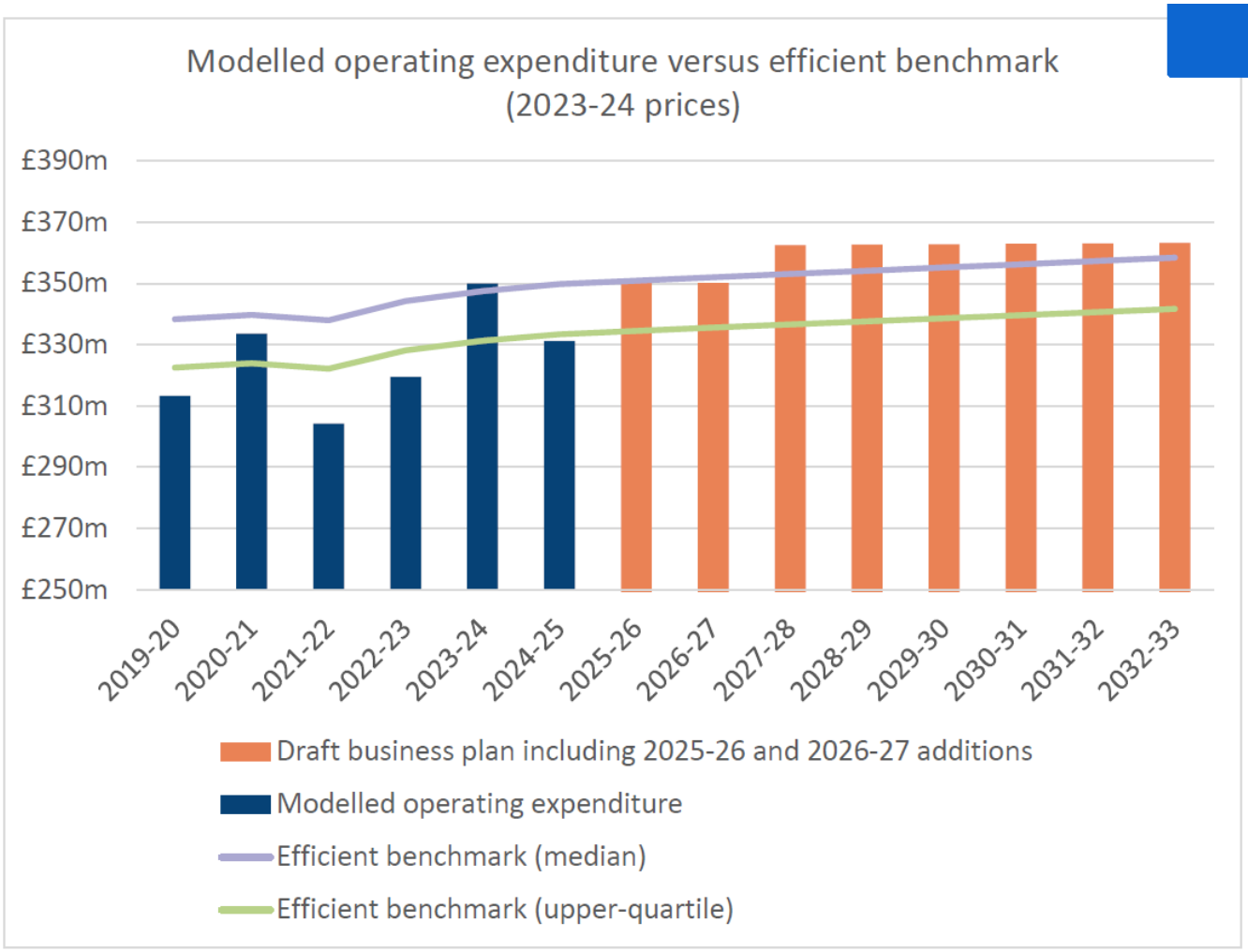

Figure 16: Modelling operating expenditure vs efficient benchmark (23/24 prices)

In line with our comments above, we consider the (Upper Quartile and median) benchmark levels used in analysis to be understated, and that would affect this assessment to some extent. In particular, for the reasons set out above, we consider it appropriate to take account of the implications of the materially different extent of geographic dispersion in Scotland relative to England and Wales, and its impact on the efficient costs of supply in two ways:

- By making use of area-weighted density measures (rather than the population-weighted density used by Ofwat) when modelling Treated Water Distribution costs in the way that was set out above. This maintains Ofwat's modelling approach to treated water distribution while including a density measure that takes better account of the different circumstances Scottish Water faces with respect to geographic dispersion. As was shown above, this increases the efficient opex benchmark for Scottish Water by around £4 million per year.
- By making an adjustment to reflect that the efficient water treatment plant size for serving remote communities can be very small, and the cost of operating those plants is much higher than average (with little opportunity to benefit from economies of scale). As set out above, we consider that the net impact of this can be taken into account in a reasonable manner by excluding around 3.5% of outturn wholesale water opex, which was equivalent to around 2.3% of overall modelled wholesale opex in the efficiency assessments set out above.

As a result, we consider that the above adjustments should be made when assessing Scottish Water's opex efficiency on either a backward or forward-looking basis. However, we also consider the forward-looking WICS analysis to raise some more fundamental questions over how it is appropriate to determine modelled benchmark levels when seeking to project forward.

A critical question that should be considered when projecting this kind of efficiency benchmark forward is the extent to which the factors which underpin the forecast increase in relevant costs can reasonably be understood as having been taken into account adequately in the development and calibration of the benchmark. Importantly, where factors have not been taken into account adequately in the development and calibration of the benchmark, then it will be appropriate to explicitly adjust for this ahead of making a comparison and drawing inferences on the basis of that comparison.

There are a number of different broad reasons why factors that underpin expected future opex increases might not have been adequately captured in the econometric modelling used to develop efficiency benchmarks, including that:

- Some part of expected future cost increases may relate to opex cost categories that were explicitly excluded from the benchmarking analysis: the key cost component here is business rates. For a like-for-like comparison, any forecast opex increases driven by expected business rate changes should be removed from this kind of comparative analysis.
- The data period used for model calibration may provide an insufficient basis for reflecting the scale of particular cost pressures: this is a key issue when energy costs are being considered because energy prices increased substantially in the latter part of the data period that was used for model calibration (2011/12-2023/24). The calibration generated by the modelling can be expected to insufficiently allow for energy costs to some extent, because average energy costs across that period would not be expected to provide a reliable guide to future expected energy costs. At PR24, Ofwat explicitly took this factor into account through its use of what it referred to as a sector-wide cost adjustment claim. This has interactions with how Ofwat takes account of RPEs.
- The RPE adjustment mechanisms that Ofwat applies materially affect the nature of the forecasting and associated opex efficiency issues to be addressed in this context. That is, Scottish Water's opex forecasts are based on its best assessment of the likely implications of input cost pressures on future opex levels. Within Ofwat's framework, the implications of equivalent pressures do not need to factored into forecasts (and associated allowances) in the same way, because Ofwat's RPE adjustment mechanisms provide a means of reconciling funding with the outturn level of relevant indicators over time (and uses the scope companies in England and Wales have to finance potential shortfalls to underpin this).
- Opex additions included in cost forecasts can reflect the emergence of cost pressures that were simply not relevant during the data period used to calibrate the benchmark. For such changes, that can make the benchmark effectively out of date and as providing an unreliable reference point for comparison unless the 'new' cost pressure is excluded from the analysis or is taken into account by explicitly applying an addition to the benchmark. The impact of changes to Employers National Insurance rates falls into this category. That increase is not factored into the calibration of the efficiency benchmarks that were generated based on past outturn data, and therefore the modelled benchmarks cannot be expected to provide a reliable basis for comparison with opex forecasts unless some adjustment is made to either include the impact of the NI change in the benchmark or exclude it from the forecast.
- Cost increases may relate to categories of spend that are unlikely to have been fully captured within the modelling process. Cloud computing costs look to raise a material boundary issue in this context, in that attributing the full extent of forecast additions related to such costs to opex may not align well with the way in which such cost have been allocated by companies in England and Wales.

Our assessment is that there are highly material factors driving forecast opex additions that would not be expected have been taken into account adequately in the model calibration process, such that the forecasts of modelled efficiency benchmarks would not be expected to provide a reliable basis for assessing the efficiency of forecast opex levels in the absence of significant adjustments being made.

We have reviewed the data and approach taken by WICS and we believe that there are a number of adjustments needed to provide a true comparison. Many of them are detailed above, however more detail on the annual effect is given in the following paragraphs.

Adjustments to our like-for-like costs

- In our review of WICS' analysis, we noted that septic tank costs had be treated inconsistently in the 24/25 year. They were included in the figures having been excluded in all periods before that. We believe this is an error and have corrected for it. This has the effect of decreasing our costs for comparison by c. £4m a year from 24/25 onwards.
- WICS had taken our reported figures in prior periods and then added specific items from our draft plan submission to it, for changes in future years. We have taken an identical approach but have updated the figures for the same numbers as shown in the final plan. This has made a de minimis impact, but we note it for completeness.
- Employers NI – as described above, the recent increases in Employers National Insurance charge rates was not captured in the benchmarking. Adjusting this out removes circa £5m a year.
- Non-commodity costs. Our forecast model for SR27 includes allowance for a price shock relating to certain "non-commodity" energy costs which reflect new initiatives such as grid reinforcement and balancing and the Nuclear RAB Levy and are therefore not part of the normal run-rate or benchmark costs – yet are out with management control. These account for around £8m of Final Plan annual operating costs and have been adjusted out.
- RBMP3. The "River Basins Management Plan 3" is SEPA regulation requiring material amounts of additional chemical dosing, including associated energy and staff costs. This is a step change in regulatory requirement and not a "business-as-usual" activity. Our plan contains c. £7m a year of cost in this category starting in 26/27.
- Finally, we reflect the 2.3% opex adjustment detailed earlier in this appendix relating to the differentiated nature of the remote communities we serve compared to England and Wales – this reduces like-for-like costs by c. £8m per year.
- Note, whilst we believe that the difference in accounting for cloud computing costs between Scottish Water and England and Wales may distort the benchmark, we are unable to draw a definitive conclusion and have therefore not made an adjustment here.

Adjustments to the benchmark

The only adjustment we have made to the benchmark is the adjustment to reflect the area-weighted densities, which as detailed above, increases the benchmark by c. £4m per year.

Resulting output

We believe that the adjustments above create a more like-for-like comparison; and one which suggests that we will continue to operate at upper-quartile levels.

The graph below shows the adjusted figures compared to the original feedback.

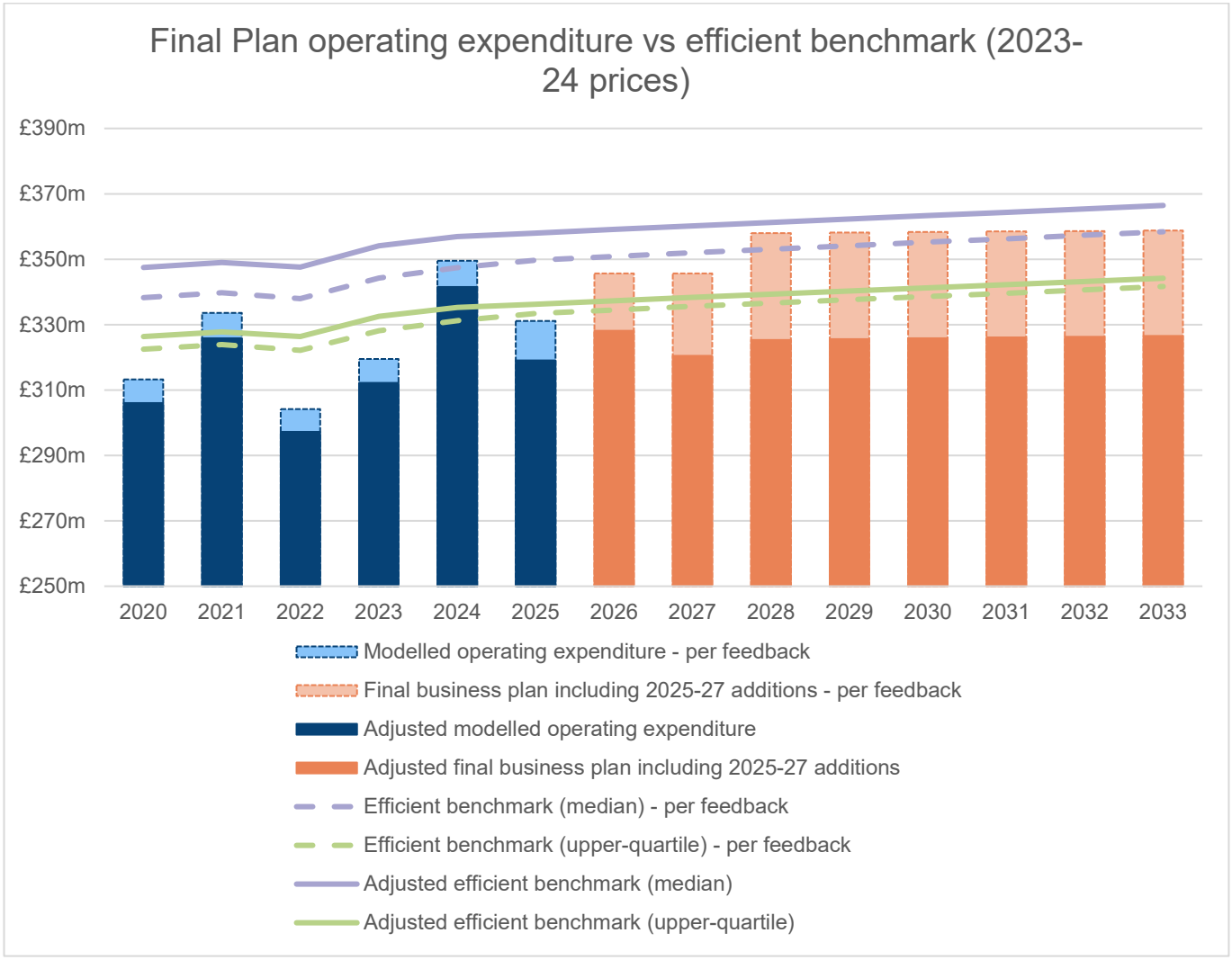

Figure 17: Final Plan operating expenditure vs efficient benchmark (23-24 prices)

Annex B: Supplementary Information on Enhancement Cost Benchmarking Based on Ofwat's PR24 Modelling

Introduction

In this annex, we provide further details on how we have assessed the efficiency of Scottish Water's enhancement cost forecasts relative to other water companies in England and Wales drawing on a range of econometric and other unit cost modelling that Ofwat undertook at PR24. In line with the description provided in the main body of this Technical Appendix, we focus below on the following areas:

- Phosphorus removal
- Sanitary permit tightening
- Storm overflows
- Mains replacement (included given its implications for Leakage enhancement)
- Lead pipe replacement
- Metering
- Flow monitoring at wastewater treatment works
- Chemicals removal

In order to support this benchmarking activity, Data Table 5 (that forms part of our SR27 business plan submission) includes information relevant to the first three areas of activity shown above (in Blocks K to M), and Data Table 9 includes information relevant to the other areas of activity shown above. The Commentary to those data tables provides further information on the sources of the information that has been used in the assessments described below.

Phosphorus removal, sanitary permit tightening and chemicals removal

We consider these enhancement areas together here because there has been significant inter-relatedness between them in the development of our SR27 plan. In particular:

- The three sites where enhancement is required to address sanitary permit tightening also face an enhancement requirement to meet a tighter phosphorus consent.
- The three sited where enhancement is needed to address chemicals removal requirements also face an enhancement requirement to meet a tighter phosphorus consent, and at one of those sites enhancement is also needed as a result of sanitary permit tightening.

In the development of our plan, the approach to addressing more than one of these enhancements at a given site has been developed and costed as a single project. In response to a specific request from WICS, Data Table 5 presents a separate line for the meeting of sanitary permit tightening at the three sites where that was required, and – for those same three sites – shows a separate line for phosphorus removal. We did this by applying a reasonable but inevitably approximate allocation approach (given latest best cost estimates).

For chemicals removal, the expenditure figures presented in Data Table 9 have not been subject this kind of cost allocation approach. Rather, Data Table 9 shows the overall forecast level of cost for each of the three projects that include chemicals removal. As a result, for the three chemicals removal sites (where tighter phosphorus consents also need to be met), both the chemicals removal expenditure figures in Data Table 9 and the phosphorus removal figures in Data Table 5 will overstate relevant costs to some extent.

In order to avoid double counting, we have treated a 50:50 allocation between phosphorus removal and chemicals removal costs as a reasonable starting point for the purposes of enhancement benchmarking. However, given the scope for alternative allocation approaches to be reasonably applied where two or more of these requirements (phosphorus removal; chemicals removal; sanitary permit tightening) are faced at the same site, we have considered it appropriate

to assess the implications of Ofwat's benchmarking when considered in aggregate across these three areas. As set out below, we consider the limitations of Ofwat's modelling (including as identified by the CMA in relation to phosphorus removal) to provide further support for assessing benchmarking implications in this broader way given the inter-relatedness of the cost data highlighted above.

Phosphorus removal

At PR24, Ofwat set allowances for phosphorus removal by putting equal weight on the results of four separate scheme-based models (with no further efficiency challenge applied), two based on historical data, and two based on company forecasts.[53] Ofwat's models used the following explanatory variables in order to seek to take account of relevant cost drivers:[54]

- Population Equivalent served by the relevant plant: to reflect scale.
- The enhanced phosphorus permit level: ie the stringency of the new requirement.
- The historical phosphorus permit level: ie the relevant starting point.
- The enhanced permit level squared (included in two models): to seek to capture a non-linear relationship between the enhanced permit level and the cost of upgrade.
- A technically achievable limit (TAL) dummy (permit <=0.25mg/l, included in two models), to capture a step change in costs at the TAL.

The table below shows the modelled levels of cost implied for Scottish Water by Ofwat's phosphorus removal models – based on Ofwat's identified coefficients – given the characteristics of the set of schemes included in our SR27 plan (as measured by reference to the above explanatory variables). We did not find the inclusion of Scottish Water data to have a material impact on the results implied by Ofwat's forecast models and did not have available data to enable a re-running of Ofwat's historical models.

Table 47: Phosphorus removal – implied modelled costs

	Modelled costs (2022/23 prices)
Forecast model 1 (PR1)	£124.3m
Forecast model 2 (PR2)	£127.4m
Historical model 1 (PR3)	£60.9m
Historical model 2 (PR4)	£60.9m
Triangulated (25% weight on each)	£93.4m

We note that a striking feature of Ofwat's modelling across all England and Wales companies was the extent of the variation between the results of the forecast and the historical models, and is difference is particularly pronounced for Scottish Water.

The table below shows the overall level of forecast totex identified in Data Table 5 as related to phosphorus removal projects in in the SR27 plan, including pre-SR27 totex associated with those projects (as the modelling seeks to assess the total costs of meeting the relevant requirement). In line with the comments above, a deduction is then made on the assumption that chemicals removal costs at the three sites where it is required will account for 50% of the costs that are shown (in Data Table 5) as related to Phosphorus removal. Scottish Water's implied efficiency score for phosphorus removal, relative to the triangulated benchmark above, is then shown.

[53] Ofwat (December 2024) PR24 Final Determinations Expenditure Allowances - Enhancement cost modelling appendix, p81.
[54] Ofwat (December 2024) PR24 Final Determinations Expenditure Allowances - Enhancement cost modelling appendix, p69 - 81.

Table 48: Phosphorus removal – forecast expenditure vs implied modelled costs

	2024/25 prices	2022/23 prices
Total forecast expenditure related to P-removal shown in Data Table 5	£110.7m	
Deduct 50% of chemicals removal costs shown in Table 9	(£8.4m)	
Implied P-removal costs	102.3m	£94.6m
Modelled costs based on Ofwat triangulated view		£93.4m
Implied efficiency score		1.01

As can be seen, if viewed in isolation, this would imply that Scottish Water's forecast costs in relation to the set of phosphorus removal projects in our SR27 plan are around 1% higher than Ofwat (triangulated) benchmark, which amounts to £1.2m. Given the allocation issues referred to above, and the results of our assessments of Scottish Water forecast costs relative to Ofwat's benchmarks for tighter sanitary parameters and chemicals removals, our assessment is that Scottish Water should be viewed as in line with Ofwat's benchmark with respect to phosphorus removal. We comment on this further below.

Sanitary permit tightening

This relates to the costs of meeting more stringent permit requirements at wastewater treatment works for ammonia or biochemical oxygen demand levels. At PR24, Ofwat used two econometric benchmarking models when setting allowances for this activity, applying a median benchmark to, and putting 50% weight on, each:

- A scheme level model which assessed how costs varied with the Population Equivalent of the site facing the requirement.
- A company level model which assessed how costs varied across companies with the overall scale of their required activity as captured by the total Population Equivalent across the sites facing requirements.

The table below shows our forecast expenditure requirements to meet relevant permit tightening, and how these compare to the allowances implied by the two Ofwat models described above. As with phosphorus removal, because the modelling is focused on the costs of meeting a requirement, we have included all relevant expenditure in the table below, including where it is expected to arise ahead of SR27, so that the total costs of meeting the requirement are considered. As shown in the table, Scottish Water's forecast costs are lower than the modelled cost (after efficiency challenge) implied by both models, although it is notable that the implied gap is much larger under Ofwat's company level model. Overall, we found Scottish Water's forecast costs to be 44% below Ofwat's benchmark, which amounts a difference of £8.7m.

Table 49: Forecast expenditure requirements vs benchmark: sanitary permit tightening

	2024/25 prices	2022/23 prices
SR27 forecast expenditure	£6.7m	
Scottish Water total forecast expenditure requirement	£12.0m	£11.1m
Modelled allowances after median efficiency challenge using:		
- Scheme-level model		£12.5m
- Company-level model		£27.2m
Triangulated modelled allowance		£19.8m
Implied Scottish Water efficiency score		0.56

The table below shows how Scottish Water's forecast expenditure levels compare to Ofwat's (triangulated) benchmark if phosphorus removal and sanitary permit tightening are considered together. As can be seen, on this basis, Scottish Water's forecast costs are around 7% (and around £7.5 million) below the Ofwat benchmark.

Table 50: Forecast expenditure requirements vs benchmark: phosphorus removal sanitary permit tightening

	2022/23 prices
Scottish Water total forecast expenditure requirement: phosphorus removal & sanitary parameter tightening	£105.7m
Ofwat benchmark: total for phosphorus removal & sanitary parameter tightening	£113.2m
Implied efficiency score	0.93

Chemicals removal

This relates to the costs of meeting tightened/new permits for chemicals/hazardous substances at wastewater plants. At PR24, given model limitations, Ofwat assessed requested funding for each company against an indicative benchmark, with companies allowed their requested level of expenditure if consistent with this benchmark (and otherwise subject to a deep dive). The specific indicative benchmark that Ofwat used is not made clear in its PR24 materials, but Ofwat considered the costs implied by a model which used the number of chemicals removals schemes as the only explanatory variable, and a model which used the population equivalent of the relevant works as the only explanatory variable (with the results of these models considered with and without the inclusion of identified outliers). Ofwat also calculated the median levels of unit costs per scheme and per unit of population equivalent (again with and without identified outliers).

We have not found these approaches to imply the overall level of expenditure assumed in the above assessment of phosphorus removal costs (ie as accounting for 50% of expenditure levels identified in Data Table 9 in relation to chemicals removals) should be viewed as breaching

Ofwat's indicative benchmark.55 This comparison provides further support for the assessment above that Scottish Water's forecast phosphorus removal expenditure requirements are in line with Ofwat's benchmark (as it implies that the level of chemicals removal costs assumed in that assessment was not unduly high).

Storm overflows

In order to try to allow for the use of Ofwat's econometric benchmarking of forecast storm overflow costs, WICS requested that the volume of 'equivalent storage' be provided in Data Table 5 for each storm overflow project included in our SR27 plan, where 'equivalent storage' was the single explanatory variable used in its models. In practice, however, the extent to which it was feasible to identify equivalent storage values for specific SR27 projects in a reliable and informative manner has been heavily constrained by differences overall in the approach to Storm Overflows being adopted in Scotland compared to England and Wales, with the focus in Scotland on High Priority UIDs, and achieving water quality and reduced SRD targets for the receiving waterbodies, rather than on achieving spill reduction targets. This has meant that our SR27 plan includes only a small number of projects where the provision of additional storage capacity is expected. As shown in the table below, these projects account for only 8% of the storm overflows expenditure identified in Data Table 5. Note that the expenditure figures shown in the table include some pre-SR27 expenditure where that relates to projects that are included in the SR27 plan, as total project costs are relevant for benchmarking in this context.

Table 51: Forecast expenditure requirements: storm overflows

	Total expenditure estimate related to SR27 projects (2024/25 prices)	**% of total**
Projects where additional storage capacity has been identified as the expected response	£29m	8%
Other projects where an effective storage capacity forecast has been estimated	£100m	29%
Projects where it has not been feasible to estimate an effective storage capacity	£117m	33%
Forecast funding to allow for further expected requirements where specific projects have not yet been determined	£103m	30%
Total forecast expenditure on storm overflows identified in Data Table 5	£350m	100%

We determined 'equivalent storage' levels in relation to a further 29% of forecast expenditure, but have highlighted the limitations of seeking to apply this approach given the different policy and (environmental) regulatory context that applies in relation to addressing storm overflow issues in Scotland compared to England and Wales. We have not been able determine equivalent storage values related to other planned expenditure given the circumstances that apply, including that –

[55] As was noted above, that level of expenditure includes the forecasts costs of phosphorus removal (as well as chemicals removal) at the three sites where chemicals removal is required in SR27, and therefore necessarily overstates the costs of chemicals removal.

given the still evolving nature of requirements – a significant number of specific projects have not yet been determined.

We have considered the implications of Ofwat's econometric benchmark models for those projects where it has been possible to determine an equivalent storage volume. However, in practice, we have not found this process to be informative. In particular, we found our forecast expenditure levels for these projects to be only a fraction (around 10%) of the levels implied by Ofwat's modelling. While this analysis clearly shows our cost forecasts to be below the benchmark levels implied by Ofwat's models, we consider the scale of the implied difference to highlight limitations of seeking to use a modelling approach with effective storage as the only explanatory variable given the different policy context that applies (as described above), and the implications this has had for the composition of our plan.

Mains replacement

The guidance for Data Table 9 sets that it should include information on mains replacement expenditure for the purpose of leakage enhancement. In our Draft Business Plan submission, we highlighted that there was no planned expenditure on mains replacement in SR27 that was driven by attempts to reduce leakage, and that it is instead its primary purpose was to protect service levels related to water supply interruptions. However, we included forecast SR27 mains replacement spend and activity levels in order to try to provide as much relevant information as possible, and we agreed with WICS that we should also adopt this approach in our Final Business Plan.

This information allows us to compare the average unit cost for the mains replacement levels forecast in our plan with the unit cost assessment Ofwat undertook at PR24. In its Final Determinations, Ofwat used a unit cost allowance of £300 per metre (in 2022/23 prices) to fund mains replacement (for all companies except Thames Water), with this based on the median of unit data it had collected.[56] As shown in the table below, the unit rate assumed in our plan is 20% lower than the level Ofwat used.

Table 52: Unit rate assumed

	2024/25 prices	2022/23 prices
SR27 forecast expenditure	£314.4m	
Length of mains to be replaced: km	1,214 km	
Forecast unit cost: £ per metre	£259/m	£239/m
Unit cost allowance assumed in Ofwat PR24 FD		£300/m
Scottish Water implied efficiency score vs Ofwat FD		0.80

Lead Pipe Replacement

We consider the following types of lead pipe replacement in turn below:

- Lead communication pipes
- External supply pipes
- Internal supply pipes

[56] Ofwat (December 2024) PR24 Final Determinations - Expenditure Allowances, p36.

Lead communication pipes

At PR24, Ofwat identified an efficient benchmark for the cost per lead communication pipe replacement by putting 50% weight on:[57]

- The median forecast unit cost per communication pipe replacement for companies in England and Wales excluding Portsmouth Water (which was excluded from this assessment as a higher cost outlier).
- An econometric model using the natural log of the number of communication pipes replaced as the explanatory variable.

The table below compares Scottish Water's forecast unit cost to the median unit cost measure Ofwat identified in its PR24 Final Determinations, and to the equivalent version of that if Scottish Water's costs are added to the dataset. On this basis, the SR27 forecast unit cost for lead communication pipes is around 8-9% higher than the benchmark level. However, as noted above, Ofwat's approach also gave a 50% weighting to the results of its econometric model, and overall this approach has the effect of implying a lower unit cost allowance (of around £1,590/pipe replacement), and that Scottish Water's forecast level of costs is around 13% higher than the benchmark level (a 'gap' of around £3.8 million). We found this result to not be materially affected by re-running Ofwat's econometric model with Scottish Water data added to the dataset.

Table 53: 2024/25 vs 2022/23 price comparison

	2024/25 prices	2022/23 prices
SR27 forecast expenditure	£35.0m	£32.4m
Number of lead communication pipes to be replaced	18,000	
Forecast unit cost per pipe	£1,946	£1,799
Unit cost identified in Ofwat FD		£1,647
Equivalent unit cost if Scottish Water added to dataset		£1,668
Modelled allowance implied by Ofwat approach using E&W coefficients (after median efficiency challenge)		£28.6m
Implied Scottish Water efficiency score		1.13

While the approach Ofwat used to arrive at this benchmark involved a number of modelling and calculation steps, we note that was nevertheless highly simplistic, in that it effectively assumed that all relevant factors that might affect the efficient level of costs could be adequately captured through the use of a single variable: the number of lead communication pipes to the be replaced. In developing its approach Ofwat had tested the inclusion of average length of lead communication pipes replaced and population density as explanatory variables in its econometric models, but concluded that the former was not better (than the number of pipes replaced) at explaining differences in the scale of efficient costs, and did not find the population variable to be statistically significant.[58] We note, though, that there is a clear economic and engineering logic to the consideration of these other factors, and that the use of only a single explanatory variable of Ofwat's approach highlights its approximate nature.

[57] Ofwat (December 2024) PR24 Final Determinations Expenditure Allowances - Enhancement cost modelling appendix, p172; and: PR24 FD Water: Lead enhancement expenditure model.
[58] Ofwat (December 2024) PR24 Final Determinations Expenditure Allowances - Enhancement cost modelling appendix, p169.

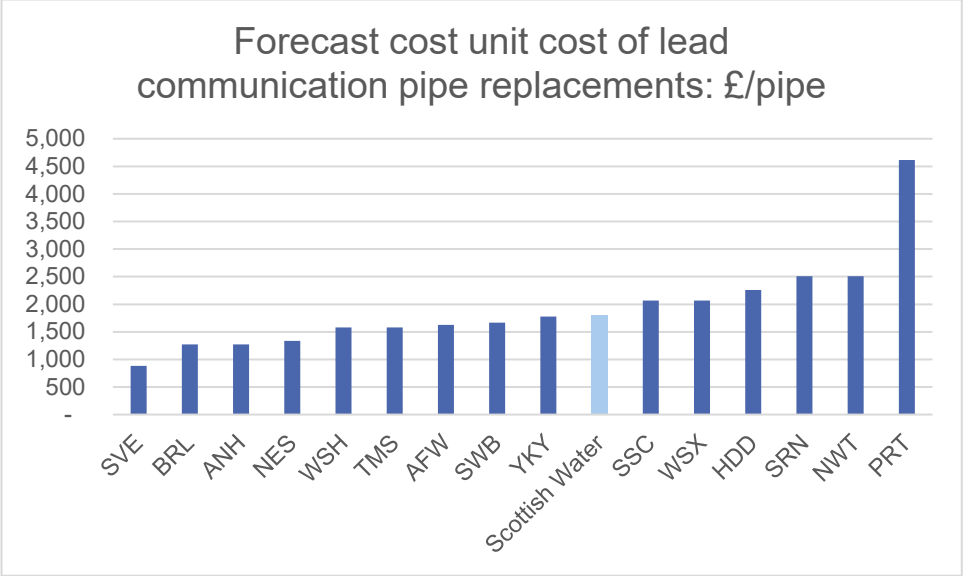

Figure 18: Forecast unit cost of lead communication pipe replacement: £/pipe

The graph above highlights this by showing the extent to which forecast costs per lead communication pipe varied across companies. For example, it is notable that the forecast unit cost for United Utilities (NWT) was 2.8 times higher than that for Severn Trent. If applied in isolation (i.e. only to lead communication pipe allowances), Ofwat's approach to benchmarking this area would involve assuming that this and other differences that can be observed, can be reliably treated as solely related to differences in efficiency. However, as is noted further below, a key feature of Ofwat's approach is that adopted a similar kind of approximate approach when setting allowances across a range of enhancement areas, such that there is some scope for relevant factors that are not taken into account and that disadvantage a company in one area, may be offset by other factors that are not taken into account but that advantage a company in another. The overall impact of Ofwat's benchmarking approach will therefore be dependent on the weighted average of implied adjustments to allowance (which under Ofwat's approach can be up and down) across the areas where enhancement modelling has been applied. In line with that, we consider further at the end of this Annex the relevance of the lead communication pipe replacement results shown above to the benchmarking of Scottish Water's enhancement cost forecasts relative to companies in England and Wales.

Lead supply pipes

At PR24, Ofwat set the benchmark when setting allowances for the replacement of external and internal lead supply pipes (other than at schools) equal to the median level of unit cost forecast by companies in England and Wales for each replacement type.[59] The table below shows Scottish Water's forecast unit costs for each replacement type and compares this to the Ofwat benchmark, and a revised version of that benchmark after Scottish Water data is added to the dataset.

[59] Ofwat (2024) PR24-FD-CA36-Water-Lead-enhancement-expenditure-model.xlsx

Table 54: Scottish Water's forecast unit costs for each replacement type and compares this to the Ofwat benchmark

	External Supply Pipes		Internal Supply Pipes	
	2024/25 prices	2022/23 prices	2024/25 prices	2022/23 prices
SR27 forecast expenditure	£0.832m	£0.769m	£0.092m	£0.085m
Number of pipe replacements	250	250	60	60
Implied Scottish Water unit cost: £ per replacement		£3,076		£1,419
Ofwat PR24 benchmark (median unit cost)		£1,842		£704
Revised benchmark including Scottish Water data		£2,000		£715
Implied Scottish Water efficiency score		1.54		1.99

As can be seen, the use of Ofwat's PR24 approach implies that Scottish Water's forecast unit costs for SR27 are 54% above the median benchmark for external lead supply pipe replacement and are around twice the level of the median benchmark for internal lead supply pipe replacement. In line with the comments on lead communication pipes above, we note that Ofwat's approach to setting the benchmark effectively assumes that all relevant factors that might affect the efficient costs of replacement for different companies can be captured adequately through the use of a single variable: the number of replacements. As the graphs below show, there is significant variation in implied unit costs across companies. Applying the Ofwat benchmark in isolation (i.e. just when setting allowances for this activity) would effectively involve assuming that it is reasonable to treat all of the observed variation as related to difference in efficiency. As was described above, Ofwat's approach of applying benchmarks across a range of areas allows for the impact of circumstances that might tend to make a company's efficient costs higher than implied by the benchmark in one area of activity, to be offset by the impact of circumstances that might tend to make its efficient costs lower than the benchmark in other areas.

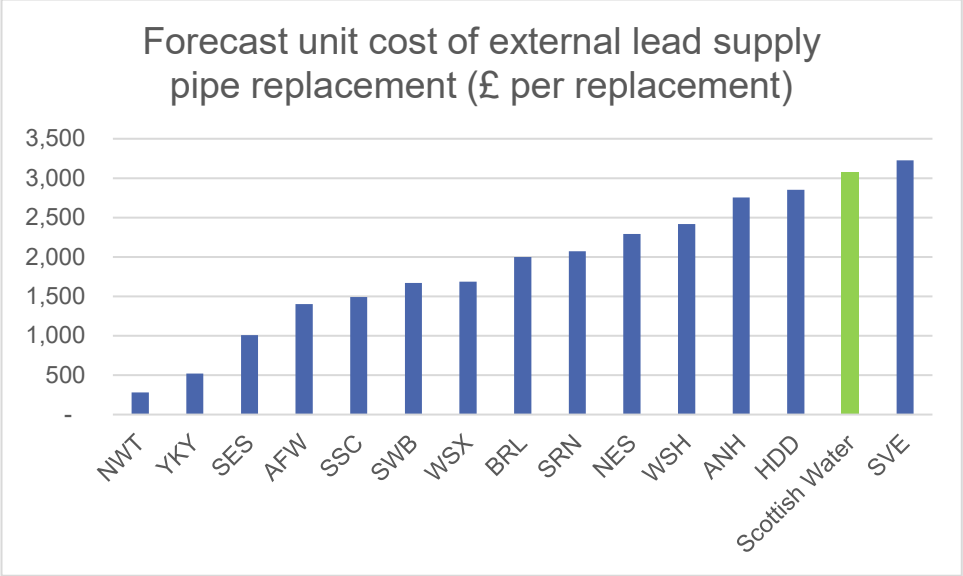

Figure 19: Forecast unit costs of external lead supply pipe replacement (£ per replacement)

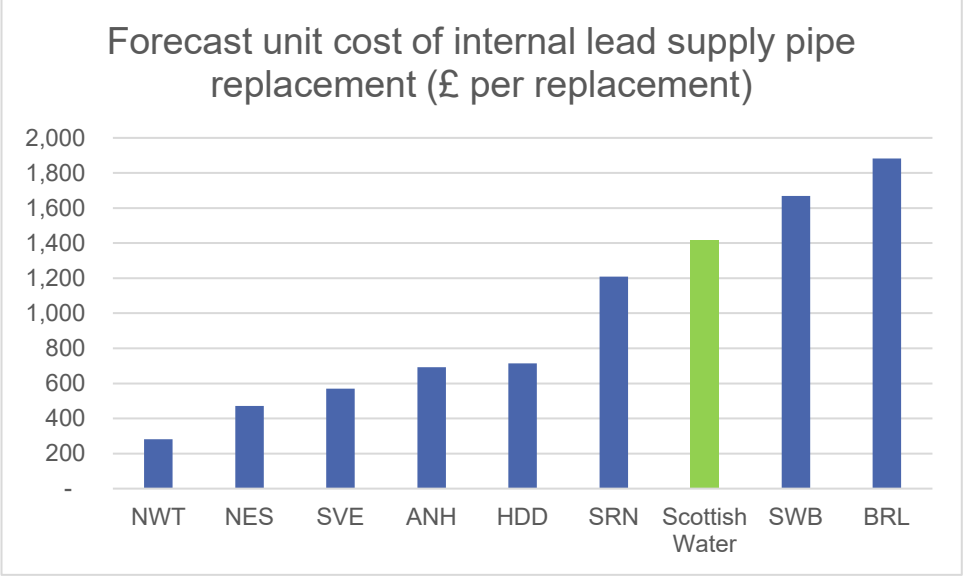

Figure 20: Forecast unit costs of internal lead supply pipe replacement (£ per replacement)

We note that one factor that is likely to impact the relative level of Scottish Water's unit costs is the scale of the planned programme for SR27. It is notable, for example, that United Utilities (shown as NWT in the graphs below), which has the lowest forecast levels of unit cost for both internal and external lead supply pipe replacement, was planning to undertake 30,000 of each type of supply pipe replacement during SR27. By contrast, as shown in the table above, our unit cost forecasts are to replace only 250 external and 60 internal lead supply pipes, with these numbers being replaced as part of pilot projects for SR27.

Metering

At PR24, Ofwat assessed enhancement costs associated with new meter installations and meter upgrades separately. For new meter installations, Ofwat set allowance levels by putting a 50% weight on the results implied by each of the two following approaches:

- The median forecast unit cost of new meter installations.
- An econometric model that sought to explain differences in forecast costs between companies using the following two explanatory variables:

- The number of new meter installations;
- Weighted average population density (weighted by population) based on Middle Super Output Areas.

For meter upgrades, Ofwat set allowance levels by putting a 50% weight on the results implied by each of the two following approaches:

- The median forecast unit cost of meter upgrades.
- An econometric model that sought to explain differences in forecast costs between companies based on the number of meter upgrades.

Ofwat did not apply a separate efficiency challenge when setting metering enhancement allowances, and instead treated the average efficiency challenge implied by the adoption of the above approaches as sufficient.

The table below shows Scottish Water's forecast levels of metering costs and activity in SR27, before comparing the implied SR27 forecast unit costs to the England and Wales median levels. As can be seen, Scottish water's forecast metering unit costs are materially above the median unit cost forecast levels for England and Wales at PR24. We consider comparisons with smart metering deployment in England and Wales to be challenging due to the absence of household metering in Scotland and the impact of that on efficient cost levels. We note that the price of a smart meter will vary depending on technology and whether additional hardware is required to boost the signal, which may be necessary in several areas across Scotland.

Table 55: Scottish Water's forecast levels of metering costs and activity in SR27

	New meter installations		Meter upgrades	
	2024/25 prices	2022/23 prices	2024/25 prices	2022/23 prices
SR27 forecast expenditure	£6.7m	£6.2m	£60.1m	£55.6m
Number of installations/upgrades	130,000		4,920	
Implied SR27 forecast unit cost		£1,256		£428
Median unit cost based on E&W forecasts		£414		£88

Our Non-household rollout is relatively low volume and geographically dispersed, significantly affecting install cost efficiency and network economics (e.g., the ratio of comms gateways to meters achievable in a geographic area). We consider these factors mean that the efficient unit costs for the relevant meter installations and upgrades Scotland would be expected to be materially higher than relevant unit cost forecasts for England and Wales.

The table below shows how our SR27 forecast expenditure levels for new meter installations and upgrades compare to the modelled cost levels implied by Ofwat's econometric models. As was noted above, the meter upgrade model includes the number of upgrades as the only explanatory variable and so unsurprisingly shows a broadly similar position to that implied by unit cost benchmarking shown above. As the new meter installation modelling includes a population density variable, in principle, it might have provided a way of taking account of some of the economies of density issues noted above that can have a significant impact on Scottish Water's efficiency service provision costs. However, for the reasons descried in Annex A (in relation to Ofwat's base cost models), the specific density measure that Ofwat would not be expected to

provide an effective means of reflecting the much greater levels of geographic dispersion that Scottish Water faces, and the impacts this can have on the efficient costs of service provision. In particular, because Ofwat's metric weights the density in different (Middle Super Output) areas by population in order to get overall company-level measures, in practice – for Scottish Water – it focuses attention on population density within the more populated parts of Scotland, rather than capturing the extent of dispersion, and to which Scottish Water serves relatively remote communities.

Table 56: SR27 forecast expenditure levels for new meter installations and upgrades

	New meter installations	Meter upgrades
SR27 forecast expenditure (2022/23 prices)	£6.2m	£55.6m
Allowance implied by Ofwat econometric model	£1.2m	£12.7m
Implied efficiency score	5.33	4.38

In line with the above, given the very different circumstances that prevail in Scotland (both in terms of the much more limited extent of metering, and the much greater extent of geographic dispersion), and that Ofwat's models have been specified in ways that could be expected to adequately take account of the implications of these differences, we have not found Ofwat's enhancement modelling of metering costs as likely to provide an effective means of benchmarking SR27 costs in this area.

Flow measurement at wastewater treatment works

At PR24, Ofwat considered that its modelling did not provide a sufficiently robust basis for determining allowance levels for flow measurement at wastewater treatment works, but instead identified median unit cost estimates that were used as an indicative benchmark, and providing a reasonable indication of efficiency.[60] In line with that, companies were allowed the full allowance they requested where their implied unit costs were below Ofwat's indicative benchmark, with costs otherwise subject to a deep dive.[61]

The table below shows Scottish Water's planned SR27 expenditure on flow measurement at wastewater treatment works, the number of planned schemes, and the forecast unit cost level that this implies. The table compares this to the median unit cost benchmark Ofwat identified for simple meter installation schemes and shows the revised median unit cost benchmark if Scottish Water's data is added to the data set. As can be seen, the forecast unit cost for SR27 is below Ofwat's indicative benchmark (with an implied efficiency score of 0.97).

[60] Ofwat (December 2024) PR24 Final Determinations Expenditure Allowances - Enhancement cost modelling appendix, p176.
[61] Ofwat (December 2024) PR24 Final Determinations Expenditure Allowances - Enhancement cost modelling appendix, p176.

Table 57: forecast unit cost for SR27

	2024/24 prices	2022/23 prices
SR27 forecast expenditure	£65.2m	£60.3m
Number of flow measurement schemes at wastewater works	862	862
Implied unit cost		£0.070m per scheme
Ofwat PR24 indicative benchmark for simple meter installation schemes		£0.075m per scheme
Revised benchmark after including Scottish Water data		£0.072m per scheme
Implied efficiency score		0.97

Summary

The following table summarises the benchmarking assessments described above. Our assessment is that these results are, overall, consistent with Scottish Water's forecast expenditure across these areas being in line with or below the efficient benchmark applied by Ofwat at PR24. While Scottish Water's forecasts have been identified as being above the Ofwat benchmarks in two areas – lead and metering – we do not consider this to imply a finding of relative inefficiency in those areas. Rather, in line with our comments above, we consider the appropriateness of Ofwat's adoption of the relatively simplistic and approximate benchmarking modelling approaches that Ofwat took in these areas to rely heavily on the scope for the impact of factors being ignored that may imply higher efficient costs in relation to one enhancement area to be offset by the impact of factors being ignored in other areas that have an off-setting effect. In line with that, when viewed in isolation, we consider that Ofwat's benchmarks are best understood as providing an indicative benchmark for the area of activity to which they relate.

Table 58: Summary of benchmarking assessments

	Implied efficiency relative to benchmark	Forecast SR27 expenditure (£m)	As % of total modelled enhancement expenditure	% excluding mains replacement
Phosphorus removal	Costs below/in line with benchmark	44.9	5%	9%
Sanitary permit tightening	Costs below/in line with benchmark	6.7	1%	1%
Storm overflows	Costs below/in line with benchmark	268.8	33%	53%
Leakage (Mains replacement)	Costs below/in line with benchmark	314.4	38%	
Lead	Costs above benchmark	36.0	4%	7%
Metering	Costs above benchmark	67.0	8%	13%
Flow monitoring at wastewater treatment works	Costs below/in line with benchmark	65.2	8%	13%
Chemicals removal	Costs below/in line with benchmark	16.8	2%	3%
Total		**819.7**	**100%**	
Total excluding mains replacement		**505.3**		**100%**

Scottish Water
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BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Financial Strength

February 2026

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1 Executive Summary

The purpose of this Technical Appendix is to set out:

- A summary of our SR21 performance;
- The steps we have taken to develop and assure our financial model;
- The inputs to our financial modelling for SR27; and
- Our financial projections for SR27.

1.1 Key Messages

This Technical Appendix builds on the SR27 Draft Business Plan and takes into account the feedback from the Water Industry Commission for Scotland (WICS) which has provided constructive challenge into our inputs and evidence base. We have captured this in our SR27 Final Business Plan, this Technical Appendix and our data tables and commentary either by making changes to inputs where appropriate and by providing enhanced evidence to support our statements. We welcome this feedback and acknowledge it has led to a more robust and evidenced plan on behalf of our customers.

Our updated modelling shows that in forecast nominal prices, our assessment of the operating, Private Finance Initiative (PFI), net interest, Reasonable Cost Contributions (RCC) and tax for 2027 to 2033 (SR27) period is £6,047 million and that £9,248m is required for repairs and investment. Given available net new government borrowing of £1,020 million, this requires revenue of £14,264 million, and therefore customer charges increasing by CPI inflation + 3.3% p.a.

We remain financially viable throughout the period, delivering the outcomes in this business plan whilst meeting a 0.8% p.a. efficiency challenge on our operating costs and investment, less real price effects estimated to be 0.2% p.a. We forecast cash being in line with Scottish Water Board's risk appetite statements.

Our modelling shows that our proposed operating costs continue to place us at the upper-quartile compared to benchmarks (see section 3.2).

In our SR27 Draft Business Plan we identified and proposed three areas of uncertainty where we have judged it is more appropriate and aligned to Ethical Business Regulation (EBR) to have allowances updated ex-post – these are wholesale revenue reductions from reduced consumption following the introduction of smart metering, changes in employer pension contribution rates and the actual real price effects on operating costs. Based upon feedback from WICS we have now modelled these areas in our plan and have set these out in the relevant sections below. Reflecting WICS feedback, we have proposed cost and outcome adjustments rather than revenue adjustments.

2 Background

2.1 Developing and Assuring our Financial Model

Scottish Water and the Water Industry Commission for Scotland (WICS) collaborated to develop a shared financial model. This is a crucial step for Ethical Business Regulation (EBR) as it allows both parties to replicate the calculations of the other – i.e. if identical inputs are used, which are all easily identifiable, both sides will produce the same output. The model has been reviewed by external consultants EY, who verified its logical integrity, functionality, and reliability. Additionally, SW Internal Audit reviewed processes and procedures to assure they are robust. It is this model which has been used to produce the financial model underpinning our business plan as described here and in Data Table 7.

You can find more detail about our overall assurance process for SR27 in the Assurance Technical Appendix.

2.2 Our Performance in SR21

Our financial performance for the years up to March 2025 is set out each year both in our regulatory accounts as part of the Annual Return and in our Performance and Prospects Annual Report. Our financial modelling for the SR27 period reflects the following for the remainder of the SR21 period:

- **25/26 Forecast:** Our post-efficient outturn position for 2025/26 on Tier 1 costs before Long-Term Normative Charge (LTNC) (Operating Costs, PFI costs and Interest costs) are currently expected to outperform (i.e. come under) the allowance in the Final Determination by £13.5m.

  This is an improvement from our SR27 Draft Business Plan position of £3m outperformance. The determination allowance is based on a forecast CPI average over 2025/26 of 3.5%, aligned to the Bank of England November 2025 Monetary Policy Committee Report and equates to £881.2m. The forecast outperformance is aligned to our Quarter 2 forecast presented to our Board in October 2025 and includes the impact of the UK Government's Employer National Insurance increase, sustained pressure on our electricity costs related to non-commodity price increases and contingency for the potential impact of adverse weather conditions when compared to our 2024/25 outturn position.

  Our forecast also includes the agreed charge increase for 2025/26 of 9.9% and net new borrowing of £170m.

- **26/27 forecast projection:** A modelled forecast view for 2026/27 including:
  - Nominal charge increase that aligns to the overall CPI+12.6% Final Determination (FD) charge cap for SR21;
  - Infrastructure charge increases in line with forecast October 2025 CPI inflation[1];
  - Tier 1 costs before LTNC items are anticipated at c. £3m better than the allowances set out in the Final Determination assuming a small reduction in CPI inflation over the 2026/27 year to 2.6%. Our view is this will be challenging to achieve given pressures including an expected increase in non-domestic rates[2], large increases

[1] Forecast CPI for October 2025 per the Bank of England Monetary Policy Committee Report in August 2025 of 3.8%.

[2] Rateable values are reset every three years to reflect inflation and property value increases. Rateable values for 23/24, 24/25 and 25/26 are from values as at 21/22. Rateable values for 26/27 and the subsequent two years will be based on values as at 24/25. Inflation over these three years has been ~20%.

in energy costs driven by non-commodity costs[3] and increases in our employment costs reflecting pay award and pay progression for our people as part of the agreed Scottish Water pay and grading structure; and

- PFI costs modelled to reduce, with two PFIs returning to Scottish Water operation (Dalmuir Waste Water Treatment Works and Daldowie sludge treatment centre) with operating costs partially offsetting this. Following further investigation since the draft plan and stakeholder feedback we have updated our assumptions with a higher level of confidence as we near the exit date.
- An updated view of cash risk appetite, enabling cash balances for Scottish Water regulated to reduce to approximately £50m by the end of the SR21 period, aligned with the outturn position in the SR21 Final Determination. We note that risk appetite is subject to change at the Board's discretion.

A summary table of financials showing actual reported values for 2024/25 and forecasts for the last two years of the SR21 period is provided below:

Table 1: Summary of Financials

Outturn (£m)	2024/25 Actual	2025/26 Forecast	2026/27 Forecast
Revenue	1,580	1,736	1,902
Infrastructure Charges	13	14	15
Disposal Proceeds	2	2	5
Borrowing (net new)	170	170	170
Grants and Contributions	5	4	5
Total Financing	**1,770**	**1,926**	**2,097**
Operating costs	(511)	(545)	(592)
PFI costs	(168)	(171)	(130)
Net interest costs	(142)	(158)	(169)
Reasonable Cost Contributions	(47)	(39)	(32)
Tax paid	16	0	-
Total Costs	**(852)**	**(913)**	**(923)**
Contribution to Repairs and Investment	**918**	**1,013**	**1,174**

[3] Non-commodity costs form part of the overall unit price of energy. As the UK transitions to net zero these non-commodity charges have increased and are set to increase further in 2026/27. Advisors have provided estimates in the region of £8.4m in the final year of the SR21 period.

2.3 Cost Reflectivity of Charges

The Principles of Charging require that charges should be broadly cost-reflective, in the sense that charges for given services to particular customer groups recover the cost to Scottish Water of providing that service. We have carried out modelling work to allocate the full cost of each service to different customers groups. We are satisfied that charges broadly reflect the costs of the services charged for over the SR27 period given the long-term nature of many of our assets. We have also applied the same model to the long-term investment profile to show the movements in costs by service over time. Over that period, costs and charges remain broadly in balance, and we do not consider that it would be necessary to adjust the balance of charges between services or customer groups over that period.

We have shared our evidence and analysis in this area with WICS and other key stakeholders. We will continue to monitor cost-reflectivity over time and will engage with WICS if we see evidence that charges require adjustments to return to a broad balance versus costs.

2.4 Responding to WICS Feedback

Following the submission of our SR27 Draft Business Plan, we received feedback from WICS on our assumptions and inputs into our shared model. We have sought to respond to all the points raised – some by amending our inputs and some by adding further evidence to support our original inputs. We have provided this evidence mainly in our commentary to Data Table 7.

For the purposes of this Technical Appendix, the most material, equating to approximately £400m over the SR27 period, feedback elements where we have provided further evidence are as follows:

Table 2: Summary of WICS Feedback and Scottish Water Response

WICS Feedback	Our Response
Proposal to model PFI returns at the average estimated cost of all returns	We considered this approach, however given the differences in both size, cost base and timing of return, the data demonstrates this would produce a materially inaccurate assessment of the costs of operation. We have added additional information on our assumptions for each PFI as well as their timing of return in our commentary to Data Table 7.
Assumption that 24/25 actual operating costs be subject to a 1% efficiency challenge to arrive at starting costs for SR27	Our approach to operating cost in SR21 is in line with meeting the Tier 1 cost efficiency challenge set in the Final Determination for that period. We are seeing various cost pressures which have been quantified and captured to produce our operating cost models used. We have added further detail on these items in our Commentary to Data Table 7 as we recognise there was opportunity to explain in more detail. This shows that costs will be compliant with the SR21 FD allowance for Tier 1 throughout SR21 (which includes a year-on-year 1% efficiency challenge), WICS have assumed that the 1% efficiency challenge is applied from the 2024/25 outturn position which, when taken "in the round" with other Tier 1 costs was a year that delivered £43m of outperformance. Applying a 1% efficiency from this point is at odds of the challenge set in the SR21 FD.

WICS Feedback	Our Response
Exclusion of cost increases between 24/25 and the start of SR27	Similar to the item above, we recognise that explanation on these items – which represent genuine cost increases we will experience – had insufficient detail in the draft plan. We have therefore itemised and explained the underlying drivers of the cost increases in our commentary to Data Table 7. The data demonstrates compliance with the SR21 Final Determination and mean operating costs entering SR27 will be higher than assumed by WICS in their feedback.
Non-household revenue growth assumption for 2025/26 and 2026/27	Non-Household revenue forecasts reflect our anticipated revenue outturn position for 2025/26 and our forecast for 2026/27 which incorporates a lower annual growth of revenue when compared to the SR21 Final Determination assumption of 0.75% p.a.

3 Our Financial Modelling for SR27

3.1 Revenue

- **Household revenue growth** is assumed at 1.0% p.a. growth rate. This is a combination of 20,000 properties per year together with a Band D equivalent factor. This level of growth is broadly aligned with actuals in the first four years of the SR21 period but is higher than the household formation predicted by National Records of Scotland. We have been optimistic in our assumption and consider that given comparable levels of properties per head across similar European countries, household formation alone is likely to underestimate household revenue growth.
- **Non-household revenue growth,** while the average growth rate over the first four years of the SR21 period has been close to 1.0% p.a. this has been driven by bringing gap sites into charge, a process that is now largely complete. Forward looking expectations would indicate a lower annual property growth of around 0.2% p.a., and this was used in our SR27 Draft Business Plan. We welcome the WICS feedback on our draft assumption of 0.2% growth and therefore in the final plan we have modelled optimistically at a rate of 0.5%, which is the mid-point between WICS long term annualised growth of 0.75% p.a. used in the SR21 Final Determination and Scottish Water's assumed growth rate of 0.2%.
- **Non-household property consumption,** in our SR27 Draft Business Plan we estimated that consumption would fall at an average rate of 1.5% per annum which is primarily driven by the average annual decline in consumption experienced over the period 2015 to 2024 of 1.3% p.a. plus the anticipated impact of the INEOS refinery closure which accounts for approximately 4% of total consumption although the unwinding of schedule 3 agreements are modelled to slightly offset this. We have considered the arguments proposed in the WICS feedback and have concluded that, given the uncertainty of year-to-year consumption patterns and the slight slowing of the trend in the later years of the period mentioned above, we will align with the WICS assumption of consumption reduction of 1.0% p.a. over the SR21 period. However, risk on this assumption remains especially with the recent announcement by ExxonMobil to close the Mossmorran Chemical plant which accounts for approximately 4% of water volumes. This recent announcement has not been included in our assumptions.

  In addition to the normalised consumption trends discussed above we have also included, following feedback from WICS, the impact of smart metering. We anticipate that this will equate to a further reduction to consumption of approximately 10% by the end of the programme and have profiled this over the period in line with the profile of installation. Consistent with the draft plan we have maintained the consumption impacts on our costs which are covered in the Operating Cost section below.

  The proposed introduction of smart metering for non-household customers assumes the transfer of responsibility for the retrieval of meter readings from Licensed Providers to Scottish Water, with an associated transfer of costs from retail margin to wholesale charge. This transfer of responsibility is subject to agreement by WICS, who would determine the scale of associated cost transfer, given the impact on retail margins.

  40-45% of non-household revenue is based on metered water consumption. Non-household consumption is expected to fall significantly over SR27 due to long-term declining trend (modelled at 1% per annum), the expected impact of smart metering and one-off changes such as the closure of Exxon Mossmorran. By contrast, less than 5% of Scottish Water's cost base varies with consumption. A further 45% of non-household revenue is based on Rateable Value (RV), which is revalued every 3 years by the Scottish Assessors.

Under a charge cap, non-household charges would increase by the same amount as household, but non-household bills would increase by less, due to the forecast significant decline in consumption. Reduced consumption delivers cost savings to Scottish Water, but under the current charge structure, a charge cap would provide bill reductions to non-household customers which greatly exceed the corresponding cost savings. To ensure equitable funding between household and non-household customer groups and stable bills for customers, we suggest that a revenue cap is considered by WICS for non-household customers in SR27 rather than a charge cap. A revenue cap would also reduce volatility in non-household customer bills and Scottish Water revenue from 3-yearly Rateable Value revaluations.

We would provisionally suggest that a revenue cap allows for annual adjustments in charges through the regulatory period to correct under or over recovery in earlier years, in order to minimise impact on the stability of charges. If WICS are supportive of this approach we will also seek feedback from Licensed Providers to inform plans.

- **Infrastructure charges** are assumed to align with our forecast for 2025/26 and assumed to increase with CPI inflation in each year.
- **Disposals of land**, property and vehicles are assumed to contribute ~£1.3m p.a. on average. This reflects a reduction in the disposals we have experienced in the SR21 period, where more marketable redundant assets have been disposed.
- **Secondary charges** are assumed to increase in line with the charge profile proposed in this plan.

3.2 Operating Costs

Over the SR27 period operating costs are assumed to increase with Consumer Price Index (CPI) adjusted for:

- A reduction for annual "frontier shift" efficiency of 0.8% on relevant costs (equivalent to 0.66% of overall operating costs) - for further details see the Efficiency Technical Appendix;
- An increase for real price effects. Scottish Water's costs are monitored against movements in the CPI. To reflect differences in weightings of our cost basket[4] in comparison to the typical basket of household goods used to generate CPI we have applied real price effects (RPE's) to our overall operating costs at 0.2%, which equate to approximately £1.4m per annum on average. Further information on how we have estimated the RPE are included in the Efficiency Technical Appendix.

We have also modelled the following step changes:

- **Electricity costs in 27/28:** Over the SR21 period around half of Scottish Water's electricity requirement was forward purchased through a long-term power purchase agreement. That agreement expires at the end of 26/27. Based on forward market prices relative to the price set in the power purchase agreement, annual electricity costs are forecast to increase by £10.85m from 27/28. This is a reduction of £2.3m on the draft plan view due to a revised

[4] As a business operating in the water sector, the costs that we incur are of different types and in different proportions to the generic make up that is used to create inflation estimates for the whole economy, such as CPI. These types and weightings are typically referred to as "baskets of goods".

forecast from external energy market forecasters. The forecasts received reflect changes in commodity and non-commodity prices.

- **Legislative change to Chemical Costs:** The River Basin Management Plan (RBMP3) programme is in response to Scottish Environment Protection Agency (SEPA) requirement to meet new reactive phosphorous standards by December 2027. This will have a consequential increase volume of extra chemical dosing at our sites, with secondary effects on increased energy use and sludge treatment. This leads to an annual increase in operating costs of £8.013m from 2027/28.
- **Pension contribution increases in 30/31:** In our plan we have forecast that employee Pension contribution rates will need to increase to avoid a funding deficit from 2030/31. This follows a period of surplus since our last triennial valuation on 31 March 2023 which has allowed for lower contribution rates. We have forecast that there will be no increase at the next triennial valuation on 31 March 2026 (effective in 2027/28) but have forecast an increase of £8.3m in outturn following the triennial valuation on 31 March 2029 and effective from 2030/31. This is broadly consistent with the level of contribution following our March 2017 Triennial valuation, before the surplus was recognised (c21.94%).
- **PFIs returning to Scottish Water operation:** During the SR27 period four further PFIs will reach the end of their contracts (Almond Valley/Seafield/Esk and Tay in 2029, Moray in 2031, and Meadowhead/Stevenson/Inverclyde in 2032), with Levenmouth the only remaining PFI at the end of the SR27 period. Analysis of the expected operating cost on return has been carried out on a site-by-site basis. Subject to uncertainty of the asset condition on return, once all four have returned to Scottish Water, operating costs are expected to increase by £56m (which is more than offset by the decrease in PFI fees – see below).
- **Land remediation:** Due to capacity issues at outlets near to Dalmuir Waste Water Treatment Works, alternative arrangements for the disposal of sludge cake will be needed. It is expected that the additional costs from alternative disposal will be ~£2m p.a. in the SR27 period.
- **New operating costs as a result of capital investment:** The impact of delivering the investment programme on operating costs is assumed to be in line with the historic trend of £0.7m p.a.
- **Leakage reduction:** Additional investment in the SR27 period to support the leakage reduction target is assumed to reduce annual operating costs by c. £2m by the end of period.
- **Bad debt:** Assumed to increase in line with prices (i.e. CPI+3.3%) which is approximately a £1.1m increase p.a.
- **The rollout of Smart metering:** For Non household (NHH) customers, smart metering is assumed to reduce operating costs by £1.8m by end of the period due to lower consumption.

Operating cost efficiency

In their feedback to our Draft Business Plan, WICS presented analysis which suggested that due to operating cost increases seen in our plan we would fail to meet the upper-quartile performance compared to benchmarks. This analysis has been adjusted to reflect both differences in the benchmark to account for certain unique characteristics of Scottish Water compared to England and Wales water companies which feed the benchmark, and for items of cost which are outside of the benchmark. This shows that our SR27 Final Business Plan keeps us at upper-quartile levels on a like-for-like basis. Further details can be found in the Efficiency Technical Appendix.

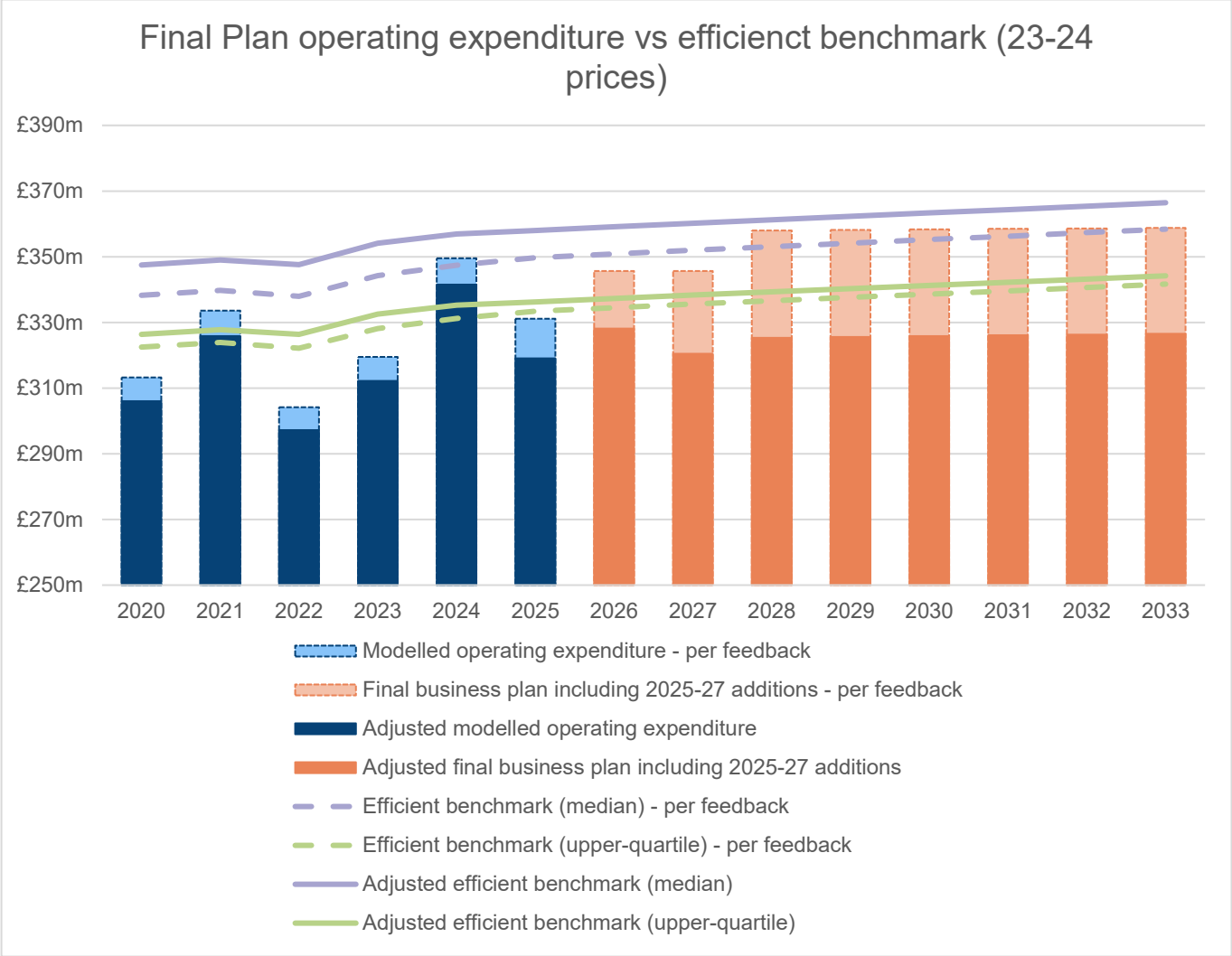

Figure 1: SR27 Final Business Plan Operating Expenditure vs Efficient Benchmark (23-24 prices)

3.3 PFI

Due to the return of all but one PFI (Levenmouth) in the SR27 period, PFI service fees will reduce from £130m in 26/27 to £37m in 2032/33, a reduction of £92m. This reduction will be stepped as PFI assets are returned to SW and the contracts expire. The Levenmouth contract expires in SR39 (October 2040).

3.4 Interest

In our SR27 Draft Business Plan we had assumed that new debt in the SR27 period would be at 4.0% in each year. Since the lockdown of our plan and as indicated in the WICS feedback, interest rate forecasts on new debt have increased by between 30 to 50 basis points (0.3% to 0.5%). We have therefore assessed interest rates in preparation of this plan and aligned to the WICS assumptions provided in their feedback as these are relatively consistent with our revised range. Therefore, our interest assumption is assumed to be 4.35% for 2027/28 and 2028/29, rising to 4.40% for the remainder of SR27. It should be noted that interest rates are difficult to predict over the time horizon to 2033 and that these may vary significantly based on macro-economic changes over this period.

3.5 Tax

Corporation tax payable is estimated to be £61.8m over 27-33 period and is based on the current corporation tax rates and our allocations to capital allowance pools based on historic actuals. Tax legislation can change over the period and if they were to revert back to the capital allowance levels prior to the covid pandemic would see a significant increase in tax payable of nearly £600m at Scottish Water. We would look to engage with WICS in such an event.

When we locked down our numbers for the SR27 Final Business Plan the tax write down allowances on the main pool were at 18%. The UK budget announcement in November 2025 amended tax write down allowances on the main pool to 14% from April 2026. Based on the numbers contained in our plan our modelling calculates the increase to our tax payments of approximately £2m over the SR27 period.

3.6 Reasonable Cost Contributions (RCC)

Reasonable cost contributions have been forecast to decrease to £32m in 2026/27, reflecting the end of significant network upgrades in the Perth region, and then increase broadly in line with inflation over the SR27 period.

3.7 Repairs and Investment

To drive the tax calculation and the Income Statement included in our section below, the following inputs into the financial model have been made in nominal price base:

- **Repairs:** forecast to be £1,557m.
- **Refurbishment:** forecast to be £1,165m
- **Asset Replacement:** forecast to be £2,296m.
- **Growth:** forecast to be £502m
- **Enhancement**: forecast to be £2,388m

4 A Summary of Our Financial Projections for SR27

The high-level output is that the charge path of CPI +3.3% p.a. finances £8,093m of repairs and investment (24/25 prices).

The final guidance requests that Scottish Water should set out the circumstances in which it might propose deviating from the charge profile of the Final Determination. Whilst we cannot identify every eventuality that might give rise to the need to adjust, examples would include material externalities that are out with our control (for example the most recent experience with the cost-of-living crisis where charges were set lower than the annual path outlined in the Final Determination). If such a decision is made then we commit to setting out the impacts on future charges to align with the levels of investment set out in the determination.

A high-level summary of the financial flows for the alternative charge path scenarios (annual increases of CPI +3.8% and CPI +4.3% respectively) are shown in Annex A – High Level Summary of Alternative Charge Paths.

Table 3: 24/25 Prices

24/25 Prices (£m)	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2032/33**	**Total**
Revenue	1,876.3	1,951.2	2,025.5	2,102.8	2,183.5	2,268.0	12,407.3
Infrastructure charges	13.9	13.9	13.9	14.0	14.0	14.0	83.8
Disposal proceeds	1.7	1.3	1.2	1.2	1.2	1.3	7.8
Total	1,891.9	1,966.4	2,040.7	2,118.0	2,198.7	2,283.2	12,498.9
Borrowing (net new)	156.9	153.9	150.9	147.9	145.0	142.2	896.7
Grants and contributions	4.6	4.5	4.4	4.3	4.3	4.2	26.4
Total Financing	2,053.5	2,124.8	2,196.0	2,270.2	2,347.9	2,429.6	13,422.0
Operating costs inc cloud from 2024/25	(579.2)	(577.7)	(601.8)	(615.3)	(618.5)	(624.1)	(3,616.7)
PFI costs	(118.9)	(120.1)	(75.3)	(51.9)	(41.9)	(31.1)	(439.2)
Net Interest cost	(162.1)	(165.7)	(168.2)	(170.3)	(174.2)	(176.0)	(1,016.5)
RCC	(30.8)	(30.9)	(30.9)	(30.9)	(30.9)	(30.9)	(185.2)
Tax	(0.3)	(3.1)	(8.3)	(11.5)	(13.2)	(16.7)	(53.1)
Total costs	(891.4)	(897.5)	(884.6)	(879.8)	(878.6)	(878.8)	(5,310.8)
Cash utilised	(1.7)	(0.2)	0.8	(2.5)	0.8	2.9	0.1
Change in working capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Completion	(15.5)	(2.2)	(0.3)	(0.2)	(0.1)	0.0	(18.2)
Contribution to repairs & investment	1,144.9	1,224.9	1,311.9	1,387.7	1,470.0	1,553.7	8,093.1

Table 4: Nominal Prices

Nominal Prices (£m)	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	Total
Revenue	2,032.3	2,155.7	2,282.6	2,417.0	2,560.0	2,712.3	14,159.9
Infrastructure charges	15.1	15.4	15.7	16.1	16.4	16.7	95.4
Disposal proceeds	1.8	1.4	1.4	1.4	1.4	1.5	8.9
Total	2,049.2	2,172.5	2,299.7	2,434.5	2,577.8	2,730.5	14,264.2
Borrowing (net new)	170.0	170.0	170.0	170.0	170.0	170.0	1,020.0
Grants and contributions	5.0	5.0	5.0	5.0	5.0	5.0	30.0
Total Financing	2,224.2	2,347.5	2,474.7	2,609.5	2,752.8	2,905.5	15,314.2
Operating costs inc cloud from 2024/25	(627.4)	(638.3)	(678.2)	(707.3)	(725.1)	(746.4)	(4,122.7)
PFI costs	(128.8)	(132.7)	(84.9)	(59.6)	(49.1)	(37.2)	(492.3)
Net Interest cost	(175.6)	(183.1)	(189.6)	(195.7)	(204.2)	(210.5)	(1,158.7)
RCC	(33.4)	(34.1)	(34.8)	(35.5)	(36.2)	(36.9)	(210.9)
Tax	(0.3)	(3.4)	(9.4)	(13.2)	(15.5)	(20.0)	(61.8)
Total costs	(965.5)	(991.6)	(996.9)	(1,011.3)	(1,030.1)	(1,051.0)	(6,046.4)
Cash utilised	(1.8)	(0.2)	0.9	(2.9)	0.9	3.5	0.4
Change in working capital	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Completion	(16.8)	(2.4)	(0.3)	(0.2)	(0.1)	0.0	(19.8)
Contribution to repairs & investment	1,240.1	1,353.3	1,478.4	1,595.1	1,723.5	1,858.0	9,248.4

Financial ratios

Our forecast financial ratios are set out in Table 5 below.

Table 5: Financial Ratios[5]

	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33
Cash Interest cover 1	7.29	7.58	8.03	8.44	8.76	9.17
Cash Interest cover 2	2.99	2.79	3.08	3.41	3.43	3.59
Funds from Operations net debt	16%	17%	19%	20%	20%	21%

[5] Definitions:

Cash Interest Cover 1

This ratio is defined as the (**SUM** of Revenue, Infrastructure charges income and Disposal proceeds **LESS** Operating costs and PFI costs) **DIVIDED BY** Interest Paid.

Cash Interest Cover 2

This ratio is defined as the (**SUM** of Revenue, Infrastructure charges income and Disposal proceeds **LESS** Operating costs, PFI costs, Asset Replacement costs and Asset Maintenance costs) **DIVIDED BY** Interest Paid.

Funds from Operations to Net Debt

This ratio is defined as the (**SUM** of Revenue, Infrastructure charges income and Disposal proceeds **LESS** Operating costs, PFI costs and Net Interest Paid) **DIVIDED BY** (Closing debt less closing cash balance).

Both ratios above improve over the period as our revenue base represents a significant majority of our overall funding (c. 6% over 2027-33) and increases at a higher rate than our costs, to fulfil the increased investment demand.

5 Financial Statements

Profit & Loss

	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33
Regulated income						
Household	1,500.1	1,595.4	1,696.7	1,804.5	1,919.1	2,041.1
Wholesale Income	514.0	541.2	565.7	591.3	618.6	647.7
Other income	18.2	19.1	20.1	21.2	22.3	23.5
Total revenue	2,032.3	2,155.7	2,282.6	2,417.0	2,560.0	2,712.3
Regulated expenditure						
Operating costs	(627.4)	(638.3)	(678.2)	(707.3)	(725.1)	(746.4)
PFI	(128.8)	(132.7)	(84.9)	(59.6)	(49.1)	(37.2)
Repairs and Non-asset	(250.4)	(258.8)	(264.1)	(300.8)	(360.2)	(388.8)
Depreciation	(443.0)	(467.0)	(493.3)	(522.1)	(554.0)	(586.7)
Amortisation of PFI	(3.6)	(3.6)	(1.6)	0.0	0.0	0.0
Gain/(loss) on sale of assets	0.5	1.4	1.4	1.4	1.4	1.5
Total expenditure	(1,452.7)	(1,499.0)	(1,520.6)	(1,588.4)	(1,687.0)	(1,757.6)
Regulated PBIT	579.6	656.7	761.9	828.6	873.1	954.7
Interest	(175.6)	(183.1)	(189.6)	(195.7)	(204.2)	(210.5)
Regulated profit before tax	403.9	473.6	572.3	632.9	668.9	744.2
Current tax payable	(0.3)	(3.4)	(9.4)	(13.2)	(15.5)	(20.0)
Deferred Tax	(100.7)	(115.0)	(133.7)	(145.0)	(151.8)	(166.1)
SW Profit after Tax	303.0	355.2	429.2	474.7	501.7	558.1

Balance Sheet

	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33
Fixed Assets	9,008	9,652	10,387	11,174	11,999	12,896
Investments	38	38	38	38	38	38
PFI 'assets'	5	2	0	0	0	0
Trade and other debtors	141	141	141	141	141	141
Stock	5	5	5	5	5	5
Cash	52	52	51	54	53	50
Total debtors	203	199	197	200	199	195
Trade and other creditors	(295)	(295)	(295)	(295)	(295)	(295)
Accruals and provisions	(176)	(176)	(176)	(176)	(176)	(176)
Infrastructure Income	(13)	(13)	(13)	(13)	(13)	(13)
Unearned income	(106)	(106)	(106)	(106)	(106)	(106)
Deferred Tax	(844)	(959)	(1,093)	(1,238)	(1,390)	(1,556)
Net assets	**7,816**	**8,341**	**8,940**	**9,585**	**10,257**	**10,985**
Loans	5,384	5,554	5,724	5,894	6,064	6,234
Capital reserves	133	133	133	133	133	133
Trading reserves	2,298	2,653	3,082	3,557	4,059	4,617
Total capital & reserves	**7,816**	**8,341**	**8,940**	**9,585**	**10,257**	**10,985**

Please note that for the purposes of SR27 financial modelling it is assumed that trade debtors, trade creditors, accruals and prepayments remain static over the period.

Net new borrowing

Table 6: Net new borrowing

£m, forecast (nominal)	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33
Opening Debt	5,214	5,384	5,554	5,724	5,894	6,064
Closing Debt	5,384	5,554	5,724	5,894	6,064	6,234
Net new borrowing	**170**	**170**	**170**	**170**	**170**	**170**

Cash Flow

	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33
PBIT (excl gain on sale of assets)	579	655	761	827	872	953
Depreciation/amortisation	447	471	495	522	554	587
Depreciation of tangible fixed assets	443	467	493	522	554	587
Amortisation of grants and PFI assets	4	4	2	0	0	0
Change in working capital	0	0	0	0	0	0
Operating cash flow	1,026	1,126	1,255	1,349	1,426	1,540
Net interest	(176)	(183)	(190)	(196)	(204)	(211)
Tax payments	(0)	(3)	(9)	(13)	(15)	(20)
Capital payments	(1,035)	(1,126)	(1,244)	(1,325)	(1,395)	(1,501)
PFI investment	0	0	0	0	0	0
Intercompany Loans	0	0	0	0	0	0
Infrastructure income receipts	15	15	16	16	16	17
Sale of fixed assets	2	1	1	1	1	1
Net cash inflow/(outflow)	(168)	(170)	(171)	(167)	(171)	(173)
Financing						
New loans - Scottish Government	327	320	318	306	295	296
Loan repayments	(157)	(150)	(148)	(136)	(125)	(126)
Net new borrowing	170	170	170	170	170	170
Cash utilised	(2)	(0)	1	(3)	1	3
Net cash outflow/(inflow)	168	170	171	167	171	173

As can be seen above operating cash flows are being utilised to fund capital payments.

Annex A – High Level Summary of Alternative Charge Paths

24/25 prices

CPI+3.8%

24/25 Prices (£m)	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	Total
Revenue	1,885.1	1,969.7	2,054.4	2,142.9	2,235.8	2,333.3	12,621.3
Infrastructure charges	14.0	14.0	14.0	14.0	14.0	14.0	83.9
Disposal proceeds	1.6	1.2	1.2	1.2	1.2	1.2	7.8
Total	1,900.7	1,984.9	2,069.6	2,158.1	2,251.0	2,348.5	12,712.9
Borrowing (net new)	156.9	153.9	150.9	147.9	145.0	142.2	896.7
Grants and contributions	4.6	4.5	4.4	4.3	4.3	4.2	26.4
Total Financing	2,062.3	2,143.3	2,224.9	2,310.4	2,400.3	2,494.8	13,636.0
Operating costs inc cloud from 2024/25	(579.3)	(577.8)	(601.8)	(615.3)	(618.4)	(624.2)	(3,616.8)
PFI costs	(118.9)	(120.1)	(75.3)	(51.8)	(41.9)	(31.1)	(439.1)
Net Interest cost	(162.1)	(165.7)	(168.2)	(170.2)	(174.0)	(176.0)	(1,016.2)
RCC	(30.9)	(30.9)	(30.9)	(30.9)	(30.9)	(30.9)	(185.3)
Tax	(0.7)	(4.0)	(9.6)	(13.3)	(15.5)	(19.6)	(62.7)
Total costs	(891.9)	(898.4)	(885.9)	(881.5)	(880.7)	(881.7)	(5,320.0)
Cash utilised	(1.3)	(0.3)	0.6	(3.0)	0.1	2.0	(1.9)
Change in working capital	(0.0)	(0.0)	0.0	0.0	(0.0)	0.0	(0.0)
Completion	(15.5)	(2.1)	(0.3)	(0.2)	(0.1)	(0.0)	(18.2)
Contribution to repairs & investment	1,153.6	1,242.5	1,339.4	1,425.7	1,519.6	1,615.1	8,295.9

CPI+4.3%

24/25 Prices (£m)	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	Total
Revenue	1,894.0	1,988.3	2,083.6	2,183.6	2,289.1	2,400.2	12,838.8
Infrastructure charges	14.0	14.0	14.0	14.0	14.0	14.0	83.9
Disposal proceeds	1.6	1.2	1.2	1.2	1.2	1.2	7.8
Total	1,909.6	2,003.5	2,098.8	2,198.8	2,304.3	2,415.4	12,930.4
Borrowing (net new)	156.9	153.9	150.9	147.9	145.0	142.2	896.7
Grants and contributions	4.6	4.5	4.4	4.3	4.3	4.2	26.4
	0.0	0.0	0.0	0.0	0.0	0.0	
Total Financing	2,071.1	2,161.9	2,254.1	2,351.1	2,453.5	2,561.7	13,853.5
Operating costs inc cloud from 2024/25	(579.3)	(577.8)	(601.8)	(615.3)	(618.4)	(624.2)	(3,616.8)
PFI costs	(118.9)	(120.1)	(75.3)	(51.8)	(41.9)	(31.1)	(439.1)
Net Interest cost	(162.1)	(165.7)	(168.2)	(170.2)	(174.0)	(175.9)	(1,016.2)
RCC	(30.9)	(30.9)	(30.9)	(30.9)	(30.9)	(30.9)	(185.3)
Tax	(1.1)	(4.8)	(10.8)	(14.9)	(17.6)	(22.2)	(71.3)
Total costs	(892.2)	(899.2)	(887.1)	(883.1)	(882.8)	(884.2)	(5,328.6)
Cash utilised	(0.9)	(0.5)	0.3	(3.1)	(0.0)	1.8	(2.4)
Change in working capital	(0.0)	0.0	0.0	(0.0)	0.0	0.0	(0.0)
Completion	(15.5)	(2.1)	(0.3)	(0.2)	(0.1)	(0.0)	(18.2)
Contribution to repairs & investment	1,162.5	1,260.1	1,367.1	1,464.7	1,570.7	1,679.3	8,504.4

Scottish Water
Trusted to serve Scotland
BUSINESS PLAN
2027-2033
TECHNICAL
APPENDICES
Performance Monitoring
February 2026

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1 Executive Summary

Our performance monitoring appendix explains our approach to forecasting the ambitious outcomes we expect to achieve over SR27, how we have aligned with Water Industry Commission for Scotland's (WICS) Guidance[1] and how we expect to develop a monitoring and performance framework for Scottish Water that is aligned to these outcomes.

1.1 Our Alignment with Guidance

For the SR27 Final Business Plan, we have followed the WICS Guidance in developing our outcome projections, ensuring that our performance monitoring framework for SR27 is robust and comprehensive. For Scenario A (the Reference Scenario) we provide SR27 outcome projections, and projections for each investment period to 2050, enabling effective long-term planning. For Scenarios B and C, we provide outcome projections for the end of SR27.

Our approach to translating our contribution towards high-level outcomes from the Water Sector Vision (WSV) into tangible measures and milestones is outlined in Section 1. We show how we plan to meet the Draft Ministerial Objectives (MOs) for the 2027-33 regulatory period, marking a significant step towards achieving the long-term sector vision.

1.2 Our Outcome Proposals for the SR27 period

Customer Experience Measures (CEMs):

- Customer satisfaction is central to all that we do and benchmarking our performance with other companies helps drive the business to customer excellence. Our benchmark UKCSI score will be above the average score of all the UK companies in the national survey and our CEMs are expected to see a 6% reduction in points lost, ensuring that Scottish Water continues to lead in service delivery and customer satisfaction.

Water Quality and Compliance:

- The provision of wholesome drinking water quality is an essential service for Scotland, and customers continue to expect us to meet the highest standards. We forecast a 29% reduction in points lost from sample failures for total drinking water compliance, a 17% reduction in Drinking Water Quality Regulator (DWQR) reported incidents, a 12% reduction in the Water Risk Assessment Planning (WRAP) measure and a 41% reduction in the number of lead pipes in our water mains and distribution network.

Water Continuity:

- Our management of water demand improves efficiency and effectiveness in our investments. We forecast that leakage across the water system will reduce by 10%, repeat interruptions to supply will remain steady and the low-pressure register will reduce by 13%.

Environmental Impact:

- Our customers, communities and environments in which we live can be affected by severe weather events and asset failures which cause spills, sewer flooding and pollution incidents. Our ambitious environmental target outcomes include a forecasted 38% reduction in serious environmental pollution incidents and a 17% reduction in unsatisfactory intermittent discharges.

[1] WICS - Strategic Review of Charges 2027-2033: Guidance and Definitions to the Business Plan Tables

Carbon emissions:

- Though we use gravity to move water and waste water where we can within out systems, we also pump water and waste water. This contributes to operational carbon footprint alongside embodied carbon emissions from our capital investment programme. We will continue our progressive journey towards the 2040 net zero target outcome.

Our proposed outcomes have been developed relative to the Draft Business Plan, taking account of stakeholder feedback and updates to proposed investment levels. Since the Draft Business Plan we have listened and responded to customer feedback through our customer research and stakeholder feedback. We have created a lower overall bill profile through lower investment and sought to maintain service outcomes that our customers most value, including a relative improvement in the outcomes of water quality taste and odour and discolouration and relative reduction in the outcomes for repeat interruptions to supply.

Stakeholders may look to compare Scottish Water's outcome forecasts with the service levels forecast by companies in England and Wales. Where relevant, detailed comparisons to outcomes levels in England and Wales are included in the Table 1 Commentary. As a more general observation, we note that outcomes are incentivised in different ways in Scotland and in England and Wales. These different incentives may impact company priorities and areas of focus, and so the likelihood of any individual forecast being met. Companies in England and Wales are generally not expected to meet all targets set within a price control. As a result, it is likely to be more useful to compare achieved outcomes over time rather than forecast outcomes across regulatory regimes.

Scottish Water are confident that the outcomes forecast in the Final Business Plan are stretching and ambitious, and will strive to meet all of the targets laid out in the Final Business Plan.

1.3 Our Next Steps

We have welcomed the opportunity to engage with changes from the SR27 Draft Business Plan to the SR27 Final Business Plan through WICS SRC Group and the Water Industry Leaders Group (WILG). This has included discussions on the outcomes and affordability and has been instrumental in shaping our SR27 Final Business Plan.

As part of our ongoing engagement and discussions, we propose additional outcomes that we think will add value to assessment of our performance. In this document we also highlight the development of an Asset Health tracker, metrics for target outcomes in SR27 and ongoing development of some other metrics to shadow report from April 2026. We also discuss measures for future consideration, for example to aid dynamic investment decision making. These steps are crucial for ensuring that our outcome projections not only meet current guidance but also anticipate future needs and challenges.

The Table 1 projections of outcomes form the foundations for performance outcome reporting in SR27. We outline the suitability of our proposed outcomes to be target outcomes, which will form a performance monitoring framework for SR27. The outcomes are grouped into those for target for a potential SR27 incentive scheme and those that will be reported. The framework will guide the future development of our incentives, ensuring that our performance remains aligned with sector expectations and regulatory requirements. Further preparation to enable the target projected outcomes to be monitored and assessed within any future incentive schemes has been undertaken to aid further engagement with stakeholders will be documented separately to our

Final Business Plan. A further review of the definitions will be made with DWQR to avoid any ambiguity for the reporting in period, which may lead to some refinements of the projections within water quality and in particular discolouration. Further details are available on page 69 of Table 1 Commentary.

In conclusion, this technical appendix explains our approach to monitoring performance across SR27 and our response to the WICS Guidance. We are committed to achieving the high-level outcomes set out here and translating these into tangible measures and milestones that will drive performance improvements and sector advancements in the long term, while balancing ambition and cost.

We look forward to continuing our productive engagement with stakeholders to ensure a good outcome from the SRC27 process for our customers and stakeholders.

2 Background

2.1 Scope of Technical Appendix

This technical appendix explains our approach to monitoring our performance across SR27 and our response to the WICS Guidance. Through our performance monitoring we will:

- Monitor performance against our Strategic Ambitions and Long-Term Outcomes,
- Manage risk and opportunities across the SR27 plan,
- Intervene to address areas of underperformance or where risk reaches unsatisfactory levels,
- Share the outputs of our Monitoring work with WICS, the Scottish Environmental Protection Agency (SEPA), the Drinking Water Quality Regulator (DWQR) and our other stakeholders, and
- Benefit from our new Assurance processes to enhance and continuously improve our Monitoring process as it extends coverage to newly reported metrics and measures.

WICS Guidance for Table 1 outcomes and performance monitoring are summarised in Table 19 in Annex A, together with an indication of where each has been prepared within this Technical Appendix.

Specifically, we will detail how we have responded to WICS Guidance, including our consideration of WICS' initial set of 44 outcomes measures and our proposal of two additional outcomes for SR27.

Table 1 below provides a summary of the outcomes proposed by WICS and by Scottish Water, and their status, the details of which we present in this technical appendix.

Table 1: Summary of proposed SR27 outcomes

Measure of level of service	Technical Appendix section	Reference	Our response
Customer Experience Measure	Customer Excellence	1.01 1.02 1.03 1.04 1.05	Forecast provided
		1.06	Forecast not supplied*
Leakage	Water Continuity	1.07 1.08	Forecast provided
Business demand		1.09	
Per capita consumption (PCC)		1.10	
Customers receiving low pressure		1.11	
Unplanned interruptions		1.12	
Planned and unplanned interruptions		1.13	
Unplanned interruptions		1.14	
Water availability		1.15 1.16	
Drinking water aesthetics	Water Quality	1.17 1.18	
Drinking water quality		1.19	

Measure of level of service	Technical Appendix section	Reference	Our response
		1.20	
		1.21	
		1.22	
		1.23	
Internal sewer flooding		1.24	
	Waste water Flows	1.25	
		1.26	
External sewer flooding		1.27	
Discharge Permit Compliance		1.28	
Serious pollution incidents (EPI Cat 1/2)		1.29	Forecast provided
Total pollution incidents (all categories)	Water Environment	1.30	
Sludge compliance		1.31	
Sewerage infrastructure discharges		1.32	
River water quality		1.33	Forecast not supplied**
Net Zero Emissions		1.34	
		1.35	
		1.36	
Operational emissions		1.37	
	Carbon Emissions	1.38	Forecast provided
	Mitigation	1.39	
		1.40	
Climate change mitigation		1.41	
		1.42	Forecasts not supplied*
Resource recovery		1.43	To be developed in SR27
Asset health	Asset health	1.44	Forecasts provided
Strategic Delivery	Additional measures	n/a	Forecast provided

* This is being developed with the aim of shadow reporting from 2026.

** Further consideration to support dynamic investment planning.

2.2 Context and Drivers

As Scotland's regulated main provider of water and waste water services, we hold ourselves to account in terms of the quality of services that we deliver to our customers, communities and the environment. This is reflected in stretching and ambitious forecast outcomes, many of which will become target outcomes in a basket used to measure and manage the performance of Scottish Water.

Our proposal for SR27 builds on the previous Strategic Reviews, forms forecast outcomes to 2033 and expands our coverage of the measures into our Performance Monitoring for SR27 and is set within the context of our Long-Term Strategy[2] and 25 Year Investment Strategy.

The long-term outcomes that we plan to deliver for a flourishing Scotland are aligned to the Draft Ministerial Objectives 2027-33 (MOs), the Water Sector Vision (WSV) and our strategic ambitions of Service Excellence, Beyond Net Zero Emissions and Great Value and Financial Sustainability.

[2] Long-Term Strategy - Our Sustainable Future Together

2.2.1 Draft Ministerial Objectives 2027-33

We set out the outcomes for SR27 in Data Table 1 related to the following MOs:

The Draft Ministerial Objectives 2027-33 are in the following highlighted objectives:

1. Water Sector Vision – Scottish Water should take the lead in working with partners to begin to pursue action towards the realisation of the co-created vision.

2. Standards of service – Scottish Water should maintain or improve current levels of service over the long term.

3. Asset Maintenance – Scottish Water should develop an evidence-based strategy that will inform the long-term capital maintenance needs of the industry.

4. Supporting Sustainable Economic Growth – Scottish Water should continue to invest in water, sewerage and drainage infrastructure to **provide capacity to enable development**.

5. Drinking Water - **Scottish Water should comply with drinking water quality duties** and develop investment plans to remove contact of potable water with lead pipes in its network.

6. Environment - **Scottish Water should build upon compliance levels with its current environmental licences** and develop investment plans that address risks of impacts on the environment from its assets.

7. Flooding/Surface Water Management – Scottish Water should pursue further partnerships with Local Authorities and other stakeholders to develop delivery and monitoring arrangements that will secure **improvement for storm water management**.

8. Security and Resilience – Scottish Water should develop, and act upon, strategies and plans, which will maintain and improve the resilience and security of Scottish Water's services and protect its network and information systems from malicious attack.

9. Climate Change, Adaptation and Mitigation - Scottish Water should understand the impacts of climate change on its assets and implement its plans for adaptation measures necessary to protect services. In response to the climate change emergency, it should also develop and implement a strategy that will see it take a leadership role in **utilising its land and assets, and working with others, to achieve its climate change commitments**.

Private Finance Initiative (PFI) funded contracts - Scottish Water should develop plans to manage its PFI contracts to secure the best value for money for the future operation of these facilities.

2.2.2 Water Sector Vision

The alignment of outcomes to the Water Sector Vision is highlighted below and is exemplified by the mapping of outcomes to the Scotland National Performance Framework (NPF) outcomes of health and active, protecting and enhancing the environment, inclusive and vibrant communities and a strong and competitive economy:

1. Scotland's water sector will be admired for excellence, secure a sustainable future and promote a responsible Hydro Nation.

2. Together we will support the **health and wellbeing of the nation**. We will ensure that all of Scotland gets excellent quality drinking water that people can responsibly enjoy. We will **involve and inspire Scotland's people to love their water and only use what they need**.

3. Scotland's waste water will be collected, treated and recycled in ways that generate value and protect people and the environment. We will promote access to the natural environment and encourage communities to enjoy and protect it.

4. We will enable the **economy to prosper**.

5. We will transform how we work to live within our planet's resources, work with the natural environment and **maximise our contribution to Scotland achieving net zero emissions and adapting to climate change**.

6. We will be agile and collaborate within the sector and work in partnership with others to be resilient to the challenges that face us.

7. We will keep services affordable by innovating and delivering the greatest possible value from our resources, helping those who need it most. We will serve all customers and communities in a way that is fair and equitable to present and future generations.

8. We are a vital part of a flourishing Scotland.

These outcomes have been informed by customers across Scotland and set out in our Long-Term Strategy and 25 Year Investment Strategy. These outcomes can be converted into measures and metrics which enable us to track our progress. The SR27 Final Business Plan explains how we will deliver these outcomes during SR27, as a step on the long-term journey.

We set out the expected outcomes for a range of measure and metrics in this Technical Appendix. These are made for Scenario A to 2032/33 and projected out to 2050 over three further regulatory periods. They are also made for two other Scenarios (B and C), to express how those outcomes are expected to change with different funding levels in SR27. In addition, we have applied confidence grades to these metrics which reflect the reliability and accuracy of the forecast outcomes.

2.2.3 WICS Guidance

Our projected outcomes are aligned with the WICS Guidance.[3] WICS has set out 44 outcome measures and metrics for SR27, following discussions with us and other stakeholders. The list of measures and metrics cover outcomes across our customer excellence, water and waste water services, carbon emissions and asset health. The list included several measures and metrics that form part of our existing performance monitoring and several that have been developed within Scottish Water and other stakeholders.

In addition, the WICS guidance invited us to add further measures and metrics. The guidance also invited Scottish Water to express how these outcomes would contribute toward the Scottish Governments' NPF and enable benchmarking of performance with comparator companies in England and Wales.

[3] WICS - Strategic Review of Charges 2027-2033: Guidance and Definitions to the Business Plan Tables

As set out in our Final Business Plan, we are seeking a price settlement of CPI+3.3% to fund investment of £8.1bn[4] over the SR27 period. This is an increase in real prices over the period for our customers. This increase aligns with our Long-Term Strategy and 25 Year Investment Strategy and is supported by our improved knowledge of our assets. This investment is necessary for us to effectively respond to the three main challenges of climate change, population shift and ageing assets; and when combined with the progress we expect to make on innovation, collaboration, transformation and efficiency, it will allow us to meet the needs of customers, communities, the environment and the economy. Specifically, we will:

- Maintain and replace existing assets to ensure that they can be adapted to meet the challenges of more frequent extreme weather events and continue to deliver services sustainably and affordably now and for generations to come,
- Protect people and the environment by ensuring compliance with all drinking water quality and environmental regulations, and
- Improve further areas of service that are of most importance to our customers and to enable sustainable housing and economic growth, supporting the connection of new homes and business premises.

In this context, it is particularly important that the outcome measures and targets we put forward demonstrate the full value to our customers from this funding.

Our forecast outcomes are stretching and ambitious. We recognise that we perform at our best when we have clear and relevant target outcomes that provide motivation and focus to staff and partners to deliver.

2.3 Methodology and Approach

Performance Monitoring and outcomes have been instrumental in driving us to improve our service and adding value to our customers, communities and environment in ways that are aligned to the Draft Ministerial Objectives 2027-33, Water Sector Vision and Long-Term Strategy. This initiative aligns with both the immediate objectives of SR27 and the overarching long-term vision for 2050.

The incorporation of WICS metrics and measures enhances our monitoring capabilities but also ensures that we remain accountable for the quality of services provided to customers, communities, and the environment.

The methodology employed in this development involves high-level engagement with WICS and other stakeholders.[5] This collaborative approach is essential in ensuring that the proposed outcomes are both ambitious and achievable, setting a clear path towards Service Excellence, Beyond Net Zero Emissions, and Great Value and Financial Sustainability.

High-level methodologies and approaches have been detailed, explaining how these outcomes interact with investment areas of the business plan. This comprehensive approach ensures that each outcome is backed by rigorous data and analysis, providing a clear rationale for their inclusion in the performance monitoring framework.

[4] Post-efficiency value, 2024/2025 price base
[5] For further details see Annex C – Summary of Joint Discussions on the Proposed Outcome Measures

While most outcomes have been identified and forecast, some areas require further development. This iterative approach ensures that the performance monitoring framework stays dynamic and responsive to emerging challenges.

The adaptation of data and construction of new definitions for certain lines is addressed in the report. This process ensures that the metrics employed are both relevant and accurate, providing a solid foundation for performance monitoring.

Areas not forecast in the SR27 Final Business Plan, such as river water quality, have been identified, and the reasons for their exclusion have been clearly outlined. This transparency ensures that all stakeholders are aware of the scope and limitations of the current performance monitoring framework.

2.4 SR21 Outcomes

Our performance monitoring in the current regulatory period has been focussed on:

- Customer Service through the Overall Performance Assessment (OPA),
- Customer Excellence through the CEMs, and
- Carbon Emissions through Net Zero Emissions.

This is alongside Value for Money and Our People measures. This has involved a flexible year-ahead internal target outcome setting within a regulatory framework that enabled investment to be reallocated to best meet the needs of our customers during the period.

Our OPA score was expected to be within the range 395 to 410 and has improved from 402 to 416 points over this regulatory period – with the figure of 416 reached from an exceptionally mild weather year and performance improvement. The basket of key performance metrics includes:

- Total drinking water compliance at the water treatment work, service reservoirs, and customer taps as reported to DWQR,
- The level for water leakage across our water system,
- The number of households affected by unplanned water supply interruptions above 6 hours,
- Waste water treatment compliance in final effluent,
- Internal sewer flooding incidents per annum caused by overloaded sewers and other causes,
- Serious environmental pollution incidents (Cat 1 and 2) in waste water and water services,
- Other environmental pollution incidents (Cat 3) in waste water and water services, and
- Disposal of sludge compliance.

Our CEMs have shown gradual improvement through SR27. Our CEMs reflect the number of incidents through contacts and the service they experience through customer satisfaction surveys for Developers, Licence Providers and businesses and householders.

Our overall carbon emissions are predicted to have reduced by 24% in the last three years. Our carbon emission target is to be net zero by 2040. This includes carbon emissions from our operations net of sequestration and from our embodied carbon from capital expenditure.

The existing measures and metrics provide useful indicators of performance to-date over past years and regulatory periods. Their continuity also provides assurance that we will keep a good focus on getting the basics right. We also believe that we need to set ourselves ambitious goals to stretch and improve out service for our customers, communities and the environment of Scotland.

2.5 Developing the SR27 Outcomes

The WICS guidance has set out two main changes to the performance monitoring for SR27. Firstly, there is a provisional list of metrics and measures with:

- Some revisions to definitions, primarily to enable comparison with England and Wales and,
- Some additions to enhance the monitoring of outcomes aligned to the Long-Term Strategy.

The revisions to definitions are for some of the metrics within the current OPA. While the changes are relatively minor, we note that proposed changes will:

- Include annual internal overloaded sewers associated with severe weather incidents (which are currently excluded). This is likely to increase the year-on-year variation in this metric with changing weather patterns,
- Amend the definition of the metric for households affected by unplanned interruptions to supply of above 6-hours, so that the metric is the total number of households affected weighted by duration of interruption, rather than the proportion of the connected customer base that experiences an unplanned interruption. Households that experience interruptions greater than 12 hours, and interruptions greater than 24 hours have increased weights. This introduces an upward trend over time to the number of households in each area that might be affected by an incident, and
- Remove Environmental Pollution Incidents (Category 3) in our water system. These are relatively few but currently included in the OPA.

The additional set of outcomes in Table 1 include:

- **Leakage reduction** in water supply zones that are expected to experience demand exceeding supply (i.e. a deficit). Improvement in this outcome will save money by delaying the need for capital investment in those zones,
- **DWQR reported incidents** provides a focus on the events that happen in the water system and the incidents that have highest impact on our service. Improvement in this outcome will show that we are learning how to reduce the events that can affect our customers,
- **Water risk assessment planning (WRAP) measure** enables the greatest risk to water supply to be shown. Improvement in this outcome will show that we have targeted our investment towards those most at risk of water supply incidents and sample failures,
- The number of **lead pipes in our network** focuses on the exposure of lead in water from our communication supply pipes to the property boundary. Improvement in this outcome will show the progress in replacing the lead pipes and reducing the risk of levels of lead exceeding complaint level,

- The number of postcodes with **repeat interruptions to supply** in a three-year period. Improvement in this outcome will reduce the loss of water supply to the areas most affected by interruptions,

- The number of **pollution incidents that are category 1 and 2**. Improvement in this outcome will reduce the number of most serous pollution incidents that affect our environment from our water and waste water systems, and

- The number of combined sewer overflows confirmed to have an environmental impact by SEPA (known as **unsatisfactory intermittent discharges** or UIDs). Improvement in this outcome will reduce the combined sewer overflow discharges with the most environmental impact in Scotland.

Asset health: The SR27 Final Business Plan includes submissions in Tables 3 and 4 from the early development work of the equipment health index (EHI), We have developed these projections into an Asset Health Tracker score, as a development of the proposals initially discussed with WICS in August 2025. We present a preferred option in Table 1 from some alternatives which are also summarised.

The full list of outcomes is included in the Table 1 submission and the outcomes to 2032/33 are discussed in Section 2. The outcomes to 2050 and for Scenarios B and C are discussed in Section 3. Further details of individual projections and key underlying assumptions are available in Commentary documents for Table 1.

2.6 Additional Outcomes

Data Table 1 includes several additional areas of interest for the development of new metrics and measures, and an invitation for us to add to the provisional list.

Of the WICS list of 44 outcomes we have currently not formed projected outcomes for the following:

- **Biodiversity (line 42):** The biodiversity outcome-based is being developed with Nature Scotland with a view to shadow reporting in Scottish Water from April 2026.

- **Resource recovery (43):** A resource recovery metric in England and Wales involves phosphorous extraction, but this is not a part of our Long-Term Strategy, or SEPA expectations, in Scotland. A metric for resource recovery will be considered during SR27 the development of the circular economy and Advanced Anaerobic Digestion (AAD).

- **Communities measure (6):** An Awareness and Behaviour Change (ABC) tracker involves customer survey data questions relating to customer and communities' awareness, opportunity and motivation as well as the behaviour outcomes of per capita consumption (PCC) and sewer blockages with a view to shadow reporting in Scottish Water from April 2026. This is geared towards altering societal behaviours and attitudes through demand side initiatives, and collating evidence of change in PCC and sewer blockages. This might pave the way towards greater demand side management activity and inform the degree of movement that might be attainable from changed awareness and behaviour and need for other options, dependent on the results. In discussion with ICG and Consumer Scotland, this development for SR27 might also be part of a set of wider Communities' measures in the future. Further development towards and during SR27 is also expected for a measure of community engagement.

- **River quality (33):** A metric will be considered, with SEPA, alongside the forthcoming River Basin Management Programme (RBMP4) to find a suitable measure for River Water

Quality specific to Scottish Water. Further consideration might be needed as to how to best facilitate dynamic investment planning in relation to any needs that arise from RBMP4 for SR27, following SEPA feedback on the Draft Business Plan.

The guidance invited us to consider whether there should be additional metrics from consideration of the mapping of outcomes to Scotland's National Performance Framework (NPF) categories. Our review found that the proposed list of outcomes published by WICS for SR27 reflected our core outcomes and contribution into four main NPF Outcome categories:

- Health: Healthy and Active,
- Economy: A strong, competitive economy,
- Communities: Inclusive empowered resilient and safe communities, and
- Environment: Protecting and enhancing the environment.

There were a further two NPFs with some connection:

- International: Make a positive contribution internationally, and
- Poverty: Tackle poverty.

There are five residual NPF categories with no representation from the WICS list:

- Children: Realising children and young people's potential,
- Culture: Vibrant and diverse cultures,
- Education: Excellence in teaching, research and innovation,
- Fair work: Fair Work and Business, and
- Human rights: Respect, protect and fulfil human rights.

Through the development of our Long-Term Investment Strategy and our application of Strategic Cost Benefit Analysis, we identified several indirect and tertiary contributions to the residual NPF categories from our long-term investment programme. For example, we found some areas where we contribute materially to a flourishing Scotland, such as through the number of additional jobs created, reach to Scottish schools to build Science, Technology, Engineering & Maths skills, and capacity to facilitate new homes and businesses.

However, we have not formally added these to the list of Table 1 metrics as they might be inputs to Scottish Water. There were also other metrics (that are less material, less measurable, or still emerging) that we considered such as:

- Methane gas which can then be used as a power source, which can be used in place of existing external power inputs (electricity) to Scottish Water.
- Recycled clothing - We can recycle used clothing and personal protective equipment (PPE), reducing the amount send to landfill as a waste stream, thereby reducing our carbon footprint, and reducing the procurement of new clothing.
- Chemical free treatment achieved through changing the processes at a treatment works and reducing or removing the need for the purchase of chemicals. This avoids the purchase of as many chemicals as would have been the case in the past

While we will continue to watch and report the more substantive activities in these areas, we do not propose at this stage any additional outcome metrics or measures from this review period.

However, while developing our SR27 Final Business Plan and the projected outcomes for Table 1, we recommend the future addition of two measures:

- An outcome measure (currently referred to as the **Strategic Tracker**) to track the progress of the outcomes in our 25 Year Investment Strategy to 2050.
- An outcome measure (currently referred to as the **ABC Tracker**) to monitor change in customer and communities' knowledge, perceptions, behaviours and outcomes related to per capital consumption and sewer blockages from wet wipes and fats and oils, which could be considered as part of a future communities' measure.

The former has an initial projected outcome formed for the SR27 Final Business Plan and both are expected to be shadow reported from April 2026.

2.7 Our Customers' Perspectives

SR27 is the first step of Scottish Water's journey to the delivery of the long-term outcomes set out in the Long-Term Strategy and customers' views have been an essential part of the development of the Long-Term Strategy, SR27 Draft and Final Business Plans and a key part of informing SR27 outcomes, alongside feedback from Scottish Water's stakeholders, as set out in the Customer Research Technical Appendix.

2.7.1 Long-Term Strategy and 25 Year Investment Strategy Customer Research

More than 5,000 customers were involved in the programme of customer research which informed the development of the Long-Term Strategy.

The second stage of the Long-Term Strategy programme of research engaged household and non-household customers, exploring and gathering feedback on SR21's Strategic Outcomes and Objectives, with a view to understanding how the changing world might have affected customers' views in the time since they were created. A conclusion of this study was that the areas that resonated most with customers were those that were specific, tangible or measurable, making Scottish Water accountable for their level of performance.

The final stage of the Long-Term Strategy programme involved a large-scale quantitative study, where customers were invited to allocate 'coins' across six categories of investment. The 'costs' of long-term outcomes had to be balanced within a budget of 'coins'. This exercise gave Scottish Water an understanding of customers' long-term preferences and as well as insights into how customers approach trade-offs between service areas. We found that customers wanted to see standards across each service area maintained at the very least. They would not trade off deterioration in any service area to achieve greater improvements in others.

2.7.2 SR27 Draft Business Plan Customer Research

For the SR27 Draft Business Plan, our customer research started by sharing three investment scenarios, each of which showed outcomes that might be offered at three different levels of

charging (CPI+2%, CPI+4%, and CPI+6.5%)[6]. Customers were also presented with personalised SR27 bill impacts of each scenario, taking into account their Council Tax Band and discount level to inform their feedback.

Customers' understanding and acceptance of the long-term challenges presented by Scottish Water and their generally positive sentiment towards Scottish Water, led to customers wanting to protect both the company and its infrastructure. In addition, they were generally accepting of the need, due to challenges and future-proofing efforts, to pay more in their bills. However, customers were seeking improved outcomes in exchange for any price rises, and none of the early presented scenarios offered enough value for money to get wholehearted endorsement from customers.

Following consideration of stakeholder engagement, customer research and internal review, the CPI+4% case was developed further for the SR27 Draft Business Plan and again summarised for customers' further review. Outcomes were revised and improved to include:

- Balancing supply and demand of drinking water - keeping on top of leakage and reduce it a further 10% over SR27, and deliver water supply resilience schemes where needed (East Central Scotland and West Coast Islands),
- Internal sewer flooding - to remove properties through SR27 to keep the number of properties at risk of internal sewer flooding at similar levels
- Managing rainwater - maintain the existing three strategic drainage partnerships (Glasgow, Dundee and Edinburgh, and add two strategic drainage partnerships (potentially in Ayrshire and Fife). This will reduce the about of rainwater entering sewers and creates more green spaces,
- Repairing and replacing our assets - maintain and operate our assets in ways which protect service levels and risks, and make sure that further generations inherit assets that have been well looked after and are future proof, and
- Carbon emissions - upgrading technology to use less electricity and minimise carbon from process emissions. Creating new woodlands on our land, restoring peatlands, and use more low-carbon generation.

When invited to consider re-prioritising expenditure across investment areas, participants generally maintained the allocations presented in the rebalanced scenario. Where changes were suggested, they typically involved diverting funds to those choice areas perceived to benefit a greater number of customers and deliver broader impact. In the post-group feedback, most participants agreed that we had listened to their feedback from the original research when designing the rebalanced investment scenario.

These feature directly in the outcome proposals for the SR27 Draft Business Plan.

2.7.3 SR27 Final Business Plan Customer Research

For the SR27 Final Business Plan, further customer research was undertaken by Scottish Water with Consumer Scotland and the Independent Customer Group. Along with a range of evidence from stakeholders, customer research influenced Scottish Water's decision to propose a lower CPI+3.3% Reference Scenario in the SR27 Final Business Plan.

Therefore, the funds available for investment in SR27 were reduced. The findings from previous customer research and further stakeholder engagement helped to shape the subsequent changes to the plan. As a result, the SR27 Final Business Plan retains improvements in leakage, improves performance (versus the Draft Business Plan) in water

[6] These were our early draft investment scenarios, reflecting our thinking at this early stage of business plan development, and used extensively across the development of our investment planning.

aesthetics (taste and odour), but reduced funding means less investment and progress in areas such as repeat Interruptions to Supply.

Further information on customer research and how it has shaped the SR27 Final Business Plan can be found in the Customer Research Technical Appendix.

3 SR27 Outcomes

In this Section we outline the projected outcomes to 2032/33 for Scenario A, our reference scenario, for each line of the list published in the WICS guidance covering:

- Customer excellence
- Water continuity and water quality
- Waste water flows and water environment
- Net carbon emissions and related outcomes
- Asset Health.

3.1 Customer Excellence

This Section includes all the measures related to customer excellence including CEMs, the new Awareness measure and UKCSI.

Our projected outcomes to 2032/33 are set out in Table 2, and summarised as follows:

- 6% reduction in points lost for dCEM, nhCEM and hCEM which reflects a continuation of recent upwards trending,
- Upper quartile position for R-MeX, which will retain our position as a leading wholesale service provider in the UK,
- Above average Scottish Water UKCSI benchmark score when compared to the UKSCI all company score, which is 6 points above the ambition of the water and waste water companies in England and Wales.

Table 2: Extract of the Customer Excellence projected outcomes from Table 1 submission (base is 2026/27)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	Year 6 2032/33
1.01	dCEM	83.25	6%	83.42	83.58	83.75	83.91	84.07	84.23
1.02	nhCEM	89.56	6%	89.67	89.77	89.87	89.97	90.07	90.17
1.03	R-MeX	9.0	-	9	9	9	9	9	9
1.04	hCEM	87.62	6%	87.75	87.87	87.99	88.11	88.23	88.35
1.05	UKCSI	77.9	-	77.90%	77.90%	77.90%	77.90%	77.90%	77.90%
1.06	Communities	0	0	0	0	0	0	0	0

Note: for R-MeX and UKCSI the values referenced are recent survey scores.

The annual projections to 2032/33 included in the main Table 1 submission are shown below and are out of 100 for the CEMs with a base of 2026/27 to show the expected change in lost points over the period. We expect these to continue to be a target outcome in SR27. R-MEX and UKCSI are new measures for Scottish Water. The figures for R-MeX and UKCSI reflect the latest score out of 10 and 100, respectively. The same figures have been entered into Table 1 as we have no projection of the absolute. These measures are comparator measures that focus on the relative rather than absolute scores. We expect the relative positions bulleted above to become a target outcome in SR27.

We plan to shadow report a new ABC tracker from April 2026, as discussed in Section 1 (see Section 7 for more details). There are currently no projected outcomes for this tracker pending the outcome of pilot survey results.

3.2 Water Continuity

Our projected outcomes to 2032/33 are set out in Table 3, and summarised as follows:

- 10% reductions in overall zone leakage metrics when compared with the 2024/25 base year,
- 13% reductions in **deficit zone leakage** metrics when compared with the 2024/25 base year, and
- No change in the number of **repeat interruptions to supply,** reflecting the impact on customers in those postcodes worst affected interruptions in a 1 and 3 year periods.

Table 3: Extract of the Water Continuity projected outcomes from Table 1 submission (base is 2026/27 unless stated)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				2027-28	2028-29	2029-30	2030-31	2031-32	2032/33
1.07	Total leakage	456	10%	2.00%	2.90%	4.20%	5.80%	7.70%	9.90%
1.08	Zonal leakage	233	13%	2.20%	3.30%	5.10%	7.20%	9.80%	12.90%
1.09	Business demand	372	15%	4.00%	4.90%	6.70%	9.10%	12.10%	14.90%
1.1	Per capita consumption (PCC)	178	2%	177	176	176	175	175	174
1.11	Low pressure	30	13%	36	39	31	28	27	26
1.12	Unplanned interruptions	7,000	0%	7,000	7,000	7,000	7,000	7,000	7,000
1.13	Minutes lost	15	0%	15	15	15	15	15	15
1.14	Repeat ITS	240	0%	270	300	275	260	250	240
1.15	Worst historic drought (m)	2.805	9%	2.83	2.852	2.876	2.896	2.914	2.564
1.16	Peak demand (m)	0.876	0%	0.883	0.891	0.913	0.921	0.926	0.877

Note: For 1.07 to 1.09 the values indicate cumulative reductions relative to the base of 2024/25. Therefore, a reduction is recorded as a positive value, indicating improved performance.

Our focus is on maintaining the number of repeat interruptions to supply where households are currently worst affected and maintaining the number of unplanned interruptions to supply above six hours during SR27. It is also forecast that minutes lost will remain stable.

Business demand is forecast to reduce, driven by the existing trend of decreasing business consumption rates, and the introduction of smart metering; the figures presented here are a combination of both.

There is limited change in per capita consumption, as there is no investment targeted in this area, and we forecast a gradual return to working in offices in Scotland.

There is reduction in low pressure register, which is already a low figure in the current OPA.

The figures for worst drought and peak demand indicate an improvement in resilience for customers at risk of loss of supply in exceptional circumstances.

The outcomes in the current OPA are expected to continue to be target outcomes, while the new metrics of Repeat interruptions and Zonal leakage in water deficit zones are expected to be target outcomes. The other metrics are more suitable for reporting than target outcomes (see Section 7 for further details).

3.3 Water Quality

Our projected outcomes to 2032/33 are set out in Table 4 and summarised as follows:

- ~40% reduction in the number of lead pipes in the Scottish Water network from our mains and distribution replacement programme to remove an average of 3,000 pipes per year.
- ~30% reduction in the points lost in total drinking water compliance through the investments in our water system from source to treatment works to customer tap.[7]
- ~15% reduction in the number of events that, under a DWQR criteria, become significant incidents.
- ~12% reduction in the number of hazard nodes[8] at an unsatisfactory level of risk to the supply of customers in the water system within the WRAP measure from focussed investment.

In addition, there is no change forecast for **taste and odour** contacts and 10% improvement for **discolouration** contacts. These two metrics are included in the Household Customer Experience Measure (hCEM).

The DWQR compliance measure already forms part of the OPA and target outcomes and is expected to continue for SR27. The **Lead in Scottish Water network** and **DWQR incidents** are new metrics and have the potential to be target outcomes. The WRAP is a new risk-based measure and through discussion with DWQR it has been agreed that it is suitable for reporting but not target in SR27 as it is still evolving and DWQR want to avoid any disincentive to report emerging risks (see Section 6.3 for more details).

Lead customer pipes are forecast to reduce as customers increase their awareness of the programme of investment to reduce lead in our network and customers act to remove lead pipes within their properties. As these are not directly driven by Scottish Water actions, their progress will be reported.

[7] See Water Quality Technical Appendix for further details of the SR27 investments

[8] There are a set of different types of hazards or risks that can occur at a location and a set of locations or nodes on the water system that are included in the assessment.

Table 4:Extract of the Water Quality projected outcomes from Table 1 submission (base is 2026/27)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	Year 6 2032/33
1.17	Taste and odour	0.51	0%	0.51	0.51	0.51	0.51	0.51	0.51
1.18	Discolouration	2.11	10%	2.11	2.11	2.09	2.02	1.99	1.90
1.19	Lead SW networks	43,154	41%	40,154	37,154	34,154	31,154	28,154	25,154
1.20	Lead customer pipes	98.014%	7%	98.035%	98.058	98.082%	98.106%	98.129%	98.153%
1.21	Drinking water compliance	99.929%	29%	99.937%	99.942%	99.944%	99.947%	99.949%	99.950%
1.22	WRAP	5,201	12%	5,116	5,125	5,064	4,933	4,801	4,568
1.23	DWQR reported incidents	30	17%	30	29	28	27	26	25

3.4 Waste Water Flows

Our projected outcomes to 2032/33 are set out in Table 5, and summarised as follows:

- 6% reduction in the annual number properties with internal sewer flooding from overloaded sewers and other causes, including severe weather incidents,
- Maintain the current number of properties on the internal sewer register for overloaded sewers at risk of 1 in 10 repeats, and
- Around 5-7% worsening of the position for the number of external areas affected by sewer flooding.

The annual number of properties with **internal sewer flooding** from overloaded sewers (excluding severe weather) is in the current OPA.

But with the inclusion of properties affected by severe weather, the year-on year variation in the metric is expected to increase, in line with varying weather patterns. Indeed, all four metrics have a high level of variation from weather patterns.

The **external sewer flooding** metrics are subject to further variation from planned monitoring, and investigations that might show an increase in the number of the areas affected and at risk. This is reflected in their confidence grade of C5 (relatively low reliability and accuracy).[9]

The high volatility of these metrics means that they are less suitable for target outcomes (see also Section 5.4).

[9] Further information on Confidence Grades can be found in Section 5.

Table 5: Extract of the Waste Water Flows projected outcomes from Table1 submission (Base is 2026/27)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	Year 6 2032/33
1.24	Annual internal sewer flooding	1.57	6%	1.53	1.52	1.51	1.50	1.49	1.48
1.25	Internal sewer flooding register	1.47	0%	1.53	1.66	1.60	1.56	1.53	1.47
1.26	Annual external sewer flooding	10.43	-7%	10.55	10.67	10.79	10.92	11.04	11.16
1.27	External sewer flooding register	11.35	-5%	11.67	12.13	12.40	12.69	12.48	11.88

3.5 Water Environment

Our projected outcomes to 2032/33 are set out in Table 6 and summarised as follows:

- 38% reduction in the number of serious (Category 1 and 2) environmental pollution incidents in our water and waste water systems.
- 17% reduction in the number of unsatisfactory intermittent discharges (UIDs) currently registered with SEPA.
- Maintain WwTW compliance for final effluent, sludge compliance and total pollution incidents in our waste water system.

Details of the investments underpinning these performance levels is set out in the Water Environment Technical Appendix.

All these metrics, except for the UIDs, are in the current OPA. The UIDs measure is a new metric and the number of removals in SR27 could be included in the target outcomes for SR27 with the total number of remaining UIDs reported (as it might be updated from time to time in SR27).

The list of outcomes from the WICS Guidance includes a reference to river quarter quality as discussed in Section 1; this metric will be considered as part of the forthcoming RBMP4 with SEPA.

Table 6: Extract of the Water Environment projected outcomes from Table 1 submission (base is 2026/27)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	End of SR27
1.28	WwTW discharge permit compliance	96.37%	0%	96.37%	96.37%	96.37%	96.37%	96.37%	96.37%
1.29	Serious pollution (EPI Cat 1/2)	8	38%	8	7	7	6	6	5
1.30	Total pollution (all categories)	34.8	0%	34.8	34.8	34.8	34.8	34.8	34.8
1.31	Sludge compliance	0	0%	0	0	0	0	0	0
1.32	Unsatisfactory intermittent discharges (UIDs)	862	17%	823	800	793	773	747	712
1.33	River water quality	0	0	0	0	0	0	0	0

3.6 Carbon Emissions Mitigation

This subsection summarises the outcomes for 2032/33 (shown in Table 7 and Table 8) in the areas related directly and indirectly to the 2040 net zero emission target.

3.6.1 Net Carbon Emissions

Our key projected outcomes to 2032/33 are summarised as follows:

- 38% reduction in the net zero carbon emissions, including operational emissions net of sequestration and embodied (capital) emissions

These projections are very dependent on the progress made to net zero from the greening of the grid and low and no carbon supply options coming to fruition. Further information of the investments in this area is provided in the Climate Change Adaption Technical Appendix and Climate Change Mitigation Technical Appendix.

Table 7: Extract of the Carbon Emissions projected outcomes from Table 1 submission (base is 2026/27)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	Year 6 2032-33
1.34	Net Zero Emissions	319,416	38%	306,930	266,522	255,559	249,685	209,158	198,126
1.35	Operational emissions (W)	37,267	74%	34,335	23,698	21,760	20,985	10,774	9,688
1.36	Operational emissions (WW)	140,224	49%	133,278	108,350	103,722	101,322	74,735	71,291
1.37	Baseline emissions	61.58%	21%	63.72%	71.42%	72.84%	73.53%	81.49%	82.47%
1.38	Operational emissions (net)	168,782	68%	157,082	117,460	107,282	102,968	64,001	54,529
1.39	Embodied carbon	150,634	5%	149,848	149,062	148,277	146,717	145,157	143,597
1.40	Carbon capture/ sequestration	-8,708	204%-	-10,531	-14,587	-18,200	-19,339	-21,508	-26,450

3.6.2 Biodiversity and Resource Recovery

We have a duty to report biodiversity every three years, and there are two metrics proposed in the list published in the WICS Guidance:

Input based-metric (line 41): This is a metric that acknowledges a change in land use that supports improved biodiversity and may include biodiversity improving measures (e.g. improved site management) or nature-based options to support service (e.g. catchment management, carbon capture, flooding) to meet this requirement. This is an input-based approach to reporting - i.e. the work undertaken each year in land use change/biodiversity improvement. For this, we undertake 3-yearly assessments of our land inventory for biodiversity and natural capital. This forms the principal basis for reporting, published under the Nature Conservation Act. This is reflected in the WICS Outcome Table 1 line 41.

We are currently working with NatureScot to pilot a further means to assess the status of biodiversity management. The Scottish Biodiversity Strategy sets an aspiration that 30% of Scotland's land (excluding statutory protected sites) is managed for biodiversity by 2030 (and 40 by 2040). These sites are termed "Other Ecological Conservation Measure" sites and we are testing NatureScot's method on its sites. Through this we expect to develop a view of the proportion of our land managed positively for nature. We would expect to report this in our 2026 Biodiversity Report.

Outcome based-metric (line 42): A metric that takes account of the relative benefit, or "gain" (not the same as statutory biodiversity gain) of biodiversity when changing the land use is an outcome-based approach to assessing biodiversity. This is more complex to undertake and presently there is no formal biodiversity metric in use in Scotland. This is in development between NatureScot, Scottish Government and stakeholders (including Scottish Water). It involves

- the need for criteria to define the attributes of biodiversity (e.g. condition, habitat type, connectivity) to be assessed:
- the need for guidelines to assess whether those levels have been met
- an assessor – someone who can verify that the change has occurred to the biodiversity status to-be-reported.

A further complication is that there is delay between an intervention and the biodiversity outcome being realised. For example, it is standard to wait years from the delivery of a woodland creation project before Scottish Forestry will sign off that the land use has changed from, say, grassland to woodland. Similarly, it may take several years post intervention for a biodiversity habitat creation scheme to realise its outcomes as the habitat needs to mature. This delay may make it difficult for an assessor to ratify the before-to-after change.

The outcome-based approach is our longer-term aim. However, it is not yet available in Scottish Water, or anywhere else in Scotland. In the absence of a metric, within the 2023 biodiversity report, we presented an initial status baseline for biodiversity using a metric agreed with NatureScot. In the last two years we have been working with NatureScot, testing how this can support decision making and benefit reporting and found areas to be improved, notably in bringing site condition into the metric. We are currently expecting an initial report in early 2026 to enable shadow reporting from April 2026. Once available, we will explore how we might use this within three-yearly reporting. As a result, we have not provided an outcome projection for biodiversity outcomes or resource recovery (see Section 2.6) and have provided the outcome for line 41 only.

Table 8:Extract of the Biodiversity and Resource Recovery projected outcomes from Table 1 submission (base is 2026/27)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	Year 2031-32
1.41	Biodiversity land-use	0	-	750	1,500	2,250	3,000	3,750	4,500
1.42	Biodiversity outcomes	0	0	0	0	0	0	0	0
1.43	Resource recovery	0	0	0	0	0	0	0	0

3.7 Asset Health

In the WICS guidance we were invited to develop an Asset Health measure to enter as a summary statistic in line 44 for the Table 1 submission. The Asset Health line in the Table 1 had a nil return for the SR27 Draft Business Plan, although we laid out a range of potential options that could be followed. Our thinking in this area and the proposed approach for the SR27 Final Business Plan has been developed further, as described below.

Asset health metrics used by Ofwat include mains bursts, sewer collapses and unplanned outage of water treatment works. These were criticised in the recent Independent Water Commission Final Report (July 2025)[10] for not being forward looking and not sufficiently focussed on long term resilience or forward-looking risk. There was also considered to be insufficient mapping and assessment of asset condition, and funding for proactive asset management.

The water sector in England and Wales (E&W) is still developing its approach to Asset Health. We understand the emerging approaches in Scotland and E&W are similar – developing EHI-based in moving towards an EHI based on Effective Age that takes account of asset condition and economic levels of proactive asset management. While Scottish Water is developing similar forward-looking models to E&W, E&W have not yet brought that together into a common summary statistic. Hence there is no direct comparator to the Asset Health Tracker that we present here.

Our Asset Health Tracker has been formed as a summary statistic of Table 3B data to form a projected outcome over SR27 and the long term. This follows the broad approach to using Table 3B information to form summary statistics that was presented to WICS in August 2025. We have taken account of WICS's feedback and looked at different options for this tracker. These focus on different elements of the long-term plan and identifying the timely need for replacement of assets. The option selected for entry into Table 1 is focussed on replacement as Scottish Water seeks, where appropriate and cost effective, to reduce the overall age and increase the aggregate condition and reliance of its assets.

The Asset Health tracker forms a summary statistic. It takes the number of assets within EHI (Calendar Age) categories EHI1 to EHI4 weighted by factors A:B:C:D across EHI1 to EHI4 respectively and A to D sum to 1. This is applied for each of four asset categories (civils, MEICA, infrastructure (AC mains) and Infrastructure (non-AC mains)). The values formed are then summed across the four asset categories by the respective percentage of long-term asset repair, refurbishment and replacement expenditure (as for the Long-Term Strategy 2025) across the four asset categories. For the main option we assume that A:B:C:D is 1/3:1/3:1/6/:1/6 for each of the four asset categories.

Table 9:Extract of the Asset health tracker projected outcomes from Table 1 submission (base is 2026/27)

WICS ref	Short title	Base	Change of Base to End of SR27	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	Year 2031-32
1.44	Asset health tracker	29.26	1%	29.45	29.78	29.81	29.71	29.64	29.59

[10] Independent Water Commission - Final Report

4 Outcomes for Scenarios B and C, and Long-Term

In this Section we outline the projected outcomes to 2032/33 for Scenario B and C and long-term to 2050, for each line of the list published in the WICS guidance by:

- Customer excellence
- Water continuity and water quality
- Waste water flows and water environment
- Net carbon emissions and related outcomes

The higher investment in Scenarios B and C leads to progressively greater outcomes in some specific lines of the list published by WICS. **Scenario A** is our reference scenario with overall investment in SR27 of CPI+3.3%, £8.1bn[11]. Our two alternative scenarios are **Scenario B** with investment of CPI+3.8%, £8.3bn[5], and **Scenario C** with investment of CPI+4.3%, £8.5bn[5].

The **long-term** projected outcomes result from the investment over the three regulatory periods to 2050 of SR33, SR39, and SR45.

4.1 Customer Excellence

There is no change to the outcomes between Scenarios A, B and C. There is gradual improvement in the CEM scores with improved service outcomes.

Table 10: Extract of the Customer Excellence projected outcomes to SR45

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.01	dCEM	84.23	85.18	86.07	86.90	84.23	84.23
1.02	nhCEM	90.17	90.76	91.32	91.84	90.17	90.17
1.03	R-MeX	9.0	9.0	9.0	9.0	9.0	9.0
1.04	hCEM	88.35	89.04	89.70	90.32	88.35	88.35
1.05	UKCSI	77.9	77.9	77.9	77.9	77.9	77.9
1.06	Communities	0	0	0	0	0	0

4.2 Water Continuity

For the Scenarios B and C, the forecast outcomes are improved for interruptions to supply unplanned above 6 hours and repeats with Water Continuity when compared to Scenario A. For Scenario C there is a further improvement in drought resilience relative to Scenarios A and B.

In the long-term for Scenario A, our reference scenario:

- The Total leakage in the long-term towards and ELL[12] of 380 ML/d.
- The impact of smart metering increases through SR33 and is then maintained
- Per capita consumption reduces to the Long-Term Strategy level of 140 ML/d.

[11] Post-efficiency value, 2024/2025 price base

[12] Economic Level of Leakage

- Repeat interruptions reduces to about 25% of the 2032/33 level with the continued focus on improving service to those postcodes worst affected by supply interruptions.
- Low pressure, unplanned interruptions to supply greater than 6 hours and minutes lost show some improvement.
- Worst historic drought and peak demand outcomes improve the resilience of the water supply.

Table 11: Extract of the Water Continuity projected outcomes from Table 1 submission to SR45

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.07	Total leakage	9.9%	11.9%	13.9%	15.9%	9.9%	9.9%
1.08	Zonal leakage	12.9%	14.9%	16.9%	18.9%	12.9%	12.9%
1.09	Business demand	14.9%	20.1%	20.1%	20.1%	14.9%	14.9%
1.10	Per capita consumption (PCC)	174	165	150	140	174	174
1.11	Low pressure	26	23	20	15	26	26
1.12	Unplanned interruptions	7,000	6,700	6,100	5,000	6,880	6,750
1.13	Minutes lost	15.0	14.5	14.0	13.0	15.0	15.0
1.14	Repeat ITS	240	200	100	60	220	200
1.15	Worst historic drought (m)	2.564	1.644	0.811	0.200	2.564	2.299
1.16	Peak demand (m)	0.877	0.609	0.330	0.050	0.877	0.877

Note: For 1.07 to 1.09 the values indicate cumulative reductions relative to the base.

4.3 Water Quality

There is no change to the outcomes between Scenarios A, B and C.

In the long term,

- Discolouration and taste and odour contacts improve relative to the offset of climate change risk and impacts[13]
- The current list of Scottish Water lead pipes is fully removed by the end of SR39 and lead in customer pipes continues to improve.
- Total drinking water compliance improves to 99.98%.
- The hazard-nodes in the WRAP measure reduce to about 30% of the levels at the end of SR27.
- DWQR reported incidents reduce to about 40% of the levels at the end of SR27.

[13] Refer to the Climate Change Mitigation, and Climate Change Adaptation Technical Appendices for further details

Table 12:Extract of the Water Quality projected outcomes from Table 1 submission to SR45

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.17	Taste and odour	0.51	0.44	0.39	0.30	0.51	0.51
1.18	Discolouration	1.90	1.39	1.13	0.60	1.90	1.90
1.19	Lead Scottish Water networks	25,154	7,154	0	0	25,154	25,154
1.20	Lead customers pipes	98.153	98.319%	98.398%	98.500%	99.153%	99.153%
1.21	Drinking water compliance	99.950%	99.960%	99.970%	99.980%	99.950%	99.950%
1.22	WRAP	4,568	3,908	3,178	2,500	4,568	4,568
1.23	DWQR reported incidents	25	21	15	10	25	25

4.4 Waste Water Flows

There is no change to the outcomes between Scenarios A, B and C.

In the long-term, the greater funding and ability to prioritise investments to remove properties from the risk register, enables removals to exceed additions, even with additions increasing through climate change impacts, resulting in a substantial forecast reduction in the **internal sewer register.** In contrast the **annual internal and external sewer flooding registers** are projected to worsen with climate change, as they are forecast to be increasingly affected by weather patterns.

Table 13: Extract of the Waste water Flows projected outcomes to SR45 from Table1 submission

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.24	Annual internal sewer flooding	1.48	1.63	1.79	1.94	1.48	1.48
1.25	Internal sewer flooding register	1.47	1.80	1.25	0.13	1.47	1.47
1.26	Annual external sewer flooding	11.24	11.97	13.44	12.83	11.24	11.24
1.27	External sewer flooding register	11.88	12.64	11.26	5.41	11.88	11.88

4.5 Water Environment

There is no change to the outcomes between Scenarios A, B and C. In the long-term, the greater funding for enhancement enables the forecast outcomes for:

- The current list of UIDs currently registered with SEPA to be fully removed,
- WWTW compliance to improve to nine non-compliant treatment works out of 580, and

- The serious environmental pollution incidents (Category 1 and 2) in the water and waste water systems to reduce to two per year.

- Total environmental pollution incidents Category 1,2 and 3 in the waste water system to gradually with improved monitoring.

Table 14: Extract of the Water Environment projected outcomes to SR45 from Table 1 submission

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.28	WwTW compliance	96.37%	96.89%	97.58%	98.44%	96.37%	96.37%
1.29	Serious pollution (EPI Cat 1/2)	5	4	3	2	5	5
1.30	Total pollution (all categories)	34.8	32.0	30.0	28.0	34.8	34.8
1.31	Sludge compliance	0	0	0	0	0	0
1.32	Unsatisfactory intermittent discharges (UIDs)	723	530	290	0	723	723
1.33	River water quality	0	0	0	0	0	0

4.6 Carbon Emissions Mitigation

This subsection summarises the outcomes for Scenarios B and C and the long term to 2050 in the areas related directly and indirectly to the 2040 net zero emission target.

4.6.1 Carbon Emissions

Scenarios B and C include progressively higher capital investment than Scenario A. Greater capital investment generally increases construction activities, in the use of materials, and energy consumption. Therefore, all other things being equal, higher capital investment will increase **Net Zero emissions** and **embodied carbon.** We see this in the higher values for these two measures in Scenarios B and C, when compared to Scenario A.

In all other categories there is no difference between Scenarios A, B and C.

For the long term, in the Technical Appendix for Climate Change Mitigation the forecast is based on substantive and challenging levels of change and innovation through all aspects of supply to meet lower emission levels.

As a point of note, this projection shows a net zero emissions level of about 13,365 tCO2e in 2040 and so the target of zero emissions by 2040 would require further future innovation to be delivered beyond that assumed in this profile. Net Zero emissions is an ambitious goal with extensive external dependencies such as the greening of the grid and Scotland's decarbonisation pathway. Whilst challenging, we expect that, in line with its net zero emissions route map, innovation in waste water process emissions, carbon capture, and capital investment within SR27 will offer further opportunities to meet the ambition, as will working across wider water catchments to further increase land carbon benefits.

The information also includes the percentage reduction in operational emissions compared to the 2006-07 baseline of WICS line 27.

Table 15: Extract of the Carbon Emissions projected outcomes to SR45 from Table 1 submission

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.34	Net Zero Emissions	198,126	50,721	-17,473	-23,439	200,975	203,824
1.35	Operational emissions (W)	9,688	2,196	-450	-1,050	9,668	9,668
1.36	Operational emissions (WW)	71,291	42,794	30,959	28,959	71,291	71,291
1.37	Baseline emissions	86.47%	90.26%	93.40%	93.96%	86.47%	86.47%
1.38	Operational emissions (net)	54,529	-6,281	-47,473	-53,439	54,529	54,529
1.39	Embodied carbon	143,597	57,003	30,000	30,000	146,446	149,295
1.40	Carbon capture/sequestration	-26,450	-51,271	-77,983	-81,347	-26,450	-26,450

4.6.2 Biodiversity and Resource Recovery

For the Biodiversity land-use measure, we are forecasting the same outcomes for Scenarios A, B and C, and for the long-term.

Table 16: Extract of the Biodiversity projected outcomes to SR45 from Table 1 submission

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.41	Biodiversity land-use	4,500	4,500	4,500	4,500	4,500	4,500
1.42	Biodiversity outcomes	0	0	0	0	0	0
1.43	Resource recovery	0	0	0	0	0	0

4.7 Asset Health

This subsection summarises the outcomes for Scenarios B and C and the long-term to 2050 in the areas related the asset health tracker.

The Asset health tracker is the same for all Scenarios A, B, and C. In the long-term the asset health tracker reduces over the three additional regulatory periods due to the projected aging of the civil assets (in EHI3 and EHI4) in Table 3B.

Table 17: Extract of the Biodiversity projected outcomes to SR45 from Table 1 submission

WICS ref	Short title	Scenario A 2032/33	End of SR33	End of SR39	End of SR45	Scenario B Year 6 2032-33	Scenario C Year 6 2032-33
1.44	Asset health tracker	29.64	29.59	29.28	28.47	29.59	29.59

5 Proposed Additional Measures

WICS Guidance invites Scottish Water to consider additional measures and metrics. As outlined in Section 1, while developing the SR27 Final Business Plan and specifically the projected outcomes for Table 1, we identified two potential additional measures to the WICS list.

- An outcome measure (currently referred to as the **Strategic Tracker**) to track the progress of the outcomes in our 25 Year Investment Strategy to 2050, and

- An outcome measure (currently referred to as the **ABC Tracker**) to monitor change in customer knowledge, perceptions, behaviours and outcomes related to per capita consumption and sewer blockages from wet wipes and fats and oils, which could also form part of a wider communities measure in the future.

We have formed an outcome proposal for the strategic tracker for the SR27 Final Business Plan, and plan to shadow report both strategic tracker and ABC tracker from April 2026.

5.1 Strategic Tracker

The Strategic Tracker is a summary statistic of the progress of outcomes of the Long-Term Strategy.

It uses Table 1 metrics to set movements in the sub-outcomes in the Long-Term Strategy that are weighted by the benefits in the Strategic Cost Benefit Analysis to form a single statistic. Progress for each sub-outcome then involves:

- Some direct equivalent metrics in Table 1 and to sub-outcomes in the Long-Term Strategy,
- Some metrics in Table 1 being used as proxies for the progress of sub outcomes in the Long-Term Strategy, and
- Expenditures of some metrics being used as proxies for the progress of sub-outcomes in the Long-Term Strategy.

Hence this links Table 1 and the Long-Term Strategy into a single statistic through the societal benefits weights.

This is a comparator tracker of progress against the Long-Term Plan. It is potentially one of several such trackers that might be looked at and reported to inform how best we can drive continuous improvement into our investment decision making and progress of outcomes.

In contrast, other measures within Scottish Water can provide:

- a weighted score of the target outcome metrics from Table 1
- a score of a subset of target outcomes from Table 1 related to specific Directorate(s) as summary statistics of SMART metrics for a financial remuneration package (e.g. currently the Scottish Water Incentives Scheme).

This approach has parallels with the distinction between Financial and reported Reputational Outcome Delivery Incentives (ODIs) in England and Wales water companies. The main difference is that instead of the company itself gaining greater or lower revenue allowance from Financial ODIs, there is no change in revenue allowance for Scottish Water. However, such measures may be useful tools in any staff incentivisation programmes that drive improved performance for Scottish Water customers.

It is not recommended that the Strategic Tracker be used in any future incentivisation scheme for SR27 because it includes both target and reported outcomes – i.e. some that are not suitable or

ready to be used as target outcomes. However, other subsets can be used for this purpose and build on the current approach in SR21. Further information is available in a separate report on the Strategic Tracker.

5.2 ABC Tracker

The current Customer Experience Measures (CEMs) for communities across Scotland within households, non-households and developers. In addition to the main CEMs, we plan to include UKCSI and R-MEX as outcomes. We will continue to monitor information across our communities.

In Scottish Water's Draft Business Plan (June 2025), we referred to the on-going development of a new 'Awareness' measure that would measure progress aligned to our Long-Term Strategy. Scottish Water has asked YouGov to pilot a survey for a new Awareness Behaviour Change (ABC) tracker to introduce shadow reporting from April 2026. The current perceptions survey, which feeds into the hCEM, is being tested for the impact of survey questions on the satisfaction score. If these changes have no material impact on the score, we plan to introduce a separate survey in April for the ABC. This second survey will focus on questions related to the two topics important to communities of per capita consumption (PCC) and sewer blockages. More specifically the measure will be a weighted score of survey results of questions relating to awareness, opportunity and motivation as well as the behaviour outcomes of PCC and sewer blockages. This is geared towards tracking changes in societal beliefs and attitudes through demand side initiatives, and collating evidence of change in PCC and sewer blockages. This might pave the way towards greater demand side management activity and inform the degree of movement that might be attainable from changed awareness and behaviour and need for other options, dependent on the results.

We have engaged with the Independent Customer Group (ICG) and Consumer Scotland, who support the development of the ABC tracker and recognise that it will reflect communities' views through the survey. They consider its focus on PCC and sewer blockages to be a step toward for SR27 and could form part of a wider set of Communities' metrics in the future (akin to there being a set of customer experience measures). Hence, we consider it here to be an important tracker for a measure for communities in SR27. It has not yet progressed to a projected outcome score owing to the need for data from the second survey but has the prospect of one year's data being available for the start of SR27. Further information can be found in a separate report on the ABC tracker.

Also, in relation to a specific measure of community engagement, we have had initial discussions with Consumer Scotland, the ICG and WICS on what this could look like, and what it should be seeking to achieve. The initial views from these stakeholders are that a community measure should show what has changed because of engagement with a community, demonstrate lasting community impact and measure the level of engagement (from inform to empower) being undertaken across the capital programme and beyond. We will work with Consumer Scotland, the ICG and WICS during 2026 to further scope this measure and seek to introduce it within the SR27 period.

6 Beyond our Current Outcomes; New Metrics and Measures

In this Section we provide information on some of the lines within the WICS Table 1 that are beyond the current set of measures and metrics and new to Scottish Water's performance monitoring. We also address areas where the WICS Guidance asked Scottish Water to clarify or confirm definitions.

In addition, **Annex B** includes a set of definitional clarifications.

- Definitions developed by Scottish Water
- Outcomes that require further development prior to forecasting
- Outcomes that Scottish Water does not consider it currently appropriate to submit.

6.1 Customer Excellence

Retail market and R-MeX[14] (Table 1 line 3): The retail market in Scotland has been running for several years with performance monitoring by Scottish Water wholesale. Scottish Water values the insight and trends that it receives from the Non-Household Customer Experience Measure (nhCEM) and will continue to track the established metrics to understand how Scottish Water is delivering improvements in services for the business and Licence Provider community.

In England, some alternative and new measures have been introduced for the non-household customers and the retail market, for example;

- BMeX[15] is a satisfaction survey of non-household customers who have had an interaction with the wholesaler. BMeX is like the Business End User (BEU) survey which is already a part of nhCEM. Therefore, we propose keeping the BEU survey in its current form as it provides a valuable direct comparison against household service levels (an equivalent household survey forms part of hCEM). We therefore propose not adopting BMeX, which would add no further advantages.

- RMeX is a six-monthly survey of retailer satisfaction, and Scottish Water has already started mirroring RMeX for benchmarking purposes. We have now established this in full alignment with the Ofwat programme and publication of performance to allow benchmarking of wholesale services.

We propose a target outcome for R-MeX to be in the upper quartile of all UK Water Wholesalers through SR27.

Household satisfaction scores and UKCSI (Table 1 line 5): The UK Customer Satisfaction Index (UKCSI) is a benchmark of customer satisfaction across different organisations. Through an online questionnaire, it tracks the state of customer satisfaction in the UK by asking over 10,000 customers to rate their experiences of dealing with over 200 organisations across 13 sectors. All survey results are published twice a year - in January and July each year. However, each set of results is based on fieldwork from the previous March and previous October to reduce impact of any seasonal variations (e.g. January 2025 results include customer feedback from March 2024 and October 2024).

The national survey is published by the Institute based on these 10000 responses. It is generally a self-selecting survey - respondents select which organisations to rate. A minimum of 48 responses is needed for an organisation to appear in the national survey. This minimum

[14] R-MeX = Retailer Measure of Experience
[15] BMeX = Business End User Measure of Experience

base size has changed in the past; until January 2023 it was 35, rising to 45 in July 2023. It has been 48 since January 2024, and the institute has confirmed it will stay at this base 'for the foreseeable'. This low and volatile national minimum base size means that in the past Scottish Water has not appeared in the national result. This also means that if selected, Scottish Water might not be compared with the same set of organisations in each reporting wave.

The Institute also conducts a benchmarking survey on Scottish Water's behalf, using the same questionnaire and approach as the national survey. This guarantees Scottish Water 1000 responses - providing more robust results to analyse. The benchmarking results are the ones predominately used for internal reporting due to the more robust base size. It is the national results that are shared by the Institute in any press releases.

OFWAT has recently cited aspirations to utilise the UKCSI as a complementary measure to the C-Mex. After considering a variety of options, OFWAT has decided on an initial target of water companies achieving 5 points below overall UKCSI (all sector) average score. The Institute is boosting the sample of water company customer responses in the national survey to ensure this measure is as robust as possible. This is being done by respondents seeing a randomised list of water companies to select from as a prompt when completing the survey. This change has increased Scottish Water's national base size from ~50 to ~200 – an overview of national base sizes for Scottish Water is below for reference -

Our proposal for targeting is to:

- Use Scottish Waters business benchmark survey results; these provide a more robust and consistent base size.

- Approach targeting in comparable manner to OFWAT (no more than 5 points below UKCSI Overall average) but recognising Scottish Water's sustained positive performance when setting the target itself.

We therefore propose a target of Scottish Waters Business Benchmarking score is either above or >1 point above the UKCSI Overall average score.

6.2 Water Continuity

Zonal Leakage in supply deficit zones (Table 1 line 8): The Zonal Leakage for inclusion as a target outcome will encourage a focus on the reduction of leakage in zones with a supply demand deficit and thereby not only reduce Total Leakage but also improve the supply demand balance and contribute to a more reliable service and delayed capital investment. The retention of Total Leakage as a target outcome will encourage maintaining leakage levels in areas where there is no supply demand issue, as well as continue the tracking of Total Leakage and OPA scores over time.

The metric is formed from a subset of the data for Total Leakage. The subset relates to the set of zones that report above Economic Level of Leakage (ELL, recalculated Q3 2025) and have a supply demand deficit in 2024/25. This list will remain constant through SR27 to mitigate for changes in geographic structure and to ensure we can clearly show the benefits achieved.

The metric tracks the percentage reduction of the 3-year rolling average leakage level associated to the list of zones taken in 2025. The reduction is taken from a baseline 3-year rolling average at the completion of 2024/25 reporting year.

We have identified a number of risks associated with achieving progress against this metric including external factors such as tough market competition for skilled leakage resource across the UK and climate change increasing the natural rate of rise year on year, and internal factors such as complex delivery of our mains replacement and rehabilitation programmes we will mitigate these risks through:

- Ensuring we develop a robust active leakage management framework that allows us to flex resources as and when we need them and where we need them.
- Increasing the internal skill base to take greater control of active leakage management activities and relying less on contractor resource.
- Upskilling resources to support leakage activity when impacted by climate effects both in winter and summer.
- Employ improved processes and technology to reduce the awareness, locate and repair times for all leakage activity both reported and unreported.

Apply resources accordingly to the proportion of leakage at Trunk Main, Service Reservoir, Distribution system and Customer side.

ITS repeats (Table 1 line 14): The issue of ITS repeats has been identified from CEM analysis. Although service is restored shortly after a failure occurs, some customers can experience repeat events resulting in recurring interruptions to supply when there are multiple failures on the same water main over a period. In many cases these situations can lead to customer escalation either within Scottish Water or via Community Councils and MSPs. The identification of frequent supply failures in the same area could indicate systemic issues. Their resolution could improve customer satisfaction and reduce customer escalations.

RCI			
Postcode Threshold			
1-year contacts		3-year contacts	
Threshold	Max no. of contacts (per property) in postcode	Threshold	Max no. of contacts (per property) in postcode
1	≥12	1	≥20
2	≥10	2	≥17
3	≥8	3	≥13
4	≥6	4	≥10
5	≥4	5	≥7
6	≥3	6	≥5
7	≥1	7	≥1
8	= 0	8	=0

Figure 1: Rule set for recording of repeat ITS

To ensure recurring customer interruptions (RCI) are addressed in a planned and consistent, policy driven manner, a management approach has been developed which considers the frequency of interruption for trunk mains and distribution network. It aims to address the problem within 12 months when these thresholds are exceeded in normal operation conditions. The number and type of customers affected and other impacts from the interruption are used to aid prioritisation within the 12-month period.

A repeat ITS is recorded if either of two conditions are satisfied within a postcode:

- ≥ 6 property contacts within 1 year

- ≥ 10 property contacts within 3 years.

This equates to a given postcode reaching **at least** threshold **level 4**. The Master RCI Monthly Report follows this rule set as shown in Figure 1.

6.3 Water Quality

WRAP (Table 1 line 22): The Public Water Supplies Regulations (2014) Articles 30 and 31 require Scottish Water to make a risk assessment on water quality and supply. Scottish Water has developed a WRAP score, and it is included in the WICS list of metrics for projected outcomes. It provides an assessment of the share of hazards and customer nodes (over 23k in number) that have an unsatisfactory long term tolerance level of risk. This is currently close to 6,000. These assessments inform the risk in the accompanying management approaches that relate to actions to improve outcomes. As such they are an input to yield more cost-effective outcomes. There is some further development work to secure this proposition.

The current version of Scottish Water's WRAP provides a means to report a single summary statistic of the share of the population with an unsatisfactory level of risk at the tap. It evaluates risk at every customer tap by assessing 19 hazards across 1,216 Water Supply Zones (WSZ). Of the 19 hazards, 16 relate to the quality of water, and three relate to the quantity. This risk assessment is based on the pre-defined logic of potential failures involving:

- **Risk Assessment**: The risk assessment involves calculating the likelihood and consequence scores for each potential failure. These scores are based on various data sources, but where data availability is lacking, a SME (subject matter expert) will score it.

- **Node Aggregation:** Individual likelihood scores from potential failures are aggregated at various network nodes, such as catchment, raw water storage, treatment, distribution, and customer nodes. This process ensures that risk assessments are both data-driven and reflective of the entire water supply chain.

The WRAP assessment calculates a risk score for each hazard in every WSZ by multiplying its likelihood and consequence values. A score of 50 or greater is classified as "unsatisfactory." This measure reports the number of unsatisfactory risks per month and can also be expressed as the annual percentage of the population exposed to unsatisfactory risk.

DWQR reported incidents (Table 1 line 23): Scottish Water reports "events" to DWQR and DWQR assesses which of those events are "incidents. This provides an operational and asset perspective that is addition to that provided by sampling and the total water quality compliance measure.

The method determines the number of DWQR reported incidents, and involves three main steps:

- Using preset criteria, DWQR scores the 'severity' of the event, and identifies the category of severity that the score sits within.

- Using preset criteria and given the severity category for the event, DWQR scores each event and applies the likelihood of a negative impact on public confidence.

Events with a combined score that is significant, serious or major DWQR declare the event as an incident.

The severity score for an event takes account of: its duration; the population affected which might typically be the whole catchment for an event at a treatment works that affects all

customers downstream, or a more localised set of households the event is within the distribution system or at a property; the acceptability based on consumer complaint information; and the cause of it in terms of whether or not it was exacerbated by Scottish Water. The likelihood of negative impact on public confidence is undertaken by a DWQR committee drawing on the evidence submitted by Scottish Water.

6.4 Waste Water Flows

There is a potential impact of climate change leading to increased uncertainty and risk of service deterioration in some metrics. Metrics include the internal sewer flooding register, the external sewer flooding register and the external sewer flooding (within the curtilage of the property). There is a risk that the investment is insufficient to maintain current levels in some services.

To enable the strategy for sewer flooding to develop we propose to report the risk register and external sewer flooding metric to a forum of stakeholders to ensure that the resources are used most effectively to resolve and protect customers and communities and develop the wider surface water management. A target outcome on the register will drive a particular approach that may not be in the best interests of the Long-Term Strategy and our customers, communities and the environment. Our aim is to build reputation in the way we report and make decisions to fulfil our strategy. The SR27 period provides the opportunity bring this to fruition and provide the reporting and information platform for the long term.

6.5 Water Environment

Unsatisfactory Intermittent Discharge (UID) (Table 1 line 32): A UID is a Combined Sewer Overflow (CSO) that is not operating as expected. UIDs are a subset of CSOs that are prioritised by SEPA for intervention by Scottish Water because of their environmental impact.

While there is an interest in All Combined Sewer Discharges in the regulatory framework in England and Wales, Scotland has adopted an approach which focusses on those that cause the most material environmental impact. We consider improvement in UIDs to be the most appropriate performance measure of sewerage network environmental impact. This puts environmental risk / harm as the focus.

There is a register of currently reported UIDs into the Annual Return. The reported UIDs were 907 and 892 in 2023/4 and 2024/25 respectively. The 2023/24 figure comprised of approximately 24 UIDs with water quality impact, with the remaining UIDs having aesthetic impact.

The register of UIDs has been under review, most significantly with an assessment of ~330 historic UIDs confirmed or removed from the UID register. There is also a reference document of Improving Urban Waters (IUW) Programme Ruleset which sets out the process (SEPA liaison) and mechanics for additions and reductions.

As the IUW programme has progressed, some UIDs have been found to be satisfactory and are recommended for removal from the list, subject to the agreement of SEPA. In December 2024 we introduced a near real time overflow map covering more than 1000 intermittent discharges. This was the first step in increasing the visibility of UID performance and creates the potential for additional UIDs to be identified into the future.

6.6 Other Metrics

For the SR27 Final Business Plan, we have identified four metrics related to lines in Table 1 to be target outcomes to supplement the lines in Table 1 for use in the Scottish Water incentives scheme:

- A count of the 'number of pipes removed from the Scottish Water network in SR27' from the total number of Scottish Water lead network metric for target outcome. Unlike the total number of Scottish Water lead pipes ***remaining*** in the network (line 19 of Table 1), the new metric is independent of the overall number of lead pipes in the network that was based on an estimate in 2012 and is likely to be updated in SR27 with this renewed focus for SR27. The new metric will be a target outcome and the line 19 will be reported.

- A count of 'the number of UIDs removed from the Scottish Water network in SR27' from the total number of UIDs. Unlike the total number of UIDs remaining in Scottish Water's network (line 32 of Table 1) makes the new metric is independent of the overall number of UIDs in the network that is the subject of further review by Scottish Water and SEPA. The new metric will be a target outcome and the line 32 will be reported.

- Net operational emissions metric with preset set of existing values for the conversion factors used in the net operational line 38 of Table 1. It has the effect of removing the uncertainty over the greening of the grid and aligns closely with the approach adopted by Ofwat. The new metric will be a target outcome and the line 38 will be reported.

- An embodied carbon intensity metric shows the movement from high to lower carbon materials across a set of materials and using a preset weight cross those materials. It has the effect of removing investment volume from the embodied (investment) carbon emissions line 39. The new metric will be a target outcome and the line 39 will be reported.

These four metrics are presented and discussed further in the Table 1 Commentary and are in addition to those reported in Table 1.

7 Building Towards a New Monitoring Framework

In this section we discuss how Scottish Water expect to use the projected outcomes in Table 1 for performance monitoring during SR27. We also plan a subset of the Table 1 outcomes to form the foundations for any future SR27 incentive schemes.

7.1 Context

For the water companies in England and Wales, a distinction is made within their reportable outcome metrics between reputational and financial Outcome Delivery Incentives (ODIs). In essence, some metrics are reported only and build reputation. Other metrics involve financial rewards and penalties which impact the allowed revenues, customer charges and private shareholder returns.

In Scotland, Scottish Water, as a publicly owned organisation, does not operate ODIs in terms of any change to allowed revenue and charges from performance.

In developing the SR27 performance framework and informing the foundations for any future incentive schemes, we are considering grouping the 44 lines in Table 1 between those that will be reported and build reputation and those that will be targeted to directly incentivise performance for our customers.

The performance monitoring framework currently used by Scottish Water has evolved over regulatory periods and has provided excellent value to our customers and Scotland. We have used the Overall Performance Assessment (OPA) and CEM scores, and more recently the 2040 carbon emissions target, to incentivise our staff to deliver change and performance improvements.

7.2 Reporting Projected Outcome Metrics

Scottish Water has three main Strategic Outcomes: Delivering Customer Excellence. Great Value and Financial Sustainability and Beyond Net Zero. In WICS guidance for SR27, the projected outcomes in Table 1 cover a set of 44 performance metrics and measures across our Strategic Objectives of Delivering Customer Excellence and Beyond Net Zero. In addition, our performance monitoring framework and incentives scheme will include metrics within our Strategic Objective of Great Value and Financial Sustainability that are outside of Table 1.

The WICS guidance for SR27 asked Scottish Water to use the projected outcomes from Table 1 as it develops its reporting of performance. Scottish Water plans to:

- report 40 of the lines of Table 1 with projected outcomes in Table 1 in the SR27 Final Business Plan and during SR27.
- report two additional lines of Table 1 (lines 6 and 42) related to the Communities measure (ABC tracker) and biodiversity outcomes that are being developed for shadow reporting from April 2026.
- further consider how to build in the flexibility to report on line 32 of Table 1 related to River Water Quality following RBMP4.

In addition, we plan to develop ways to monitor progress in line 43 (Resource Recovery) during SR27.

7.3 Incentivised Projected Outcome Metrics

There are ten extra metrics proposed for inclusion in the list of incentivised project metrics from Table 1 in SR27 relative to SR21. Table 18 sets out the proposed set of Table 1 metrics for SR27 target outcomes and potential inclusion in the incentives scheme.

- The current SR21 incentive scheme includes 16 metrics overall, including three metrics in customer service (e.g. CEMs), nine metrics in OPA, one metric in Net Zero Emissions and three metrics in Finance. **Thirteen** of these metrics relate closely to the lines in Table 1.

- For the SR27 incentive scheme we propose to include 26 to 28 metrics overall, including five metrics in Customer Service (e.g. CEMs, UKCSI and R-MeX), sixteen metrics in two new OPA-type measures for the Environment and Water, two metrics in Net Zero Emissions and further potential three to five metrics in relation to financial and investment performance. **Twenty-three** of these metrics are included or relate closely to the lines in Table 1.

We note that the number of financial ODIs of water and waste water companies in England and Wales is typically between 20 and 30 and hence the plan to include around twenty-seven aligns with companies in England and Wales.

Table 18: Number of incentivised projected outcome metrics

Category	SR21	SR27
Customer service	3	5
Service outcomes (OPA)	9	16
Carbon emissions	1	2
Subtotal of Table 1	13	23
Finance	3	3 to 5[16]
Total	16	26 to 28

Figure 2 sets out the list of the 23 lines from Table 1 included in the set of potential incentivised outcomes. This is structured in a way that reflects our organisation's structure to facilitate their monitoring and progress. The list of twenty-three includes four metrics that are closely related to the metrics in Table 1 discussed in section 6.6, for which an amendment to the definition to enable the performance to be better tracked, while the Table 1 definition will continue to be reported. In Figure 2 these are represented by the "~" by the line number in the WICS Table 1.

Figure 3 sets out the list of 21 lines from Table 1 included in the set for reporting plus a further two lines for development in SR27. Nineteen of these lines have projected outcomes. Two lines, the Communities measure of the ABC tracker (see section 5.2) and Biodiversity outcomes (see section 3.6.2) do not currently have protected outcomes and we plan to commence shadow reporting from April 2026. The two lines for further development in SR27 relating to river water quality and resource recovery (see section 2.6).

There are two further additional metrics under consideration for the monitoring of performance in SR27 that are not included in Table 1. These are the Strategic tracker (see section 5.1) and

[16] Finance and investment delivery metrics to be included remains under development.

CSOs for Bathing Waters which was raised in SEPA's response to the SR27 Draft Business Plan alongside river water quality.

Annex D sets out our approach to identifying the list of lines in Table 1 to be included in incentivised projected outcome metrics (Figure 2) and reported outcome metrics and to be developed metrics (Figure 3).

As a further step towards linking the list of 23 lines in Table 1 (in Figure 2) to any future incentive schemes used by Scottish Water, we have also developed means of grouping lines into summary statistics to aid their inclusion into the incentive scheme, in a similar way to the current OPA. We have grouped the 16 metrics referred to in Table 17 and listed in Figure 2 under the headings of Water and Environment services outcomes to form an OPA-type score that is projected to 2032/33. We have also grouped the 23 metrics referred to in Table 17 and listed in Figure 2 under all four headings plus potentially three to five metrics referenced in Table 18 to form an OPA-type score to 2032/33.

In the development of the expansion of the OPA-type summary statistics inclusion of 16 metrics grouped from Table 1 into Water and Environment outcome service outcomes, there is a further option to consider ways to introduce two further lines into the OPA-type score to better enable flexibility of dynamic investment planning, as requested by SEPA in their feedback to the SR27 Draft Business Plan. Two additional lines relate to potential investment and outcomes for SR27, not currently in the SR27 Final Business Plan, relating to CSOs for Bathing Waters and river water quality. This option could be considered further as the performance monitoring related to target and incentivised outcomes develops further for SR27. These might be related elements of the Environmental Performance Assessment Scheme (EPAS) which is a wider framework being introduced by SEPA to monitor the water environment in Scotland, of which other metrics like unsatisfactory intermittent discharges and pollution incidents also form a part.

It is important to note that the two further lines do not form or determine any specific incentive schemes that may be used by Scottish Water but could provide information to enable its further consideration and development for SR27 and thereby enable a direct link between Table 1 metrics and future incentives schemes as requested in WICS's Final Methodology. The performance reporting framework and any related incentive schemes will be further developed through to the start of SR27. We expect the commencement of shadow reporting from April 2026, which will be a further step in the preparation for performance reporting during SR27.

Customer Service			Water service outcomes			Environment service outcomes			Carbon Emissions		
dCEM	Developer	1	**In current OPA**	Total Leakage	7	**In current OPA**	Internal flooding	24	**Alternative to Table 1**	New Op metric	~38
nhCEM	Non-household	2		Pressure	11		WWtW	28		Embodied carbon intensity	~39
hCEM	Household	4		ITS>6 hrs	12		Pollution Cat 1&2 W&WW	29			
UKCSI	UK satisfaction comparator	5		Total WQ	21		Pollution Cat 1-3 WW	30			
R-MeX	Wholesaler comparator	3	**Additions from Table 1**	Zonal leakage	8		Sludge	31			
				Repeat ITS	14	**Additions from Table 1**	UIDS count of removals	~32			
				T&O contacts	17						
				Discoloured contacts	18						
				DWQR incidents	23						
			Alternative to Table 1	SW lead count of removals	~19						

Figure 2: List of the 23 lines from Table 1 included in the set of incentivised outcomes

Customer Service		Water service outcomes		Environment service outcomes		Carbon emissions		Strategic Delivery		To be developed in SR27	
Communities/ABC measure	6	Business demand	9	Internal register	25	Total	34	**Asset health**	44	**River Water quality**	33
		PCC	10	External flooding	26	Op W	35			**Resource recovery**	**43**
		ITS average mins lost	13	External register	27	Op WW	36				
		Drought	15	UIDS	32	Carbon 2006 baseline	37				
		Peak demand	16	Biodiversity land use	41	Op Total	38				
		SW Lead pipes	19			Embodied	39				
		Lead customer	20			Sequestration	40				
		WRAP	22			Biodiversity outcomes	42				

Figure 3: List of the 23 lines from Table 1 included in the set of reported outcomes and 2 lines to be developed in SR27

8 Conclusion and Next Steps

In conclusion, we have built on previous engagement with WICS to develop and forecast an ambitious set of outcomes that we believe represents a balance of service and value to our customers, considering the challenges that Scottish Water faces.

We have provided forecasts for 40 of the 44 outcomes identified by WICS. Two outcomes are in development to shadow report from April 2026 as they are awaiting further information to define a base position (for the SR27 communities measure or ABC Tracker and Biodiversity outcomes). A further two projected outcome metrics will be developed for SR27, as the river water quality depends on the forthcoming RBMP4 and the resource recovery will depend on the progress being made to manage resource recovery in SR27.

We have also proposed a strategic tracker that we think could bring additional insight into Scottish Water's performance.

We have sought to adhere by the guidance provided by WICS and projected outcomes for the outcome metrics in Table 1 and a small set of supplementary metrics to aid performance monitoring on an annual basis through SR27 period. Our focus on outcomes for performance monitoring will also be supplemented by other monitoring of the business, including outputs and finance.

We have laid out proposals as to how these outcomes could be best combined and built into a performance framework for Scottish Water over SR27. To complement the outcome metrics and measures within our strategic outcomes of delivering customer excellence and beyond net zero, the broader performance monitoring framework will also include metrics and measures to track progress in great value and financial sustainability. These will include metrics that track the progress of investment for the delivery of outputs that contribute to the outcomes.

We welcome further engagement on our outcomes approach, forecasts and performance framework proposals as we continue to develop the final performance monitoring for reporting and incentives in SR27.

Annex: Supplementary Information

Annex A – WICS Guidance

Table 19: The key relevant elements of WICS' guidance and how we have responded

Subject	Detail	Our response
Purpose	Scottish Water's outcomes and associated levels of service for customers, the environment, and other stakeholders from SR27 – SR45 and alternative scenario outcomes for SR27	Sections 4 and 5, and Data Table 1
Translation of Contribution	Scottish Water is expected to translate its contribution towards the high-level outcomes from the Water Sector Vision (WSV) into tangible measures and milestones over the long term.	Section 2
Investment Plan	Scottish Water should then set the investment plan (investment outputs) consistent with making that progress and the required resources (inputs) over 2027-33	This is included through consistency with other tables
Initial View of Outcomes and Performance Measures	As Scottish Water develops its Business Plan, it may propose alternative or additional measures	Additions in Section 4, new areas to Scottish Water monitoring in Section 5
Evidence for Alternative Measures:	Scottish Water should provide evidence to explain why alternative or additional measures are appropriate.	Section 4
Final List of Outcomes	The final list of outcomes from the Business Plan should be used to measure Scottish Water's performance during SR27	Section 7
Mapping Against 2050 Vision and Principles:	The initial list of outcome measures is mapped against the 2050 WSV r and the Scottish Government Water Sector Principles.	Section 2
Alignment with National Performance Framework	Scottish Water should examine how its proposed outcome measures map onto the Scottish Government's National Performance Framework (NPF).	Section 1.6 and 6
Forecast Performance	As part of its business plan, Scottish Water should provide its forecast performance on each measure over the regulatory period. Scottish Water should then identify which of the forecasts represent targets against which it will be held accountable for delivering to customers over the regulatory period as part of the regulatory contract	Section 3
Annual Targets	By setting out its annual targets before they come into effect, Scottish Water provides WICS and other	Section 3

Subject	Detail	Our response
	stakeholders with an opportunity to comment on their reasonableness.	
Further Development of Outcome Measures	Following consultation on the SR27 Draft Business Plan tables and guidance, several outcome measures require further development, covering benefits to customers and communities, the impact of Scottish Water's partnerships, environmental performance, and sewerage infrastructure discharges.	Plans for SR27 Final Business Plan in Section 5
Principles for Finalising Outcome Measures	In finalising outcome measures and setting targets, Scottish Water should commit to principles such as alignment with Scottish Ministers' Objectives, stretching annual targets, stakeholder engagement, demonstrating progress against commitments, and proposing annual targets or commitments on performance measures	Plans for SR27 Final Business Plan in Section 5
Performance Assessment:	WICS and Scottish Water should assess performance against the measures set out in the Final Determination with any management or employee incentives aligning with these measures.	Section 6
Mapping to National Performance Framework:	Outcome measures should cover all benefits that customers receive, and these measures should be mapped to the Scottish Government's National Performance Framework (NPF).	Data Table 1 commentary
Quality Assurance	Data submitted should be subject to a rigorous, high-quality assurance process.	Progressed through audit review
No Blank Input Cells	Scottish Water should ensure that no input cell is left blank and can include zero if applicable	Nil entries have been applied in Table 1 where data is not available.
Commentary on Information Source	The commentary should explain the source of the information and the basis for any assumptions used to populate the tables.	Data Table 1 commentary

Annex B – Definitions and outcomes

Table 20: Definitions developed by Scottish Water

Reference	Measure of Level of Service	Level of Service	Unit	Updated Scottish Water Definition
1.02	CEM	nhCEM Non-Household Customer Experience Measure	Number	The Non-Household Customer Experience Measure (nhCEM) score, measuring service to businesses and licensed providers. Scottish Water should provide its minimum expectation for performance in each year. [Re potential update to the definition of CEM: Scottish Water values the insight and trends that it receives from the nhCEM and will continue to track the established metrics as a means to understand how it is delivering improvements in services for the business and LP community. However, we have now established the R-Mex as a bi-annual survey, in full alignment with the Ofwat programme and publication of performance to allow benchmarking of wholesale services.]
1.04	CEM	hCEM Household Customer Experience Measure	Number	The Household Customer Experience Measure (hCEM) score. Scottish Water should provide its minimum expectation for performance in each year. [Re potential update to the definition of CEM: Scottish Water is keen to maintain the hCEM in its current form, it has provided invaluable insight and sits at the heart of a number of service excellence improvements delivering benefits to customers. Maintaining the measure as it provides a clear line of sight on performance improvements. We will always take time to consider potential changes to the hCEM, which has evolved since it was first introduced in 2015.]
1.09	Business Demand	Percentage reduction of consumption at non-household premises*	%	The percentage net reduction of three-year average measured business demand in mega-litres per day (ML/d) from a 2024-25 baseline. Three-year average values are calculated from annual average values for the reporting year and two preceding years expressed in ML/d. non-household premises include businesses, charities and public sector organisations. Methodology to be further developed to accommodate economic changes e.g. new industrial demand or loss of industrial demand
1.14	ITS Repeats	Repeat interruptions to water supply	Number	The number of postcodes with repeat contacts of either • ≥ 6 property contacts within 1 year • ≥ 10 property contacts within 3 years.
1.15	Water availability	Customers supplied by systems not capable of meeting demand during a worst historic drought	Number	Population of customers supplied by systems not capable of meeting demand during a worst historic drought Definition includes: • Worst Historic Drought (assumed 1:150) • Climate change adjustments would be made in line with climate adaptation plan. • the use of documented drought measures.

1.16	Water availability	Customers supplied by systems not capable of meeting peak demand.	Number	Population of customers supplied by systems not capable of meeting peak demand Definition is based on: • peak period against WTW capacity and CAR licence (both summer and winter) • not considered peak network constraints • allows for Scottish Water tankering policy.
1.19	Drinking water quality	Estimated number of lead pipes in public network	Number	Estimated number of communication lead pipes remaining in public network.
1.21	Water Quality	Total drinking water compliance	%	Total Water Quality compliance as reported in DWQR including samples at taps, service reservoirs and treatment works. Current definition is based on regulatory samples across all asset base – zones to use baseline sampling - including Cryptosporidium (non-UV irradiated). Detailed methodology to be agreed with DWQR for the SR27 Final Business Plan. Test volatility of risk based zonal sampling to confirm impact if any before Jan 2027. If low impact, we will add risk zonal samples into the measure.
1.22	Water Risk Measure	Drinking water quality risks across all systems above long-term tolerable threshold.	Number	The number of WQ WSZ and Hazard Pairs above long-term tolerable threshold (including those considered significant), based on thresholds of 42 from WRAP using likelihood x consequence.
1.32	Sewerage Discharges		Number	Number of UIDs (Unsatisfactory Intermittent Discharges), classified and prioritised in collaboration with SEPA.

Table 21: Outcomes where there is an additional suggested improvement by Scottish Water

Reference	Measure of Level of Service	Level of Service	Unit	Reason that measure will not be submitted in the SR27 Draft Business Plan
1.20	Drinking Water Quality	Indicator of lead in customer supply pipes.	%	Current WICS definition: Percentage of random daytime regulatory samples with lead levels greater than 3 µg/l *Scottish Water proposal:* Percentage of random daytime regulatory samples with lead levels **not** greater than 3 µg/l Scottish Water proposes that this metric is more effectively framed in the positive. Whilst a simple inverse of the definition in the guidance this approach would better align with internal reporting approaches.

Table 22: Outcomes that require further development prior to forecasting

Reference	Measure of Level of Service	Level of Service	Unit	Reason that measure will not be submitted in the SR27 Draft Business Plan
1.42	Climate Change Mitigation	Biodiversity and Nature Based Solutions (final measure)	Biodiversity net gain or improvement	Biodiversity and nature-based solutions combined into a Biodiversity net gain unit aligned with NatureScot and Scottish Government. Full definition and unit to be agreed as the development work with NatureScot progresses.
1.43	Resource recovery	Resource recovery	tCO2e	A resource recovery measure will require further engagement and development to ensure that it is a meaningful additional datapoint. Scottish Water notes that such a measure may be linked to the deployment of Advanced Anaerobic Digestion technology at Bioresource facilities and circular economy. Scottish Water also notes that the benefits of resource recovery activities may already be captured as a reduction in carbon across operational or capital measures. Further engagement with WICS is needed to understand the role and potential timeline involved in this type of measure.
1.44	Asset Health	Equipment/asset health index		As previously communicated, work continues to assess the best approach to a single asset health measure that gives an accurate representation of the development of the health of Scottish Water's assets whilst complementing the detailed asset health data available in Table 3b. Scottish Water is also aware of the significant attention that Ofwat and companies in England and Wales are giving to the development of asset health measures and we are keen to ensure that we align with any developing best practice before 'locking in' a measure in this area. We continue to work on two primary options in the development of a single asset health measure: Option 1: A combination of service-related metrics across relevant areas (e.g., burst rates, AC main replacement, MEICA mean time to fail); and Option 2: An EHI-based metric (i.e., Table 3b data 'rolled' up to 1 line). Given the importance but practical difficulties of representing asset health in a meaningful 'one line' measure – we propose a joint Scottish Water-WICS Working Group should be formed to progress this work and achieve a joint understanding of the most effective measure to be used in SR27.

Table 23: Outcomes that Scottish Water does not consider it appropriate to submit

Reference	Measure of Level of Service	Level of Service	Unit	Reason that measure will not be submitted in the SR27 Draft Business Plan
1.06	CEM	Communities experience measure		For SR27 Scottish Waer proposes the Awareness and Capability measure as part of a ser of measures that might be developed in the future on Communities. This measure includes customer and community surveys related to PCC and blockages. The pilots to enable this are being trialled for early 2026.
1.33	River water quality			A metric will be considered, with SEPA, alongside the forthcoming River Basin Management Programme (RBMP4) to find a suitable measure for River Water Quality specific to Scottish Water.

Annex C – Summary of Joint Discussions on the Proposed Outcome Measures

This summary position was submitted to WICS in October 2024 to set the result of the joint discussions on the proposed Outcome measures that will be used for reporting in SRC27.

Context

On **19 September 2024** Scottish Water received the draft data tables and associated guidance from WICS for SRC27. The expectation from WICS was for Scottish Water to provide feedback on the Table 1 (Outcomes) by **22 October 2024**. WICS' current expectation is that the final list of outcomes from the Business Plan should be used to measure Scottish Water's performance during SRC27 through the Scottish Government Investment Group (SGIG)[17].

WICS confirmed in the written guidance provided with the draft tables that as Scottish Water develops its SR27 Business Plan, it may propose alternative or additional measures, recognising that it may want to test measures through customer research or that other measures may be more appropriate to capture given the composition of the investment programme. It would be expected that Scottish Water would provide evidence to explain why alternative or additional measures are appropriate.

The proposed Outcome measures and other draft tables were made available for public and stakeholder consultation on the WICS website as part of the Draft Business Plan Guidance Consultation | WICS.

This consultation ran from **8 October – 5 November 2024**, with feedback updated on the **12 December 2024**.

The draft list of outcome measures

The initial list of 43 Outcome measures was discussed through 12 workshops with WICS, external stakeholders and Scottish Water Subject Matter Experts (SME). These are shown in Table 24 below.

We have also colour coded the table to indicate the level of agreement or development still to be done at the working level between Scottish Water / WICS / Quality Regulators. Of these:

- 31 had been agreed in draft with WICS through the workshops (shown in green in Table 24).
- A further 4 (shown in yellow in Table 24) were committed to joint DWQR and Scottish Water input ahead of the **5th November** consultation deadline, with a DWQR session planned for the **23rd October** (Water Aesthetics (x2), Drinking Water Quality Compliance at customer taps and DWQR declared incidents).
- A further 3 (shown in blue in Table 24 were agreed to develop prior to the Draft Business Plan submission with DWQR (Lead and water quality risk position).
- There were 2 measures (shown in grey in Table 24) proposed for Water Availability which were to be discussed with WICS. This will need to be agreed ahead of the Draft Business Plan submission.

[17] SGIG now known as Water Industry Investment Group (WIIG)

- A further 2 (shown in purple in Table 24) were committed to joint SEPA and Scottish Water input ahead of the draft Business Plan submission (River Water Quality and Sewage Infrastructure Discharges).

- 1 final category (Asset Health Index) needs further work but is likely to be a shadow measure for SR27.

Table 24: Draft outcomes jointly discussed with WICS, October 2024 (with updates in blue)

			Indicator of Change		Forecast annually for SR27, 2039 and 2045			
Ref	**Level of Service**	**Agreed with WICS**	**Existing/ new/changing**	**Notes**	**Draft**	**Final**	**SR27 period**	**Shadow only in SR27**
1	dCEM	Yes	Existing measure	Value add components of dMeX to be added to AR25. Separate action to pick up.	Yes	Yes	Yes	No
2	nhCEM	Yes	Existing measure	No changes	Yes	Yes	Yes	No
3	R-MEX	Yes	Change to existing measure	Increases the frequency of the R-MeX survey (to twice a year) but removes the LP Annual survey	Yes	Yes	Yes	No
4	hCEM	Yes	Existing measure	Work to action 'mechanics' of the calculation between WICS and Scottish Water.	Yes	Yes	Yes	No
5	UKCSI	Yes	New measure	Scottish Water utilise this measure already- but not as a formal outcome measure.	Historic value used.	Historic value used	Historic value used	No
6	Net Zero Emissions	Existing	None	Yes	Yes	Yes	Yes	Yes
7	Operational Emissions (Water)	New	Carbon intensity for W/WW only currently (included in the NZ routemap)	Forecastable ranges for SR27 and future years	Yes	Yes	Yes	Yes
8	Operational Emissions (Waste water)	New	Carbon intensity for W/WW only currently (included in the NZ routemap)	Forecastable ranges for SR27 and future years	Yes	Yes	Yes	Yes
9	Operational emissions (reduction to baseline 06/07)	No	NA	Forecastable ranges for SR27 and future years	Yes	Ye	Yes	Yes
10	Operational emissions (net emissions)	Change- (operational emissions minus sequestered emissions)	Yes- reported overall net position to date	Forecastable ranges for SR27 and future years	Yes	Yes	Yes	Yes
11	Investment Emissions	New	None	Forecastable ranges for SR27 and future years	Yes	Yes	Yes	Yes
12	Carbon Capture/Sequestration	New	None	Forecastable ranges for SR27 and future years	Yes	Yes	Ye	Yes
13	Biodiversity and Nature Based Solutions (interim measure)	New	None	No	No	Tracker only by SR27	NA	Yes

			Indicator of Change		Forecast annually for SR27, 2039 and 2045			
Ref	**Level of Service**	**Agreed with WICS**	**Existing/ new/changing**	**Notes**	**Draft**	**Final**	**SR27 period**	**Shadow only in SR27**
14	Biodiversity and Nature Based Solutions (final measure)	New	Timeline dependent upon work with NatureScot and Scottish Government.	No	Yes, when available	Tracker only by SR27	NA	Yes
15	Resource recovery	New	None	No	No	No – to be developed in SR27	NA	NA
16	Percentage reduction of three-year average leakage*	Yes	Change to existing.	Previous leakage measure has been total leakage volume expressed as MLE in single reporting year (Fiscal)	Y	Y	Y	No
17	Leakage reduction in areas with supply-demand balance deficit	Yes	New	N. A forecast for 2027 to 2033 will be provided based on the set number of zones reported to be in yield deficit. We cannot provide a forecast beyond the 6-year cycle as the number of zones in deficit may change.	Y	Y – should be regarded as a shadow measure		No
18	Percentage reduction of consumption at non-household premises	No- see notes	New	Further development work on the definition and methodology required. Methodology to accommodate economic changes e.g. new industrial demand or loss of industrial demand.	Yes	Yes	Yes	Yes
19	Three-year average per capita consumption	Yes	Change; existing reporting is per household	This will be based on calendar year to align with other elements of the annual water balance. Reporting will begin from January 2027.	Yes	Yes	Yes	Yes
20	Number of properties on the low pressure register	Yes	Existing measure	No change	Yes	Yes	Yes	No
21	Weighted Unplanned interruptions greater than 6 hours, excluding 3rd party	Yes	Existing	Yes	Yes	Yes	Yes	No
22	Average minutes lost due to water supply interruptions (over 3 hours) *	Agreed as a placeholder	Existing	Customer research might be useful in informing whether to take forward (3 hr threshold vs. repeats). Will be agreed prior to Draft Business Plan submission.	Yes	Yes	Yes	Yes
23	Repeat ITS	Yes- in principle only- see notes	New	Currently reported to Scottish Water Board, thresholds under review in Management Approach. Definition to be further developed. Timeline for definition and methodology for agreement TBC in advance of the Draft Business Plan submission.	Yes	Yes	Yes	No

			Indicator of Change		Forecast annually for SR27, 2039 and 2045			
Ref	**Level of Service**	**Agreed with WICS**	**Existing/ new/changing**	**Notes**	**Draft**	**Final**	**SR27 period**	**Shadow only in SR27**
24	Customers supplied by systems not capable of meeting demand during a worst historic drought	No- see notes	New	Methodology and approach to be developed and applied and agreed with WICS. Timelines to be confirmed ahead of the Draft Business Plan submission.	Yes	Yes	Yes	Yes
25	Customers supplied by systems not capable of meeting peak demand	No- see notes	New	Methodology and approach to be developed and applied and agreed with WICS. Timelines to be confirmed ahead of the Draft Business Plan submission.	No	Yes	Yes	Yes
26	Taste and odour contacts	No- see notes	Development of existing reporting	Agreed proposal to be submitted prior to 5th November. Agreement with DWQR required.	Yes	Yes	Yes	No
27	Discolouration (and possibly aeration) contacts	No- see notes	Development of existing reporting	Agreed proposal to be submitted prior to 5th November. Agreement with DWQR required.	Yes	Yes	Yes	No
28	Lead pipes in public network	No- see notes	New	Tracking progress to lead free network in line with Ministerial objective. Agreed with WICS and DWQR that this measure can be developed in advance of the Draft Business Plan submission.	Yes	Yes	Yes	No
29	Indicator of lead in customers supply pipes	No- see notes	New	Not directly controlled by Scottish Water – no target. Agreed with WICS and DWQR that this measure can be developed in advance of the Draft Business Plan submission.	Yes	Yes	Yes	Yes
30	Improvement in drinking water compliance at customer taps	No- see notes	New	Impact of risk-based sampling to be assessed. Agreed proposal to be submitted prior to 5th November. Agreement with DWQR required.	Yes	Yes	Yes	No
31	DWQ risks across all systems above long-term tolerable threshold.	No see notes	New	Tracker as may move up and down with changing environment. Agreed with WICS and DWQR that these measures can be developed in advance of the Draft Business Plan submission.	Yes	Yes	Yes	Yes
32	Number of DWQR declared incidents	No- see notes	New	All incidents will need declared by March – can take until May. Agreed proposal to be submitted prior to 5th November. Agreement with DWQR required	Yes	Yes	Yes	No
33	Number of internal sewer flooding incidents	Yes	Extension of existing measures	Approach to forecasting and measuring incidents due to severe weather requires development. Severe weather cannot be forecast.	Yes	Yes	Yes	No

			Indicator of Change		Forecast annually for SR27, 2039 and 2045			
Ref	**Level of Service**	**Agreed with WICS**	**Existing/ new/changing**	**Notes**	**Draft**	**Final**	**SR27 period**	**Shadow only in SR27**
34	Number of properties at risk of internal flooding	Yes	Existing	Count of the number of properties on the Internal at Risk Register and is based on current Annual Return methodology.	Yes	Yes	Yes	Yes
35	Number of external sewer flooding incidents	Yes	Extension of existing measures	Approach to forecasting and measuring incidents due to severe weather requires development. Severe weather cannot be forecast.	Yes	Yes	Yes	Yes
36	Number of areas at risk of external sewer flooding	Yes	Existing	Count of the number of areas on the External at Risk Register and is based on current Annual Return methodology.	Yes	Yes	Yes	Yes
37	Percentage compliance with SEPA discharge permits*	Yes	Existing	WICS agreed to use existing measure until SEPA EPAs detail confirmed. Action to understand if this will be before the Final Business Plan.	Yes	Yes	Yes	No
38	Number of serious pollution incidents*	Yes	Existing	Assume calendar year, and water and waste water. Sum Cat 1 and 2 only of B11a.13 Total (sewage and water and surface water) related premises. WICS confirmed 10/10 to include water and waste water.	Yes	Yes	Yes	No
39	The total number of pollution incidents from a sewerage asset affecting the water environment*	Yes	Existing	Assume Calendar year and WW only. Sum of Total number (Cat 1-3 incidents) for Assume Calendar year and WW only. Sum of Total number (Cat 1-3 incidents) for B11a.1 Sewage treatment works B11a.2 Storm tank B11a.3 Combined sewer overflow B11a.4 Foul sewer B11a.5 Pumping station B11a.6 Rising mains B11a.7 Other	Yes	Yes	Yes	No
40	Percentage unsatisfactory sludge disposal		Existing	No change	Yes	Yes	Yes	No
41	River water quality- timescale and definition dependent on RBMP4 content		New	WICS/Scottish Water/SEPA agreed to holding line only until RBMP4 development to ascertain a suitable measure for River Water Quality specific to Scottish Water.	No	No	No	NA
42	-	Holding Line agreed	-	Definition to be agreed in conjunction with SEPA.	-	-	-	-
43	Equipment/asset health index				No	Yes	Yes	Yes

Annex D: Identification of Reported and Incentivised Outcomes

The identification of the outcomes suitable for either targeting or reporting involved three main steps.

- Firstly, we applied the SMART (Specific, Measurable, Achievable, Relevant, Time-bound) criteria to assess the suitability of a metric to be a target outcome and found those listed under the Reporting column in 4 (below) to have limitations.

- Secondly, we applied the confidence grade criteria (as set out in the Guidance for application in other areas of the SR27 Draft Business Plan) to the outcomes and found some correlation with the columns in Figure 4.

- Thirdly, a further review following observed changes in the projected outcomes between the SR27 Draft Business Plan and the SR27 Final Business Plan which lead to a reassessment of both SMART and confidence grades in some instances.

This Annex sets out the presentation of the review at the time of the SR27 Draft Business Plan and then its development for the SR27 Final Business Plan. This enables us to set out the nature of the changes since the SR27 Draft Business Plan and hence this is included in the Annex rather than the main text of the Technical Appendix.

SR27 Draft Business Plan Review of 'suitability to target' with SMART criteria.

For the SR27 Draft Business Plan, we grouped the 44 lines into Figure 4 and assessed each metric using the SMART criteria (Specific, Measurable, Achievable, Relevant and Time-bound) and before consideration of any data values.

Our assessment of those measures more suitable for reporting rather than targeting is outlined as follows:

- **Specific (strategy):** Some metrics, such as average minutes lost and lead in customer supply will benefit from a period of reporting to build a more comprehensive history before specific targets can be well calibrated.

Meanwhile, for SR27 we proposed the specific metrics in the current OPA and those identified in the 'OPA Extra' category as the most suitable to be target outcomes. They best align to customer priorities, and to the Long-Term Strategy.

- **Measurable (application):** Some metrics, for example business demand, are affected by many factors, including the economy, temperature, retail contracts, business entrants and exits to the market, as well as the activities of Scottish Water, such as our wholesale activities.

The main purpose of the metric is to enable us to show changes in the performance of Scottish Water resulting from the roll-out of smart metering. For this to be a reliable measure of performance, there would need to be significant analysis to eliminate and correct for the non-smart-metering factors listed above. Therefore, the metric is less suitable for target outcomes and more suitable for reporting.

- **Relevant (use)**: Some of the metrics are an output of a model that is dependent on the setting of multiple parameter values (e.g. worst drought and peak demand). The model estimates, for each Water Resource Zone (WRZ), the "Dry Year Headroom" less "Target Headroom", to form a deficit and then sums the populations served in the deficit zones.

The model uses many inputs to form estimates for these two variables and inform the planning response in each WRZ. The model is better viewed as a tool to inform planning under different scenarios analysing the nuances of each WRZ, and less a measure of performance.

As such it is more suitable for reporting.

- **Timebound (periodicity)**: Some metrics are limited by their reporting window. A biodiversity land-use output metric would require the planted trees and plants to take 5-years to mature before they could be signed off as being realised. Therefore, an input-focus metric is proposed to report progress in SR27.

- **Achievable (readiness):** Some metrics are limited by their availability. For the longer-term we are working with NatureScot to develop a biodiversity outcome metric. However, this is not yet formed and not expected to be available ahead of the SR27 Final Business Plan or the start of the next regulatory period.

In Figure *4* below, we categorised each metric and its suitability as a target during SR27.

Customer Excellence			Service Excellence										Strategic Delivery		Carbon			Reporting		
dCEM		1	**Current OPA**	Total Leakage	7	**OPA Extra**	Zonal leakage	8	**Base-lined**	Internal register	25	**Strategic Tracker**	SR27	**NZE**	Total	34	**Reporting**	nhh demand	9
nhCEM		2		Pressure	11		Repeat ITS	14		External flooding	26		SR33		Op W	35		ITS average mins lost	13
R-MeX E&W		3		ITS>6 hrs	12		T&O contacts	17		External register	27		SR39		Op WW	36		Drought	15
hCEM		4		Total WQ	21		Discolour-ed contacts	18					SR45		Carbon 2006 baseline	37		Peak demand	16
Awareness	PCC	10		Internal flooding	24		Lead Scottish Water	19				**WRAP**	22		Op Total	38		Lead customer	20
UKCSI		5		WWtW	28		DWQR incidents	23				**Asset health**	44		Embodied	39		Biodiversity Land use	41
				Pollution Cat 1&2 W&WW	29		UIDS	32							Sequest-ration	40	**Not available**	Communities	6
				Pollution Cat 1-3 WW	30													River quality	33
				Sludge	31													Biodiversity outcomes	42
																		Resource recovery	43

Figure 4: Mapping of the list from WICS to the provisional performance framework

SR27 Draft Business Plan Review with confidence grades

For the SR27 Draft Business Plan, to provide further colour on our forecasts of outcomes over SR27, we incorporated WICS guidance on confidence grades that had been used in other parts of the Business Plan Data Tables submissions for SR27 and applied it to the outcomes in Data Table 1. This looked at reliability, and particularly the source of information. It also considered accuracy and the margin of error for the central estimate. We used this information to assign the WICS outcomes into distinct groups which reflected their maturity and readiness for application of target outcomes. This was further enabled by adding an additional column regarding the reliability and accuracy definitions which expressed their readiness for target outcomes currently.

Table 25: Overview of reliability bands

Reliability Band	WICS Description	Scottish Water level of reliability and state of readiness for use in target outcomes
A	Sound textual records, procedures, investigations or analysis properly documented and recognised as the best method of assessment.	Excluded as we have none that are robustly forecast from an audit process viewpoint.
B	As A, but with minor shortcomings. Examples include old assessment, some missing documentation, some reliance on unconfirmed reports, some use of extrapolation.	Those subject to outturn audit processes within current performance, have been subject to in-period forecasting and are sufficiently reliable for target outcomes
C	Extrapolation from limited sample for which Grade A or B data is available.	Those that are not yet within current performance monitoring, have received development attention and could developed further to become sufficiently reliable for target outcomes.
D	Unconfirmed verbal reports, cursory inspections or analysis.	Those that are not considered to be sufficiently reliable or suitable for target outcomes.

We assessed this in terms of the range around the overall percentage change. For example, if the projected lost points in a CEM metric is expected to reduce by 6% by 2033 and be within a range of 0 to 15 percentage points the margin of error is 9% and we state it as a "3". This was the state of variation or margin of error around the central estimate at the time of the SR27 Draft Business Plan. The final column in the table expressed this as a level of uncertainty about the forecast number.

Table 26: Overview of accuracy and uncertainty bands

Accuracy Band	Accuracy Range	Uncertainty in the forecast values
1	Less than +/- 1%	Very low
2	+/- 5% to +/- 1%	Low
3	+/- 10% to +/- 5%	Medium
4	+/- 25% to +/- 10%	High

Accuracy Band	Accuracy Range	Uncertainty in the forecast values
5	+/- 50% to +/- 25%	Very high
6	Greater than +/- 50%	Extremely high
X	Accuracy outside +/- 100 %, zero or small numbers or otherwise incompatible	

The following confidence grades were then applied.

Table 27: Overview of confidence grades

Accuracy Bands	Reliability Band			
	A	B	C	D
1	A1			
2	A2	B2	C2	
3	A3	B3	C3	D3
4	A4	B4	C4	D4
5			C5	D5
6				D6

At the time of the SR27 Draft Business Plan we showed the confidence grade for the outcomes for SR27 in Figure 5. In general (but not in every instance) higher reliability and accuracy to the left and lower reliability an accuracy to the right. Further details of this are provided.

For reliability, there were more cells with a reliability of ‘B’ to the left and more cells with a reliability of ‘D’ to the right.

For accuracy, there were more blue cells with an accuracy of ‘3’ to the left and more cells with an accuracy of ‘5’ to the right.

Customer Excellence			Service Excellence									Strategic Delivery		Carbon			Reporting		
dCEM		B3	**Current OPA**	Total Leakage	B3	**OPA Extra**	Zonal leakage	C3	**Base-lined**	Internal register	C4	**Strategic Tracker**	SR27	**NZE**	Total	C3	**Reporting**	nhh demand	D3
nhCEM		B3		Pressure	B3		Repeat ITS	C4		External flooding	C5		SR33		Op W	B3		ITS average mins lost	D3
R-MeX E&W		C3		ITS>6 hrs	B3		T&O contacts	C3		External register	C5		SR39		Op WW	B3		Drought	D4
hCEM		B3		Total WQ	B3		Discolour-ed contacts	C3					SR45		Carbon 2006 baseline	B3		Peak demand	D5
Awareness	PCC	C4		Internal flooding	B3		Lead Scottish Water	C3				**WRAP**	C4		Op Total	B3		Lead customer	D4
UKCSI		C3		WWtW	B3		DWQR incidents	C4				**Asset health**	B4-D5		Embodied	C3		Biodiversity Land use	DX
				Pollution Cat 1&2 W&WW	B3		UIDS	C4							Sequest-ration	C0	**Not available**	Communities	-
				Pollution Cat 1-3 WW	B3													River quality	-
				Sludge	B2													Biodiversity outcomes	-
																		Resource recovery	-

Figure 5: Mapping of the list from WICS to the provisional performance framework including confidence grade

SR27 Draft Business Plan Assessment of outcomes that could be targeted and incentivised in SR27.

For the SR27 Draft Business Plan, we presented in the table below our initial response to the question in WICS' guidance of which outcomes could be targeted in SR27. Our assessment was that there were a set of metrics used for performance monitoring in SR21 that are expected to continue to be target outcomes in SR27. There were a set that had the potential to become a target outcomes subject for further development, testing and/or revision. Other lines were expected to be reported but not targeted because they were not available or not suitable to be a target outcome.

Table 28: Suitability for target outcomes or reporting at the time of the Draft Business Plan

WICS ref	Short title	Key	WICS ref	Short title	Key
1.01	dCEM	1	1.23	DWQR reported incidents	2
1.02	nhCEM	1	1.24	Annual internal sewer flooding	1
1.03	R-MeX	1	1.25	Internal sewer flooding register	2
1.04	hCEM	1	1.26	Annual external sewer flooding	2
1.05	UKCSI	1	1.27	External sewer flooding register	2
1.06	Communities	4	1.28	WwTW compliance	1
1.07	Total leakage	1	1.29	Serious pollution (EPI Cat 1/2)	1
1.08	Zonal leakage	2	1.30	Total pollution (all categories)	1
1.09	Business demand	3	1.31	Sludge compliance	1
1.10	Per capita consumption (PCC)	3	1.32	Unsatisfactory intermittent discharges (UIDs)	2
1.11	Low pressure	1	1.33	River water quality	4
1.12	Unplanned interruptions	1	1.34	Net Zero Emissions	2
1.13	Minutes lost	3	1.35	Operational emissions (W)	3
1.14	Repeat ITS	2	1.36	Operational emissions (WW)	3
1.15	Worst historic drought	3	1.37	Baseline emissions	3
1.16	Peak demand	3	1.38	Operational emissions (net)	3
1.17	Taste and odour	2	1.39	Embodied carbon	3
1.18	Discoloration	2	1.40	Carbon capture/sequestration	3
1.19	Lead Scottish Water networks	2	1.41	Biodiversity land-use	3
1.20	Lead customer pipes	2	1.42	Biodiversity outcomes	4
1.21	Drinking water compliance	1	1.43	Resource recovery	4
1.22	WRAP	2	1.44	Asset health	2

Key

1	Expected to be a target outcome
2	Potential for it to become a target outcome
3	Not expected to be a target outcome, but reported
4	Not expected to be a target outcome or reported

At the time of SR27 Draft Business Plan, we confirmed that 14 lines for inclusion in target or incentivised outcomes (Key = 1 in Table 27) and 14 lines for potential inclusion (Key = 2 in Table 27). This would have been a total of 28 lines from Table 1 into target and incentivised outcomes from Table 1

We also indicated that the confidence grades in Table 1 highlighted the further work that would be needed for the SR27 Final Business Plan to improve the confidence grades, by

securing more rigorous processes to progress and monitor the measures and metrics and consideration of ways to reduce year-on-year volatility in the numbers.

The SR27 Final Business Plan Assessment of outcomes that could be targeted and incentivised in SR27

As noted in the main text (section 7) the number of outcomes expected to be targeted and incentivised has increased from 14 to 23 lines from SR27 Draft Business Plan to the SR27 Final Business Plan. We have also added two (carbon emission) lines from the SR27 Draft Business Plan category not expected to be a target outcome but reported.

We list these nine additions as:

- Zonal leakage
- Repeat ITS
- Taste and Odour contacts
- Discolouration contacts
- DWQR reported incidents
- Lead pipes in Scottish Water networks removed (new)
- UIDs removed (new)
- New net operational metric (new)
- Embodied carbon intensity (new).

We note that in attaining the nine additions we have created four new variants of existing lines in Table 1 as discussed in the main text (see section 6.6). This was driven by the movement in the projected outcomes increasing the range or variation between the SR27 Draft Business Plan and the SR27 Final Business Plan.

- For Lead pipes in the Scottish Water network and UIDs this movement was observed from resetting the number of pipes and UIDs that are estimated to be in our systems. This highlighted that this number was likely to continue to be updated to enable reporting through SR27 as it is re-estimated with more studies and better information. Consequently, we propose to use the number of Scottish Water lead pipes removed from our network and the number of UIDs removed from the network as a more reliable measure of performance. The original metrics for Table 1 will continue to be reported and their progress monitored.

- For all carbon emissions lines in Table 1 we observed a significant movement in the projected outcomes between the SR27 Draft Business Plan and the SR27 Final Business Plan as a consequence of better information and methods of calculation. We also noted that in England and Wales they overcame issues of conversion factor movement for incentivised outcomes by setting those conversion factors to be constant over the regulatory period. Consequently, we have adopted that to form two new metrics for net operational carbon emissions and carbon emissions intensity. That latter goes beyond what is used in incentive outcomes in England and Wales, but its inclusion here reflects our commitment to drive change towards the net zero outcome in Scotland. The original metrics for Table 1 will continue to be reported and their progress monitored.

Having looked at the additions that make up the 23 lines, we next list of 7 lines that were considered for potential inclusion (Key = 2 in Tabel 27) in the SR27 Draft Business Plan but are excluded in the SR27 Final Business Plan, as:

- Lead customer pipes
- WRAP
- Internal sewer flooding register
- External sewer flooding
- External sewer flooding register
- Net Zero Emissions
- Asset health

These have been excluded from the target and incentivised outcomes following further consideration of SMART and accuracy, alignment of the metrics with our strategy and maturity of the metric.

- For lead customer pipes, the measure is an estimate and could be improved if Scottish Water were to be proactively able to access properties where there are lead pipes and remove those lead pipes. Our strategy places priority on the removal of lead pipes in Scottish water networks with are included in the target and incentivised outcomes. The customer pipes metric can be reported but it does not meet the Achievable criteria of SMART and so is excluded from the target and incentivised outcomes.

- For WRAP, the measure is in development to meet the statutory requirements for reporting to DWQR. The WRAP is a new risk-based measure and through discussion with DWQR is has been agreed that it is suitable for reporting but not target in SR27 as it is still evolving and a wish to ensure the reporting of emerging risks (see Section 6.3 for more details).

- For the three metrics of sewer flooding listed above, there is the potential for adaptation and change though reporting and engagement with stakeholders. To enable the strategy for sewer flooding to develop we proposed to report the risk register and external sewer flooding metric to a Forum of stakeholders to ensure that the resources are used most effectively to resolve and protect customers and communities and develop the wider surface water management. A target on the register will drive a particular approach that may not be in the best interests of the long-term strategy and our customers communities and environment. Our aim is to build reputation in the way we report and make decisions to fulfil our strategy. The SR27 period provides the opportunity bring this to fruition and provide the reporting and information platform for the long term

- For Net Zero Emissions, we acknowledge that it is the long-term goal to bring this to zero and beyond. The transformation to get there requires a focus on the choices and decisions that Scottish Water makes. This transformation commenced in SR21 and will continue in SR27 through the reporting of the measures in Table 1 and the target and incentivised two new metrics identified above. For the transformation the two metrics are more specific and achievable, and therefore more SMART, than the reported metrics. This follows the practice of reporting and incentives for the companies in England and Wales.

- For Asset health, the measure is new summary statistic. It has uncertainty around it in in that its projected outcomes sits within a wide range dependent on elements such as the method of infilled data that might lead to changes in reporting through SR27. There are several options on how it might be reported to assess progress. The method of reporting might also change from a focus on Calendar Age to Effective Age. This area is also developing and evolving for the companies in England and Wales. This means that the specific measurable and achievable elements of SMART are all weakened for its to be considered a target and incentivised outcome in SR27. Significant steps forward can be made through its reporting in SR27.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Customers and Communities

February 2026

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1 Executive Summary

Our customers, communities and stakeholders are fundamental to the service that we offer, and we want to continue to deliver for them in SR27 and beyond. Scottish Water recognise that in a period of increasing public awareness and interest in water resources and management, we must actively listen to our customers and communities, taking action to continue to involve them in our business, communicate with them and help them engage with us when they need to.

During SR21 we have made good progress in improving how we support and work with our customers and communities, with several notable achievements including high household customer satisfaction levels (93.9% in November 2025); first place ranking for 'overall service' for our Retailer Measure of Experience (the UK wide measure for water wholesalers); and our Development Customer Experience Measure consistently tracking above target. Our ongoing customer research tells us that our customers are happy with the way we engage with them, however we recognise that as customer expectations and technology both evolve, we must continue to invest to meet them, taking opportunities to find the most efficient and effective ways to do so.

For SR27, customer and community excellence will be at the heart of everything we do. Our ambition is to improve our performance across all the customer and community performance metrics in the period in line with Draft Ministerial Objectives 2027-33 1a and 1b; *"Scottish Water must maintain or improve current levels of service over the long-term and Scottish Water must engage with stakeholders and customers to establish appropriate standards of services for the 2027-33 period and beyond."*

As a result of our learnings from SR21, coupled with feedback on our SR27 Draft Business Plan from our Independent Customer Group (ICG) and Consumer Scotland particularly, our long-term ambitions and our awareness of the changing landscape in which we operate, in SR27:

1. We will **continue to improve how we listen to our customers** and evidence where we have used their voices in our strategic and day to day decision making – ensuring customers continue to be at the heart of all we do.

2. We will **use technology and data** to ensure our service for customers and communities is efficient, streamlined and personalised whilst maintaining our commitment to our 24/7 Customer Engagement Centre.

3. We will **continue to invest in our ability to predict and prevent** issues to protect our customers and communities from disruption, whilst optimising our ability to complete first time fixes.

4. We commit to further development **of our service commitments for customers with vulnerabilities.**

5. We will continue to **develop our people and processes** and embed Service Excellence capabilities, mindsets and behaviours.

6. We will grow our **community engagement**, building positive relationships, involving them in decisions and contributing to a flourishing Scotland

7. We will **increase awareness and change behaviours,** asking customers to play an owners' part to reduce demand on our services; reducing consumption and blockages.

Throughout SR27 and in the delivery of the above seven areas of focus, we will concentrate on working efficiently, driving productivity and improving our overall performance for customers, ensuring we get the most value for them for every pound we spend.

Part of the process of development of our proposals was the creation of the SR27 Draft Business Plan submission against which stakeholders provided feedback against their expectations. Our SR27 Draft Business Plan proposed limited investment in customer and community initiatives, and stakeholders asked we strengthen our commitments to community engagement, driving behaviour change and supporting those in vulnerable circumstances. We have expanded our areas of focus and increased our committed investment to deliver the priorities above.

In SR27 we are investing £21.5m directly through customer and community initiatives as described below in Table 1. In addition to the investment described below the delivery of these seven priorities will be achieved through investment within other Technical Appendices and ongoing operating expenditure (Opex).

Table 1: Customer and Communities SR27 Investment Summary (24/25 price base, post-efficiency)

Investment Category	Investment value
Customer Research	£2.2m
Priority Service Register Improvements	£4m
Digital Developments for Customer Experience enhancements	£5.4m
Access to assets	£5.5m
Campaigns & marketing	£4.4m
Total Customer & Communities Investment	**£21.5m**

As a result of new investment and continued Opex funding aligned to our priorities, we are continuing to forecast an increase in all our Customer Experience Measures as well as maintaining above average score of all UK companies on the UK Customer Satisfaction Index and upper quartile performance in the Retailer Measure of Experience.

Our SR27 Final Business Plan narrative and full suite of Technical Appendices set out the investment we are proposing to maintain, replace and improve our water and waste water assets and services, for the benefit of our customers. The investment detailed in this Technical Appendix is over and above that and will be used to enhance the customer and community experience and engagement opportunities.

2 Background

2.1 Context

We know our customers are proud of their tap water and Scotland's beautiful water environments, but we also want them to play an owners' part and be proud of, value and trust Scottish Water as custodians of our most precious, natural resource. Customers and communities form the foundation of everything we do at Scottish Water, and we will always strive to deliver the excellent service our customers expect.

We continue to face challenges to the water sector which have the potential to impact on service and levels of customer trust, including those presented by climate change, ageing assets and an ever-changing population. We recognise we need to persist in our drive to continually deliver service and customer excellence, building trusting relationships and keeping our customers and communities engaged and informed on the things that matter most.

2.2 SR21 has Built a Strong Foundation for SR27

Throughout SR21 we have focused on three key areas to deliver customer and community excellence:

1. *We continue to listen to customers, particularly about their experiences and feedback regarding what we do and how we do it*

Undertaking customer research: Listening to our customers is fundamental to achieving our long-term ambitions of Service Excellence and Great Value and Financial Sustainability as their views aid our understanding of their needs, expectations and perceptions of Scottish Water. Our robust research and insights programme will continue to inform our improvement activities and decision making whilst helping us to build and strengthen relationships with customers and communities.

Throughout SR21 and previous regulatory periods we have continued to monitor the experiences of our customers so that we fully understand their experience in dealing with Scottish Water. We track, monitor and learn from customer feedback, ensuring the voices of our customers sit at the heart of our business. This comprehensive research programme, delivered by independent research agencies on our behalf, spans our entire customer base — including households, businesses, Licensed Providers, and Developers, reaching tens of thousands of customers on an annual basis.

As well as seeking customers' views on strategic direction and performance through our wider research programme (see our Customer Research Technical Appendix for further detail), we conduct a range of both qualitative and quantitative research projects across a wide variety of topics. For example, exploring customer views on their annual charges, as well as understanding the impact of capital projects on local communities.

We actively gather feedback following customer interactions, through email or SMS surveys, to gauge satisfaction and identify areas for improvement. We also benchmark our performance against other UK utilities and customer-facing organisations through participation in the UK Customer Satisfaction Index (UKCSI), a national measure of satisfaction conducted by the Institute of Customer Service.

Learning from customer complaints: Prioritising customer feedback also allows Scottish Water to learn from mistakes. In SR15 we significantly drove down complaints by restructuring the team

who manage complaints and reframing their role in the business from complaint handlers to service reviewers. Then in SR21 we continued to improve performance with a focus on embedding Root Cause Analysis and case studies on customers issues, working with the wider business to ensure learning and secure behaviour change. Customer issues and complaints sit at the heart of decision making and inform investment decision making. For example in SR21 we have introduced the Customer Alternative Resolution Management (CARM) team to assess and prioritise repeat water service issues for investment.

Part of our challenge and aspiration going forward is how we can reduce the cost of failure whilst building on our commitment to listen and learn from each customer experience. Figure 1 below shows the steep decline in complaint numbers since 2008/09 due to focus on complaint handling and service review practices.

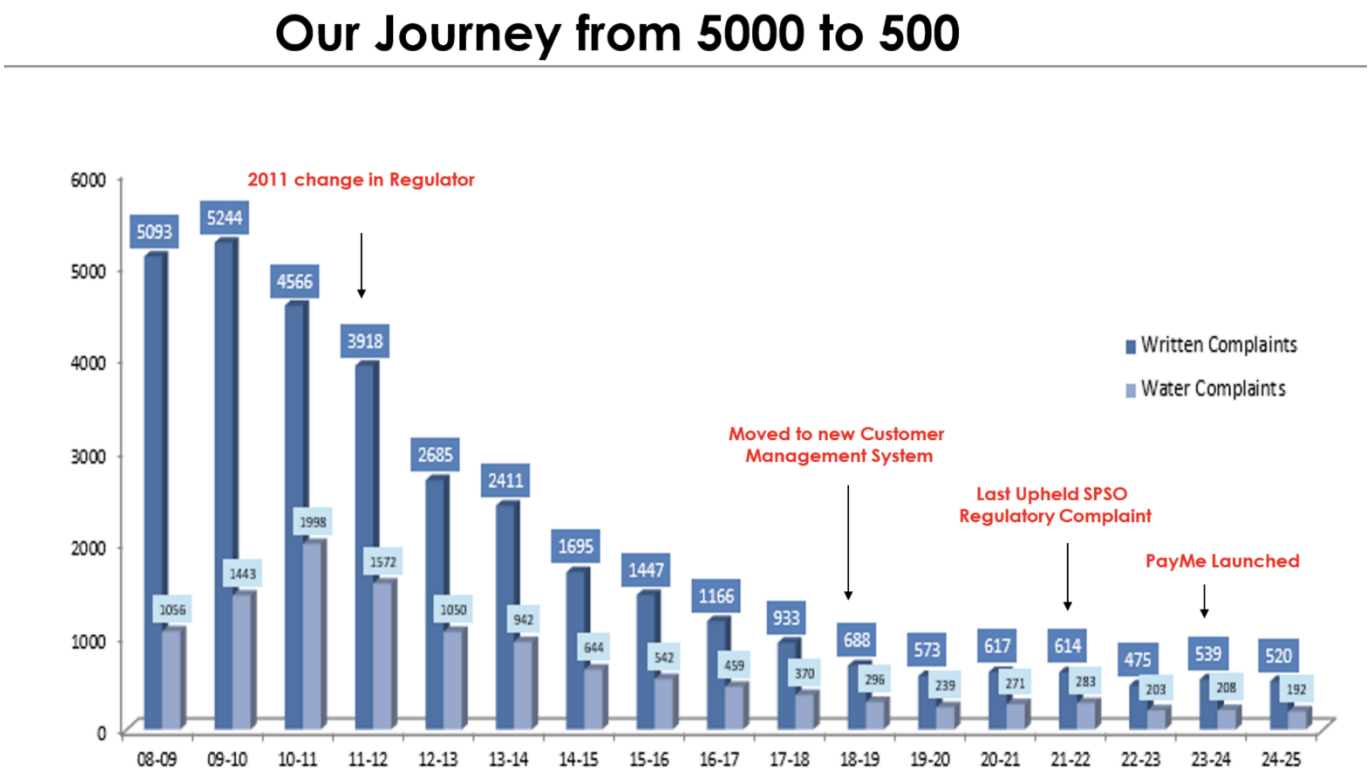

Figure 1: Complaint journey from 2008

At the end of SR21, Scottish Water are aligning with the Scottish Public Service Ombudsman's new Model Complaints Handling Policy which aims to ensure complaints are handled fairly, quickly and simply across public services in Scotland. This will further improve the service we deliver to our dissatisfied customers by making an even more significant commitment to speed of response and resolution.

Measuring customer satisfaction: We measure customer satisfaction through a series of Customer Experience Measures (CEM) and have developed one for each of our key customer groups as detailed below. Our household CEM gathers quantitative metrics such as customer contacts and complaint numbers alongside qualitative data which captures transactional feedback from customers and opinions of those who have not had a personal interaction with Scottish Water (i.e. a service issue). Our household CEM is strong and stable (See Figure 2) and furnishes us with a vast amount of insight and trend data to facilitate a programme of business-as-usual improvement activities.

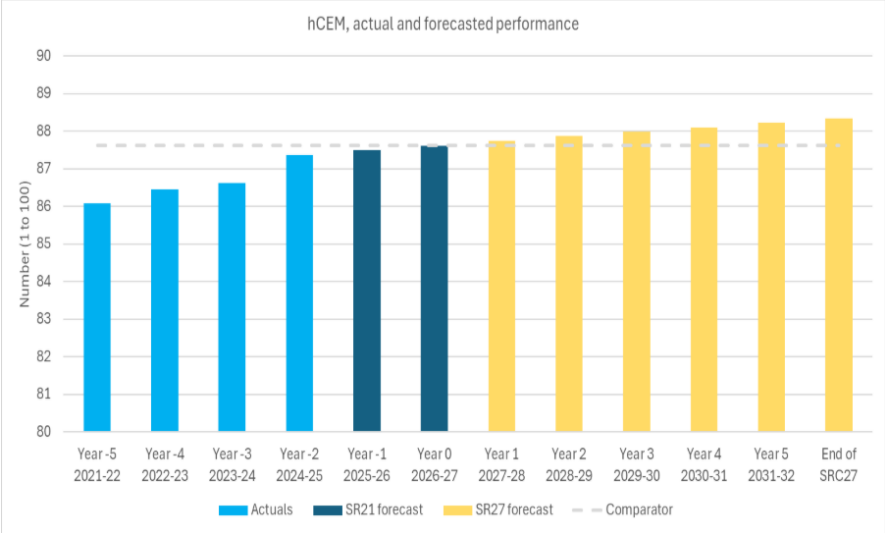

Figure 2: Our household CEM actual and forecasted performance

With regards to Licensed Providers (LPs), our ambition is to be a great wholesaler who is easy to do business with. We are passionate about getting things right first time, working collaboratively, and delivering great value to our LPs and business customers. Our service performance, as measured by our non-household Customer Experience Measure (nhCEM) (See Figure 3) and wholesale Key Performance Indicators remains strong and we continue to enhance all aspects of the customer experience, as evidenced by recent UK-wide benchmarking results.

The Retailer Measure of Experience (R-MeX) survey, conducted by the Market Operator for English water companies (MOSL), assesses LP satisfaction with wholesaler services in England. Scottish Water also conducts a similar, independent benchmarking survey to measure our performance against other wholesalers. We are proud to have recently achieved higher scores than any English or Welsh company, marking a significant milestone in our journey to Service Excellence.

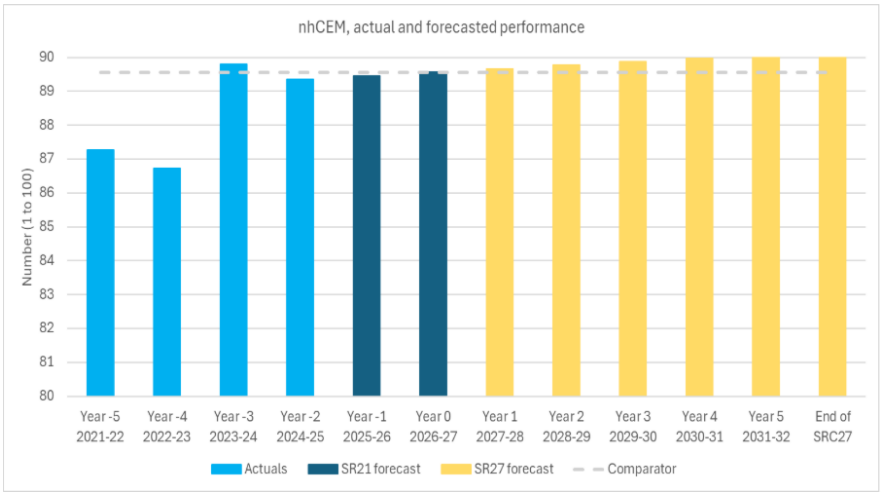

Figure 3: Our non-household CEM actual and forecasted performance

We support Scotland's economic and housing growth by aiming to connect our customers "just ahead of need" to enable building and housing developments. We receive positive feedback from our developer customers, and the Development Customer Experience Measure (dCEM) is currently tracking above target, indicating that we are providing an improving level of service. (See Figure 4) Further detail on our development plans in SR27 can be found in our Enabling Growth Technical Appendix.

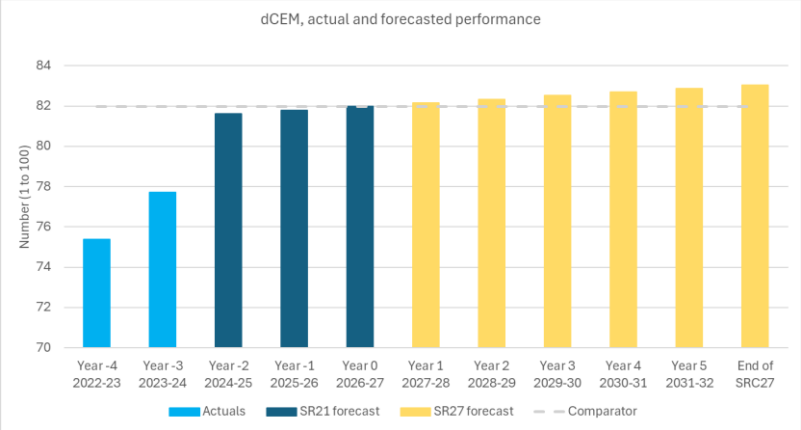

Figure 4: Our development CEM actual and forecasted performance

As well as listening to customers directly, Scottish Water is an active member of the Institute of Customer Service, which publishes the UK Customer Satisfaction Index (UKCSI) every six months, allowing us to benchmark our service against other water companies, utilities, and a variety of other sectors. In the most recent July 2025 survey, the UKCSI showed Scottish Water's results were notably higher than the water sector, utilities, and Scottish averages. Results from our business benchmarking survey (which provides a larger, more robust survey base than our national results) saw Scottish Water maintain the top spot for UK water companies for four consecutive waves from July 2023 - January 2025 and claim second spot in the July 2025 wave. (See Figure 5).

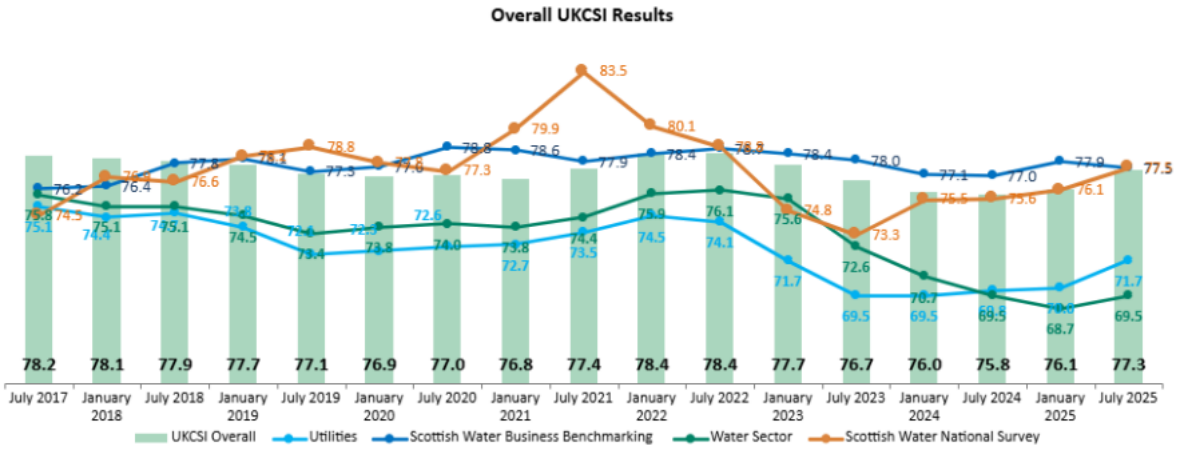

Figure 5: Our UKCSI historic performance

Using insight to improve our decisions: Knowledge is key in the improvement of service excellence and through continued investment in the development of technology enabled intuitive customer insights, we will ensure that decisions at all levels in Scottish Water can demonstrate where they have been informed by customers. In particular, the use of our Customer Powered Insight Dashboard (CuPID) allows Scottish Water employees to see at a glance, the real time impact of incidents and service issues on customers and communities, facilitating informed and accelerated decision making.

2. *We have simplified the promises that we make to our customers making them more accessible and easier to understand*

In the past few years we have made significant improvements to service provision, including the refinement of "Our Promises – Our Code of Conduct"[1]. This document sets out the Service Standard commitments we make to our customers and communities detailing how we will remedy the situation should things go wrong. It is now easier to access and understand, with several of the promises being simplified and caveats removed particularly in terms of interruptions to water supply, to drive Scottish Water towards improved and efficient service delivery performance. We have also implemented a more streamlined and secure method to pay Service Standard payments to customers (detailed on page 10).

"Our Promises" is a live, interactive document on our website and will be kept updated as service expectations and delivery evolve. It is also updated in agreement with Consumer Scotland (on behalf of the Water Industry Commission for Scotland (WICS)).

Working with the Senior Stakeholder Group which is chaired by Consumer Scotland and represents the wholesale market, a new Code of Practice for the Scottish non-household retail market took effect from April 2025. This ensures Licensed Providers work with their customers and Scottish Water to ensure the retail non-household market continues to deliver positive benefits to non-household customers regardless of location or business size.

Finally, we have developed a Service Excellence Assurance Model where we engage with each directorate to develop an ambitious and sustainable set of performance metrics which will track contributions to Service Excellence and maturity over time. We are piloting this approach in SR21 with our Capital Investment directorate, developing scorecards which will assure their performance is in line with achievement of our strategic ambition, and enable this to be presented in an accessible, simplified and consistent way. This assurance model provides alignment from our Business Plan, through to departmental planning and individual objective setting, ensuring that customers and communities are embedded and at the heart of all we do.

3. *We have implemented a number of technology solutions to support the experiences of our customers and communities and are seeing positive feedback as a result of our initiatives*

Improved speed of response: As part of our ongoing commitment to transform our speed of response we now have a fully integrated remote diagnosis offering. Through digital connections customers can simply transfer images and videos to Scottish Water allowing diagnosis of the issue, and often, resolution at first point of contact.

The team has proven effective in resolving customer issues remotely eliminating the need for field visits in around 40% of cases. This approach has not only led to significant cost savings but has also reduced CO_2 emissions and improved resolution times for customers. Year-on-year net financial benefit of £350k and carbon savings of 104,722kg CO_2e have been delivered across our water and waste water services.

Moving into the future we will look to use this triage approach for a broader range of service issues, with an ambition that this becomes an opportunity for customers to self-diagnose in some instances. For example, a customer could use the diagnosis tool, understand the required next step, and book and manage the job or appointment online.

[1] 290824OurPromisesOurCodeOfPractice.pdf

We will continue to seek opportunities to deliver the most effective and efficient use of customers' money by looking to the use of dynamic customer response service level agreements (SLAs). These will be informed by customer demand information and will be visible to staff throughout the journey to enable accurate customer engagements. We have also introduced technology which allows customers to track their named engineer so if our customer is expecting a visit, they can monitor their progress. This has been warmly welcomed by our customers as illustrated in the following feedback: *"Very impressed with first point of contact and being informed of progress by text again was very helpful. Very impressed with the customer service"* and *"We were contacted in advance by phone AND text. The operator arrived in time. He was polite, quick and efficient. All in all, an excellent job."*

Proactively alerting customers to service issues: As Scottish Water does not directly bill household customers, we do not hold comprehensive customer data unless customers have previously contacted us and provided this data. This means it is hard for us to proactively alert customers should we anticipate or encounter a service issue in their area. To help overcome this, we have launched a Text Alert service which encourages customers to register their details with us so we can keep them informed in the future. This has led to an immediate reduction in inbound contacts, driving efficiency in the way we support our customers and allowing our people to focus on those who need help the most.

Listening to our Assets: During SR21, we began the journey of transforming how we proactively and remotely understand and operate out assets by initiating the evolution from the Intelligent Control Centre (ICC) towards a Remote Operating Centre (ROC), which paved the way for the broader, company-wide Compass programme. This shift marked a move from reactive incident management towards proactive asset monitoring, using data and automation to predict and prevent issues before they impact customers.

As our approach matured we consolidated all activities into the Compass programme, uniting multiple digital and efficiency projects under one strategic umbrella. Compass aims to position Scottish Water as a world-class asset management organisation by harnessing digital capabilities. It enables Operations to standardise remote access, monitoring, maintenance, and data-driven insight, closing a critical gap in managing our assets effectively over their full lifetimes. This evolution has allowed us to anticipate issues earlier and make evidence-based decisions – improving customer service, protecting the environment, optimising spend and supporting our people. Compass is now a key enabler of the transformation required to meet future challenges. More information can be found in the Transformation and Innovation Appendix.

Streamlined service standards payments: We have recently introduced the PayMe app, which means we can immediately transfer service standard payments to customers. This is a much faster and more secure way of transferring money to customers if we have breached one of our promises. Welcomed by customers, this process helps to protect customers' personal data as well as ensure quick redress at times when they need it most. We will continue to progress with enhancements in this offering aligned with customer expectations.

Improving Licensed Providers' experience: Our commitment to service improvement is demonstrated through key initiatives such as our Wholesale Resolutions Team, which focuses on improving first-time resolution through triage and additional support to identify and resolve complex issues. We have also strengthened our digital capabilities through an overhaul of our self-service platform for Licensed Providers, enabling them to provide a more responsive service to business customers. Platform improvements have included a new help centre, redesigned web forms, intuitive process picker and a new service tracking feature, making interactions more streamlined and accurate.

We have also carried out a trial of "smart metering" for business premises. This will bring a range of benefits to LPs and their customers including improving the timeliness and accuracy of bills, identifying meter issues and leakage more quickly, allowing customers to better manage their

usage and sustainability performance. Scottish Water will have a more accurate view of where and when water is being used, which will improve our leakage management, and as fewer site visits will be needed to read meters the overall carbon of the retail market will reduce. As a result of these initiatives, each of our performance outcome measures has seen an overall increase since the start of SR21.

4. We have grown our customer and community engagement programme, continuing activities across Scotland to encourage behaviour change and build the value of water

Over the past five years, Scottish Water has strengthened its commitment to community engagement. We have promoted access to more of our reservoirs, creating safe and welcoming spaces for recreation and nature appreciation. This work has been supported by a dedicated Reservoir Ranger team who provide education in and around these valuable natural resources.

Our network of Top Up Taps has grown significantly, with 136 taps now installed across towns, cities, and rural areas. These have supported thousands of refills each, helping communities reduce single-use plastics and save more than 20 million bottles from landfill.

Through nationwide campaign roadshows and events, including Nature Calls, which urges people to only flush the 3Ps, and Water is Always Worth Saving, we've engaged directly with people in supermarkets, high streets, major events including the Royal Highland Show, schools, council meetings, and community events. These face-to-face interactions have raised awareness of water efficiency and environmental protection, embedding positive behaviours that safeguard Scotland's water resources for future generations.

Our growing Generation H_2O education programme is also inspiring young people to become responsible water citizens of the future. We recently helped celebrate 10 years of the Learn to Swim programme which has seen 210,000 children take part in lessons to keep them safer around water. Collectively, these initiatives have reached thousands of communities across Scotland.

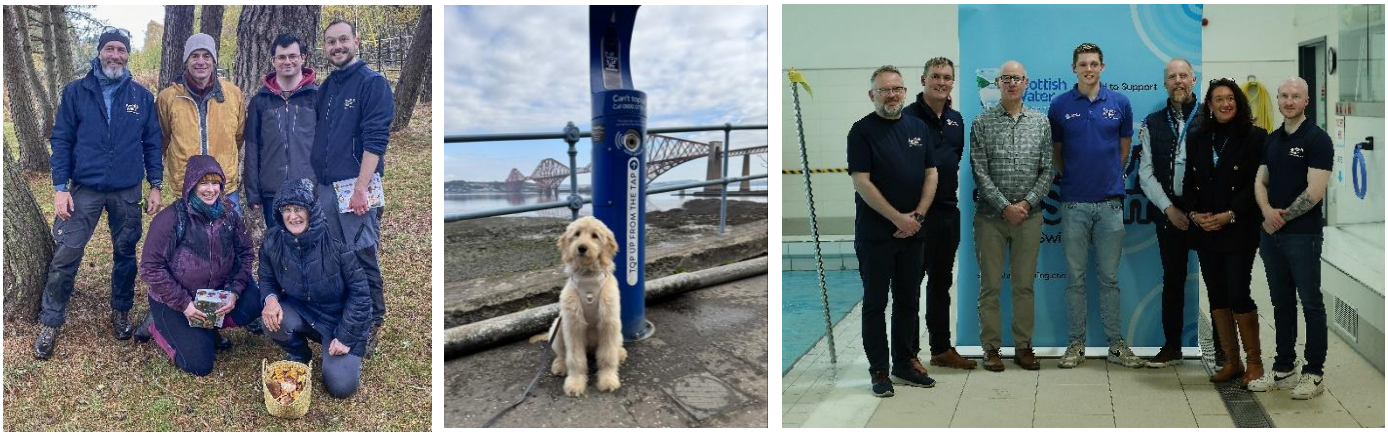

Figure 6: Examples of Community Engagement across Scotland

2.3 What has Changed Since SR21

In recent years there has been a significant increase in public scrutiny of the water industry, particularly in England and Wales. While trust levels in Scottish Water remain high, they have been impacted by an increase in negative sentiment towards the industry as a whole.

Whilst our customer satisfaction has increased since the beginning of SR21, reflecting the positive experience our customers have when they have a direct transaction with us, our trust levels experienced a slight decline as shown in Figure 7. This dip is less severe than many in the industry and is already showing signs of recovery as we approach our new strategic planning period.

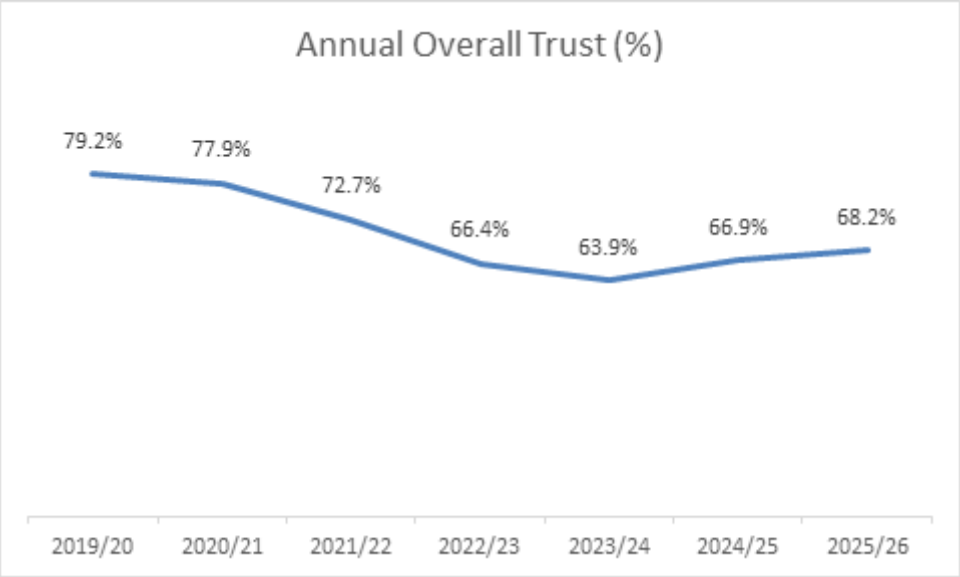

Figure 7: Our Overall Trust Score (2025/26 figure is April - October 2025 only)

Through ongoing research, we know that our customers trust us more because we are publicly owned, and this has informed our ongoing campaign “Piped by Us, Owned by You” which was launched in 2024. This is the beginning of a conversation with all our customers and communities where we aim to increase understanding of Scottish Water and our public ownership model. We commit to ongoing engagement with our customers to help them understand the value of water as a precious resource, the importance of waste water processes particularly with regards to our natural environment, and the impact climate change is having on the services we provide.

3 The Focus of our Customers and Communities Strategy in SR27

3.1 Our Approach

Customer and community excellence is at the heart of everything we do. Our ambition is to improve our performance across all the customer and community measures in the period in line with the Draft Ministerial Objectives 2027-33 1a and 1b; "*Scottish Water must maintain or improve current levels of service over the long term*" and "*Scottish Water must engage with stakeholders and customers to establish appropriate standards of services for the 2027-33 period and beyond*".

In addition, as a public body, Scottish Water is required to meet the Consumer Duty, a government policy which requires customers to be considered in all strategic decision-making. We commit to track and regularly report on our compliance through our annual Performance and Prospects Report.

Service Excellence is one of Scottish Water's three strategic ambitions ensuring the whole business is considerate of the impact they have on our customers and the communities to which they belong in terms of service delivery, cost and environmental impact.

To support the fulfilment of these strategic ambitions in SR27 we conducted research with customers to learn more about their expectations for service delivery. This has informed our seven key priorities relating to customer and community excellence in SR27, which support increases in our customer experience outcomes including our Customer Experience Measure, UKCSI and R-Mex:

1. We will **continue to improve how we listen to our customers** and evidence where we have used their voices in our strategic and day to day decision making – ensuring customers continue to be at the heart of all we do.
2. We will **use technology and data** to ensure our service for customers and communities is efficient, streamlined and personalised whilst maintaining our commitment to our 24/7 Customer Engagement Centre.
3. We will **continue to invest in our ability to predict and prevent** issues to protect our customers and communities from disruption, whilst optimising our ability to complete first time fixes.
4. We commit to further development **of our service commitments for customers with vulnerabilities.**
5. We will continue to **develop our people and processes** and embed Service Excellence capabilities, mindsets and behaviours.
6. We will grow our **community engagement**, building positive relationships, involving them in decisions and contributing to a flourishing Scotland
7. We will **increase awareness and change behaviours,** asking customers to play an owners' part to reduce demand on our services; reducing consumption and blockages.

3.2 What we Will Deliver in SR27

1. *We will **continue to improve how we listen to our customers** and evidence where we have used their voices in our strategic and day to day decision making – ensuring customers continue to be at the heart of all we do*

Research and Insights Programme

We will continue to listen to our customers through our established and robust research programmes both to improve day to day service and inform investment and future strategic decisions. Our full programme of customer research is ongoing and continuous, gathering feedback on the quality of our interactions with customers, tracking levels of trust, awareness and satisfaction, and seeking insights from our customers on specific investment projects or topics. Ongoing research is supplemented by strategic research, which has informed both the Long-Term Strategy and the SR27 Final Business Plan.

As set out in the Customer Research Technical Appendix, the role of customers in this Strategic Review process has been strengthened by the Memorandum of Understanding on Customer Engagement in SR27, between WICS, Consumer Scotland and Scottish Water. Setting out the principles of customer engagement, and three pillars of work: evidence, challenge and confirmation. Under the challenge pillar the Independent Customer Group has retained its role to support and challenge Scottish Water's understanding and incorporation of customers' needs and expectations in the SR27 Final Business Plan.

Our research programme overall is delivering actionable insight and driving real positive change; this programme will continue in the 2027-33 regulatory period. Supported by a proposed investment of £2.2m we commit to continually improving both the research approaches we take as well as how and where we gather feedback. A robust research programme allows us to ensure our customers' views are at the heart of our decision making. For example, in SR27 we are looking to improve our transactional survey activity. This will involve having a single survey provider to deliver all transactional research, expanding the reach of the surveys to more customers through a multi-channel approach. In conjunction with the independent research agencies we work with, we will continually innovate and refine the qualitative and quantitative research methods used, guided by Market Research Society best practice.

CuPID and Community Map

To complement our Customer Powered Insight Dashboard (CuPID) tool introduced in SR21, we will continue development and functionality of our Community Map dashboard allowing us to understand real-time service impact on geographical communities, informing everything from strategic decision making to tactical engagements. These tools make customer insight accessible and tangible across Scottish Water, enabling more timely decision making whilst bringing the voice of the customer into the hands of all our people.

Complaints

As outlined in Section 2.2, Scottish Water captures and manages customers' complaints through a robust and tested process managed on a day-to-day basis by our Service Review Team that will sit in the new Customer Service Directorate. Whilst working with the business on the resolution and investigation of customers' formal complaints one key aspect of the team is to ensure insight and learning from each customer issue. This process has, to date, been an internal process. Consideration will now be given in conjunction with Consumer Scotland as to how some of this insight and learning can be shared. The aim being to ensure awareness of the commitment Scottish Water has to listening, and delivering a programme of continuous improvement. This will also enable sector stakeholders to be part of the discussion and make more use of the insight in sector discussions.

2. *We will use **technology and data** to ensure our service for customers and communities is efficient, streamlined and personalised whilst maintaining our commitment to our 24/7 Customer Engagement Centre.*

We are proud of our Scotland-based Customer Engagement Centre open 24 hours a day, 7 days a week, 365 days a year. Our customers appreciate that they can speak to a person who understands their challenge and support them when something goes wrong. Our advisers are skilled and empathetic experts, with access to real-time field updates and we dynamically update our responses and processes through our new and real-time online library of resources. This is reflected in the customer satisfaction levels that we receive from the interactions with our customers (93.9%).

We are planning to invest £5.4m in SR27 to improve our website and develop our contact channels with our customers, enabling customers to tailor our services to suit them. This will be achieved through the provision of digitally supported and tailored portals for each of our main customer groups. Our commitment is that we will always be easy to contact and to interact with. We will continue to monitor contact preferences and look to specifically establish contact using existing and emerging channels. Where possible we will enable customers to book their own appointments; provide customers advance warning of potential issues so they can prepare; and provide a transparent view of how work is progressing. These activities will allow customers to engage with Scottish Water in the way that's easiest for them, reduce the level of contact to our Customer Engagement Centre and enable our people to focus on the more complex and challenging customer issues. These activities will have a direct impact on our customer measures and on the Customer Experience Measure (CEM), in particular.

Our website will be improved during SR27 to be dynamic, intuitive, and accessible, offering self-help articles, videos, and information tailored to customers' locality or interests. The website will provide personalised access to our customers and deliver powerful analytics to allow us to continuously improve and enhance the user experience. We will explore and adopt opportunities presented by Artificial Intelligence (AI) predominantly to support our employees to continue to deliver human experiences as appropriate. Looking at plans for our business customers, our aim is to implement smart metering for 130,000 Non-Household Customers[2] (further information can be found in the Water Continuity Technical Appendix).

By working collaboratively with LPs, we expect this new technology to empower customers to improve their water efficiency and take control of their bills and environmental footprint, through increased transparency of their usage. Smart Metering is also one of a number of enablers for Scottish Water to provide a more proactive service, identifying and resolving issues before customers or LPs become aware of them. We will further enhance our digital capabilities to deliver a more seamless service, maintaining LPs' and customers' trust and confidence while continuing to deliver service excellence.

A large proportion of activities proposed are digitally enabled and therefore the activities mentioned above are predicated on the delivery of the Digital Strategy, see Digital Technical Appendix for more details.

[2] Representing approximately 95% of the total programme during SR27, this assumption will continue to be updated as the project progresses through governance stages

3. *We will **continue to invest in our ability to predict and prevent** issues to protect our customers and communities from disruption, whilst optimising our ability to complete first time fixes.*

In SR27, will continue to develop the fully integrated remote diagnosis offering that we have rolled out in the SR21 period. This is where customers can send photos or videos which allow us to identify problems and solutions remotely enabling us to resolve more issues immediately, reducing impacts on customers.

Increasingly, as information from our assets improves, and we secure more customers' contact information, we will proactively engage more customers in service issues in their area, helping them prepare and minimise any impact on them. Dynamic web links are provided with each text message sent to customers, which enables them to see what the issue is, what progress is being made and how they can help maintain supplies. We will continue to explore options to further expand the customer contact data that we hold; to enhance our proactive and real-time personalised service offering so we can support our customers when they need it most.

Figure 8: Scottish Water Text Alerts Advert

Using customer powered data tools such as CuPiD and Community Map, alongside our asset data, will enable us to identify more issues before they affect our customers, minimising disruption, and giving as much proactive notice as we can. Ultimately, we aim to make more of this data accessible to customers in an intuitive and accessible way.

In SR27, we will build on the Compass programme's SR21 achievements to embed intelligent asset management into business-as-usual. The digital capabilities and insights delivered by Compass will be fully leveraged to drive efficiency and informed decision making across the organisation. Using Compass's unified, end-to-end operational view, we will target the most impactful improvements and prioritise investments that deliver maximum value. Real-time asset data and predictive analytics will underpin short, medium, and long-term decisions:

- **Short term:** Smarter monitoring and automation to optimise daily operations and maintenance.

- **Medium term:** Enhanced asset performance data to guide investment prioritisation and planning.
- **Long term:** Robust, evidence-based insight to ensure strategic investments strengthen resilience.

Compass will work closely with Sustainable Investment Decision Making (SIDM) and SR27 planning to ensure alignment, avoid duplication, and deliver transformation. By embedding these capabilities, Scottish Water will move beyond implementing digital tools to fully integrating intelligent asset management—driving efficiency, resilience, and customer value for the communities we serve. More information can be found in the Transformation and Innovation Technical Appendix.

*4. We commit to further development of our **service commitments for customers with vulnerabilities***

All our household customers are individuals, and we aim to recognise, support, and meet our diverse customers' and communities' requirements in an inclusive and accessible way. We know Scotland's population is changing in many ways, and one outcome is that people are living longer, and we have a larger group of elderly customers to care for.

Developing a Priority Service Strategy

We have made significant progress through SR21 in building strong foundations for our service to customers with vulnerabilities and we will continue to do all we can to further develop and personalise our services. We appreciate that many of our customers face personal challenges which may place them in vulnerable circumstances, and we have focused on how we can support them through the expansion of our Priority Services Register (PSR). As well as raising awareness through promotion, we have established meaningful partnerships with Age Scotland and other utility companies, enabling us to better support those customers who need us most when services are interrupted. This work will evolve as we ensure we reach all our customers who need some extra help via other agencies, the NHS, community groups and our partnerships.

Our recently developed Priority Service Strategy sets out our desired outcomes and drives improvement activities for customers with additional requirements. This document will develop as customer needs and numbers evolve and grow, and we gather feedback on service provision.

Priority Service Improvements

As we increase our Priority Service Register (PSR) of customers, promoting the importance of taking individual responsibility to ensure personal resilience will become more critical, alongside increasing accessibility, prioritised care and tailored communications. As the Register grows, we will categorise customers' needs, prioritise assistance and ensure the most vulnerable are looked after first.

We continue to train our people to spot signs of vulnerabilities through phone calls or on the doorstep and enable them to sensitively signpost further support if necessary. We will also make it easy for our customer facing people to serve these customers, allowing time for extra care and conversation and ensuring they understand the individual's 'need' to prepare them for the interaction.

One of our biggest challenges in this space is that our customers tend to sign up for additional support during an incident where service is disrupted. This makes it much harder for us to provide

the proactive service customers expect. We are working to systemise how we manage PSR sign-ups and bottled water requests during a large-scale incident to streamline prioritisation.

We will also continue to explore various options for data sharing and accessibility to enable more seamless support for vulnerable customers. This would benefit customers greatly as Scottish Water could access secure Scotland-wide data, immediately telling us which households require extra support. This would be a huge change and is highly complex in terms of data compliance, security and data sharing process and infrastructure.

As we currently don't have plans in place to access this data, the additional £4m funding for PSR improvements in this Plan is to support a PSR which grows at the current rate. Should data sharing be agreed, additional funding may be required to accommodate the additional needs of a larger customer group. The investment will enable us to develop our services to vulnerable customers as numbers grow, and ensure they are at no disadvantage should they experience a service issue.

Inclusion and Accessibility

Recite Me is an accessibility tool available on our website and self-service web pages used to promote and prioritise inclusion and accessibility for all. It allows audio, translation and visual assistance on one click. In addition, we will continue to monitor and assess the range of alternative communication channels we offer (currently large print, braille, Text UK, British Sign Language and translation services).

Proactive Bottled Water Initiative

To be as proactive as we can, and to enable customers' personal resilience, we will continue to promote our Proactive Bottled Water Initiative every autumn, offering a means to an alternative supply of water to our PSR customers so they are immediately protected should their supply be affected in the winter months. This initiative has proved popular and successful and is welcomed by our customers.

Public Sector Equality Duty

Whilst customer care is always our principal driver, this work also contributes positively to our Public Sector Equality Duty commitment to consider and advance equality, eliminate discrimination, and foster relations. This also feeds into the overarching Public Sector Equality Duty and Consumer Duty framework.

*5.. We will continue to **develop our people and processes** and embed Service Excellence capabilities, mindsets and behaviours.*

Professionalisation of Customer Service Skills

We continue to drive Service Excellence by investing in our people through learning and training, promoting the professionalisation of customer service skills, and encouraging career development within customer-facing teams. Ensuring Service Excellence is a priority for everyone in our business, regardless of their role, we will continue to accredit individuals with appropriate skills via the Institute of Customer Service's training and development programmes. People are the backbone of Scottish Water and nurturing talented sector individuals to be ambassadors for service and our customers is a key priority for the future. Further details on our People Strategy can be found in the People Technical Appendix.

Customer Service at the Heart

As we look to the future, it's important that how we work and how we are structured sets us up for success in a changing world. As detailed further in the People Technical Appendix, we are making changes to simplify our organisational structure, ensuring clarity of accountabilities, and that we have the skills and resources we need for the future.

Our new organisational operating model (Figure 9) will ensure we are empowered to identify and grasp opportunities quickly, to be agile and innovative, bold and inspiring. We will be an organisation ready and fit for SR27, with customers at our heart. Our new model creates a dedicated Customer Service Directorate which will be the advocate for the voice of internal and external customers in all decisions; making sure we are easy to do business with and delivering for our customers, when they need us the most.

A new Director of Customer Service will lead our teams who are the first line of support and set the tone for customer experience for both our people and external customers. This directorate unites our teams which enable Scotland's sustainable economic and housing growth, those who manage our customer interactions through the Customer Engagement Centre and those who improve the service we offer to our vulnerable customers. It is also accountable for driving our ability to predict and prevent incidents before they impact our customers through the Intelligent Control Centre and listening to customers' views through our customer research.

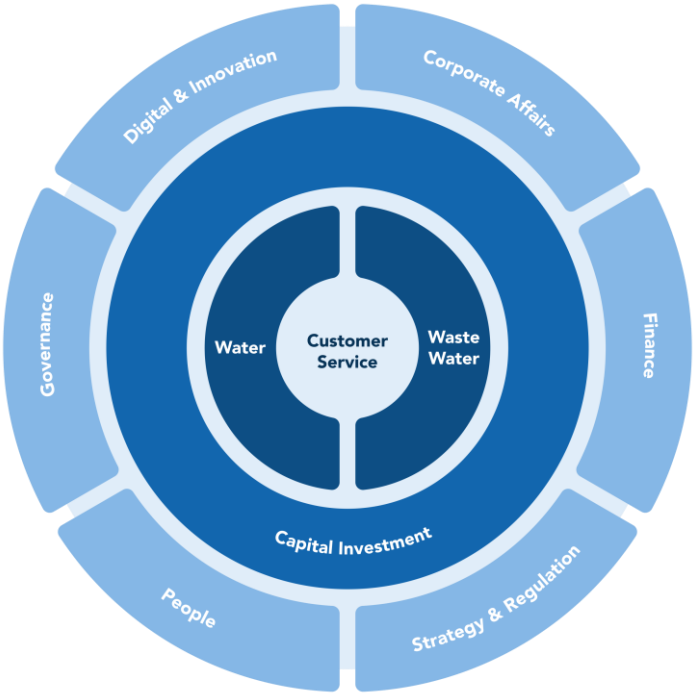

Figure 9: Scottish Water's New Operating Model

Our Service Excellence Assurance Model will engage with more directorates as we grow and learn from the pilot in Capital Investment. The model is an operational performance dashboard designed to showcase how each directorate contributes to the organisation's Service Excellence ambition. It provides a clear and data-driven view of the impact and improvement opportunities directorates have for customers and communities across Scotland.

This report is part of a wider effort to embed service excellence into everyday operations, enabling teams to:

- Monitor progress against key performance indicators.
- Identify areas of strength and opportunities for improvement.
- Align their activities with organisational priorities and customer outcomes.

Each section of the report highlights specific metrics relevant to a directorate's remit, offering transparency and accountability in how service excellence is being delivered. The report is refreshed regularly and is accessible for real-time insights.

Service Excellence will continue to be part of everyone's annual objectives and tailored targets will be aligned to different directorates, allowing us to monitor progress. We will also continue to promote positive stories of Service Excellence in action both internally and externally and recognise and reward outstanding individual performances.

6. *We will **grow our community engagement**, building positive relationships, involving them in decisions and contributing to a flourishing Scotland*

Community Engagement and Earlier Engagement

We are committed to embedding meaningful community engagement at every stage of our project planning and delivery, as described in our Community Engagement (Annex 1) and Earlier Engagement (Annex 2) frameworks, which we set up and agreed in SR21. Our ambition is to listen to communities, where possible during the design of projects and throughout their implementation, ensuring that local voices shape decisions and help us deliver a positive legacy for the future. Our Community Engagement Framework specifies five levels of engagement (Figure 10).

Figure 10: Levels of Community Engagement

During SR21 we have learned that a one-size-fits-all approach to earlier engagement is not feasible in relation to the nature and drivers of the projects which Scottish Water and our partners are delivering for customers. Therefore, we will tailor our engagement approaches based on the scale and type of investment and in conjunction with local community representatives. We commit to regular review sessions which will be used to explore opportunities to engage communities throughout the programme of investigation and work.

Our communications and engagement approach will continue to create opportunities for communities to co-design solutions, reinforcing the sense of ownership and ensuring that feedback is visibly reflected in outcomes. This approach builds trust and delivers long-term benefits that matter to local people.

We place communities at the heart of our business, with a focus on listening, local action, social value, and transparency. By strengthening these areas, we aim to deliver meaningful engagement and a lasting legacy for Scotland's people and places.

We will share progress and learnings with sector stakeholders more regularly and case studies shared will include both those where communities had a meaningful impact, and those where learnings were taken.

Opening up Access

As well as community engagement in investment projects, local community engagement is evident in a range of other activities from Scottish Water and our partners as we encourage the people of Scotland to use, appreciate and value our assets. In SR21 have been trialling several different activities on our sites to support access to our reservoirs and upland catchments.

We invested in Reservoir Rangers who took care of certain reservoirs and welcomed people to learn more about the wildlife and nature surrounding them. Between April and October 2025, they spoke directly to over 1,800 customers helping them to enjoy their activities at our sites. As well as running events directly, on sites where we have interested and engaged community groups we have worked with them to support their own activities. We plan to broaden this programme in SR27.

Between April and October 2025, we also facilitated 5 community litter picks, ran three volunteering days with a further five planned for woodland creation over the winter. We have run 15 Ranger led walks, for wellbeing, local history, and birdwatching, and our Rangers have led nine on-site events - based on nature and access activities. We engaged with partner organisations (e.g. Scottish Fire Service and Police Scotland) to visit schools with targeted messages about water safety and responsible access and supported partner organisations with similar events on their sites where they are in proximity to our assets.

Figure 11: Volunteers and Visitors at Gladhouse Reservoir

We have continued to improve access to our sites, and at Milngavie near Glasgow we have resurfaced and upgraded our paths, so they are accessible for pushchairs and wheelchairs, installed visitor information around the site and a children's biodiversity trail. Visitor counters show around 140,000 people visit Milngavie each year. Working with a local stakeholder group we have devised and implemented a management plan to protect and enhance some of the heritage features at the site.

We have rolled out similar visitor information and a biodiversity trail at Carron Valley near Falkirk and are adding visitor information to a further six sites before the end of the investment period. We are keen to monitor the impact and usage of our sites to better understand community benefit and have the instillation of visitor counters planned at several of our higher footfall sites.

In SR27 we will invest £5.5m to expand on the elements of the pilots which have worked well, improving engagement with partner organisations to help support and improve access to our assets for education, skills and wellbeing.

Measuring Community Engagement

We are committed to improving how we measure and report on community engagement in SR27. Transparent, accessible reporting, showcasing examples of how community input has influenced decisions and highlighting the impact of local initiatives, will help build confidence and demonstrate the real-world value of engagement. We will incorporate regular updates and case studies in reporting to sector stakeholders which will illustrate progress and share learnings.

WICS requested the development of a specific measure of community engagement in their methodology. We have had initial discussions with Consumer Scotland, the ICG and WICS on what this could look like, and what it should be seeking to achieve. The initial views from our customer stakeholders are that a community measure should show if customers and communities feel they have been engaged at the right time and level; demonstrate lasting community impact; and measure the level of engagement (from inform to empower – see Figure 10) being undertaken across the capital programme and beyond. We will work with Consumer Scotland, the ICG and WICS during 2026 to further scope this measure and seek to introduce a Community Engagement Measure within the SR27 period.

7. *We will increase awareness and change behaviours asking customers to play an owners' part to reduce demand on our services; reducing consumption and blockages.*

It is vital we raise the public profile of the value of water so we can all play our part in protecting this precious natural resource to ensure a sustainable future for all. Within our Long-Term Strategy we recognise the need to collaborate and lead partnerships with customers and communities so that we can reduce demand on our services and assets by helping customers use water more efficiently, reduce blockages and manage rainwater on the surface. Our customer research shows us that customers are more accepting of these increases when they can see the value we are delivering.

We must increase customer awareness of who we are and what we do, and how changing behaviours can help ensure resilient and sustainable services into the future. We will do this through a number of social marketing activities, as well as the continuation of our education programme, Generation H_2O.

Responsible Water Citizens of the Future

Scottish Water's Generation H_2O education programme is designed to inspire and educate young people across Scotland about the importance of water and responsible water use. The initiative includes interactive school visits, where employees volunteer to help deliver lessons on topics such as the water cycle and water conservation. The programme is highly valued, with 91% of respondents in a YouGov survey supporting Scottish Water's engagement with young people to promote water protection.

A key goal is to reach 90% of schools in Scotland by the end of SR27, with a strong focus on developing STEM (Science, Technology, Engineering, and Maths) skills. The programme is funded through operational expenditure and aims to build the future workforce by sparking interest in STEM careers.

Partnerships are central to extending the programme's reach and impact. Scottish Water will focus on collaborating with its supply chain, public organisations like Developing Young Workforce and Skills Development Scotland, and Science Centres. These partnerships will help broaden engagement and encourage more young people to consider STEM pathways. The programme also seeks closer alignment with Scottish Water's Early Careers team, ensuring that outreach is targeted to areas with skills gaps and supports Public Sector Equality Duty outcomes.

Piped By Us, Owned By You

Our overarching customer campaign "Piped by Us, Owned by You" seeks to build trust and pride in Scotland's water, reinforcing customer ownership and prompting responsibility for sustainable use. The campaign builds on customer research findings that show when customers know that Scottish Water is publicly owned, they are more likely to act when asked to change behaviours and have positive perceptions of the organisation against a number of metrics including trust, value for money and overall satisfaction.

During SR27 this campaign will evolve the message of public ownership (with awareness levels consistently above 70%) to one of value, helping build understanding of the investment that is needed to protect of Scotland's world-class water in the face of climate change challenges. These campaigns will also provide the foundation for other behaviour change campaigns – requesting customers play their owners' part.

Nature Calls

We launched our “Nature Calls” campaign in SR21 with the aim of raising awareness of the damage done by flushing wipes and fats, oils and grease down the drain on the environment, customers, and our costs. We have also been campaigning for a ban on wipes containing plastic.

The original campaign helps protect sewer systems and environmental water quality, reducing pollution and operational costs. In SR27 we will continue this campaign, building from learning in SR21 which shows a combination of national activity should be supported by localised campaigns and face to face engagement in areas with a high number of chokes per population. These engagements include distributing products to enable behaviour change, i.e. bathroom bins, reusable wipes and kitchen gunk pots. It is expected the cost of this campaign will be c£1.8m over the SR27 period.

In addition to the original campaign, we will introduce engagement activity specifically related to flooding and nature-based solutions, which will promote blue green infrastructure and resilience against climate impacts, aligning with nature and climate targets.

This new campaign is being launched in 2026 and will seek to increase awareness of the issues caused by climate change and how customers can use green solutions in their gardens and wider community spaces to help, such as keeping natural lawns, planting trees and shrubs, and capturing rainfall from roofs and gutters using water butts and planters. We will use segmentation to focus the campaign on those who can do the most, for example larger households with gardens and higher disposable income and evolve the messaging to reach other groups, stakeholders and businesses who all have a part to play. The cost of this campaign is included with the Managing Quantity of Flows Technical Appendix.

Top Up Taps

We are proud to of our network of Top Up Taps since the first one was installed at the Scottish Parliament in 2018. The Top Up Taps encourage appreciation of water, health and hydration allowing everyone to stay hydrated whilst out and about and they have helped develop a refill culture reducing plastic waste and strengthening trust in Scottish Water. The taps have not only saved our customers money but also the equivalent of over 20 million 330ml single-use plastic bottles (at November 2025).

Our tracking surveys consistently show that those who are aware of the Top up Taps and use them have a greater affection for Scottish Water. Therefore, having built a strong network of Top up Taps across Scotland we will continue to promote use of the taps we have to customers.

Measuring Awareness and Behaviour Change

In Scottish Water’s SR27 Draft Business Plan, we referred to the on-going development of a new measure that would track progress aligned to our Long-Term Strategy approach of reducing demand on our services. Work has been ongoing across Scottish Water to develop this new Awareness and Behaviour Change measure.

Scottish Water will work with our stakeholders and an independent research partner to shape and pilot a new Awareness Behaviour Change (ABC) survey with the aim of introducing shadow reporting from April 2026. This new survey will focus on questions related to water consumption and sewer blockages, looking to understand capability, opportunity, motivation and behaviour as described in the COM-B Model of behaviour change shown in Figure 12.

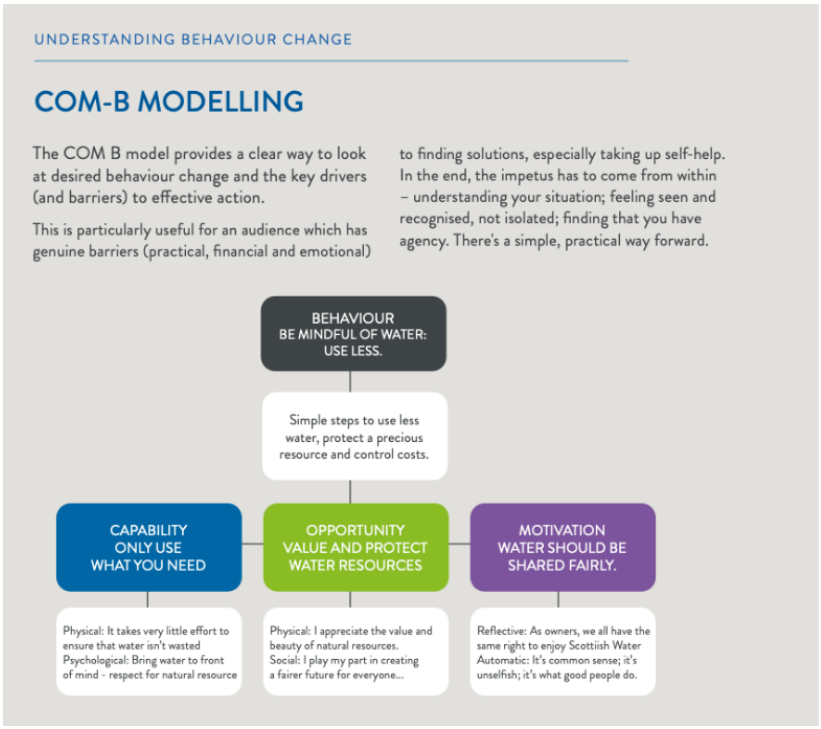

Figure 12: COM-B Model of Behaviour Change

The ABC measure will be a weighted score of survey results from the new ABC tracker survey, as well as the behaviour outcomes measured through a reduction in per capita consumption of water (PCC) and total number of sewer blockages. This measure seeks to understand how to alter societal beliefs and attitudes through demand side initiatives and should pave the way towards activities which will have long-term and lasting impacts.

The development of the ABC measure has been shared with the ICG and Consumer Scotland, who are supportive of the initiative and consider its focus on PCC and sewer blockages to be a step forward for SR27. We will continue to work with all stakeholders on the development of the measure to ensure we can demonstrate impact.

Embracing New Engagement Approaches

In early 2025, a domestic smart monitoring trial was launched in Dundee to explore if providing homeowners with regular information about their water use would change their usage patterns and to assess the potential for significantly and sustainably reducing domestic demand. This trial is expected to report in 2028 with the results informing the potential role of smart monitors in reducing domestic demand in the future.

Scottish Water will also continue to develop our engagement approaches with our partners, LPs and developers. We will continue activities which have been successful including the LP Newsletter, CLANN magazine and in-person events. For example, the annual Development Forum provides an opportunity to engage Developers as well as educate and inform on best practice initiatives that benefit Scotland as a whole. Through our established and trusted relationships with organisations such as Homes for Scotland (HFS) we will continue to work

alongside industry stakeholders to inform best practise and transformational shifts that are required to reduce development impacts on existing customers and communities as well as the local environment.

3.3 The Investment Required to Deliver our SR27 Final Business Plan

The SR27 Final Business Plan sets out investment in maintaining and enhancing our assets and services to benefit customers through the provision of providing high quality drinking water and minimising environmental impact. The investment proposed in this Technical Appendix is over and above that, and will enable us to better engage our customers and communities, and to improve the customer experience.

To deliver the above initiatives and the seven priorities that will support our customers and communities throughout SR27 we are proposing to invest £21.5m. As noted throughout this Technical Appendix investment from elsewhere and existing Opex funding will help deliver a number of improvements.

Table 2: Our proposed Customer & Communities SR27 investments

Investment Category	Investment value
Customer Research	£2.2m
Priority Service Register Improvements	£4m
Digital Developments for Customer Experience enhancements	£5.4m
Access to assets	£5.5m
Campaigns & marketing	£4.4m
Total Customer & Communities Investment	**£21.5m**

3.4 The Outcome of our Strategy

Through the investment in and delivery of these activities we will continue to improve our customer experience across all measures, with this performance aligning with our long-term projections and aspirations (detailed in our Long-Term Strategy). To complement these measures, Scottish Water will look to raise the prominence of established Trust tracking as a further indication of our reputation and performance in delivering Service Excellence:

Table 3: The outcome of our strategy

Level of Service	Year 1 2027-28	Year 2 2028-29	Year 3 2029-30	Year 4 2030-31	Year 5 2031-32	Year 6 2032-33	SRC33	SRC39	SRC45
dCEM	83.42	83.58	83.75	83.91	84.07	84.23	85.18	86.07	86.90
nhCEM	89.67	89.77	89.87	89.97	90.07	90.17	90.76	91.32	91.84
R-MeX	SW score to be in the upper quartile of the list of UK Wholesalers								
hCEM	87.75	87.87	87.99	88.11	88.23	88.35	89.04	89.70	90.32
UKCSI	UKCSI benchmark for SW against the average UK companies score.								

As mentioned, we will be seeking to develop two new measures for SR27, an Awareness and Behaviour Change (ABC) Measure, and a Community Engagement Measure.

Finally, the work described in this Technical Appendix will contribute to Scottish Water meeting the Consumer Duty and the Public Sector Equality Duty.

3.5 Why we are Confident in our Strategy for SR27

The activities described above and the investments we are proposing are based on both Scottisj Water's long-standing approach to working with customers and communities and our continuous improvement of engagement approaches, tools and techniques developed historically including in SR21. The plans for SR27 build on the momentum established in the SR21 period, elevating our service experience and offerings and aligning with increasing customer and community expectations and demand. We have also responded to the considered feedback from our customer stakeholders, the Independent Customer Group and Consumer Scotland, who continue to provide support and challenge as we have developed this SR27 Final Business Plan, and will support and challenge our delivery during the period.

3.6 What are the Key Assumptions of our Strategy?

One fundamental key assumption is that Scottish Water secures the funding that will ensure the maintenance of service levels at those currently benefiting customers, whilst utilising customer and asset data to inform decision making with regards to investment prioritisation and planning. Should there be a material reduction in investments proposed we will revisit our seven priorities and the investments proposed under each to ensure that our customers and communities continue to receive our full support in the most appropriate manner.

As described in Section 3.2 a large proportion of activities proposed are digitally enabled and therefore the strategy presented within this document is predicated on the delivery of the Digital Strategy.

We currently don't have plans in place to access vulnerability data from others such as the Scottish Government; therefore, our assumption is that the PSR grows at the current rate. Should data sharing be agreed, additional funding may be required to accommodate service the additional needs of a larger customer group.

4 Implementation

Scottish Water will measure our success on this journey through the evolution of key customer listening metrics such as the Customer Experience Measures, complemented through ongoing trackers such as the UKCSI. We also plan to develop an industry leading, holistic Service Excellence Assurance Model which will clearly illustrate how the work we do is positively, or negatively impacting our ambition to deliver Service Excellence, holding each area of the business to account on behalf of our customers. This will be developed collaboratively with each business unit and will ultimately allow each employee to clearly see how the work they do contributes to Scottish Water's Service Excellence overall. The Model will also enable us to shine a light on much of the positive feedback and accolades we proactively receive from our customers.

5 Conclusion

It is vital to the success of the SR27 Business Plan and our Long-Term Strategy that our customers trust us and see themselves as partners with a personal share in all we do. We will continue to foster a relationship of openness and transparency with our customers and communities, so they understand who we are, what we do and how we do it.

Scottish Water's journey to Service Excellence will never stand still. As customers' and communities' expectations increase and technology advances, we will continue to strive to be the best we can be for our customers and communities, listening, monitoring and adapting to meet their growing expectations. We are proud to serve our customers and the communities of Scotland and will never stop working to make it as easy as possible for them to contact us in the way that suits them and keep them informed as their journey progresses. We will keep our promises and work together as One Team for the benefit of all our customers, to help them, their communities and Scotland flourish.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

People

February 2026

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1 Executive Summary

Scottish Water's People Strategy for SR27 is designed to enable our workforce to deliver our most ambitious business plan to date. Building on the strong foundations of SR21, this strategy sets out how we will equip our people with the skills, leadership, and working environment needed to thrive and deliver in a rapidly changing world.

Our People strategy has three pillars:

- **Clear, Capable People:** We will ensure every colleague understands their role and how they contribute to our purpose, is equipped with the right skills, behaviours and mindset, and is supported to grow, adapt and perform their best for our customers, communities and the environment. Investment in technical skills and knowledge, digital capability, and strategic resourcing will enable us to meet evolving business, customer and community needs.
- **Inspirational and Empowering Leadership:** We are committed to developing leaders who motivate, engage, and empower their teams. Through a new leadership blueprint, defined talent management and succession planning, and insight-driven people practices, we will create a strong and flexible leadership pipeline that is equipped to perform well today and in the future.
- **Inclusive and Engaging Environment:** We will foster a culture where everyone feels valued, included, and able to contribute their best. We will focus on diversity, inclusion, supporting equality and wellbeing. This will ensure Scottish Water remains a great place to work.

The strategy aligns with our new operating model and addresses future demands, including digital transformation, climate adaptation, and the need for new partnerships and skills.

It is a commitment to our people, who proudly work to provide the excellent water and waste water services that are essential to everyday life for households and businesses across Scotland. It will enable us to create safe, healthy and productive environments which deliver Service Excellence, Great Value and Financial Sustainability and help us to go Beyond Net Zero for Scotland — now and into the future and be a critical enabler in achieving the outcomes in the SR27 Final Business Plan.

Ahead of the Delivery Plan, and the start of SR27, we will refine our plan to deliver a Technical Skills Academy Centre of Excellence, testing its value for money against other transformation initiatives. This will support a range of activities such as the management of our distribution systems: helping to reduce leakage, interruptions to supply, water quality issues.

2 Background

2.1 Building on SR21 Foundations

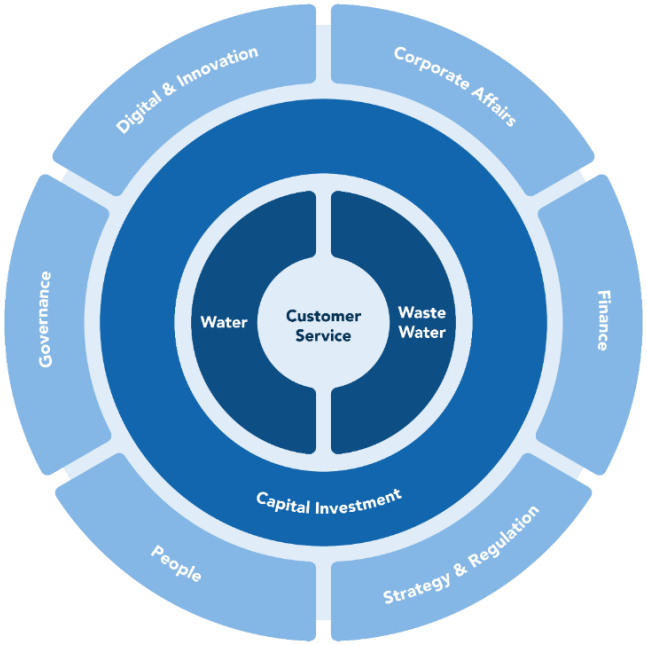
Scottish Water has successfully delivered key people initiatives to enable business delivery and outcomes. Notable deliverables during SR21 include:

- **Strategic Direction & Communication**: We increased colleague connection with our strategy and the part they play in achieving our purpose by 24% since 2023 from 46% to 70%, through introducing 'Plans on a page' and the 'Connecting with Purpose' All Employee Events.
- **Leadership Development & Talent**: We strengthened leadership pipeline, with almost 50% of our senior leaders progressing from our future leader initiatives. Our recent Take the Lead programme resulted in 50 employees moving into first-line leadership roles from a pool of over 300 participants, with many more prepared to step into leadership positions as opportunities arise.
- **Technical Skills Academies**: We have built future skills in water distribution, water resources and treatment through our Water Academy. This resulted in the recruitment and training of 207 apprentices, retaining 87% of them. We also launched Customer Experience and Digital Skills Academies to enhance our service and digital capabilities.
- **Collaborative Skills Partnerships**: We met rising capital investment and resourcing needs by launching a sector-wide careers site through the creation of a Collaborative Skills Steering Group with our Engineering Construction Delivery Partners. This created a unified brand to attract talent to the industry and address future skills challenges,
- **Performance Management**: We increased clarity and consistency by successfully launching and embedding our 'My Story' performance management approach, with 96% of our people having objectives set in 24/25. This encourages open performance dialogue, supports learning, and links contribution ratings to pay progression for those in our upper grades. Employees are empowered to discuss achievements, raise issues, and focus on delivering and learning, strengthening their connection to our purpose and strategic direction.
- **Wellbeing & Inclusion**: Our Public Sector Equality Duty (PSED) outcomes have focused on youth opportunities, workforce and leadership diversity, and high engagement among under-represented groups. Achievements include Investors in Young People Platinum standard, Neuro Champion status, and multiple awards for wellbeing and flexible working. We support inclusion through 10 active Belong groups and a Diversity, Equality & Inclusion dashboard for leadership.
- **Reward Architecture**: We enhanced consistency, transparency and clarity and provided a solid foundation for future career development by introducing a new reward framework with updated job profiles, a role catalogue based on 'Hay Evaluation', market-aligned salary grades, and transparent pay progression for all colleagues.

2.2 Our New Operating Model for SR27

Our existing organisational structure has supported strong performance and effective delivery to our customers, communities, and the environment since it was introduced in 2013.

To prepare for the evolving needs, a new operating model is being implemented ahead of SR27. This is designed to protect and preserve successful elements of our existing structure while positioning us to effectively meet emerging challenges.



We are a water and waste water business, serving the people of Scotland. In our new model we are bringing together planning, maintenance and operations into two new Water and Wastewater Directorates and creating a new Customer Service Directorate. Holding accountabilities across the entire end-to-end process for water and waste water will help us to be ready and fit for SR27. Insight from other organisations and our own transformation work, shows that if we align 'end to end' processes in one place we can deliver faster, at lower cost and unlock innovation. And, by bringing together our core external and internal customer service functions into a new Customer Service Directorate, we can continue to champion the customer voice and aim to further improve the quality of service whilst also ensuring value for money.

Figure 1: Scottish Water's New Operating Model

In our new structure, the operating model will:

- Put Scottish Water in the best place to deliver our biggest ever multi-billion-pound Business Plan in SR27,
- Enable us to take on an increased role in delivering waste water services, as existing Private Finance Initiatives ('PFI') become part of Scottish Water operation, bringing those teams into the Scottish Water family, and
- Help us to further improve customer and community experience of Scottish Water and maintain our position as the UK's joint most-trusted utility.

We will continue to deliver on our three Strategic Ambitions — Service Excellence, Beyond Net Zero Emissions, and Great Value and Financial Sustainability — while upholding the distinctive character of Scottish Water.

The adoption of this new operating model will build on successes to date, enhance organisational creativity and shared responsibility in achieving our outcomes. This approach will strengthen Scottish Water to be an even better place to work, empowering our people to develop, flourish and deliver their best for our customers, communities and environment.

3 The Focus of our People Strategy for SR27

3.1 Our Approach

We have focused our People Strategy vision statement into three people strategic objectives, initially created in 2024. These will remain our pillars for SR27, building upon our proven track record of delivery in SR21 and aligning to the needs of SR27.

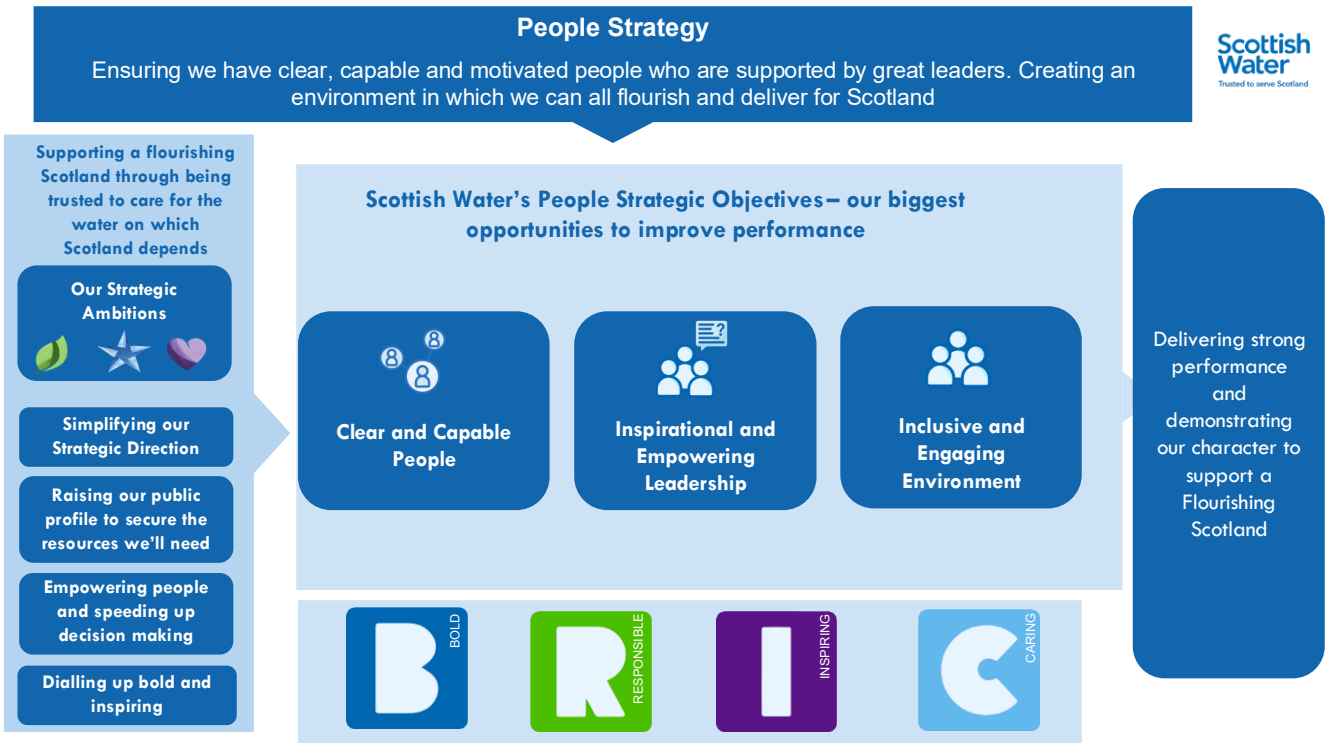


Figure 2: Summary of our People Strategy

3.2 Our Key SR27 Pillars

3.2.1 Clear and Capable People

Our success is founded on our people. It is critical that they are clear about where they add value and are capable of all we ask of them. In SR27 we will:

- **Ensure our organisation is designed for success:** We are implementing our new Operating Model prior to the start of SR27. This will deliver the principles of a providing a customer focus, creation of clear accountabilities and ownership, delivery of best value, defined capabilities, and simplicity in how we operate. During SR27 we will maximise the efficiency and productivity that this model can drive. We will do this by ensuring all operating model changes are governed robustly. Reward mechanisms will ensure team and role changes are fair, considered and consistent across the organisation.

- **Create a strategic workforce plan across Scottish Water and our partners:** We will create a strategic workforce plan to ensure we are well placed to deliver throughout SR27 by having the right number and mix of people, with the right skills, in the right roles, at the right cost at the right time. We will forecast future needs, identify gaps, and design and deliver strategies to address those gaps, looking at Scottish Water, our partners and the external labour market. This will help us build on our work in early careers making the

most of apprentice and graduate possibilities. This proactive approach will mean we are well placed to support business objectives and maintain a competitive edge.

- **Strengthen our performance and productivity:** We will have a strong performance culture through further embedding of our 'My Story' Performance Management process and management practices. Our focus will be on establishing consistent quality standards for all objectives and learning plans. Underperformance will be identified, with support provided to enable improvement. This approach will support sharing of best practice and improved productivity. We will continue to strengthen the alignment between individual roles, team outcomes, departmental goals, through our 'Plans on a page' and their broader contributions to our strategic objectives and to Scotland as a whole.

- **Deliver an Enterprise Model:** The creation of our Enterprise Model requires a different approach to partnering and working within Scottish Water. This creates learning opportunities and will require those in the Enterprise and Scottish Water to think differently about the behaviours and capabilities for success. It is an important change that will act as a positive disruptor and build on our experience of working collaboratively with partners. It will provide an environment for us to test and learn from different approaches that may have wider applicability in Scottish Water.

- **Technical skills:** We will develop the skilled and competent resources required to deliver the proposed £686m investment that is planned in water distribution and demand management and the proposed £126m of investment planned in strategic water transmission infrastructure. A new centre of excellence and purpose-built training facility will be essential to develop the skills that we need in a safe, controlled and simulated training environment, preventing the potential for any negative impact upon our customers supplies and water quality during training activities.

- **Digital Productivity and Confidence:** We will develop a workforce that is productive, adaptable, and confident in digital environments, empowering staff to create value. To achieve this, we will use new technologies to enrich our job roles and are actively enhancing our people's digital abilities and confidence. This strategy not only improves their work and supports our business goals but also fosters employee wellbeing and provides vital skills for living in a digital age. By integrating emerging technologies such as AI and embracing digital innovation throughout our operations, we ensure our employees are prepared to serve customers, succeed, and drive success across the organisation.

3.2.2 Inspirational and Empowering Leadership

Our people are key to delivering our success. Our leaders are instrumental in our employees' experience, and great leadership is essential for the successful and sustainable delivery of the outcomes in the SR27 Final Business Plan. We will focus on ensuring our leaders are clear and enabled to drive our business success. In SR27 we will deliver:

- **A Leadership Blueprint.** Scottish Water is introducing a clear and consistent Leadership Blueprint. This will provide clarity and consistency, provide targeted development, support feedback, and recognise outstanding practice in our leadership community. This will support all leaders to deliver strong and sustainable business performance and give a clear framework for developing talent for future leaders and creating career paths and succession plans.

- **Talent Management:** Our workforce planning shows that due to strong retention many of our long-standing leaders may conclude their careers with us during SR27. On top of robust workforce planning, we will ensure effective leadership transition and knowledge transfer by building a diverse pipeline of future leaders. We will review capabilities and design targeted talent and leadership programmes aligned to leadership pipelines — an approach that has served us well during previous periods of transition and for which planning is well underway. These programmes will include structured mentoring, transparent career pathways, and targeted development initiatives to accelerate readiness for leadership roles. We will also embed diversity and inclusion principles at every stage, actively seeking to broaden the range of backgrounds and perspectives represented in our leadership cohort. These next-generation leaders will need to be significantly more digitally proficient, enhanced by deeper people analytics now available through our corporate systems.

- **People Data and Insights:** Effective people management relies on access to accurate and timely data. Dashboards will allow corporate people data to be made available to leaders throughout the organisation, enabling them to determine areas of focus within their teams. This approach will allow leaders to review information such as team headcount, attrition, absence, performance metrics, required learning, survey data, and other relevant information necessary for effective leadership.

- **People Policies and Processes:** We will transform our people policies and processes to be simpler, more agile, and focused on increasing productivity. By streamlining our systems, we empower leaders to confidently make decisions and swiftly adapt their teams to meet business needs. This bold approach enhances the effectiveness of our core people systems – and delivers a seamless employee experience. Leaders will receive clear, actionable guidance outlining where they have the autonomy to optimise team structure and where formal approval is necessary, ensuring clarity and improved outcomes across the organisation.

3.2.3 Inclusive and Engaging Environment

It is important that our people thrive and strive at work. This means setting the right culture throughout the organisation and providing the right tools for the job, while ensuring a productive, diverse and inclusive workplace.

- **Diversity, Inclusion and Wellbeing:** In SR27, we will deliver our 2025–2029 PSED Outcomes and develop future goals to meet the needs of the diverse customer and community base we serve. We will move towards our workforce reflecting Scotland's diversity, particularly for women, minority ethnic groups, and disabled people. We will focus on creating an inclusive employee experience and increasing opportunities for individuals facing barriers due to background or location, especially at early career stages. We will enhance our Occupational Health, physiotherapy, and employee support programmes with a strong emphasis on wellbeing, offering multiple avenues for employees to access help when they need it most.

- **Branding and advocacy:** Attracting and retaining the right talent is essential for Scottish Water to remain resilient as we deliver for our customers and communities. A strong, authentic employer brand not only helps us compete for top candidates but also boosts pride and engagement among our current employees. By strengthening our Employee Value Proposition and clearly articulating what it means to be part of our organisation, we will foster a sense of pride and belonging. This approach will also raise our profile in the wider public, positioning Scottish Water as an employer of choice and a valued contributor to society. By enhancing both our internal engagement and external reputation, we will secure the talent and support needed to achieve our ambitions.

- **Strengthening engagement:** We will actively listen to, and value the perspectives and lived experiences of our people through great conversations, empowered employee networks, strong and visible leadership, direct engagement, trade union involvement, surveys and roadshows, ensuring every voice is valued. This inclusive feedback drives decisions that truly meet our workforce's needs. As a result, our employees not only feel valued and listened to, but their contributions actively shape the workplace. This drives higher motivation, increased productivity, and strong alignment with organisational goals, ultimately underpinning our continued success.

- **Embedding consistent reward practice, moving towards 'Total Reward':** We are committed to sustaining a fair and transparent reward framework, adopting a progressive approach to annual pay awards. By enhancing employees' awareness of their total compensation package, we aim to ensure our people truly recognise the breadth and value of the benefits provided. This strategic focus not only maximises our return on investment in our workforce but also enables us to unlock greater value by fostering stronger engagement, attraction, retention and drive a performance culture. Additionally, we will undertake a comprehensive review of our incentive plan structures for SR27, working collaboratively with government and regulators to ensure that all reward mechanisms are closely aligned with delivering meaningful outcomes and operational efficiencies for our customers.

- **Delivering 24/7:** To create a resilient water and waste water service and exceed customer expectations, it is imperative that we deliver reliable 24/7 service. As we continue to standardise our assets and embrace advanced digital management, we must take a strategic approach to reviewing our operational delivery model. This involves evaluating whether our existing framework of core hours supplemented by standby arrangements remains fit for purpose in a changing environment. By exploring innovative work patterns, that allow us to manage the assets proactively we position ourselves to be resilient in the face of a changing climate, enhance employee wellbeing, and maximise productivity.

- **Property provision:** Scottish Water's property portfolio is being adjusted to support spaces for connection, collaboration, learning, carbon reduction aligned with our net zero route map, and consolidation of underutilised office areas. The intention is to develop a property portfolio that aligns with current and future working methods. We will pay particular attention to our welfare facility provision, which may necessitate workplace investments in response to changes in Equality Legislation. The aim is to provide environments that accommodate individual differences and enable all employees to feel safe and included.

3.3 Confidence in our People Strategy

Our longstanding commitment to the wellbeing and development of our people, has enabled us to create a high-performing environment with an engaged workforce. As we look ahead to SR27, we remain committed to championing our people, recognising they are the driving force behind our ambition and future success.

The initiatives underpinning our People Strategy are informed by our SR27 objectives, the capabilities required to achieve these goals, and a comprehensive understanding of our people's needs. Utilising our main Technical Appendices, we have identified essential capabilities and aligned critical initiatives necessary for cultivating a skilled and motivated team, supported by effective leadership. This approach fosters an environment where all individuals can thrive and contribute to delivering value for Scotland.

4 Implementation

We will continue our well-established governance rhythms, reporting and communication mechanisms, which we will continue to utilise throughout SR27. These include:

- **Regular Board meetings on People Strategy, Reward and Talent:** Board actively engaged throughout the year on aspects of People Strategy. For example, talent reviews to align development with strategy, succession, and risk management. The Remuneration Committee sets the executive pay and compensation framework.

- **An Executive Leadership Team (ELT) approved People Strategy, and People Business Partners supporting implementation:** Our ELT actively sponsors key people initiatives and works with People Business Partners to implement the People Strategy within their directorate.

- **Leadership focus:** Each directorate holds performance reviews, where standardised key personnel metrics are presented and discussed to ensure that the People Strategy is incorporated into broader business performance considerations. Leaders drive performance and productivity through 'My Story'. This includes setting annual goals, a mid-year review, and a year-end performance assessment. Objectives are tied to each Directorate's 'Plan on a page', ensuring alignment with the overall vision.

- **A celebration of people's achievements through recognition:** Scottish Water aims to set clear standards and recognise employee achievements through team celebrations, corporate awards, long service recognition, and internal customer service awards. These initiatives help boost morale, acknowledge hard work, and create memorable experiences.

- **A people section in our Annual Report and Accounts:** Each year, we report on our People Strategy and note key achievements in our Annual Report and Accounts, Performance and Prospects.

- **Our people activities will be audited as required by the Audit Committee:** We conduct audits as scheduled with our Audit Committees to ensure compliance, promote equality, and manage risks proactively.

5 Conclusion

Our people are at the heart of Scottish Water's success and our People Strategy and key priorities reflect this, focusing on delivering for today and ensuring we have people who will deliver our long-term commitments and aspirations.

As we complete SR21 and approach SR27, we are preparing to meet significant challenges with confidence and ambition. We will ensure Scottish Water remains a great place to work – where our colleagues of today and the future will flourish.

Our People Strategy pillars: clear capable people; inspirational and engaging leadership; and inclusive engaging environments will enable us to build an organisation characterised by strong employee engagement, advocacy, and a performance-driven culture supported by a robust strategic workforce plan. Our leadership aims to inspire the best from our teams, cultivate an inclusive environment, and enhance the benefits of increased diversity. This strategy not only strengthens Scottish Water but also positively impacts our partnerships and informs better decisions for customers, communities, and the environment.

Through the commitment of our people, we will uphold the trust placed in us to serve Scotland ensuring our actions today lay the foundations for future generations to flourish.

Scottish Water
Trusted to serve Scotland

BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Digital

February 2026

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1 Executive Summary

Digital technology is core to the delivery of Scottish Water's Strategic Ambitions: *Service Excellence*, *Beyond Net Zero Emissions*, and *Great Value & Financial Sustainability*. Digital technology, data and analytics now underpin nearly all critical business processes and customer interactions. To support the SR27 Final Business Plan, our Digital Strategy pivots from foundational cloud migration to becoming a direct enabler of business transformation, achieving better business outcomes at lower cost and carbon. This Technical Appendix sets out the investments, capabilities, and governance we need to deliver that shift securely.

Our SR27 digital investment plan will modernise our platforms, improve operational resilience, protect against evolving cyber threats, and accelerate the intelligent use of data, analytics and artificial intelligence (AI) to support better decision-making and service delivery. This includes full migration from legacy data centres, enhancement of our cloud-native platforms, supporting secure convergence of Information Technology (IT) and Operational Technology (OT) systems, and the adoption of more efficient agile, DevOps-led delivery practices.

Scottish Water are also preparing for the future, with targeted investment in artificial intelligence, secure digital platforms, and data-driven operations that will underpin greater efficiency, automation, and customer satisfaction. Our transition to a more adaptive operating model, supported by a new partner ecosystem from 2026, ensures we have the capability, capacity, and culture to deliver at scale and pace.

Modern water and waste water assets increasingly come with remote control, automation and sensor led intelligence on their condition and performance as standard. As our assets and networks become increasingly digitally enabled - our ability to design and operate them securely must keep pace. Security will be embedded by design, not bolted on after the fact. At the same time, we will empower our people through tools like Microsoft Copilot and citizen development platforms, enabling innovation to happen at all levels of the organisation, safely, responsibly and at scale.

To deliver this, we are investing in:

- **Robust foundations**: completing our cloud transition, securing our systems, and managing technology obsolescence through a structured, risk-based approach.
- **Smarter operations**: enabling real-time, data-driven automation of infrastructure (new and retrofitted) by securely integrating IT and OT and deploying edge computing technologies.
- **User-centred innovation**: enhancing customer experience, social inclusion and employee productivity through intuitive platforms, better data, and responsive digital services.
- **Agile and DevOps practices**: delivering value incrementally and securely, supported by strong governance, internal capability building, and adaptive delivery models.
- **Resilience and readiness**: staying ahead of evolving cyber threats through security investment and education. We recognise that this alone cannot remove the risk and therefore we will continue to bolster our cyber response and recovery capability. We are also preparing for future cryptographic standards, including the quantum era.

The SR27 Final Business Plan represents a decisive shift. We are moving from enabling digital capabilities to delivering better business outcomes at lower cost and carbon through them. This plan builds on the progress and lessons of SR21 and reflects a maturing digital function - one that is now integral to Scottish Water's operational and strategic success.

We will invest a total of £226m (2024/25 prices) over 6 years to deliver this plan. £107m of this is tier 2 with the remainder accounted for as 'Cloud arrangement costs. Table 1 below summarises our key investments, alongside the projected benefits.

Table 1: Our SR27 Digital Investments

Investment Summary	Projected Benefit
Efficient Planning & Delivery Maintain business critical system availability, access and performance; optimise and automate repeatable process to unlock business value wherever possible.	Sustain operational efficiency, support secure and integrated service delivery, and ensure core systems remain reliable, scalable, and aligned to Scottish Water's evolving digital and organisational needs. They will also future-proof key platforms by addressing contract, performance, and architectural risks.
Customer Experience Management Anticipate and fulfil customers' needs ensuring our customer engagement channels are always available.	Modernise our customer-facing and regulatory platforms, ensuring security, compliance, and integration with core systems. These investments will improve customer experience and social inclusion, maintain public trust, and support efficient service delivery.
Intelligent Decision Making Exploit our data and leverage advanced analytics to deliver actionable insights and comply with Regulatory and Legislative drivers.	These investments will maintain core operational and data platforms, reduce technical debt, enable efficient data processing and support secure, integrated, automated and future-ready digital operations across telemetry, asset management, analytics and artificial intelligence.
Ring-Fenced Commodities & Infrastructure Maintaining essential business continuity through end user devices, communication, productivity and collaboration solutions	These investments will enable secure, efficient management of our cloud estate, improve tooling for digital delivery, and ensure our end-user technology remains current, supported, and aligned with modern working practices.
Risk & Security Management Always protect our customers, people and assets from Digital Cyber threats and process data in a legal, fair, transparent and ethical manner.	These initiatives will strengthen our data governance, security, and compliance posture, while modernising key business and technical platforms to adapt to future regulatory, operational, and risk management needs.

*AR3: Asset Repair, Refurbishment, and Replacement

2 Background

Key Points:

- Our investment in cloud technology remains on track – and we have received strong external endorsement to our approach on cyber.
- However, we know that that digital landscape is evolving rapidly, driven by the pace of technological advancement and changing business needs within a more complex and sophisticated cyber threat landscape.
- To stay ahead, we are adopting a forward leaning, ambitious approach: using Digital as a driver of innovation, lower costs *and* a lower carbon footprint.

2.1 Context

Scottish Water has developed a bold, new Digital Strategy, demonstrating our commitment to leveraging technology, data and analytics to accelerate us towards our Strategic Ambitions. Our previous Digital Strategy of transitioning vulnerable legacy applications to secure cloud technology shifts to one which is an essential and integral part of delivering improved business outcomes - addressing the challenges of climate change adaptation and asset deterioration at affordable customer prices.

We rely on a broad array of technologies not only for achieving service excellence, environmental sustainability and great value, but also for maintaining resilience and security in a rapidly evolving digital landscape.

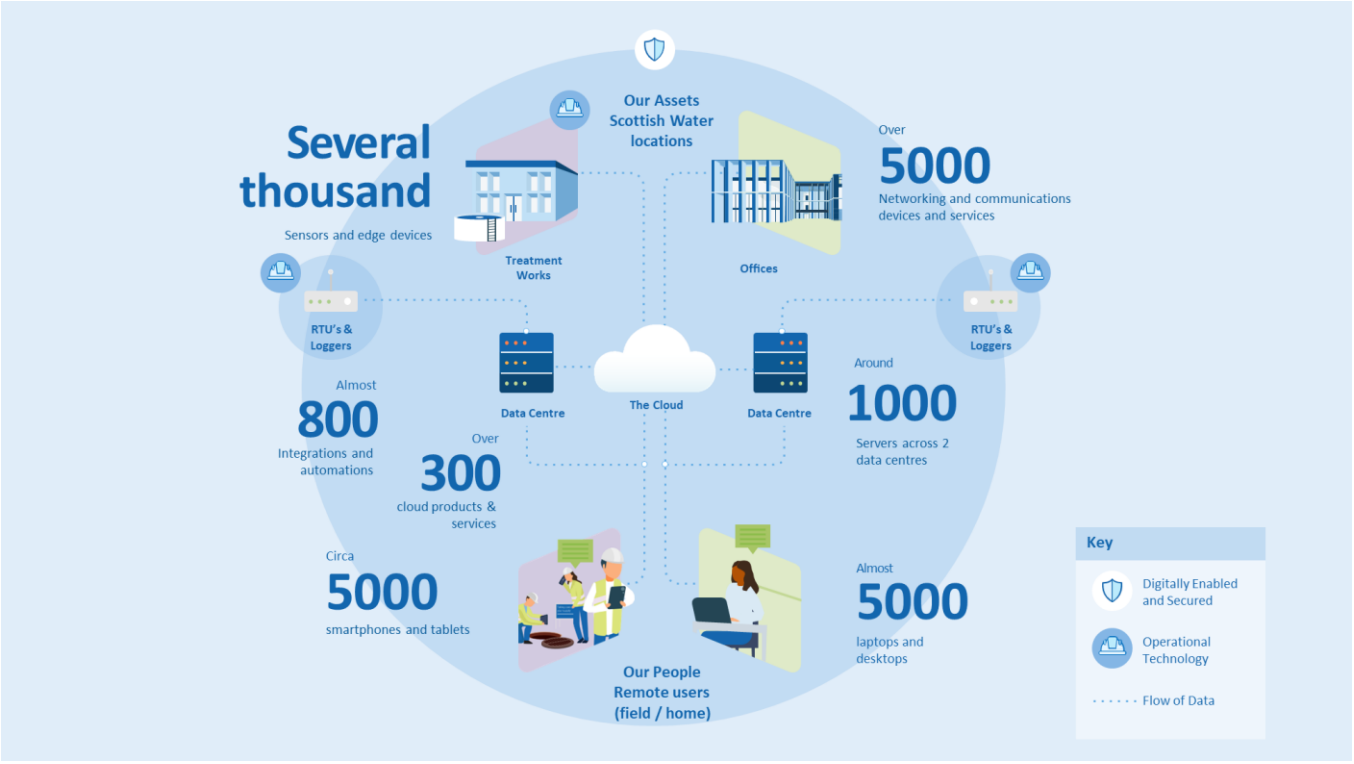

Figure 1: Our Digital Assets

Over recent years we have made considerable progress in addressing outdated and vulnerable technology as we move from largely on-premise, customised and unsupported applications to those that exploit the scale, security and flexibility of cloud computing.

As this shift nears completion, it is time to adopt a more ambitious approach. Our new Digital Strategy therefore positions digital as a driver of innovation within our organisation, delivering business outcomes at significantly lower cost and carbon footprint. This transformation, spurred by rapid technological advancements, necessitates fresh thinking and the development of new capabilities to not just adapt, but to lead and disrupt positively and responsibly.

2.2 Our Digital Progress

Scottish Water's cloud migration journey is in its final stages, aiming for full transition in 2027 and the decommissioning of our legacy on premise data centres. This includes the migration of remaining critical applications such as our Asset Management system, Telemetry platform, and Laboratory Information Management System. These foundational shifts not only modernise and better secure our estate but also unlock greater agility, resilience, and scalability.

Scottish Water are also progressing well with our Public Switched Telephone Network (PSTN) Migration programme, replacing over 4500 legacy telephony connections to operational assets with more reliable and modern communication solutions. This is necessitated by BT's withdrawal of PSTN services in January 2027. Importantly, it also acts as an enabler for more intelligent, responsive operations across our asset base.

Across the board, our technology investments remain on track and within the agreed investment envelope, enabling us to meet critical infrastructure goals while freeing up capability and focus for wider digital transformation efforts. Our SR21 digital portfolio is illustrated below:

Asset Management Modernising and transforming how we manage our assets across the business.	**Digital Workplace** Modernising how we work and collaborate across the business from any location.	**Operational Technology** Addressing obsolescence and improving visibility of our assets to predict, prevent and minimise risk.
Infrastructure Refreshing and extending our infrastructure, increasing resilience and strengthening operations.	**Cyber & Security** Ensuring our business is secure, continually adapting to increasing cyber risks.	**Data Regulation** Ensuring our data is secure and access to our corporate applications is controlled.
Stand Alone Projects Discrete projects with benefits not aligned to larger programmes shown here.	**Cloud Evergreen** Ensuring our cloud systems are kept up to date and in support.	Projected out-turn of SR21 digital investment is £277m in 2023/24 prices.

Figure 2: SR21 Digital Portfolio

Service performance remains strong, with device experience trending above industry standards and a continued reduction in customer-impacting service interruptions. This reflects progress in our drive toward zero preventable incidents, supported by more effective self-service and

automation. A decline in critical Priority 1 incidents further demonstrates the growing resilience of our business systems and telemetry infrastructure.

Employee satisfaction also remains high. Digital improvements shaped through colleague feedback have made tools and services more intuitive, connected, and responsive - transforming day-to-day experiences for our people.

In cybersecurity, Scottish Water's investment and education programmes has led to zero impactful incidents to date, and our move toward full cloud integration has contributed significantly to that. With 80% of IT systems already cloud-based, we are leveraging the advanced, embedded security controls offered by our cloud providers to secure our estate more effectively than was possible with traditional on-premises infrastructure.

To sustain and build on this, we continue to test and evolve our approach. Scottish Water has been proactive in conducting regular internal and external cyber audit and assurance activity to verify compliance, assess maturity, and identify areas for improvement. This includes independent assessments aligned with national guidance and industry standards. We also recognise that technology and education alone cannot eliminate the risk of cyber-attack and so we will continue to strengthen our response and recovery playbooks and business continuity plans.

We've recently received strong external endorsement of our cyber posture:

- In February 2025, the National Cyber Security Centre (NCSC) described our structured Cyber Resilience Plan update as the best they've seen to date in the UK water sector and confirmed they had no concerns with our maturity or approach.
- In January 2024, an external Drinking Water Quality Regulator (DWQR) audit of our Network and Information Systems (NIS) compliance praised our security culture, open engagement, layered defence approach, awareness of emerging threats, and our progress on asset management and risk understanding.

This positive feedback from both the NCSC and DWQR reflects not only the strength of our current controls but also our cultural maturity - a willingness to be transparent, to listen, and to continually improve.

2.3 Drivers for Change

Our strategic projections have highlighted climate change, asset deterioration and affordability as our greatest challenges. We recognise that overarching solutions to these will span a 25-year horizon as part of our Long-Term Strategy, with technological transformation being a key driver. Our Digital Strategy will start to deliver improvements within a shorter timeframe, aligned with what is reasonable for a technology horizon and in conjunction with detailed planning for SR27, enabling us to make impactful changes and drive progress more rapidly.

Our current operating model and partnerships, while effective, were primarily designed to address legacy needs, early large-scale cloud shifts, and the initial stages of our transformation. Instead, we can now put more emphasis on agile delivery methods that yield benefits and outcomes earlier and more frequently for our customers and colleagues. These practices are also better suited to our adoption of automation, advanced analytics and artificial intelligence (AI) that are setting new standards of efficiency and service excellence. Our new strategy will require further development of these capabilities and access to appropriate skills in the market.

Historically, Operational Technology (OT) and Information Technology (IT) were separate, ensuring our water and waste water assets were protected from cyber threats. The convergence of IT and OT has accelerated as modern water assets increasingly come connected to the internet using a growing array of sensors and driven by opportunities to enhance service, reduce cost and carbon emissions via an intelligent asset base. New strategic partnerships that seamlessly integrate these complex and high-scale digital innovations with engineering practices across capital investment are essential. These partnerships will align with the DV4 'enterprise' model, ensuring security by design and NIS compliance.

As a measure of the scale of potential change here, Gartner, a leading global research and advisory firm, predicts that by 2026 over 70% of investments in new industrial assets will incorporate intelligent asset design features, e.g. remote-control capability.

2.4 An Evolving Digital Landscape

Cutting-edge technologies and emerging threats, together with a constantly evolving technical landscape, present both challenges and opportunities for Digital services and products. Alongside changing business needs, financial pressures, and sustainability goals, this creates a dynamic environment in which our strategy must remain adaptable. Our current SR27 projections reflect what we know today, including a mix of initiatives that are funded and others that are not yet funded but may become necessary as the period progresses (e.g. post-quantum encryption). It is therefore Digital's intention to review and refine our strategy at regular intervals throughout SR27 to ensure it continues to reflect the organisation's needs and external developments.

In the technology arena, cutting-edge developments like Machine Learning (ML)/AI, Edge Computing, IT/OT convergence, Digital Twinning, and Quantum Computing can empower our people and partners:

- **Artificial Intelligence, ML & Advanced Analytics** will revolutionise how we work. It has the potential to help us work smarter by automating decisions without losing accuracy and reliability, improving productivity. AI can completely transform our processes and data journeys, helping us to make decisions with unparalleled precision. We will maximise the value that AI can deliver in a way that is safe, transparent, ethical and fair, whilst abiding by current and emerging legislation. We also recognise that effective engagement with our colleagues and Trade Unions is vital to securing enthusiastic commitment to more efficient ways of working.
- **Edge Computing** lets us handle data right where it's created instead of sending it far away to be processed. This can help us work more swiftly and smartly, letting us analyse information on-site at places like treatment works, which saves time and makes our processes more efficient. This growing number of devices will require secure management and maintenance to ensure they remain up-to-date and fit for purpose throughout their lifespan.
- **IT/OT Convergence** helps us better understand the health and performance of our assets, we need smooth and immediate data transfer between our operational assets and IT systems. To tackle this, we must bring in new technology that will let our assets and systems communicate seamlessly and securely. This means faster and more reliable sharing of information and new capabilities like remote control making us more efficient and helping us deliver better more resilient services to our customers and communities
- **Digital Twinning**, joining-up of technology, data and analytics through digital twinning can assist us in digitally rehearsing construction and commissioning, enhancing operational efficiency, reducing our carbon and avoiding potential issues through scenario planning.

- **Quantum Computing** is an advanced type of computing that can solve large, complex problems simultaneously and at speeds completely unachievable by conventional computers. Potential applications include helping us get better at treating water, understanding the effects of climate change, or finding leaks faster. Quantum computing promises to supercharge our operations, not only making them smarter, but also more secure in an ever evolving and volatile digital landscape. Whilst it's not mainstream just yet, it will become increasingly important to follow best-practice cyber security techniques to continue to safeguard our customers, people and assets from digital threats.

3 Our Digital Strategy

Key Points:
• We developed an internal 5-year Digital Strategy in 2024 which has continued to evolve in line with our development of our Long-Term Strategy and SR27 Final Business Plan objectives.
• Our Digital Strategy in an integral part of achieving Scottish Water's Strategic Ambitions. It will deliver better business outcomes for customers at lower cost and carbon by empowering our employees and partners, enhancing decision making through data, driving efficiency through innovation, and effectively mitigating the growing threat of cyber-attacks.
• This Digital Strategy for SR27 is informed by and fully aligned to our SR27 Final Business Plan outcomes.

3.1 Overview

Our strategy is to digitally lead Scottish Water, delivering better business outcomes through solutions and innovation that add value, are secure, easy to use and always on. This represents a significant transition from primarily de-risking our estate and digitally enabling our workforce, to being an integral part of business strategy in pursuit of supporting a flourishing Scotland. This new direction leverages agile execution and the responsible disruption of our business practices. It will enhance service delivery, drive smarter investment decisions, and help tackle affordability and environmental sustainability challenges.

Figure 3: A snapshot of our Digital Strategy

To do this, our Digital Strategy pivots on four foundational pillars / strategic objectives designed to redefine how we operate and deliver value:

1 **Empowerment and Effectiveness:** We are committed to empowering our employees and partners by equipping them with the right skills, along with cutting-edge tools and technologies, using digital to enhance job satisfaction and effective collaboration. For instance, our successful trial of Copilot for Microsoft 365 has led to improved productivity, allowing staff to automate routine tasks like email management and document creation, thus focusing more on strategic initiatives.

2 **Data-Driven Insights:** Enhancing decision-making through data-driven insights and advanced analytics is key to our strategy. This emphasises the importance of data quality, management, design, advanced analytics capability and literacy. For instance, by implementing real-time analytics and control systems on waste water treatment works and pumping stations, we have maximised the value of our data and improved the energy efficiency of our assets.

3 **Innovation and Efficiency:** Our focus on innovation and automation is geared towards streamlining processes and boosting productivity, e.g. by using AI to read meters and automate recording, we've enhanced operational efficiency. This application has not only accelerated data collection and analysis but also ensured accuracy and better customer satisfaction; and could be scaled into many other areas where we collect data.

4 **Security and Protection:** Recognising the growing threat of digital intrusions, such as AI-generated deep fakes, a major focus of our strategy has been to safeguard our business, customer data, and operational assets through robust cybersecurity measures. Our ethical hacking initiatives have proactively identified and addressed vulnerabilities, helping to educate our people and fortifying our defences before threats could materialise, thereby maintaining the integrity and reliability of our operations and securing customer trust. We also regularly simulate cyber-attacks (e.g. ransomware) at both Board and Operational level, to aid faster response and recovery while maintaining public trust and confidence.

3.2 Strategy in Action

Key elements of our new Digital Strategy have already been put into practice. For example, since September 2023, Scottish Water has been using Microsoft Copilot for Microsoft 365, a generative AI-powered assistant aimed at enhancing productivity within Microsoft applications like Outlook, Word, PowerPoint, Excel, and Teams. Now in use across circa 1800 employees, we have exploited the tool's potential to streamline tasks, reduce time spent on repetitive activities, and improve work quality. Significant time savings have been realised across all directorates, averaging a 4.7% to 6% reduction in time spent per user per week.

Unlike previous AI technologies that required expert knowledge to implement and deliver value with, generative AI is more accessible. Tools like Microsoft Copilot, ChatGPT and many more can be used with natural language, making powerful features available to a broader audience, including those without specialist skills.

As early adopters, we've also taken a leading role in implementing responsible AI. We have pioneered the development of internal AI guardrails and data ethics frameworks, ensuring that AI is deployed safely, transparently, and in alignment with our values. This includes controls on how AI interacts with sensitive data, alignment with our cyber and privacy standards, and rigorous review of potential use cases to assess risk and fairness. Crucially, we are also factoring in the carbon impact of large-scale AI investments, recognising that advanced AI workloads can be energy intensive. Our aim is to ensure that any expansion of AI capability is not only productive - but sustainable and ethically grounded.

In a recent study, McKinsey projects that by 2030, approximately 27% of current working hours in Europe could be automated, driven by advancements in generative AI. If achieved, this could lead to significant value for Scottish Water.

Our Digital Strategy is also becoming an integral part of delivering better business outcomes against some of our biggest challenges, as the following examples demonstrate:

- **Transforming Waste Water Services:** Advanced sensors in our waste water network have enabled us to detect blockages or issues and prevent impact to customers or the environment. We are seeing a circa 25% reduction in pilot areas. We are now maturing this capability and scaling up to cover 16 drainage areas, over 20% of Scotland's population, with the aim of progressively eliminating pollution and flooding due to 'other causes.'
- **Empowering Customers and Communities:** Digital capabilities can help inform, educate and aid changing consumer behaviour to lower water consumption through smart meter monitoring and data, while digital platforms offer customers real-time information during service interruptions, improving their experience and satisfaction with Scottish Water.
- **Transforming Our Emissions:** We are expanding our use of digital portals and artificial intelligence to optimise energy use at our exemplar pumping stations and waste water treatment works.
- **Consistently Excellent Water Supply:** Through expanding our intelligent asset base, such as the advanced water monitoring systems in Inverness, we have reduced water leakage and demand sufficiently to defer the need for significant planned investment. These intelligent network solutions will become the viable alternative or primary mitigation to expensive conventional supply-side solutions.

3.3 Development of Our Digital Strategy

We engaged with stakeholders across Scottish Water to develop a rich understanding of the challenges faced by teams across our organisation. We identified four key groups of users: our customers, our people, our partners and our regulators. A summary of our findings is shown below:

Figure 4: Stakeholder Engagement Summary

We also engaged with other water companies and many organisations both inside and outside of our sector. We took counsel from industry analysts such as Gartner and applied our own deep understanding of the technology sector to ensure that our Digital Strategy is aligned with technology evolution as much as is possible in a fast-paced environment.

Finally, we ensured alignment with our Digital Management Approach, the policy by which we draw down investment to ensure our digital products and services continue to provide the critical functions needed by our customers and our people. This policy defines replacement and refresh triggers based on service and support obsolescence, and is defined by multiple technology, service and product categories.

3.4 Challenges, Risks, Mitigations and Opportunities

Our technological advancement brings with it risks and challenges that we must acknowledge and address:

- **Data & Technological Threats:** Rapid AI progression and misinformation may outpace our response capabilities. By committing to ethical practices and robust safeguards, e.g. through AI guardrails and a data ethics policy, we can manage these risks while leveraging AI's value. We remain vigilant against advanced cyber threats like deepfakes and AI-generated phishing, necessitating ongoing investment in detection, education and defensive strategies. AI also offers new avenues for proactive protection and rapid response.

- **External Environment Adaptation:** Scottish Water works with a global supply chain, sourcing digital components and specialist resource from around the world. Emphasising ethical supply chains, especially in cybersecurity procurement, is crucial. Future partnerships must incorporate adaptability and flexibility to navigate external changes effectively.
- **Digital Skills Gap:** Enhancing our digital capabilities and deriving insights from data requires new skills. Initiatives like our Digital Academy, Data Citizenship and Data Fluency are preparing our workforce for future challenges. We also plan to grow skills in AI Literacy. The scarcity of digital expertise presents both a challenge and an opportunity to innovate in talent development. For example, by forming dynamic partnerships with open talent marketplaces, we can quickly close skill gaps and promote inclusion among overlooked communities.
- **Resistance to Change:** Positively disrupting our business will likely introduce new resistances to our digital advancement, necessitating clear alignment to benefits and ever greater engagement with users. A clear focus on providing an excellent digital experience and growing skills will go some way to averting this risk.

We are committed to making our digital services user-friendly, responsive and simple. By automating processes and focusing on collecting only the most essential information, we can prevent app fatigue and increase efficiency amongst our teams, all whilst considering the environmental impact of our digital activities, moving us towards our net-zero target.

To maximise the value from digital solutions, we need to move faster, at lower cost and with higher quality and security and privacy by design. Cloud products are ideal for employing DevOps (rapid development of new capability and value into operation) and this is where we, and our future partners, need to go. Our goal is also to become a more intelligent client too, taking ownership of key digital capabilities that will drive us forward in reaching our strategic ambitions.

Industry-wide trends in Digital offerings reflect these common needs, and the cloud platforms and services we have and are building provide a stable and secure base to develop products at pace, while keeping major line-of-business applications up to date and in line with shifting regulatory and statutory demands. Regular engagement with other water and utility companies to share challenges and solutions has provided continued assurance that Scottish Water is approaching its Digital needs in a cost effective and sound fashion, and frequent consultations with Gartner inform technology strategy, ways of working, delivery methodology, sourcing and project-specific choices.

As we look ahead to SR27, our strategy will shift from laying digital foundations to actively driving transformation across the business. We will build on the momentum from SR21 to complete our cloud migration, scale intelligent asset capabilities, deepen IT/OT convergence securely, and embed agile delivery as the norm. Investment will focus on maintaining secure, evergreen platforms; unlocking the full value of our data; and enabling smarter, faster decisions across Scottish Water. We will modernise legacy systems, enhance field and customer-facing services, and strengthen our cyber resilience in line with emerging threats and regulatory expectations. This next chapter represents a strategic pivot - from enabling digital capabilities to delivering measurable business outcomes through them.

4 SR27 Digital Plan

Key Points:
• We are proposing to invest **£107m** (tier 2) in Digital within the SR27 period. Our investment planning is informed by the digital Management Approach, which sets out our detailed investment policy. This is in addition to the funding of our Cloud Computing Arrangement (CCA). • For all our digital areas, our approach is to replace assets when they are obsolescent but still functioning. The exception to this is the Digital Workplace, where we replace assets when they are obsolete and functioning.

4.1 Management Approach

Our SR27 Digital Plan is built upon the foundation of our Digital Strategy, which informs technology choices and direction. The accompanying management approach sets out our investment policy for existing digital assets.

The aim is to manage the obsolescence of digital products and services in line with our risk appetite, ensuring that systems and data remain accessible, secure and effective. When technology-driven replacement enables the adoption of a better modern equivalent, we will pursue this - seeking to reduce our carbon footprint, enhance usability and productivity, strengthen security, and improve resilience.

Unlike physical assets, digital assets are seldom refreshed or replaced in isolation. Interdependencies must be considered, and risk must be assessed across four dimensions: business fit, vendor support, future development plans, and underlying technical structure. An emerging issue in one area may necessitate investment in another. Consequently, assessments are based on a combination of business needs dates (e.g. policy or service expiry), vendor dates (e.g. end-of-support), and technology dates (e.g. end-of-life).

Each digital asset category is assigned a risk profile based on criticality, vulnerability, vendor reliance, and interdependence with other components in the estate. This classification helps prioritise investment and informs refresh decisions. Categories labelled as High demand require close monitoring and earlier intervention due to their operational importance or security sensitivity. A Low rating indicates a more tolerant posture toward obsolescence, often due to lower criticality or reduced exposure. Where risk is context-dependent, a Sliding scale is used to denote that investment timing should be based on localised business conditions, deployment scope, or evolving dependencies.

For investment planning, we classify our digital estate into ten interconnected areas. Each plays a key role in supporting Scottish Water's operational and strategic ambitions. Table 2 below sets these areas out.

Table 2: Digital Investment Planning Categories

Area	Description	Risk Profile
Data Centre Systems	A diminishing on-premises footprint used to host legacy applications and infrastructure, comprising compute, storage, databases, hardware, network and telecoms.	High
Digital Workplace	End-user devices, productivity/collaboration solutions for staff and partners (e.g. laptops, desktops, tablets, mobiles, audio-visual).	Low
Cloud Business Systems	Line of business, or systems of record with a slow rate of change, typically used for transactional purposes.	Sliding scale
Digital Channels	Applications, services, and Application Programming Interfaces (APIs) used to communicate and engage with customers, partners and external stakeholders.	Sliding scale
Integration & Automation	Services and APIs used to connect systems and improve business processes.	Low
Cloud Platform	Used to build, maintain, and enhance modern applications on Azure, including compute, storage, databases, app services, and networking.	Sliding scale
Cloud Products	Internally developed solutions using Azure components to enable agility and data-driven decision-making.	Sliding scale
Edge Compute & Sensing	Assets providing sensing, logging, secure remote control, and analytics for operational equipment, spanning apps, networking, and telecoms.	High
Cyber Security	Technologies and controls that safeguard the confidentiality, integrity, and availability of systems and information.	High
Networks & Communications	Core connectivity infrastructure enabling seamless data flow across the estate.	High

The preferred investment policy for most digital areas is to replace assets when they are obsolescent but still functioning. This strikes a balance between cost-efficiency, risk mitigation, and operational continuity. By replacing before critical failure occurs, we maintain strategic alignment and operational integrity.

An exception is made for the Digital Workplace category, where assets are replaced when they are obsolete and functioning, as earlier refreshes tend not to deliver significant additional benefit. This approach continues to meet productivity and security needs without incurring avoidable cost.

Where delays in asset replacement are necessary - due to upstream project dependencies or pending architectural upgrades - mitigating actions such as increased monitoring or annual condition reviews will be implemented to manage risk and maintain readiness for timely intervention.

4.2 SR27 Planned Investment

We have set out, below, our proposed SR27 investments (in line with the management approach described above) across:

- Data Centre Systems;
- Digital Workplace;
- Cloud Business Systems;
- Digital Channels;
- Integration & Automation;
- Cloud Platform;
- Edge Compute & Sensing;
- Cyber Security; and
- Networks & Communications.

These investments draw on the £107m investment set out in our Reference Scenario in the Executive Summary, plus the Tier 1 accounting treatment of Cloud Computing Arrangement (CCA) cost.

4.2.1 Data Centre Systems (Telemetry Consolidation)

We are pursuing a full and final exit from our legacy data centres, aligned with our strategic commitment to cloud-first architecture and modern infrastructure practices. This includes the physical and digital decommissioning of residual services, alongside the clearance of physical plant - such as power supplies, Uninterruptible Power Supply (UPS) units, racks, cabling, and cooling systems - which cannot be removed until the final workloads have been transitioned.

A critical aspect of this programme will be the consolidation and retirement of legacy telemetry applications that remain in use, such as legacy instances of our Water Management System, Lomond Scheme SCADA (Supervisory Control and Data Acquisition), and Open Enterprise. These systems, while functionally valuable in their time must be replaced or migrated in a manner that preserves operational continuity while eliminating technical debt.

It is important to note that if this work is not commenced in line with our current plan, there is a significant risk of cost escalation. Deferring investment or failing to vacate our data centres will not only incur additional operational costs (e.g. for facilities management, power, and vendor support), but may also introduce risks of regulatory non-compliance, security vulnerabilities, and unscheduled system failures.

The amount shown for this area of investment is specifically intended to cover telemetry consolidation activities following successful data centre exit of all other IT systems, in line with our plan. It does not include any provision for extended operations, rework, or additional remediation that would become necessary if the data centres are not exited on schedule. Should deferral of current plans occur, substantially greater investment would be required.

4.2.2 Digital Workplace

The Digital Workplace programme for SR27 encompasses a series of targeted initiatives to ensure our workforce remains well-equipped, connected, and productive in a hybrid working environment. The focus is on providing modern, secure, and reliable tools that meet evolving user needs while supporting operational resilience, flexibility, and service improvement.

A core element of the programme is a structured refresh cycle for our end-user devices, including laptops, mobile phones, desktops, tablets, and rugged toughbooks. This includes both planned lifecycle refreshes and a reactive budget line to cover ad-hoc replacements driven by unexpected failures or business growth. With a likely shift to Windows 12 and next-generation hardware - potentially including ARM or AI-based architectures - this investment will position us for a more modern, secure, and high-performance desktop estate.

Our mobile and tablet strategy will evolve in response to usage patterns. With a current estate of around 1,400 Android tablets (as of Jan 2025), we anticipate a gradual reduction in favour of laptops where feasible. Toughbooks (approx. 392 Windows rugged devices) will continue to be refreshed with an efficient factory pre-configuration and Intune-based deployment model.

Beyond end-user hardware, we will review and rationalise our voice platforms. Both our customer experience centre and intelligent control centre have raised concerns about existing solutions (Puzzel and Teams Voice) and have indicated interest in alternatives like Dynamics Voice and enhanced analytics capabilities. A key objective will be to consolidate down to no more than two strategic platforms, supported by a refresh of disaster recovery arrangements.

To further support hybrid working, investment will be made in agile working tools, including refreshed hybrid meeting room technology and enhancements to the Matrix Booking System. These are tightly coupled with planned office changes and dependencies on building shutdowns. Similarly, the transition of our door entry system to a cloud-based solution is aligned with both the data centre exit strategy and new office timelines.

Lastly, our print service - delivered during SR21 - will be reviewed for refresh or replacement, dependent on the outcomes of sourcing activities, reduced printing needs and contract lengths. Together, these initiatives ensure the Digital Workplace remains fit for purpose, secure, efficient, and aligned to the way our people work - now and into the future.

4.2.3 Cloud Business Systems

Our Cloud Business Systems programme for SR27 brings together a wide range of strategic system refreshes, platform transitions, and targeted upgrades designed to modernise, streamline, and future-proof our core business platforms. This investment supports our transition toward true cloud-native architecture, ensuring systems are evergreen, agile, and better integrated across the enterprise.

Many of our core systems, such as Enablon (Quality Management), Maximo (Asset Management), and our Enterprise GIS (Geographic Information System), require further work to move beyond initial data centre shifts into sustainable cloud-based, evergreen models. In several cases - like GIS and Copperleaf (Asset Investment Planning) - current solutions are not cloud-native and will need substantial effort to migrate or re-platform over time in line with vendor roadmaps, especially around contract renewals.

Similarly, Dynamics (customer contact and case management) presents a significant area of transformation. While low-end investment may involve keeping current instances evergreen, a more realistic scenario is the re-architecting or replacement of multiple Dynamics-based solutions across different customer segments. There is a parallel need to assess options such as Salesforce or ServiceNow, particularly where integrations or platform consolidation would bring value.

Several other domains are facing similar decision points. For example, Work Scheduling & Field Services may need a Salesforce platform re-evaluation due to licensing costs and integration complexity. Likewise, our Finance Systems (Oracle Fusion), Human Capital Management (Workday), Portfolio, Programme & Project Management (P3M), and Learning Management (Cornerstone) systems may require platform change if contractual or performance issues emerge. The costing tools platform (BES) remains a likely candidate for replacement, with limitations in performance and carbon accounting capabilities continuing to constrain its effectiveness.

Complementing these major platforms are a series of targeted initiatives: transitioning end-of-life Telemetry and Situational Awareness systems to Software as a Service (SaaS) or Platform as a Service (PaaS) models, integrating ServiceNow more deeply into DevOps pipelines, modernising our Testing & Environment Management tooling, and refreshing Information Management platforms such as SharePoint, Data Tooling, and Information Regulation systems delivered in SR21. The ServiceNow roadmap also includes options for enhanced automation, AI-driven assistance, and expansion into risk and compliance modules.

In addition, we must plan for regulatory-driven requirements, such as the SR27 Central Market Agency (CMA) release, which will necessitate bi-annual system and process changes. A new laboratory and Laboratory Information Management System (LIMS) replacement, Waste Management upgrades, and Hydraulic Modelling cloud transitions are also key elements, supporting efficiency, automation, and audit compliance across operations.

Taken together, these initiatives form a cohesive strategy to ensure our business systems are not only fit for purpose but are also agile, scalable, secure and positioned to meet the challenges of a digital-first future.

4.2.4 Digital Channels

The Digital Channels programme for SR27 focuses on modernising and sustaining our external-facing digital presence, with particular emphasis on public engagement, customer experience, and data transparency. Central to this is the refresh of our External Media Engagement platforms, including the corporate website, customer portals, web channels, and associated digital services that support customer communications and service visibility.

These platforms form the public face of our organisation and are critical to maintaining customer trust, ensuring service transparency, and enabling responsive engagement. They also support our obligations around Open Data and integration with key business systems such as Maximo, SharePoint, and Azure.

Given the rapid pace of change in web technologies, accessibility standards, and digital security threats, these systems must not be allowed to stagnate. A regular refresh cycle is essential - not only to ensure modern user experience and accessibility compliance, but also to safeguard against vulnerabilities and maintain integration integrity with our back-end systems.

This investment will ensure that our digital channels remain secure, modern, and capable of supporting future business needs while continuing to offer a high-quality experience for customers, stakeholders, and the wider public.

4.2.5 Integration & Automation

This programme is focused on strengthening the foundations of our digital ecosystem by ensuring robust, scalable, and future-ready connectivity between systems. Central to this is the refresh of our Data & Application Integrations, which will complete the transition from legacy Boomi implementations to a strategic, Azure-native integration model aligned with our broader cloud and automation ambitions.

This work is vital to maintain system interoperability as we modernise key platforms such as Enterprise Asset Management (EAM), Geographic Information Systems (GIS), and Programme & Project Management (P3M). As these systems evolve, so too must the integrations that connect them - especially given the increasing reliance on SaaS platforms, where ongoing vendor-driven changes can rapidly render outdated integrations fragile or non-functional.

Additionally, regulatory requirements continue to drive change, including the refresh of our Annual Return system. This ensures that we remain compliant with reporting obligations while improving efficiency and accuracy in data collection and submission processes.

Together, these initiatives will improve data flow, reduce manual interventions, and support more responsive, automated business operations - laying the groundwork for a fully integrated, adaptive digital environment in SR27 and beyond.

4.2.6 Cloud Platform

The Cloud Platform programme for SR27 is focused on ensuring that our cloud foundation remains secure, scalable, and fit for purpose as our digital estate continues to grow in complexity and importance. This includes refreshing core platforms, modernising tooling, and addressing key technical debt and sustainability risks introduced during earlier transformation phases.

One of the primary initiatives is the refresh of the Power Platform and associated Azure applications. With a growing backlog of developed apps and concerns over "app sprawl" and limited post-deployment support, there is a clear need to rationalise, simplify and modernise the estate. This will include re-platforming or refactoring existing apps, particularly where Microsoft make platform changes that break compatibility or introduce new security requirements.

The Data Lakehouse, which includes technologies such as Delta Lake, is also a priority. While a significant upgrade may be fully delivered in SR21, further refactoring or enhancements are expected in SR27 to ensure full alignment with our enterprise data strategy. This includes improved performance, integration, and data lifecycle management to support analytical and operational needs.

A critical enabler across all cloud activity is Cloud Tooling. This initiative represents a foundational investment in the technologies required to manage a modern, all-cloud environment - tools that were either unnecessary in an on-prem world or previously provided by partners. The work involves defining and delivering tooling across three key domains: Service Management, Security,

and Application Development. Some tooling (e.g. Microsoft Sentinel, Defender, and Purview) is already in place but is underutilised. Future tooling will include AI-assisted development environments like CoPilot Studio, as well as enhanced application security testing capabilities such as SonarQube for SAST (Static Application Security Testing). Integration with OT environments must also be considered, with thoughtful planning for shared use and necessary segregation.

Ultimately, the Cloud Platform programme is about maintaining pace with the rapid evolution of cloud technologies, while ensuring our platforms remain robust, well-managed, and able to support secure innovation at scale.

4.2.7 Cloud Products

This programme is focused on the maintenance and sustainment of core digital and data systems that have become critical to business operations. These initiatives are not intended to introduce major new functionality but instead to ensure that existing cloud-based products remain secure, reliable, and compliant as the wider technology and regulatory environment evolves.

The programme includes activities to support the continued operation of business analytics tools, including essential technical rework of reporting applications where needed. This is to manage compatibility with changing data sources, resolve technical debt, and maintain the usability of tools relied upon for day-to-day insight and operational reporting.

Work will also continue to support enterprise data compliance. This includes maintaining systems for records management, retention and archiving, data loss prevention (DLP), and sensitivity labelling across existing platforms such as Power BI and Power Platform. Some ongoing activity will be required to manage regulatory compliance, sustain data quality controls, and support digital rationalisation - ensuring the current estate remains manageable and coherent, rather than expanding or adding further complexity.

Support for tools used in synthetic data creation, data collection, and metadata management will also continue where existing capabilities have been established during SR21. These tools require updates to remain functional as wider systems change or as regulatory expectations shift.

In addition, the programme includes the introduction and sustainment of a digital requirements management tool to replace outdated spreadsheet-based tracking. This will support more reliable coordination of digital delivery across teams, without significantly altering existing processes or introducing new capabilities.

Overall, this programme ensures that our cloud-based products remain fit for purpose, manageable, and secure - preserving the value of prior investment and aligning with a responsible digital asset management approach.

4.2.8 Edge Compute & Sensing

The Edge Compute & Sensing programme for SR27 is focused on the ongoing maintenance and sustainment of critical operational systems at the boundary between the physical and digital environments. The emphasis is on ensuring reliability, continued performance, and alignment with longer-term strategic outcomes, rather than introducing new capabilities.

A key initiative is the refresh of metering systems, which covers the maintenance and update of front-end interfaces and supporting databases. While some foundational work is expected to be completed under SR21, a fully sustainable solution - particularly one built on modern utility network models - will require ongoing investment. This will ensure metering systems remain secure, accurate, and fit for purpose as operational demands and integration requirements evolve. This initiative provides a foundation for a more resilient, manageable, and future-ready operational technology environment, with a focus on keeping critical edge systems dependable and properly aligned with business strategy.

4.2.9 Cyber Security

The Cyber Security programme for SR27 focuses on maintaining and evolving core security capabilities in response to a rapidly changing digital, regulatory, and threat landscape. As Scottish Water becomes an almost exclusively cloud-based organisation with increasing IT/OT convergence, the cyber security function must adapt to ensure continued resilience, compliance, and operational protection.

A key initiative is the refresh of existing security systems, currently delivered under managed service arrangements. This includes reassessment and renewal of the full toolset - such as threat detection, monitoring, and endpoint protection - against an updated Cyber Security Mesh Architecture (CSMA) or equivalent model. The aim is to ensure the refreshed toolset is appropriate for today's risks, which now include AI-powered threats, supply chain vulnerabilities, and the need for resilience against future cryptographic risks such as those posed by quantum computing.

We will continue to educate our people who are also a critical line of defence. More frequent enhanced training in the ability to spot more sophisticated social engineering attacks, such as deepfake phishing emails, are essential and, recognising that technology and education alone cannot eliminate the risk of a cyber breach, we need to continue to bolster our ability to respond and recover, and test these playbooks regularly through effective scenarios and simulations.

To support secure development and deployment of operational technologies, a Cyber Lab will provide a test environment for validating OT-related solutions. This includes bench testing of devices like Westermo routers and SD-WAN (Software-Defined Wide Area Network) configurations for OT use cases. It will also support proof-of-concept work and integration testing where IT and OT boundaries continue to blur, particularly as legacy telecoms services are retired and replaced.

The programme also includes funding for compliance with NIS regulations. NIS2 expands obligations into areas like waste water and further regulatory evolution in SR27 is likely.

The Quantum Cryptography Discovery initiative ensures we remain ahead of the curve in understanding and preparing for the impact of quantum-resilient encryption. As new cryptographic standards such as CRYSTALS-Kyber and Dilithium are adopted, we will need to assess where and how to update our systems to mitigate long-term cryptographic risk. The rapid development of Quantum poses a risk to the security of our communications and while we have included the cost of assessment and preparation in this plan by 2028, as per guidance to Critical National Infrastructure providers from NCSC, the cost of implementation prior to 2033 is not included in this plan and represents a cost and service risk.

In support of secure communications across IT and OT systems, a broader rollout of Public Key Infrastructure (PKI) will also be required. This will provide secure identity and authentication for systems including SD-WAN, control networks, third-party integrations and end-user devices.

Finally, the Privacy Management Tools initiative addresses the need to operationalise and automate data privacy governance. Current manual processes are unlikely to be sustainable as our data landscape grows in complexity and risk, particularly with the rise of AI and the increasing volume of personal and sensitive data. Tools such as OneTrust - or equivalent - will support enterprise-wide privacy compliance, further embedding privacy by design across all systems and services.

Together, these initiatives ensure that our cyber security capabilities remain robust, adaptive, and aligned to both operational needs and regulatory expectations - while continuing to manage emerging risks at the speed of digital change.

4.2.10 Networks & Communications

The Networks & Communications programme for SR27 focuses on maintaining and evolving the connectivity infrastructure that underpins both field and fixed operations across the estate. The programme continues the transition away from legacy network technologies and supports the shift to cloud-first, secure, and flexible communications, while ensuring ongoing operational reliability and value for money.

The Field Connectivity Refresh initiative provides for the continued operation and lifecycle management of over 500 deployed devices (including 164 vehicles) that were connected during SR21 using 4G-based Blackspot routers. These routers, often deployed in harsh environments and subject to frequent movement, require structured maintenance to ensure they remain fit for purpose. In parallel, we will support connectivity for new sites and vehicles not upgraded in SR21. Each site will be evaluated to determine the most cost-effective and supportable solution - ranging from basic 4G routers to more advanced SD-WAN deployments, with or without Juniper Mist Wi-Fi Access Points (APs), depending on operational needs.

The SD-WAN for OT initiative extends secure, resilient software-defined networking to operational technology environments. While initial deployments in SR21 focused on IT and lower-tier OT traffic, this phase includes the design, testing, and standardisation required for broader OT adoption. It supports future replacement of legacy communications technologies such as TSAT Mesh, M2M, radio, and microwave links, in line with the IT/OT strategy.

For cases where SD-WAN is not a viable solution, this programme provides for the replacement of remaining MPLS (Multiprotocol Label Switching) and internet connections - especially in specialist or private wire scenarios - ensuring that all communications infrastructure remains reliable and supportable.

The Local Area Network (LAN) Refresh initiative will ensure continued performance and manageability of wired and wireless network infrastructure across both office and operational sites. This includes refreshing legacy devices deployed under earlier projects (such as Network Strategy Execution - bringing local area, wide area And Wi-Fi networks to a consistent standard; and Enterprise Connect - replacement of a service withdraw by BT for multiple small sites) with modern equivalents. The future state aims for consistent deployment of SD-WAN and Juniper

Mist Wi-Fi, phasing out obsolete wireless technologies and ensuring network services align with our standard architecture.

Together, these initiatives support a robust, adaptable, and secure network environment - one capable of supporting the full breadth of operational and enterprise requirements across our evolving digital estate.

4.3 Exclusions

While our SR27 digital plan is comprehensive and forward-looking, there are several areas that remain outside the immediate investment scope. These exclusions are shaped by the current maturity of emerging technologies, affordability constraints, dependencies on broader organisational decisions, and the evolving external landscape e.g. quantum computing risk to communications and network security.

Our approach to digital investment is pragmatic: we will continue to pursue efficiencies through continuous improvement and targeted innovation. However, not every opportunity or risk can be fully quantified or addressed at this stage. We expect new challenges and opportunities to emerge over the SR27 period, some with uncertain financial implications. Our strategy has been designed with enough agility to respond and adapt as needed.

4.3.1 Post-Quantum Cryptography

The emergence of quantum computing presents a long-term threat to current encryption standards, particularly public key cryptography, which underpins much of our digital estate. In response, the National Cyber Security Centre (NCSC) has issued a phased migration plan advising organisations to begin preparing now for a transition to post-quantum cryptographic algorithms.

NCSC’s guidance outlines the following target milestones:

- By 2028: Identify and prioritise systems requiring cryptographic upgrades.
- By 2031: Implement upgrades for the most critical systems.
- By 2035: Complete transition to quantum-safe encryption across all systems.

In line with this roadmap, we have included provision in our SR27 plan to meet the 2028 target - specifically, the identification, assessment and prioritisation of systems that rely on vulnerable cryptographic methods. This includes planning activities, initial risk assessments, and architectural design for future migration.

However, the cost and complexity of achieving the 2031 and 2035 milestones are still being scoped. These are likely to be significant, as they may involve wide-ranging updates across infrastructure, software, and vendor ecosystems. The scale and timing of required remediation will depend on both the maturity of post-quantum standards (such as NIST's finalisation of the CRYSTALS-Kyber and Dilithium algorithms) and the extent of embedded cryptographic dependencies in our estate.

At this stage, cost estimates for 2031 and 2035 are still in development. We expect the associated investment to be distributed across both SR27 and SR33, with final allocations refined as our

understanding improves. The SR27 plan will be updated at a future point once firmer estimates are available, and technology pathways are clearer.

This is a live area of strategic importance. We are actively monitoring developments and engaging with relevant standards bodies, vendors and utility peers to ensure that our cryptographic transition plan is robust, timely and proportionate to risk.

4.3.2 Emerging Technologies Not Yet Investment-Ready

Several emerging technologies - such as quantum computing mentioned already, advanced synthetic data generation, large-scale digital twinning, and regenerative AI - are being actively monitored but have not yet reached the maturity, affordability, or regulatory clarity required for mainstream adoption. While these technologies hold promise, our SR27 plan deliberately avoids speculative investment, focusing instead on tangible value and alignment with our operating context.

Where pilots, discovery work, or small-scale proofs of concept are justified, we will pursue these through innovation funding or partnerships. However, mainstream adoption of these technologies is excluded from the core SR27 investment scope.

4.3.3 Innovation and Continuous Improvement Funding

The plan does not include a ring-fenced fund for continuous improvement or tactical innovation initiatives. In practice, we expect many small but high-impact improvements to arise organically as part of delivery e.g. maximising value from a modern equivalent replacement. To support this, we will rely on agile delivery practices, effective product ownership, and mechanisms such as innovation sprints or flexible change budgets within programme boundaries. Should the need arise for more structured or formalised innovation funding, this would require separate business case development and governance.

4.3.4 Potential Changes to Regulatory or Legislative Requirements

Our SR27 digital plan is aligned to current regulatory and statutory expectations. However, material changes - such as a step change in NIS regulation, new data governance obligations, new cyber threats or expanded reporting requirements - may introduce new costs or capabilities that are not currently planned. Where such changes occur, we will engage with stakeholders to explore options for reprioritisation, re-scoping, or seeking additional investment through formal change mechanisms.

4.3.5 IT/OT Convergence

Our SR27 digital plan does not include a specific initiative to validate the feasibility and value of IT/OT convergence, which would ensure any future investment is justified, technically sound, and aligned with business priorities. It is expected that this activity will be driven and funded from the Operational area of the business with full co-operation and co-ordination from Digital, once the Digital Sourcing and Target Operating Model changes are agreed.

5 Implementation

Key Points:
• We use a range of delivery frameworks (Waterfall, Hybrid, Agile) to successfully execute our digital initiatives, chosen based on the specific needs of projects. This is underpinned by a robust governance framework that spans investment decisions, oversight bodies and risk management processes. • We have updated our operating model to enhance the speed and efficiency of our IT delivery, foster closer collaboration between our business, digital partners and vendors, and support continuous development and automation. • We are committed to building our internal capability (including the future skills that will be crucial for our long-term success), whilst bringing in niche expertise to meet our evolving needs. • We have taken a proactive approach to delivery lessons learned from SR21, whilst building on successes to deliver our SR27 digital plan.

5.1 Delivery Frameworks and Governance

5.1.1 Delivery Frameworks

At Scottish Water, we employ a variety of delivery frameworks to ensure the successful execution of our digital initiatives. These include waterfall, hybrid, and agile methodologies, each chosen based on the specific needs and complexities of the project or product at hand.

- Waterfall: This traditional approach is used for projects with well-defined requirements and a clear sequence of stages. It allows for meticulous planning and documentation, ensuring that each phase is completed before the next begins.
- Hybrid: Combining elements of both waterfall and agile, the hybrid approach offers flexibility while maintaining a structured framework. This is particularly useful for projects that require a balance between predictability and adaptability, or where iterative cycles are needed.
- Agile: Agile methodologies, including Scrum and Kanban in our Azure DevOps environment, are employed for projects that demand rapid iteration and continuous feedback. This approach enhances our ability to respond to changing requirements and fosters collaboration.

Our governance processes have consistently led to successful outcomes, ensuring that projects are delivered on time, within budget, and to the desired quality standards.

As we near completion of our shift to cloud-based infrastructure, our delivery approach will increasingly emphasise agile methods and DevOps practices. This evolution enables us to deploy new capabilities faster, iterate based on user feedback, and embed continuous improvement across our digital estate.

5.1.2 Governance Structure

Digital delivery at Scottish Water is governed through a robust framework that encompasses investment decision-making, oversight bodies, and risk management processes.

- **Investment Decision-Making**: Investment decisions are guided by a comprehensive appraisal process, ensuring that all projects align with our strategic ambitions, comply with our digital management approach, and deliver value for money.
- **Oversight Bodies**: The Digital Value Management Board, Investment Group Design Approval Board, Change Acceptance Board and other oversight bodies provide continuous monitoring and governance, ensuring that projects adhere to agreed policies and architecture, privacy, security and design standards and deliver expected benefits.
- **Risk Management**: Our risk management processes are designed to identify, assess, and mitigate risks throughout the project lifecycle. This proactive approach helps us manage uncertainties and ensure successful project outcomes.

5.2 Sourcing, Resourcing and Skills

5.2.1 Operating Model Shift

Scottish Water is undergoing a significant shift in its operating model to better align with our strategic ambitions and the evolving digital landscape. This transformation will see the introduction of a new partner ecosystem from September 2026, alongside bringing some services in-house where better aligned to internal capabilities, clarify accountability and reduce overall cost.

Our new, adaptive operating model is designed to enhance the speed and efficiency of IT delivery, foster closer collaboration between Scottish Water, Digital Partners and Vendors, and support continuous development and automation. Here are the key attributes of this model:

1. **Focus on Agility**: The adaptive model shifts focus to models and practices that deliver value incrementally and continually through agile and DevOps practices.
2. **Business Value Alignment**: There is a clear alignment to business value, with applications and teams aligned to our strategic outcomes.
3. **Customer and Colleague Experience**: The model introduces capabilities for better customer experience (CX) and user experience (UX), ensuring that the solutions developed are secure, inclusive and meet the needs of our customers.
4. **Continuous Development and Automation**: The adaptive model supports the continuous development of new functionalities and highly automates underpinning processes and infrastructure. This reduces manual effort, reduces risk and increases efficiency.
5. **Collaboration and Culture Change**: The model fosters closer collaboration between Scottish Water, Partners and Vendors, requiring a change in culture to support this new way of working. We have been moving towards this way of working for several years now and the redesign better aligns to our aspirations for a more integrated approach.
6. **Agility and Flexibility**: The adaptive model is structured to be agile and flexible, allowing Scottish Water to quickly respond to changing business needs and technological advancements.
7. **Enhanced Governance and Risk Management**: The model includes robust governance structures and risk management processes to ensure that digital initiatives are delivered successfully, securely and align with the organisation's strategic ambitions.
8. **Integration with Digital and Organisational Strategies**: The adaptive operating model is closely aligned with the wider organisational change agenda, including the supply chain strategy and 'enterprise model'.

These attributes collectively enable Scottish Water to drive digital transformation more effectively delivering SR27 business outcomes at lower cost and carbon.

5.2.2 Internal Capability

Building internal capability is a cornerstone of our strategy. We are committed to developing a robust internal skill set through various initiatives:

- **Digital Academy**: Our Digital Academy is designed to upskill our workforce, providing training in the latest digital technologies and methodologies. This initiative ensures that our employees are equipped with the necessary skills to drive digital transformation within the organisation. This includes data citizenship – growing data fluency skills and AI literacy to improve the health, quality and completeness of data, essential to delivering our SR27 objectives
- **Citizen Developers**: We are empowering our employees to become citizen developers, enabling them to create secure digital solutions on a safe, scalable platform to common standards. This approach fosters innovation and allows for rapid development and deployment of digital tools at low cost.
- **Professional Upskilling**: Continuous professional development is facilitated through targeted training programmes and workshops. These initiatives focus on enhancing skills in areas such as data, analytics, AI, MLOps (Machine Learning Operations) and DevSecOps (Development, Security and Operations), ensuring our workforce remains at the forefront of technological advancements.
- **Cyber Security**: our employees and supply chain are an important line of defence. We will develop more comprehensive training programmes and awareness to mitigate the threat of ever more sophisticated, AI-generated deepfake social engineering techniques. Regular ethical penetration testing will confirm the effectiveness of training and provide more immediate learning reinforcement. We will also continually improve our ability to respond and recover, regularly testing these playbooks through incident scenarios, recognising that we cannot eliminate the risk of cyber-attack completely.

5.2.3 Partner Strategy

Our sourcing strategy for SR27 is designed to bring in both niche expertise and Partners that can scale flexibly to meet our evolving needs:

- **Niche Expertise**: We will engage with partners who specialise in areas such as AI, cyber security, and DevSecOps. These partnerships will provide us with the specialised knowledge and skills required to tackle complex challenges and drive innovation.
- **Flexible Scaling**: Our partner ecosystem will be structured to allow for flexible scaling of resources. This approach ensures that we can quickly adapt to changing demands and leverage external expertise when needed, while maintaining control over critical aspects of delivery.

5.2.4 Future Skills Planning

Understanding and addressing skills gaps is crucial for our long-term success. Our future skills planning involves a multi-faceted approach:

- **Recruitment**: We are actively recruiting talent with specialised skills to fill identified gaps. This includes roles in AI, cyber security, and other emerging technologies.
- **Partnerships**: Collaborating with educational institutions and industry partners to develop tailored training programmes and internships. These partnerships help us build a pipeline of skilled professionals ready to contribute to our digital initiatives.
- **Training**: Ongoing training and development programmes are in place to ensure our existing workforce continues to grow and adapt. This includes leadership development, technical training, and workshops focused on emerging technologies.

By aligning our sourcing, resourcing, and skills development strategies with our new adaptive operating model, we are well-positioned to achieve our digital strategic objectives and drive digital transformation across Scottish Water.

5.3 Learning from SR21

5.3.1 What Worked

The SR21 period saw several notable successes that have laid a strong foundation for our future initiatives:

- **Cloud Transition Progress**: We made significant strides in transitioning to cloud-based infrastructure, which has enhanced our operational efficiency and scalability.
- **Improved Resilience**: Our efforts in de-risking the IT estate and enhancing our infrastructure have resulted in improved resilience and security and reduced incidents.
- **Incident Reduction**: Through the implementation of modern platforms and technologies, we have successfully reduced the number of incidents, leading to more stable and reliable services.
- **Agile Trials**: The introduction of agile methodologies has shown promising results, enabling faster delivery and better adaptability to changing requirements.

5.3.2 Challenges

Despite these successes, SR21 also presented several challenges that we have learned from:

- **Underestimating Delivery Timescales**: One of the key issues was underestimating the time required to deliver certain projects. This led to delays and impacted our ability to meet some of our targets.
- **Legacy System Complexity**: The complexity of our legacy systems posed significant challenges, particularly in terms of integration and maintenance. This complexity often resulted in higher costs and longer delivery times.
- **Skills Shortages**: We faced shortages in critical skills, which affected our ability to deliver projects efficiently. This highlighted the need for a more robust strategy for skills development and recruitment.

5.3.3 SR27 Improvements

The lessons learned from SR21 are being actively incorporated into the design and delivery practices for SR27 to ensure better outcomes:

- **Enhanced Planning and Estimation**: We have improved our planning and estimation processes to provide more accurate delivery timescales. This includes more rigorous project scoping, new agile approaches and better risk management practices.
- **Modernising Legacy Systems**: To address the challenges posed by legacy systems, we are investing in modernising our IT infrastructure. This includes the adoption of new technologies and platforms that are more flexible and easier to integrate.
- **Building Internal Capability**: Recognising the importance of having the right skills, we are focusing on building internal capability through initiatives such as the Digital Academy, Data Citizenship, professional upskilling, and the development of citizen developers.
- **Agile and DevOps Practices**: We are expanding the use of agile and DevOps practices across more projects to enhance our delivery speed and adaptability. This approach will help us respond more effectively to changing requirements and improve overall project outcomes.

- **Robust Governance and Oversight**: Strengthening our governance structures and oversight mechanisms is a key focus for SR27. This includes better investment decision-making processes, continuous monitoring, and proactive risk management.

By integrating these enhancements into our SR27 planning, we aim to build on the successes of SR21 while addressing its shortcomings. This approach will enable us to deliver more efficient, resilient, and innovative digital solutions that align with our strategic ambitions.

6 Conclusion

This technical appendix sets out a bold and forward-looking digital plan for SR27, one that is integral to achieving Scottish Water's SR27 Final Business Plan and Long-Term Strategy. We are investing in the capabilities that will allow Scottish Water to operate more intelligently, more securely, and more efficiently - directly enabling our strategic ambitions.

We will invest £226m across ten key digital domains to modernise legacy infrastructure, harness cloud capabilities, converge IT and OT securely, and unlock greater value from our data. This plan is structured, risk-based, and guided by our Digital Management Approach, ensuring we maintain operational continuity while building the digital capabilities of the future.

We are confident in our ability to deliver this plan. We have strengthened our internal capability, established clear governance, and aligned our sourcing and delivery models to our digital ambitions. Agile and DevOps practices are now embedded into our ways of working, supported by strong product ownership and a culture of continuous improvement.

The SR27 Final Business Plan reflects the reality of a dynamic and uncertain environment. Our strategy is not fixed - it is adaptable. We have built in the mechanisms to respond to change, whether through technology evolution, shifting regulatory requirements, or emerging customer needs.

Scottish Water's digital function has become a driver of responsible disruption. This digital plan demonstrates how we will continue to lead the way - modernising our estate, securing our operations, and empowering our people to deliver an even better future for our customers and communities.

Scottish Water
Trusted to serve Scotland
BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES
Transformation & Innovation
February 2026

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1 Executive Summary

As Scotland's publicly owned water company, Scottish Water continually seek ways to improve and protect the service we provide to our customers. We must also find ways to make these improvements whilst making our operations and investments more efficient and effective. Every improvement that we make in this way leads to better outcomes for customers, lower bills or reinvestment back into our assets.

We face significant challenges moving into the SR27 period, including climate change, population growth, and stricter regulations. Our ageing water and waste water assets will need more investment to maintain current service levels and prevent unfair burdens on future generations. Therefore, the need for investment in SR27 is greater than ever.

We have developed our proposed investment plan within a series of constraints i.e. within an affordable cost envelope, to a scale that is deliverable, whilst overcoming challenges and seizing opportunities as they emerge. Through targeted research and innovation and transformation programmes we can develop the knowledge and capability to adapt the way we work and to make the sustainable change necessary to drive better customer outcomes.

Through our transformation programme we improve and adapt our business processes, adopt new technology and deploy digital advancements to deliver our services more efficiently in the near term. Through our research and innovation programme we seek to enhance our knowledge and capability to ensure that our assets and therefore our service adapts over time to ensure long term service excellence, great value and financial sustainability and go beyond net zero emissions.

In SR27, it is proposed that Scottish Water will invest c.£113m in Transformation over the first three years of the period, with a c5% allocation reserved for contingency (and the formation of future phases and longer-term initiatives that could extend beyond the current period). This investment is expected to deliver c.£405m of gross efficiencies and c.£292m of net benefits, supporting delivery of the SR27 efficiency challenge within the £8.09bn post-efficiency funding envelope. Benefits will be realised through a combination of operating expenditure savings, capital efficiencies, and cost avoidance, underpinned by strengthened portfolio governance, assurance, and performance tracking.

1.1 Lessons Learned from SR21

Lessons learned from SR21 have guided us to prioritise the key themes of our SR27 Transformation programme to drive the largest benefits, whilst balancing the capacity of the organisation for major change. Although these themes represent the balance we aim to strike, future opportunities will be assessed on their benefits potential and impact on organisational capacity. To ensure our Research & Innovation investments deliver best value to customers, in developing our SR27 portfolio we have followed a staged approach to Research & Innovation, increasing knowledge and learning, applying this through pilot trials, and ultimately scaling through demonstrator projects. In the delivery of Transformation and Research & Innovation programmes in SR27 we have recognised that greater alignment of the programmes is required to increase the opportunity to scale benefits faster. Transformation and Research and Innovation programmes will come under a single portfolio in Digital and Innovation directorate.

Table 1 and Table 2 below describes a summary of our SR27 Transformation and Research & Innovation programmes.

Table 1: SR27 Transformation Investment and Benefits Summary (Shown in 24/25 Prices)

Programme	Investment (£m)	Gross Benefits (£m)	Opex (£m)	Capex (£m)
Capital & Digital Procurement	30.83	211.62	5.94	205.68
Continuous Improvement & Process Excellence	19.11	54.98	30.79	24.19
Digitisation, AI & Automation	15.97	25.31	0.00	25.31
System-Based Approach (SIDM)	9.56	71.12	0.00	71.12
Asset Risk & Optimisation (Compass)	30.85	42.03	4.23	37.80
Partnership Ecosystem (Team Scotland)	6.28	0.00	0.00	0.00
Total	**113.00**	**405.06**	**40.96**	**364.00**

Table 2: Summary of SR27 Research & Innovation Investment

Programme	Proposed Investment (£m, 24/25)
Hydro Nation Chair programme	3.5
Research and Innovation Programme	22.6
Lighthouse Fund	5.2
Total	**£31.4m**

The SR27 Transformation programme is expected to deliver around £405m in gross benefits, comprising c.£41m in operational savings and c.£364m in capital savings, based on current best estimates and after applying a 60% portfolio-level risk adjustment. Figures in the SR27 Final Business Plan represent the agreed submission position and reflect the best available evidence at this stage.

They remain subject to refinement as business cases mature through SR27 governance. As plans develop and further evidence becomes available, both costs and benefits will continue to evolve as we pursue the best return on investment for customers money. The SR27 Final Business Plan provides a transparent baseline from which progress will be tracked, and Data Table 6 will be updated as required.

As we enter SR27, the Transformation themes will be subject to the established governance process before each investment is approved. Individual investment cases must demonstrate a clear strategic rationale, robust cost and benefit assessment, an agreed implementation plan and a credible benefits realisation approach before progressing into delivery. These requirements will continue to be reviewed and refined to ensure they remain aligned with Scottish Water's strategy and the efficiency challenge.

As the SR27 portfolio matures, additional opportunities within and beyond the key themes will emerge and be explored. Those that support our strategy and meet the defined approval criteria will be considered for investment, on a spend to save basis, and will follow the governance process described above. Investment is allocated and managed at portfolio level to enable rebalancing as stronger cases emerge.

2 Background

2.1 Using Transformation and Research & Innovation as Levers for Improvement

As Scotland's publicly owned water company, Scottish Water continually seek ways to improve and protect the service we provide to our customers. We must also find ways to make these improvements whilst making our operations and investments more efficient and effective. Every improvement that we make in this way leads to better outcomes for customers, lower bills, or reinvestment back into our assets.

In addition, as we have developed our Long-Term Strategy, and subsequently in the development of our SR27 Final Business Plan, we have identified several key challenges we must overcome and near-term opportunities that we must seize if we are to deliver our ambitions regulatory and statutory commitments.

2.1.1 Challenges we are facing and opportunities we must seize in SR27

We are facing an unprecedented scale and variety of challenges to the services that we provide with the assets we own as we move into SR27:

- **Climate change impacts** – for example warmer, drier summers that can lead to drought and deteriorating raw water quality, wetter winters that cause flooding, more frequent storms that disrupt our assets and services etc.
- **Population growth and change** – the predicted increase in population, along with the changes to where people live, will mean that we need to provide more water if we keep using it at the same rate we do today. The increase in housing will also put more pressure on our waste water network and result in a need for new assets to treat the additional volume of waste water. In addition, there will be an increase in non-permeable surfaces, such as driveways, paths and roads that will further reduce green space for natural drainage.
- **Tightening regulatory requirements** – for example, the recast Urban Waste Water Treatment Directive (rUWWTD) could new drive standards of service that our assets must deliver.

Against this backdrop, our water and waste water assets continue to age in aggregate and will require additional investment just to maintain services at the level they are today and to avoid placing increasing and unfair burdens on future generations of customers. Combining these factors - the need for investment in SR27 is greater than ever before.

To address the challenges facing the sector and meet the SR27 efficiency challenge, Scottish Water is deploying two primary levers of change: Transformation and Research & Innovation. Together, these levers strengthen organisational capability, resilience, and productivity, enabling sustained improvements in efficiency and service outcomes over the SR27 period.

1. **Transformation** – focuses on improving how Scottish Water operates at lower cost and carbon. It delivers organisation-wide and system-level change by strengthening

governance, data driven decision-making, and performance delivery across the business. Transformation enables scalable and repeatable process improvements that are embedded into business-as-usual, supporting sustained reductions in cost, improved service performance, and greater resilience. Investment is targeted to ensure changes are deliverable, evidence-led and aligned to the overall efficiency challenge.

2. **Research and Innovation** – developing and deploying new knowledge and approaches, new technologies to specific areas of our business. This includes advances in physical and social science and engineering technology, and how it can be employed now and, in the future, to develop the science and assets we need to deliver our ambitions. This requires a balanced portfolio across incremental innovation to drive near term efficiencies and improvements, research and development to provide evidence and confidence in new technologies and approaches prior to deploying at scale in partnership with academia and other collaborators.

In deploying the above levers, we are able to:

- Deliver our plans (both our SR27 Final Business Plan and our wider, long-term strategy ambitions) more efficiently i.e. deliver more or the same for less money;
- Meet or exceed service performance ambitions i.e. achieve improved regulatory outcomes;
- Explore new approaches to service delivery that drive better outcomes for customers and / or reduce the long-term costs of service - this is essential to move towards the aspirations in our long-term strategy; and
- Enhance our ability to identify and manage new and emerging water quality risks (such as PFAS[1] and antimicrobial resistance), so that our assets and treatment processes can adapt as standards, science and customer expectations evolve.

[1] PFAS (per- and polyfluoroalkyl substances) are a group of persistent chemicals, sometimes referred to as “forever chemicals”, that are increasingly subject to regulatory scrutiny due to their potential environmental and public health impacts.

3 We Must Change Parts of our Business, our Assets, and the Way We Deliver Services

Lessons learned from SR21 have directly informed the design and prioritisation of the SR27 Transformation and Research & Innovation portfolio. SR21 delivery demonstrated where the greatest value can be realised, the importance of balancing ambition with organisational capacity, and the benefits of stronger alignment between transformation, innovation, and delivery. This section sets out the SR21 evidence base that underpins the SR27 approach.

In this section, we set out how Scottish Water performed during the SR21 period, with a particular focus on how we have delivered our planned transformation and research & innovation initiatives. This includes delivering transformation activities against the Tier 1 efficiency challenge (of 1% per year) set out in WICS' Final Determination, our capital costs via our Transformation programme and against the technical challenges in each of our key investment areas.

Unless otherwise stated, all benefit values are reported as net (i.e., after accounting for delivery costs). Gross figures are included where relevant to illustrate total value.

3.1 Transformation

In summary, our transformation activities have contributed to our Tier 1 efficiency challenge to date, and we currently estimate that we will broadly meet our SR21 efficiency commitment of 1% p.a. by the end of the regulatory period.[2]

The Transformation programme is expected to deliver £433m in gross benefits during SR21, against total delivery costs of £259m (including £23m in ongoing costs). This equates to £174m in net benefits, which have supported wider investment across the capital programme. Based on current analysis, capital costs are forecast to be around 6% lower at the start of SR27 than they were at the start of SR21.

3.1.1 Delivering our SR21 efficiency challenge

Transformation initiatives are forecast to contribute £30m in net Tier 1 benefits, derived from £49m in gross Tier 1 savings. The top five initiatives contribute over 60% of the total Tier 1 benefits:

- **SR21 Procurement** – although predominantly delivering Tier 2 savings (as planned), this initiative is also forecast to deliver Tier 1 savings.
- **Wholesale Transformation** – the Wholesale Service processes were streamlined to better respond to the customer's concerns, improve right first time and reduce waste.
- **Project SWIFT** – SWIFT has improved the efficiency of field work, whilst reducing carbon emissions and improving service.

[2] This is calculated on the basis that at the start of SR21 Scottish Water's Tier 1 costs were £899.1m, as reported in AR22. In 24/25 prices this equates to £1,112.9m. Our current forecast for 26/27 Tier 1 costs is £1109.1m, which would be £1,051.6m in 24/25 prices. This estimate would equate to c5.5% cumulative efficiency savings over the SR21 period, marginally lower than the 5.8% set out in the SR21 Final Determination. We continue to look for additional efficiencies that can be captured during the remainder of SR21, such that we can fully meet our commitment over the period.

- **Co-pilot Upscale** – the introduction of Co-pilot increased the productivity of the pilot groups to such an extent that its deployment has been upscaled.
- **Functional Hub** - the Functional Hub is deploying the capabilities and culture to enable the business to continuously improve its processes.

In addition to delivering the Tier 1 benefits above, Transformation initiatives are forecast to deliver around £384m in gross Tier 2 and Tier 1a benefits during SR21. Exact final figures are subject to current forecasts continuing through the final year of SR21. The largest contributing initiatives are shown below:

- **SR21 Capital Procurement -** application of new partnerships for DV1 and DV2.
- **SIDM Programme -** making smarter investment decisions.
- **DV1 Execution Plans and Mobilisation -** streamlining of the Plan and Prepare stages of capital investment projects.
- **Waste Water Intelligent Networks and Improved Urban Water Routemap -** improved asset and network condition and performance management at lower cost through the application of sensors.
- **Standardisation -** simplification and standardisation of designs to reduce time, cost, and carbon within capital procurement projects.
- **Project Swift -** streamlining of field work processes to improve planning, scheduling, and delivery of work.
- **Intelligent Water Networks – Source to Tap -** proactive water network management enabled by improved asset and network condition intelligence.

Further details on our approach to transformation and the initiatives delivering the largest benefits contributions, can be found in Annex A.

3.2 Research & Innovation (R&I)

We have made some significant improvements to technologies, products and processes through research and innovation that are integrated into current and future activities. The R&I programme has 185 projects across the water (41), waste water (55), net zero (37) and circular economy (52) focus areas. The programme is a balance between site trials of technology and approaches, sponsored PhDs, and collaborative projects through academia, supply chain partners, and other water companies through the Ofwat innovation fund. The R&I programme is on track to leverage up to £100m of additional funding from external sources over the SR21 period.

Outputs from the programme include:

Hydro Nation Chair – in line with Scottish Government programme for government, Scottish Water established the Hydro Nation Chair programme, hosted by Stirling University, in partnership with the Scottish Funding Council. This programme acts as a focal point for Scottish academia to drive research and innovation focused on Scottish Water's Strategic Ambitions, to support service excellence, great value and financial sustainability and go beyond net zero. The

programme has accelerated evaluation and adoption of monitoring technologies, leveraged research funding of c£20m from UK Research and Innovation and stimulated early-stage development of technologies for capturing and utilising process emissions, and developing tertiary waste water treatment that has the potential to generate energy from process emissions.

Resource Recovery - Achievement of end of waste categorisation for grit recovered from waste water treatment. This can be utilised in recycled aggregate reducing carbon emissions and diverting waste from landfill. We are working with SEPA to identify pathways for other recovered materials that benefit our water and waste water systems e.g. cellulose, screenings, alum sludges.

New waste water treatment technologies – Adoption of new waste water treatment technologies (Nereda) – which can help to reduce the required size of treatment works by 50% and provides treatment at lower costs compared to legacy processes.

New water treatment technologies – Evaluation and adoption of ceramic membrane water treatment system - with the first installation in a facility at Bonnycraig water treatment works, Peebles. The work has identified the operating envelope for membrane treatment which informs £500m of future investment where this technology will be utilised. The modular design and off-site delivery model developed by Ross-shire Engineering (RSE) using this technology enables faster project delivery from initiation to commissioning. This has generated a significant new order book for RSE across the UK water sector – supporting a Flourishing Scotland.

Minimisation of water quality incidents in distribution – Building on research from University of Sheffield, we have adopted a water mains management approach that reduces the discoloration at customers taps and reduces the need for mains rehabilitation saving £40m in SR21. Applying this approach has an enduring benefit – reducing the need for investment into future investment periods.

Systemisation of final effluent monitoring at waste water treatment works – Installation of near real-time monitors on waste water treatment works in SR21 has provided greater insight on treatment performance. This replaces long lead-time laboratory analysis and enables proactive interventions to manage compliance at lower cost due to reductions in energy and chemicals.

Design and implementation of resource recovery at demonstrator waste water treatment works – We are in the final stages of design to install cellulose recovery and algal bioreactors for phosphorus removal and recovery at an existing waste water treatment works. This will enable evaluation of process benefits of resource recovery and allow for testing and development of markets for recovered resources.

Nature Based Solutions – Developed and designed a nature-based treatment system for installation at a waste water treatment works for environmental improvement and to support growth. This will inform our future investment strategy and increase understanding of the

capability of nature-based solutions. Deployment of this technology is enabling us to meet increased demand and will enable us to assess the potential for wider application at smaller waste water treatment sites.

Process Emissions – increased the understanding of process emissions from waste water treatment through identifying and deploying new measurement technologies and determining process conditions that drive emissions. This allows us to identify ways to control our processes to mitigate these emissions to support our Net Zero ambition. This will be an essential part of our Net Zero Route Map in SR27 and inform the level of carbon capture that is required to offset the emissions.

Embracing Circular Economy Principles – We have worked with our supply chain partners to develop a refurbishment and remanufacturing approach for waste water pumps to reduce cost, carbon, and time to replace pumps. This approach is being integrated into our waste water pump management approach to drive more efficient service delivery.

3.3 Learnings from SR21 Transformation and Research & Innovation Initiatives

3.3.1 Transformation

- **Dedicated resources** - Dedicated resources were a key success factor in SR21, supporting the delivery of major change initiatives. In SR27, return on investment is expected to improve through a more efficient, capability-led approach, with stronger retention of organisational knowledge and a focus on building internal capability over time. This approach is intended to improve the relationship between delivery effort and benefits realised, while maintaining sufficient capacity to prioritise, govern and assure delivery across the portfolio.

- **Capacity** – In SR21 we recognised the need to balance organisational capacity with the scale and complexity of in-flight change. Experience indicates that there are practical limits to how much complex, cross-business change can be progressed effectively at any one time, and this learning is being applied in SR27 by prioritising a focused set of themes aligned to the areas of greatest opportunity and strategic need, while retaining flexibility to adapt as priorities and evidence evolve.

3.3.2 Research & Innovation

- **Dedicated resources** – the Research & Innovation programme has been delivered by a core team within the business, aligned to water, waste water and net zero strategies. Working with integrated sponsor teams across these areas ensures that research and innovation projects are prioritised and aligned to strategic and operational needs which in turn makes the process of implementation smoother and yield greater customer benefits.

- **Funding** – Having a dedicated investment allocation allows for greater agility to respond to co-funding opportunities. As an example, Scottish Water has leveraged (currently £70m)

from the Ofwat Innovation Fund which was put in place to drive greater collaborative innovation across the water industry in England and Wales. The programme (£200m in PR21 and £400m in PR24) is driving advances in cross-sector needs including, net zero waste water treatment, advanced thermal processing of biosolids, 3D printing of concrete structures and open data initiatives. We also collaborate on technical research through UK Water Industry Research who deliver a £4m per annum research programme that underpins the performance of water and waste water services and advances approaches to asset management, leakage, and wider system operation. A key focus area for Scottish Water will be to maximise the value of our research and innovation funding.

- **Internal Collaborative working** – in delivering the research and innovation programme in SR21, internal collaboration was a key success factor. We established innovation groups covering water, waste water, and net zero with senior level representatives from across the business to sponsor the R&I programme and act as the governance groups. This ensured that R&I activity and projects was focused on business need and that consideration for implementation and utilisation of the project outputs was built in. This created a business pull for the outputs and a buy in to the innovation. As we have developed the SR27 Investment Needs, gaps in knowledge and capability have been identified and captured and are built into the rolling Research and Innovation programme. This will enable a smoother transition from SR21 to SR27 and earlier realisation of benefits.

- **External collaborative working** – our ability to unlock opportunities and manage risks associated with our services is increasingly dependent on support from stakeholders and customers. For example, the Research and Innovation programme has benefitted from collaboration with academia in Scotland through the Hydro Nation Chair programme hosted by University of Stirling. This novel approach, funded by Scottish Water through the Scottish Funding Council, created a dedicated resource across multiple Scottish universities focused on key missions aligned to our net zero ambition. This programme has leveraged additional funding through UK Research and Innovation (UKRI) and other sources (c.£20m to date) and pulled on the expertise across Scotland's water research community accelerating knowledge transfer, increasing understanding of impacts on the water environment and developing new evaluation techniques for peatland restoration work and monitoring of woodland expansion to mitigate our emissions. The UK now has access to Horizon Europe research and innovation funding which is proposed to be €175 billion budget covering 2028 to 2034. This increases the opportunities to work in partnership with others to drive fundamental change.

- **Scaling Innovation –** the rate limiting step in innovation is the implementation phase. This generally involves significant business change and with technology, brings increased risk levels and initial cost – the innovation premium. In an attempt to overcome this, we have used Lighthouse Projects to direct specific funding and approach to project delivery. Examples of this are The River Almond Lighthouse, Resource Recovery Factory and Craigleith Blue/Green. In SR27 the approach will continue to be utilised as required to support innovation implementation.

We have learned that fragmented approaches lead to inefficiency in delivering benefits, including duplication of effort, inconsistent standards, and sub-optimal investment decisions, where digital, data, asset and operational change are progressed in isolation. Bringing these activities together under a single portfolio enables clearer prioritisation, reduces duplication, and supports more effective investment decisions, accelerating the translation of capability into measurable improvements in service performance, asset outcomes, and cost efficiency.

4 Transformation and Research & Innovation in SR27

4.1 SR27 Approach

4.1.1 SR27 Transformation overview

The purpose of Transformation is to support Scottish Water's strategic ambitions. In SR27, Transformation will deliver six themes that collectively strengthen how we plan, invest, and serve customers. These themes reflect lessons from SR21 and focus on the areas with the greatest potential to deliver value and productivity.

The six themes have been designed as a single, integrated portfolio rather than standalone programmes. Several themes provide enabling capability, such as standards, data, systems, and ways of working, that unlock benefits delivered elsewhere in the portfolio. The themes are therefore complementary and interdependent and should not be assessed or prioritised in isolation.

Lessons learned from SR21 have informed how we prioritise and balance the programme, including the need to align ambition with organisational capacity and to enable early mobilisation where this accelerates delivery. On this basis, around £113m of Transformation investment is included in the SR27 Final Business Plan to support early delivery across the portfolio, including mobilisation, partner enablement, platform and data foundations, and the initial scaling of priority capabilities, aligned to Data Table 6.

Although the themes are established, the detailed design of each programme will continue to mature through SR27 governance. The investment and benefits values included in Data Table 6 therefore remain best estimates at this stage, based on top-down assumptions and comparable SR21 initiatives. This approach avoids double counting, ensures consistency with SR27 cost baselines, and aligns with the assurance principles set out in the Table 6 Transformation Commentary.

To ensure best value for customers, investment and benefits may be rebalanced across themes as individual business cases mature. Any rebalancing will be undertaken within the context of the overall portfolio design, recognising the enabling role of some themes and the dependencies between them. This ensures that short-term optimisation of individual initiatives does not undermine delivery of long-term value, resilience, and efficiency across the wider programme.

This flexibility includes the use of an Invest-to-Save approach where initiatives can demonstrably pay back within the regulatory period. In such cases, funding may be drawn from the Transformation allocation or, where appropriate, through reprioritisation across Management Approaches, including use of later-year allocations and replenishment through realised benefits.

As we enter SR27, each theme will follow the established SR21 governance process before investment is approved. Individual business cases must meet defined criteria, including a clear implementation plan, robust cost-benefit analysis, and a benefits realisation plan. These criteria will continue to be refined throughout the period to ensure alignment with Scottish Water's strategy and the efficiency challenge. This ensures that strong opportunities, particularly around energy efficiency, optimisation technologies and other cost-reducing innovations, can be progressed without increasing total SR27 expenditure.

As the portfolio develops, additional opportunities will also emerge within and beyond the six themes. Those that support our strategy, meet approval criteria, and demonstrate credible returns will be considered for investment on a spend-to-save basis, subject to governance and available capacity.

Benefits will be measured against the SR27 Reference Scenario baseline. Capital benefits will be realised through reduced capital investment requirements compared to the baseline, allowing additional projects to be funded within the same envelope. Operational benefits will be realised through tapering operational budgets over the period. Both will be tracked through the IPS cycle, and Data Table 6 will be updated as business cases mature and evidence strengthens.

A material proportion of Transformation value is expected to arise through the avoidance of future costs rather than direct reductions to the current cost base. These impacts depend on future demand, growth, regulatory requirements, and asset performance, and will continue to be evidenced as business cases mature. Scottish Water will capture, evidence and, where appropriate, claim cost avoidance through a structured approach including counterfactual baselines, scenario analysis, and comparison of forecast outcomes with and without transformation intervention. This will be applied consistently across the portfolio and strengthened over time as delivery evidence develops.

The total Transformation investment across SR27 is around £113m, delivering c.£405m in gross benefits and c.£292m in net benefits based on current estimates and after applying a 60% portfolio-level risk adjustment to benefits. These efficiencies materially support Scottish Water's ability to meet the SR27 cost-efficiency challenge of 0.8% per year (c.£300m over six years).

We are confident in our ability to deliver this programme. Although the themes are new, they build directly on proven approaches delivered through over 50 initiatives in SR21, providing confidence in the planning, governance, and execution processes now in place.

The section below describes each theme and the associated investment and benefits figures included in Data Table 6.

4.1.2 SR27 Key Transformation Initiatives

The SR27 Transformation portfolio focuses on six themes that together strengthen how Scottish Water plans, invests and operates. Each theme reflects lessons from SR21, areas of greatest opportunity, and the organisation's capacity for major change. All costs and benefits presented here are based on the best available estimates and align with Data Table 6.

The detailed annual investment and benefits profiles for all six themes are set out in Data Table 6. This table should be read as representing how Transformation investment enables value across the portfolio as a whole, rather than as a like-for-like comparison of individual themes. Several themes primarily enable or amplify benefits delivered elsewhere, with value realised through interaction with other initiatives rather than in isolation.

Capital and Digital Procurement

Capital and Digital Procurement strengthens how Scottish Water works with its capital and digital partners to deliver greater efficiency, innovation, and value for customers. Building on the alliance and partnership models established during SR21 for both capital and digital delivery, the programme integrates capital and digital procurement to improve planning, delivery coordination, and whole-life value.

It combines the DV4 Capital Enterprise Model, which deepens collaboration through shared risk and aligned incentives, with Digital Partner Reprocurement to strengthen digital delivery partnerships that support transformation and operational improvement. Transformation activity focuses on embedding and operating these established approaches consistently across the organisation, ensuring that the intended benefits of partnership working are realised in practice. Together, these changes reduce delivery risk, improve productivity, shorten delivery times, and increase use of standardised solutions.

Investment is concentrated in the early years to maximise return over the period, support mobilisation and partner enablement. The SR27 Final Business Plan includes c.£31m of investment and c.£212m of gross benefits, comprising c.£6m of operational savings and c.£206m of capital savings.

Continuous Improvement & Process Excellence

Continuous Improvement & Process Excellence provides the foundation for sustained productivity gains across Scottish Water. The programme focuses on simplifying and standardising processes, strengthening end-to-end accountability, and embedding consistent ways of working that improve efficiency, reliability, and performance.

The programme delivers benefits in its own right through improved productivity, reduced waste and more consistent operational performance. It is also a critical enabling capability, unlocking

and amplifying benefits across other Transformation themes by providing common standards, improved process design, and stronger performance management. As a result, a material proportion of its value is realised through interaction with other initiatives rather than in isolation.

The SR27 Final Business Plan allocates c.£19m of investment and c.£55m of gross benefits, comprising c.£31m of operational savings and c.£24m of capital savings.

Digitisation, Artificial Intelligence, and Automation

Digitisation, Artificial Intelligence, and Automation enable efficiency across all Transformation themes by improving data access, automating routine activity, and applying advanced analytics to planning, operations and asset management.

The programme strengthens collaboration across teams and partners by improving the flow, consistency, and usability of information, enabling more joined-up working and better-informed decisions. Enhanced insight supports earlier intervention, clearer prioritisation and more confident trade-offs between cost, risk, service, and carbon outcomes.

Investment is front-loaded to modernise platforms, scale automation and embed data- and AI-enabled insight. As capability matures, benefits increase through reuse, standardisation, and business-as-usual adoption, delivering both direct efficiencies and wider value across the Transformation portfolio.

The SR27 Final Business Plan allocates c.£16m of investment, delivering c.£25m of gross benefits.

System Based Approach (SIDM)

The Sustainable Investment Decision Making (SIDM) approach strengthens how Scottish Water plans and prioritises investment by embedding whole-system, whole-life and data-driven decision-making across assets, services, and systems. Building on SR21, SIDM improves the quality and consistency of investment decisions, enabling more effective prioritisation of interventions and avoiding unnecessary or premature capital investment while maintaining service and risk outcomes.

As the programme reaches a more mature phase, investment reduces compared with SR21, with benefits delivered primarily through improved investment efficiency and capital cost avoidance. SIDM also strengthens longer-term system planning, forecasting and cross-directorate alignment, supporting more transparent and evidence-based investment decisions.

The SR27 Final Business Plan includes c.£10m of investment and c.£71m of gross benefits, delivered through capital cost avoidance arising from improved system-level prioritisation and decision-making.

Asset Risk and Optimisation (Compass)

Asset Risk and Optimisation enhances how Scottish Water anticipates and manages asset and operational risk by combining data, insight, and decision-support tools to enable earlier intervention and reduce reactive activity.

Investment is concentrated in the early years to scale capability and embed predictive insight across priority systems. As capability matures, optimisation activity transitions into business-as-usual.

The programme delivers operational and capital efficiencies through remote control, reduced asset failures, fewer reactive repairs and optimised maintenance, while also supporting wider resilience, service, and carbon outcomes.

The SR27 Final Business Plan provides c.£31m of investment, delivering c.£42m of gross benefits, comprising c.£4m of operational savings and c.£38m of capital savings.

Partnership Ecosystems (Team Scotland)

The Partnership Ecosystem, known as Team Scotland, builds on the success of SR21 by strengthening collaboration with customers, communities, government, and industry to deliver shared outcomes in water efficiency, resilience, and sustainability.

The initial focus in SR27 is on influencing behaviour and reducing per-capita consumption, helping to manage long-term demand on Scottish Water's infrastructure while supporting customer and environmental outcomes. Over time, the programme provides a platform for broader collaboration in areas such as resource efficiency, resilience, and innovation, as partnership models and evidence mature.

Investment of c.£6m is planned, focused primarily in the early years of SR27 to support partnership coordination, behavioural insight, communications, and targeted engagement activity. As partnerships mature and activity becomes more self-sustaining, investment requirements are expected to reduce.

Benefits are not monetised within SR27 due to early maturity and reliance on behavioural change. However, the programme is expected to deliver measurable indirect efficiencies and long-term value, including deferred capital investment, reduced operational pressures and enhanced environmental outcomes. As evidence develops, benefits will continue to be assessed and, where appropriate, incorporated into future Data Table 6 updates.

4.1.3 SR27 Research and Innovation

Our approach in SR27

We follow a staged approach to research and innovation, increasing knowledge and asset capability, applying this through pilot trials, and ultimately scaling through demonstrator projects. This approach has been successful in deploying ceramic membrane treatment for drinking water production and developing our resource recovery factory. These demonstrators provide operators and stakeholders real world application, inform investment planning, and build confidence in new approaches.

We balance our portfolio to deliver short-, medium- and long-term benefits and value. This means being clear on what our research and innovation intent is and recognise, the risk profile, resources committed, measures of success and speed of delivery vary across the portfolio.

The research and innovation portfolio is balanced across:

- **CORE (40%):** deliver efficient and effective services with our current asset base;
- **ENHANCE (50%):** ensure our assets and services can meet increasing customer demand and adapt to deal with the impacts of climate change, and knowledge and capability; and
- **EXPLORE (10%):** consider and evaluate emerging risks, technology trends, and legislation and how these can be incorporated into our future service to meet our strategic ambitions.

Partnership working to facilitate Research & Innovation

Developing the knowledge and capabilities we need to deliver efficient and effective services now, and to adapt and transform services for the future, require us to look for ideas and opportunities from a diverse range of sources. We have grown and expanded our research and innovation ecosystem to include our people, our customers as well as academia, research bodies, suppliers (existing and emerging), industry partners and beyond to ensure that we quickly identify, evaluate and implement new and emerging solutions. The specifics of who we work with will change over time to fit the challenges we are trying to address and the opportunities that emerge. Working in partnership ensures that any investment in research and innovation from Scottish Water is leveraged with partner funding. Across our research and innovation programmes we aim to achieve on average 10:1 leverage i.e. £10 for every £1 invested.

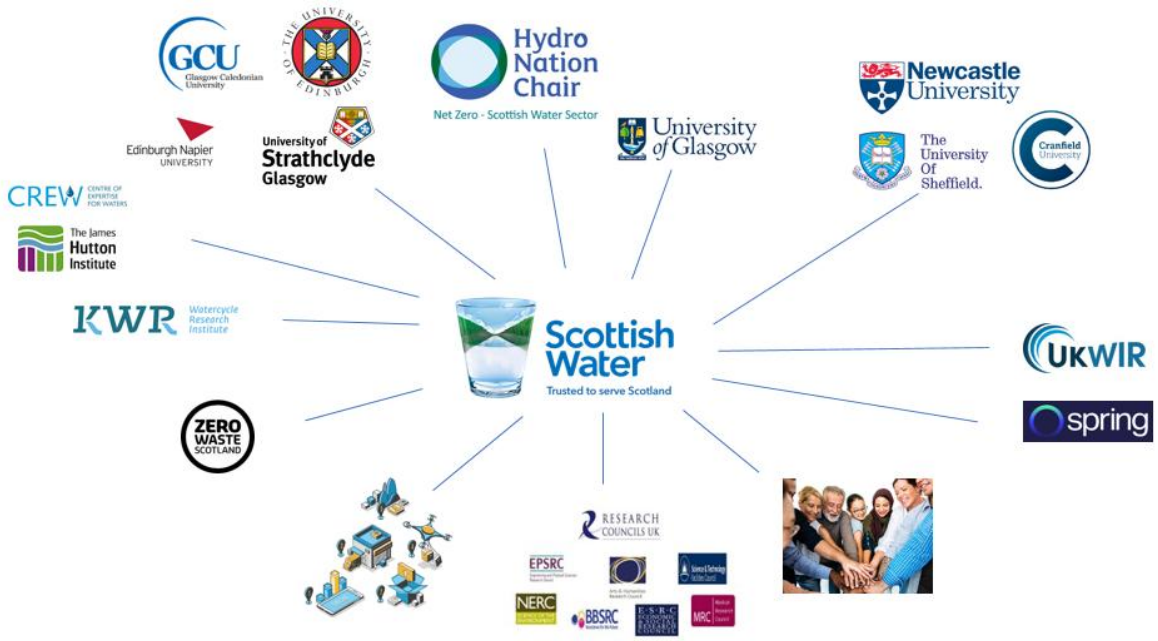

Figure 1: Our Research & Innovation Partnership Network

Key partners in our Research & Innovation ecosystem are:

Hydro Nation Chair (HNC) Programme – hosted by University of Stirling, this partnership between Scottish Water and the Scottish academic sector is delivering a critical mass of water and environmental research and knowledge focused on enabling Scottish Water to deliver our net zero ambition. The HNC programme has delivery partners from Stirling University, Glasgow Caledonian University, Heriot-Watt University and UK Centre for Environment and Hydrology to support key outcomes that enable our Beyond Net Zero ambition. These include process emissions, low carbon infrastructure and enhancing natural systems.

Wider Water Industry and Research Bodies

We work collaboratively with researchers across academia, primarily in the UK, where there is alignment with the Water Sector Vision, our Long-Term Strategy or SR27 Final Business Plan.

- **University of Glasgow** - £5.8m programme grant exploring new ways to provide decentralised water and waste water treatment for rural communities beyond the reach of the public network. This aligns with Scottish Government's commitment to provide access to clean water and safe sanitation to all, and the programme is developing water and waste water treatment technologies, enhancing existing systems and identifying changes required to policy and regulatory landscape to support adoption.

- **Water Infrastructure Resilience (WiRE) doctoral programme** - co-fund PhD projects with Cranfield, Newcastle, and Sheffield universities. The programme aims to develop future technical engineers and scientists for the water industry and provides knowledge and capability focused on key industry challenges (e.g. reducing leakage, reducing process emissions and more effective water treatment).

- **Cross Industry Collaboration** – work with funding agencies (UK Research and Innovation), industry networks (IBioIC and Zero Waste Scotland), and other water companies as appropriate. IBioIC and Zero Waste Scotland are key partners in resource recovery projects including characterisation of materials recovered and establishing cross-sector links with potential markets.

- **International Collaboration –** we have a strong track record of working with water operators and research bodies internationally. We will continue to seek out partners with shared challenges and common aspirations to leverage funding and knowledge.

- **Napier University –** PhDs looking at the prevalence of antimicrobial resistant (AMR) genes in the freshwater environment. This supports the UK National Action Plan on AMR to determine the contribution of AMR from human and animal medicine and the wider environment. This will inform future investment for the water industry and prescribing practices for NHS and veterinary practice.

- **University of Highlands and Islands –** aligned with the broader AMR action plan and source control of pharmaceuticals to prevent environmental pollution. Lead a partnership between Scottish Water, SEPA and NHS Highland exploring pharmaceutical formulations that are less harmful to the environment whilst maintaining efficacy.

- **UK Water Industry Research (UKWIR)** conducts collaborative research on behalf of the water industry in the UK and Ireland. The research output from UKWIR produces the evidence to underpin current industry performance, create common approaches to cross-industry challenges e.g. process emissions, and informs future policy and regulation and creates the knowledge needed to respond to future needs e.g. climate adaptation.

- **SPRING** is the UK water industry's innovation accelerator with the aim of increasing the amount and rate of innovation and reducing the burden on innovators and companies by streamlining the innovation process. [This creates a focal point for shared challenges set out in the Water 2050 Innovation Strategy, and common solutions, enabling greater collaboration and leverage of resources and reducing duplication of effort. SPRING works in partnership with UK water companies to facilitate innovation, share knowledge and support the delivery of the Ofwat innovation fund (£200m 2020-2025; £400m 2025-2030)].

4.1.4 SR27 Key Research & Innovation Initiatives

The primary focus of our Research & Innovation programme provides new knowledge and capability to support and enable delivery of our water, waste water, and net zero strategies. Cross-business innovation groups focused on each of these areas acts as the sponsor and governance mechanisms to identify and prioritise research and innovation requirements and ensure that the outputs from the programme are implemented into the business. We have allocated £31m in the SR27 Reference Scenario to deliver the Research and Innovation programme.

Building on the approach in SR21 we intend to extend the Hydro Nation Chair programme that engages and builds capability across Scottish Academia (£4m) in research focused on addressing key gaps and challenges in our Long-Term Strategy. The remainder (£28m) will be

used to carry out research and innovation projects aligned to needs identified in Water Quality, Water Environment, and Climate Change Mitigation Technical Appendices. As in SR21, we will proactively seek leveraged funding where appropriate to scale the programme.

We work extensively across the UK water industry to identify and deliver research and innovation through industry level collaborative research and innovation delivery mechanisms. This ensures that common industry level needs and opportunities (e.g. lead) are identified and coordinated research and innovation is carried out cost effectively through combined investment. Given the dynamic nature of research and innovation activity, the portfolio will adapt over time to reflect current and emerging needs and respond to threats and opportunities as they arise.

Following the approach described in 4.1.3, our SR27 research and innovation programme is aligned with our investment strategy for water, waste water and net zero in SR27 and towards delivering on our Long-Term Strategy. The Technical Appendices for Water Quality, Water Environment and Climate Change Mitigation provide the context and detail of why and what research and innovation is needed. This is summarised below.

Ensuring excellent water quality and a continuous supply

- *Catchment management* enables us to manage the environmental factors impacting on raw water quality for our drinking water systems. As the need for climate adaptation increases, we need to have a greater understanding of land use impacts on quality and quantity and what changes we can make, in collaboration with others to minimise deterioration or improve quality. This reduces the downstream need to increase the levels of treatment. Working with FORTH ERA at University of Stirling we are utilising in-situ multi-parameter monitors and satellite sensing Increased use of satellite and environmental monitoring and modelling enables us to identify priority areas for activity and the likelihood of improvements. This work will be pivotal to supporting our Climate Adaptation pioneer catchments.

- *Enhancing the resilience and efficiency of water treatment processes* remains an ongoing challenge due to variations in source water quality driven by climate change and the identification of emerging contaminants. The water treatment programme has already identified ceramic membranes and ion exchange treatments that increase the robustness of treatment and reduce the ongoing maintenance costs. We are advancing further work looking at flat sheet membranes as a potential enhancement to existing filtration plants. This has the potential to provide more robust treatment and increase the capacity of existing works within the current footprint due to higher treatment rates. We are further exploring the use of ceramic membranes in nanofiltration applications. These are predominantly in our rural treatment systems, and these membranes could replace the current polymeric PCI tubular membranes (85 sites) increasing operational performance and life.

- *Aesthetic quality* is an important issue for customers, and we will be continuing with research work on taste and odour compounds both from raw water (e.g. Geosmin and 2-methylisoborenol (MIB)) and disinfection by-products, such as trihalomethanes and halo-

acetic acid compounds. Ongoing work with University of Glasgow has developed a promising monitoring technique for faster identification of taste and odour compounds in raw water.

- With drier periods and reduced storage in raw water reservoirs, there is an increased risk of manganese discolouration in distribution. We are developing monitoring and modelling techniques to better understand what drives increased manganese in raw water and identify better management and treatment options.

- *Demand reduction* through better leakage management, increasing awareness of domestic consumption and offsetting the use of drinking water for non-potable purposes will be further explored. This will link in with UK wide research and innovation with other water companies through UKWIR.

- *Integrated water resource management* through the utilisation of surface water and grey water will be investigated to determine whether this can support demand reduction in existing and new developments. Proposals are being developed as part of the HNC programme and Stirling University to build low carbon / low water demand intergenerational living homes as exemplars.

Protecting and enhancing our water environment

- We need *better understanding* of the impacts of multiple inputs to the environment as well as sewer and waste water treatment discharges to ensure that investment we make has the desired benefit. Working with FORTH ERA at Stirling University we are carrying out research that will better evaluate the impact of interventions on the water environment so that collective action delivers the improvements needed. With the increasing knowledge and awareness of micropollutants, removal through better treatment will be a project focus.

- The proposed *resource recovery demonstrator* on our waste water plant at Alloa will evaluate the benefits of resource recovery on treatment efficiency and effectiveness and the impact on overall emissions. The resource materials recovered will enable quality testing and identification of potential onwards uses. Working with Stirling and Clackmannanshire City Deal we are developing a green economy hub concept in the Forth Bank area of Alloa to support the creation of new enterprises based on resource recovery. A funding bid for UKRI is being prepared for this project.

- *Optimising treatment* - we need to build the learning from research on process emissions to understand the optimisation of waste water treatment to balance effluent quality, energy and chemical consumption, resource recovery and reducing emissions. This will require the development of simulation models to better control the process to determine further mitigation needs.

- *Managing the biology of waste water* – advances in identifying and managing the biological processes within waste water treatment provide the opportunity to better optimise waste water

treatment. Historically the focus of waste water treatment has been on reduction of biological loading, but with increased awareness of micropollutants and process emissions, better control of the biological communities in waste water process is required. Research will be carried out to determine whether biological communities can be tailored within a works to target specific contaminants and balance biological treatment and minimise emissions.

- *Small scale waste water treatment* covers a significant number of assets. A research and development focus will be on balancing nature-based solutions with waste water treatment to maximise circular economy benefits and reduce emissions, whilst delivering resilient effluent quality.

- *Advanced Thermal Conversion (ATC) technologies* - in collaboration with suppliers and UK water companies to gain deeper insights into their operation and the materials produced. This knowledge will help us identify target markets, collaborate with SEPA to create regulatory and commercial pathways, and develop value chains for recovered resources. Additionally, these materials will be used to explore opportunities for phosphorus recovery from char and ash, while informing waste treatment solutions for small-scale rural and island communities. This is likely to require significant investment to scale up and build confidence in the technology. We are working with other water companies to build this capability and understanding.

- *Monitoring* – Further research is needed to understand the connection between waste water networks and treatment systems. This includes evaluating the impact of widescale surface water removal and improved water efficiency on network performance, influent flow variability to waste water treatment works (WWTWs), treatment performance, and compliance risks. Expanding trade effluent discharge monitoring and enhancing WWTW inlet quality monitoring could provide early warnings of treatment issues, enabling proactive compliance efforts. Some of this work is currently underway and will continue into SR27.

Climate adaptation and mitigation

- *Process emissions* from waste water will become the largest source of greenhouse gases as other parts of the economy decarbonise. There is a lack of international knowledge on methane and nitrous oxide emissions from waste water systems and their management. We are developing better monitoring systems to quantify emissions and understand the processes that influence them. Our focus is on minimising emissions through process optimisation while maintaining compliance. In collaboration with the University of Glasgow, we are exploring microbiological control in waste water systems to manage emissions and examining the impact of resource recovery, gas capture and utilisation, and non-biological treatment methods. This will minimise the production of nitrous oxide and release of methane from our treatment systems.

- Promote research and innovation and undertake trials on *CO_2 capture technologies* from our waste water treatment processes. We have identified Carbon Capture and Utilisation technologies that can produce material for cement production that reduces the carbon emissions associated with infrastructure.

- *Nature-based solutions* are increasingly used in waste water treatment and surface water management to reduce environmental impact or for non-drinking reuse. Collaborating with academic researchers and the Royal Botanic Gardens in Edinburgh, we aim to find the optimal plants for various applications and broaden their use.

- *Infrastructure emissions* from our investment delivery are an important part of our net zero goals. We are collaborating with our supply chain, other infrastructure organizations, and academia to identify lower carbon construction materials, especially for concrete and steel. Detailed requirements are provided in the Climate Change Mitigation Technical Appendix.

- We shall continue to *develop our understanding of the impact of climate change* on the quality of our raw water sources, particularly in relation to variations in rainfall patterns, extreme weather events and increasing temperatures. Research and development in the following areas will be required:
    - Understand the risks to source water treatability associated with climate change impacts, including algal blooms, taste and odour and increasing levels of organics and pathogens;
    - Assess the efficacy and environmental impacts of nature-based, in-reservoir and catchment solutions;
    - Development of monitoring and modelling techniques to predict and manage variations in raw water quality, including organics and pathogens.

Lighthouse Projects

A key challenge in driving innovation through to implementation is overcoming capacity or resistance to change that can slow down the rapid and wide deployment of new technologies and ways of working. Often termed the “valley of death,” new technologies and business models struggle for traction. To overcome this, Scottish Water created a framework, Lighthouse Project, that gives innovative approaches the greatest chance of success. This approach creates an environment that encourages and supports:

- Cross-functional and multi-partner teams to facilitate and progress Lighthouse projects
- Investment to scale the innovation to a level that builds confidence in the technology and the delivery mechanisms.
- Strong senior level sponsorship to unblock delivery and overcome barriers to progress
- A learning and open mindset to ensure that progress towards outcomes is the focus and learning is valued

This framework has been used to ensure that new technologies, e.g. ceramic membranes and Nereda, are embedded into our solutions library or can be used to provide focus to addressing a strategic imperative e.g. achieving lead free Scotland. There is no ringfenced lighthouse funding in the reference scenario reflecting the reduced innovation allocation in SR27.

The wider list of Lighthouse opportunities included in Appendix B represents potential demonstrators that will continue to be explored during SR27. These will be scoped and refined using Innovation allocation for feasibility work only. Any further delivery will be subject to full investment appraisal, prioritisation against strategic need, and confirmation that they deliver measurable value for customers.

This approach ensures that Lighthouse activity remains aligned with the SR27 investment envelope and continues to support strategic objectives without creating unfunded commitments.

5 Assumptions and Uncertainties

5.1 Assumptions

Transformation – We use a range of assumptions when estimating the costs and benefits of individual projects within our Transformation themes. These are based on the best available information at this stage and will be developed and updated as projects approach launch and costs are firmed up. In addition, new information may come to light that shows that it would be in customers' interests to pursue different Transformation projects, or to focus our attention on a sub-selection of activities that will drive a better return on investment for customers money. We will continue to engage with WICS and key stakeholders as our Transformation plans develop – both for the SR27 Final Business Plan and as we approach the start of SR27.

Ofwat Innovation Fund – The success of the Research and Innovation programme over recent years can be attributed to high levels of collaboration within the water industry driven by the introduction of the Ofwat Innovation fund in England & Wales, and consistent funding from UKRI in water related research and doctoral training centres. This has provided high levels of leveraged funding and driven collaboration at an industry level. While the innovation fund has been extended from 2025 to 2030 and increased from £200m to £400m, it cannot be assumed that the fund will continue indefinitely.

Academic funding – Additionally, the UK research landscape, and more recently and pronounced, the Scottish academic funding landscape, has come under increasing cost pressures. Reduced levels of collaboration and funding would result in increased cost to Scottish Water in developing new knowledge and capability and likely slow down the rate of progress.

5.2 Uncertainty

At this stage of planning, there is significant uncertainty as to the exact costs and benefits associated with individual Transformation projects; hence why we apply a 60% risk adjustment. Unlike other investments within the SR27 Final Business Plan, we typically do not have historical examples of similar projects as a benchmark – with many initiatives representing frontier improvements across the water and related industries. Individual cost and benefit estimates remain subject to revision as we approach the start of SR27, and it is likely that some projects will materially outperform our assumptions while others will not achieve initially anticipated benefits. We deploy strong governance structures to monitor outcomes and will stop or adapt if programmes are not delivering value for money. However, our overall confidence that the Transformation portfolio can, in aggregate, meet the efficiency challenge within the regulatory period is high (reliability C) for a number of reasons:

- **Historic performance** - The listed themes are a continuation or expansion of similar initiatives conducted throughout SR21. With over 100 initiatives delivered in SR21, we have increased confidence in the planning, governance and execution processes we have developed.

- **Application of transformation risk** – In keeping with the approach adopted in SR21, a Transformation risk adjustment has been applied to benefits for initiatives at the early design, definition, and development stages, consistent with the treatment of initiative-level 1 projects during SR21. The SR21 risk adjustment of 50% has been validated through portfolio performance over the SR21 regulatory period. Given SR27 is further into the future, and the themes are at an early stage of assessment, a 60% risk adjustment has been applied to all SR27 benefits estimates.

- **Appropriate benefits quantification** – Benefits that have proven more difficult to quantify and evidence—such as those associated with the standardisation of operating practices, Agile, Lean and Total Productive Maintenance (TPM) within the Continuous Improvement and Process Excellence theme, and those associated with the Team Scotland theme—have been excluded until benefits and overlaps with other themes are better understood.

- **Spend to save** – The portfolio may be enhanced by spend-to-save initiatives identified during the regulatory period. Where they demonstrate strong value, investment may be reprioritised to focus on activities delivering the highest return for customers, subject to affordability and governance.

In summary, our Transformation benefit estimates are based on a combination of benchmarks, extrapolation of existing initiatives, and lessons learned from comparable projects. Downside risk has been explicitly allowed for through the application of conservative and well-tested risk adjustments, reflecting the possibility that savings may be lower than forecast.

6 Conclusion

This Technical Appendix has set out our SR27 approach to our Transformation and Research & Innovation Programmes.

The core purpose of our Transformation programme is to support the Scottish Water Strategic Ambitions - focussing on Service Excellence, and Great Value and Financial Sustainability. Our Research and Innovation programme, which is anchored in collaboration with academia, will continue to be a key provider of knowledge and capability, enabling delivery across all key investment areas - also helping us deliver on our Long-Term Strategy.

We are proposing to:

- Invest around £113m across six Transformation themes during the SR27 regulatory period, with around £292m in net benefits forecast to support Scottish Water's cost-efficiency challenge of 0.8% per annum;
- Invest £4m to extend the Hydro Nation Chair Programme that engages Scottish Academia in research focussed on net zero/circular economy priorities - and invest £28m in carrying out continued research and innovation aligned to the needs identified in Water Quality, Water Environment, and Climate Mitigation Technical Appendices.

Our approaches across both programmes have been built on our successes and lessons learned from the SR21 period and are designed to address the three key challenges we have identified: increasing extreme weather, population growth and change, and tighter regulatory requirements.

These projects and programmes help us achieve improvements in our services, whilst making our operations and investments incrementally more efficient and productive. Every improvement that we make in this way leads to better outcomes for customers, lower bills, or reinvestment back into our assets. They enable us to deliver on our ambitions of Service Excellence, and Great Value and Financial Sustainability.

Annex A: Transformation in SR21

Transforming our business

The transformation portfolio includes over 50 initiatives. Each regulatory period, the portfolio is balanced to ensure that all costs are returned in financial benefits within the period, whilst also supporting non-financial initiatives. Financial benefits include recurring savings, capacity creation, avoided costs and additional income. Non-financial benefits include service excellence improvements and carbon reduction.

New initiative opportunities are actively sought across all of Scottish Water's operations, processes, and locations. Scottish Water has strengthened its approval approach by applying defined value-for-money and delivery criteria before initiatives progress. For each new initiative, a financial baseline is defined as well as the associated one-time costs, ongoing costs, whole life costs, one-time savings, and recurring savings.

Potential initiatives progress through a staged portfolio approach, with increasing levels of definition, evidence and certainty required at each stage. As initiatives mature, cost and benefit assumptions are refined, implementation plans are strengthened, and benefits realisation approaches are developed and validated with finance. Only initiatives that continue to demonstrate clear value for customers and alignment with agreed approval criteria progress into delivery. This staged approach acts as a funnel, reducing uncertainty over time and ensuring that only initiatives with robust evidence, credible delivery plans and clear customer value are taken forward.

Initiative progress and benefits are tracked and reported on a regular basis, comparing planned, forecast, and actual delivery against agreed expectations. This enables timely identification of gaps, corrective action where required, and active management to maximise value. Benefits are independently reviewed and verified by finance before being confirmed as realised.

In addition to assurance at an individual initiative level, the Transformation portfolio is subject to periodic internal assurance and audit to confirm that appropriate controls and processes are in place to define, evidence, monitor and report benefits consistently across the portfolio.

SR21 Tier 1 benefits: Transformation initiatives are on track to contribute £49 million of gross (£30 million of net) Tier 1 benefits over the SR21 regulatory period. The top five initiatives contribute over 60% of the total Tier 1 benefits. They are listed below:

- **SR21 Procurement** – although predominantly delivering Tier 2 savings (as planned), this initiative is also forecast to deliver Tier 1 savings.
- **Wholesale Transformation** – the Wholesale Service processes were streamlined to better respond to the customer's concerns, improve right first time and reduce waste.
- **Project SWIFT** – SWIFT has improved the efficiency of field work, whilst reducing carbon emissions and improving service.
- **Co-pilot Upscale** – the introduction of Co-pilot increased the productivity of the pilot groups to such an extent that its deployment has been upscaled.

- **Functional Hub** - the Functional Hub is deploying the capabilities and culture to enable the business to continuously improve its processes.

SR21 Tier 2 and 1A benefits: Transformation initiatives are forecast to deliver around £384m in gross Tier 2 and Tier 1a benefits, based on the best available estimates. The seven largest initiatives account for approximately 80% of these benefits (c.£313m) and are summarised below.

SR21 Capital Procurement

The advent of the SR21 regulatory period allowed Scottish Water to enter new partnership arrangements with its Delivery Vehicle 1 and 2 (DV1 and DV2) partners. New and anticipated efficiencies in the Plan, Prepare and Deliver phases of projects allowed for efficiency factors to be agreed upfront with DV1 partners, versus the SR15 cost basis. Improvements in the DV2 delivery model also allowed for rates efficiencies and rebates to be agreed upfront with DV2 partners, versus the SR15 cost basis.

DV1 benefits began in FY 2021-2022, whereas DV2 benefits commenced in FY 2022-2023, once contracts were in place. The financial benefits each year are calculated by multiplying the capital investment expenditure by the SR21 percentage cost saving versus the SR15 baseline.

As well as providing financial benefits, the improved efficiency within the procurement process is delivering capital programmes within reduced lead-times.

SIDM Programme

The Sustainable Investment Decision Making Programme (SIDM) programme, launched in 2020, was established to ensure we are managing our current assets effectively and planning for the wise use and investment of customers' money, by making smarter investment decisions. This includes showing how we are becoming more efficient in the investment decisions we make now on our assets using the best available data and analytics, but also how they are resilient and looked after for future generations to inherit.

The SIDM programme is a 10-year programme and will continue beyond the SR21 regulatory period, maturing our investment decision making approach.

DV1 Execution Plans and Mobilisation

At the commencement of the SR21 regulatory period, Scottish Water and its DV1 partners collaborated to run pilot projects through the Plan and Prepare stages. With accelerated project launches, increased teamworking and streamlined processes, the pilots significantly reduced the time to navigate from Unifier stage 30 through to stage 90.

The pilots were benchmarked against similar SR15 project types (factory, conveyor, and assembly) to establish cost baselines, savings targets per project type and a streamlined Plan, Prepare process.

Waste Water Intelligent Networks and Improved Urban Waterways

Launched in 2022, the Wastewater Intelligent Network (WwIN) initiative is improving the operational awareness of the waste water network. The implementation of 1,000 CSO monitors, and 1,200 waste water network sensors will provide an overview of asset and network condition and performance. This real-time monitoring enables Scottish Water to detect and clear network issues, such as blockages, before they impact on customers and the environment.

Standardisation

This initiative has simplified and standardised our designs to reduce the associated time, cost, and carbon of DV1 and DV2 procurement programmes. The combination of improved requirements management, a move towards standard products, the introduction of a design library and the implementation of an E-portal to collaborate with supplier partners have reduced the cost and increased the quality of product designs and construction programmes.

As well as delivering financial savings, the introduction of the design library has enabled the re-use of low carbon designs, materials, and techniques.

Project Swift

Launched in 2021, SWIFT improves how Scottish Water and DV2 partners plan, manage, monitor, and deliver field work across Scotland. SWIFT streamlines field work processes, integrating planning and scheduling with DV2 partners. By providing field teams with improved applications for planning, scheduling and delivery of work, response times and the associated costs of field work have been significantly reduced. SWIFT is being progressively expanded into other SW teams and supply chain partners.

As well as providing financial benefits, the reduction in response times and increase in first time fix rates, improves customer experience and reduces carbon.

Intelligent Water Networks – Source to Tap

Launched in 2021, the source to tap initiative ran a pilot to build intelligence related to our asset and network condition and performance in the Inverness area. This intelligence is helping to optimise operations, reduce leakage and predict service issues, allowing for prompt preventative interventions.

As well as providing financial benefits, proactive water network management improves water quality and reduces interruptions, resolution times, leaks, and raw water extraction.

Other Initiatives

The remaining initiatives account for £71m of Tier 2 (and Tier 1a) benefits and other, non-financial benefits. Examples of carbon reduction benefits are the Exemplar waste water treatment works and Exemplar large SPS initiatives, where live waste water asset monitoring has reduced energy consumption and emissions. Examples of service excellence improvements include the streamlining of internal processes (I-journeys), the introduction of Co-pilot and the application of non-complex service delivery to increase productivity and reduce lead-times.

Annex B: Sample SR27 Innovation Lighthouse Projects

The scopes set out in this appendix are intended as examples of potential lighthouse projects that would inform future strategy. There is no ring-fenced funding in SR27 for these projects beyond determining scope and prioritising need. Funding to develop them will be subject to investment prioritisation alongside other needs.

Proposal: Resource resilient development

Long-term Step: Reduce Demand on our Services

Outcome: Key role in enabling Scotland's sustainable economic and housing growth

Rationale:

Society needs adaptation and mitigation strategies to respond to the climate emergency. Urban planning takes a non-systematic, siloed approach to development and provision of utility services. This increases the pressure on existing infrastructure and misses potential synergistic opportunities to address water management challenges and generate sustainable energy and heat.

Rethinking new residential and commercial developments has the potential to embrace circular economy thinking to better manage rainwater, surface water, and waste water to reduce environmental impacts, and to provide local sources of sustainable heat and energy.

Ongoing work with University of Glasgow (Decentralised Water Technologies – Offgrid water) has identified potential opportunities to improve and integrate waste water treatment and heat recovery systems. Internationally there is an increased focus on integrated urban water management to mitigate the amount of water abstracted from the environment and reduce the impact of surface water and sewer discharges to the environment.

Lighthouse Scope

Options that could be explored at scale and in partnership with developers, utility providers, planners, and community groups to scale up and implement alternative water management, waste water treatment, and heat / energy provision at a local level.

1. Integrated water management
2. Surface water and rainwater capture, treatment, and recycling for non-potable purposes e.g. irrigation, toilet flushing, commercial uses
3. Private water supply point of use treatment alternatives
4. Source separated waste water treatment
5. Black water and grey water separation – increased strength of effluent allows for anaerobic treatment, with heat and energy production. Heat and energy generated can be utilised to enhance the treatment processes with excess used to supplement community heat / energy systems and reduce fuel poverty/customer bills
6. Integrated waste management to combine organic waste streams and treat anaerobically to generate energy and heat
7. Nutrient recovery and process emissions control.

Potential Partners

University of Glasgow – Offgrid Water

University of Stirling – City Deal funding (c£7m) for intergenerational and low carbon housing

Homes for Scotland – representing house builders – unlocking development

Proposal: Advanced Thermal Conversion (ATC) technologies – securing our bioresources outlets

Long-term Step: Collaborate and lead partnerships

Outcome: Protecting our water environment

Rationale:

Advanced Thermal Conversion (ATC) technologies offer a range of potential benefits for biosolids management e.g. greater pollution destruction, less) dependency on land as an outlet for bioresources, greater capability to recover resources.

Scottish Water needs to build the supply chain in ATC, from the technology supplier to acceptance of the output materials and build a future customer-base for the output material for the circular economy; this takes time and requires building new business partnerships.

We need to test future business models: at the small-scale for multiple organic material inputs and at the large scale as part of future resilience.

The capability to demonstrate, within SR27, will show the market, the technology providers, regulators, and customers that we are prepared to make bold commitments to the circular economy and to the environment.

Lighthouse Scope

There are 3 modes of demonstration to consider, but at this stage it is too early to select. Multiple demonstrations might be possible if we work with partners.

1. Scottish Water hosted demonstrator on a sludge treatment centre (STC), time limited
2. Partner-demonstrator (where either SW host or Partner host), time limited
3. Demonstrate on Scottish Water STC, with option to purchase and make permanent.

ATC technologies within scope for bioresources

- Large-medium pyrolysis
- Medium-small hydrothermal carbonisation
- Gasification as either standalone or as bolt on
- Hydrothermal liquefaction to demonstrate via a partner host (this would be for the supply chain to host e.g. Fire Fly)
- Keep option open to partner on other emerging ATC technology demonstration

Proposal: Zero Process Emission site – 'Going Beyond Net Zero'

Long-term Step: Transform and drive efficiency

Outcome: Protecting our water environment

Rationale:

Following greening of the grid, process emissions (nitrous oxide and methane) from waste water treatment works will make up 56% of Scottish Waters operational emissions. Solutions need to be developed to enable us to go Beyond Net Zero by 2040. Projects are underway to mitigate these emissions through for process control and resource recovery by removing the causes of the emissions where appropriate – e.g. ammonia.

To achieve net zero process emissions there will be a requirement to apply these approaches and potentially capture and treat process emissions – be they N2O from ASP processes or CH4 from biosolids treatment.

Lighthouse Scope

This project seeks to employ a range of process emission options to achieve a zero-process emissions site.

This demonstrator will:

1. Measure the whole emissions of an ASP site using N2O monitors and air flow monitors in the off-gas flow.
2. Mitigate the whole emissions of a treatment works
3. Allow verification of liquid calculations versus total emissions for a whole ASP site
4. Demonstrate the cost and scalability of process emission solution.

Options for collection to be evaluated include:

- A full span Aluminium structure roof (highest carbon)
- A self-inflating gas bag (lower carbon)
- A suspending gas curtain (lower carbon)

Destruction/collection technologies to be evaluated include:

- Active destruction using
  - Acti-layer contained in a UV box
  - UV and Ozone box – e.g. Oxytec
  - Other
- Collection of N2O and scrubbing/compressing for use in other industry.

In conjunction with collection and destruction techniques mechanisms to control and manage the treatment process will be deployed and evaluated. These include:

- Nitrous oxide artificial intelligence and machine learning control philosophies
- Explore and deploy microbiology manipulation / control

Proposal: Digital Management of Water Environment

Long-term Step: Reduce Demand on Our Services

Outcome: Protecting our water environment

Rationale:

The River Almond Lighthouse project is developing a management approach to improve water quality in the River Almond to address improvement objectives driven by local action groups, environmental issues, and desire for greater access to the water environment.

The project is leveraging the developing FORTH ERA Digital Observatory delivered by University of Stirling as part of City Deal funding. MOT4 Rivers, a NERC funded project, is providing increase monitoring of the ecological health of the Almond Catchment. Scottish Water and PFI assets in the catchment discharge into the river. The River Almond catchment is also a selected Climate Change Adaptation Pioneer catchment.

Lighthouse Scope

Aim to operationalise outputs from FORTH-ERA / Almond Lighthouse and MOT4 Rivers to determine environmental / ecological capacity of water environment and identify priority inputs that need addressed at catchment level (Scottish Water and non-Scottish Water) to drive desired improvements.

We will use the outputs to drive a catchment level cost effective programme of measures. This may include development of digital twins of waste water treatment works alongside our natural environmental catchment management to enhance exemplar waste water operation and overall water management in the catchment to drive optimisation for compliance, emissions, and cost.

There is potential to link in our waste water intelligent networks to optimise management of sewer flows in dry and overload conditions to minimise the amount of CSO spills in priority catchments.

Potential Opportunities

- FORTH ERA – Digital Observatory of Forth Catchment funded by Stirling City Deal
- MOT4 Rivers – NERC research looking at ecological health of rivers and factors impacting it – Stirling / Glasgow / UKCEH etc.
- Almond Lighthouse
- Severn Trent Zero Spill Hub – collaborative approach to “solving” CSO issues
- University of Exeter fellowship to develop Waste water Digital Twin

Proposal: Circular Economy Regional Development

Long-term Step: Collaborate and lead partnerships

Outcome: Reduce demand on our services

Rationale:

Scottish Water is currently progressing phase 1 resource recovery demonstrator at Alloa Waste Water Treatment Works. This project aims to demonstrate and evaluate at scale the following opportunities:

- Diversion of waste products currently removed from landfill (e.g. grit)
- Extraction of potential resources from the waste water stream that benefit compliance and process capacity (cellulose and algal removal of phosphorous)
- Understanding of the material quality that can be recovered, to allow for market identification, develop product specifications and achieve end of waste criteria
- Understand the operation and maintenance impacts of resource recovery
- Evaluate the cost and benefits of resource recovery at an operational works

Other opportunities for resource recovery were identified in the pre-design work for Alloa, including hyrdothermal liquefaction of biosolids and pyrolysis of screenings. The need and markets for these were less well developed and were held back for phase 2.

Alongside this works, Clackmannanshire Council is developing a community vertical farm enterprise and have the aim to create a regeneration zone in and around the Forth Bank area that the treatment works is located. There is City Deal funding available to support green growth in this area and Alloa could become an R&D centre for resource recovery. Scotland's International Environment Centre, based at Alloa College is co-ordinating the delivery.

Lighthouse Scope

Phase 2 would be a build on the phase 1 demonstrator

- Evaluate benefits of resource recovery in phase 1 and determine what elements should or could be made permanent
- Dependent on bioresources / resource recovery strategy, progress with HTL pilot
- Screenings pyrolysis evaluation – determine central v's local and material outlets

Potential Opportunities

Phase 2 would seek to leverage the SIEC work with Clacks Council to develop an R&D and Green Growth facility in the Forth Bank area. This would seek to include enterprise agencies and SEPA to speed up the development of green business and products.

Scottish Water
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BUSINESS PLAN 2027-2033 TECHNICAL APPENDICES

Assurance

February 2026

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1 Executive Summary

The purpose of this Technical Appendix is to strengthen confidence in the SR27 Final Business Plan by clearly explaining the approach taken to assurance and risk assessment.

Assurance is the process by which we ensure the SR27 Final Business Plan is well evidenced, meets our obligations, follows the Water Industry Commission for Scotland's (WICS) methodology and is trustworthy. We use assurance to identify potential errors (e.g. in data and approach), make improvements and monitor how we develop our plan. We have worked with WICS to co-design the assurance requirements for our business plan submission, aligning with the requirements of WICS' SRC27 Final Methodology. Our assurance framework follows the three lines of assurance model, with internal data/product owners having independent review by senior independent management culminating in a review by an external third party assurance partner.

The WICS SRC27 Final Methodology requires the Scottish Water Board to provide appropriate assurance of Scottish Water's SR27 Final Business Plan. The Board has been fully engaged throughout the development of the SR27 Final Business Plan, providing leadership, scrutiny and challenge at every stage.

The Board Assurance Statement provided in relation to the SR27 Final Business Plan (and included in the Final Business Plan narrative document) reflects the systems of internal control and assurance that have been undertaken ahead of the submission of the SR27 Final Business Plan. Within the BAS there are nine areas identified as key to the assurance for the SR27 Final Business Plan. In preparing this Board Assurance Statement, the Board has thoroughly considered the requirements set by WICS, understands the retained risks to the extent that these are presently known, is fully committed to delivery of the plan and will respond proactively and proportionately should further risks emerge or materialise.

2 Assurance

2.1 Context

The following section explains our approach to assurance for the Strategic Review of Charges 2027 (SR27) Draft and Final Business Plan, including the related risk assessments and the development of the Long-Term Strategy.

We want the information we publish to be trusted by all sector stakeholders, so it is important that we evidence the reliability of our approach to business planning. To do this we have a detailed assurance approach, that builds on our well-established annual return regulatory assurance processes.

We have worked with WICS to co-design the main assurance requirements for our business plan submission, aligning with the requirements of WICS' SRC27 Final Methodology. The Scottish Water Board is ultimately accountable for the assurance of the business plan, and responsibility for delivery is delegated to identified individuals within the company.

In line with our continuous improvement approach, assurance for SR27 builds upon the SR21 approach, previously presented in the SR21 Strategic Plan: Quality and Assurance Plan.

2.2 Our Approach to SR27 Assurance

Scottish Water has a well-established risk management policy and framework which sets out Scottish Water's commitment to Risk Management. It defines and promotes an integrated, holistic approach to managing risk within our organisation, which ensures that risks are appropriately identified, assessed and managed in line with our Corporate Risk Appetite.

Building on this framework, we developed an approach tailored to identifying and managing business plan risk aligned to the Draft Ministerial Objectives 2027-33 and the WICS' reporting requirements. We mapped these to a set of key themes and tests (see Section 2.6.1).

We developed an assurance map that targets proportionate assurance based on the reporting risk assessment, deploying three lines of assurance to check compliance with business plan requirements and management of reporting risk.

We evidence completion of our lines of assurance through self-assurance statements, assurance reports and governance papers. Our Regulatory Assurance Team monitors assurance findings and manages responses, reporting findings and evidence of compliance / reporting risk management to the Audit and Risk Committee and Scottish Water Board.

The WICS SRC27 Final Methodology requires the Board to provide appropriate assurance of Scottish Water's SR27 Final Business Plan. The Board have been fully engaged throughout the development of the SR27 Final Business Plan, providing leadership, scrutiny and challenge at every stage. The requirements set by WICS have been fully considered, the Board Assurance Statement reflects the systems of internal control and assurance that have been undertaken ahead of the submission of the SR27 Final Business Plan. Within the Board Assurance Statement, there are nine areas identified as key to the assurance of the SR27 Final Business

Plan - with confirmation from Scottish Water Board that it has challenged and assured itself against each one.

2.3 How the SR27 Assurance Approach Fits into Existing Governance Structures

The SR27 assurance approach links into existing Internal and External Governance groups, this section summarises each of these.

The development of the SR27 Final Business Plan is led by the Strategy and Regulation Directorate with input from across Scottish Water. There are six key workstreams which develop and inform the SR27 Final Business Plan and each of these has a director level sponsor.

The Strategy and Regulation Directorate are responsible for coordinating and assuring the inputs from these workstreams into the plan and the submission of the plan and the Director of Strategy and Regulation is the accountable director for the plan. This structure for the SR27 Final Business Plan is shown below:

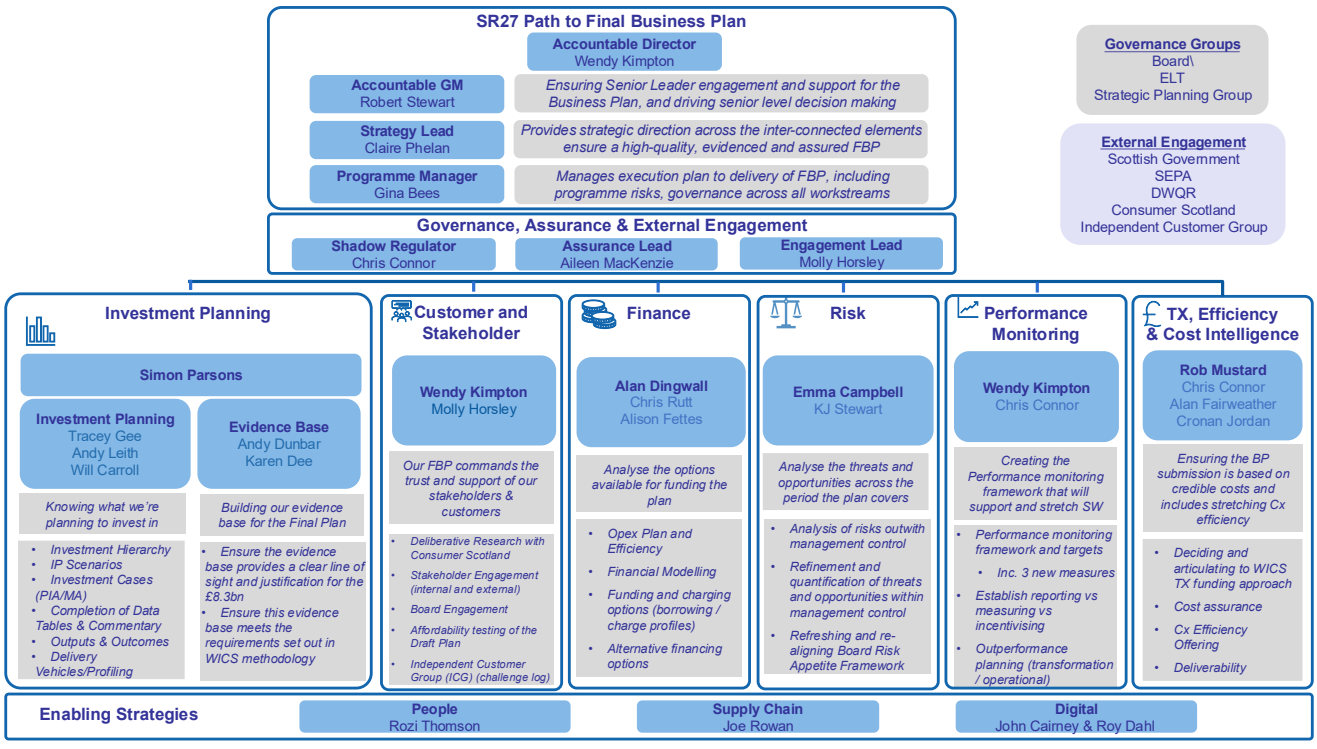

Figure 1: SR27 Final Business Plan organisational structure

2.3.1 Internal Governance

There are three key internal governance groups which have responsibility or accountability for the governance and assurance of the SR27 Draft and Final Business Plans.

Scottish Water Board

The Board of Scottish Water is accountable for approving Long-Term Strategy and SR27 Draft and Final Business Plan submissions and publications. It provides overall leadership and accountability for our risk governance. The Board is also required to sign a Board Assurance Report for the SR27 Draft Business Plan and a Board Assurance Statement for the SR27 Final Business Plan.

Executive Leadership Team (ELT)

ELT has provided delegated authority to the Strategic Planning Group to make project related decisions (which includes but is not limited to topics such as assurance approach, economic analysis and customer and community research). ELT retain responsibility for approval of key decisions in strategy and SR27 such as setting service outcomes and pricing and submissions to Scottish Water Board. The ELT is responsible for ensuring that decisions are informed by appropriate risk considerations and that risks escalating from the programme are effectively managed within the Corporate Risk Framework.

Strategic Planning Group (SPG)

The purpose of the Strategic Planning Group is to oversee the effective development of the Long-Term Strategy and SR27 submissions. In doing so, SPG is responsible for ensuring that SR27 planning and delivery are supported by robust risk identification, assessment and management arrangements.

The objectives of SPG are to:

1. Publish Long-Term Strategy ahead of SR27 Final Business Plan Submission

2. Prepare the SR27 Draft and Final Business Plan submission documents in accordance with WICS SRC27 Final Methodology and milestone dates, and to meet Ministerial Objectives for approval by the Scottish Water Board

3. Ensure SR27 Final Business Plan is demonstrably informed by and aligned to the Long-Term Strategy and Scottish Government Climate Change Adaptation (CCA) Policy Development

4. Ensure all internal and external stakeholders have confidence in our Long-Term Strategy and SR27 Draft and Final Business Plan submissions

5. Ensure assurance, quality and governance expectations are met

6. Ensure satisfactory SR27 funding is secured

2.3.2 External Governance

There are several different external governance groups which all have a role across the current and future investment periods which Scottish Water use to engage with its external stakeholders as shown in the figure below.

The Water Industry Investment Group predominately focuses on investment within the current SR21 investment period and the completion programme from SR15. As some investment will cross into the SR27 period there is a link between this and the main group responsible for SR27 development the Future Investment Group. The Future Investment Group, which has a focus on setting the Draft Ministerial Objectives 2027-33 for the SR27 period, is the group at which key SR27 Final Business Plan development information is shared with key stakeholders.

In addition, Scottish Water has actively engaged with sector stakeholders throughout the business planning process. This has occurred on both a one-to-one basis and through engagement in forums such as WICS's SRC27 Group. This engagement has allowed Scottish Water to discuss the challenges that the SR27 Final Business Plan is looking to address – and the feedback received has helped to shape the proposals and decisions included in the SR27 Final Business Plan.

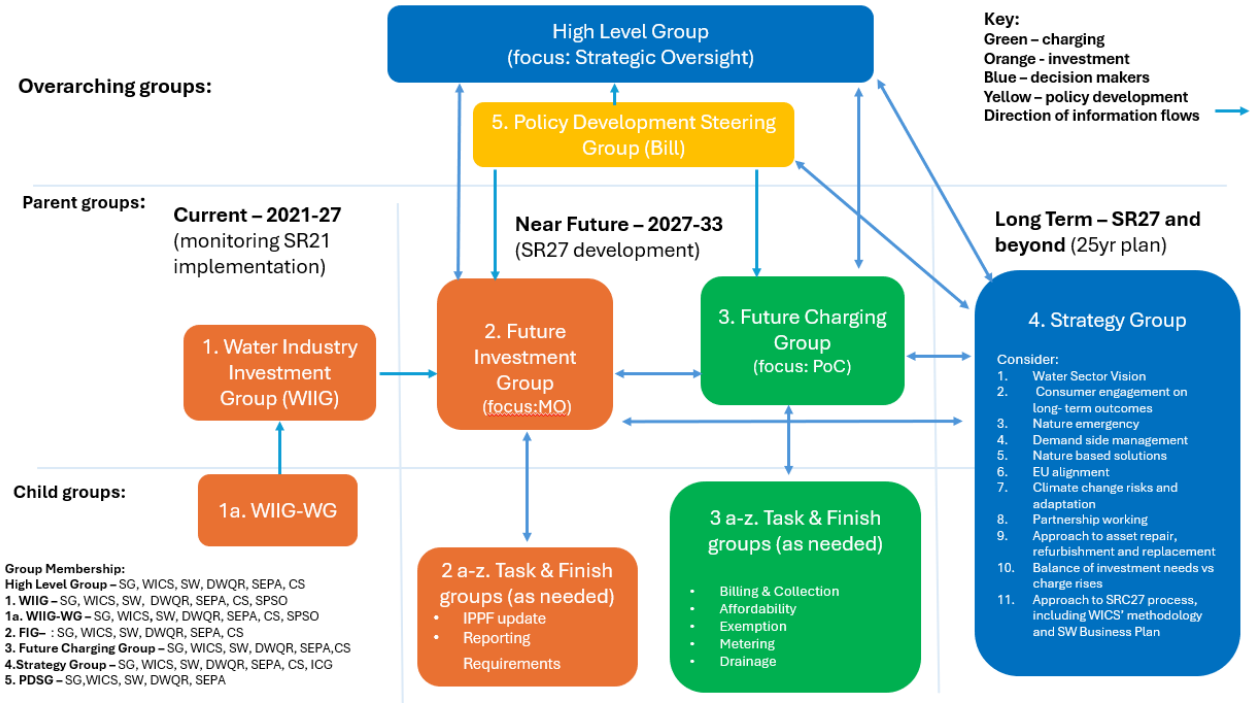

Figure 2: External governance groups

2.4 Key Elements of the SR27 Assurance Approach

Our approach to SR27 assurance has been built around a Three Lines assurance approach and a risk assessment of the plan to target the appropriate assurance activities to apply across different elements of the SR27 Final Business Plan.

2.4.1 Three lines of assurance approach

Assurance is the process by which we ensure the SR27 Final Business Plan is well evidenced, meets our obligations, follows the WICS' SRC27 Final Methodology and is trustworthy. We use assurance to identify potential errors (e.g. in data and approach), make improvements and monitor how we develop our plan.

Assurance differs from audit in that audit looks backwards from the end of the process to assess whether something is right or wrong, whereas assurance aims to assess what is done during the process, so that any required corrections and improvements can be made as the plan is developed.

Scottish Water uses a Three Lines assurance model which has layers of assurance, with each one responsible for building on the work of the previous line (see Figure 3). For the SR27 Final Business Plan, each stage has been split into two parts to clearly define areas of responsibility.

The first line of assurance is broken into two parts (1a &1b) to ensure proper management oversight of the data production process.

We break down the second and third lines of assurance into two (2a & 2b; 3a & 3b) to differentiate between the responsibilities of the different assurance providers.

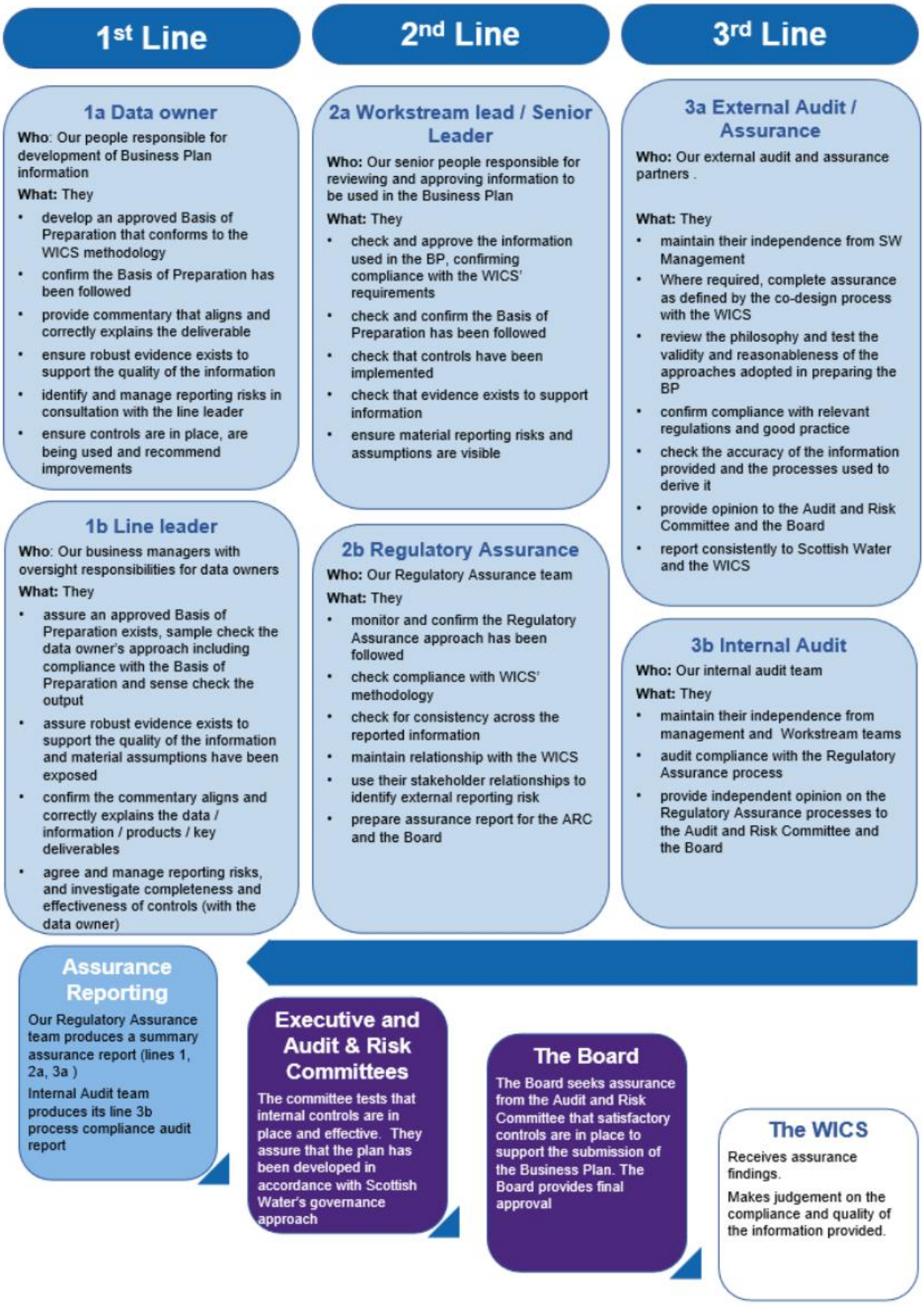

Figure 3: Three Lines of assurance approach (for SR27 Draft and Final Business Plan)

2.4.2 Risk Assessment

We developed an initial matrix based on our existing Risk approach reviewing the initial workstream maturity (Step 1a); which was revised once workstreams and work packages were mature enough to make an assessment on risk markers such as complexity (Step 1b).

Step 1a Initial risk assessment to target assurance

An initial risk assessment was undertaken to review all the components of the plan considering where the greatest opportunity for material errors and shortfalls in the plan quality could occur. This reviews:

- The likelihood of a reporting error of a component due to the maturity of the workstream plans.
- The impact if an error should occur, particularly on customers' and stakeholders trust and confidence, and our reputation.

The following matrix was used very early in the process to assess individual workstreams' risks in terms of their initial plan development.

Initial framework for assessing Business Plan risk - Matrix *'Risk of workstream deliverables and key products failing to meet the reporting requirements'*		Likelihood		
		The workstream plan has clearly articulated activities, owners and timescales that meet the DBP programme milestones; AND The products/deliverables are specified and agreed, AND The team is fully resourced, with experienced individuals and expert support, AND Workstream risks are known and managed.	The workstream plan is in outline/high level with provisional timescales that have not been confirmed to deliver the DBP programme milestones; AND The products/deliverables are generally understood but not specified, AND The team is partially resourced with some experienced individuals and support is being procured, AND Workstream risks are known but not managed.	The workstream plan is under development, OR The products/deliverables are being formulated, OR The team is either not resourced or resourced with inexperienced individuals, or contracted support is not yet in place OR Workstream risks have not been assessed.
		L	M	H
Impact	£50m or greater at risk from inadequate business planning; OR Significant stakeholder concern.	H			
	£5m - £50m at risk from inadequate business planning; OR Moderate stakeholder concern.	M			
	Less than £5m at risk from poor business planning; OR Minor stakeholder concern.	L			

Figure 4: Risk Assessment Framework

A desktop risk assessment was undertaken by the Scottish Water SR27 Business Planning Team to undertake an initial assessment of each workstream against the eleven themes and tests. This assessment identifies the highest risk areas for assurance across all themes and tests were Performance Measures, Targets, Governance and Reporting and Investment Planning and Delivery. This initial assessment was undertaken in August 2024.

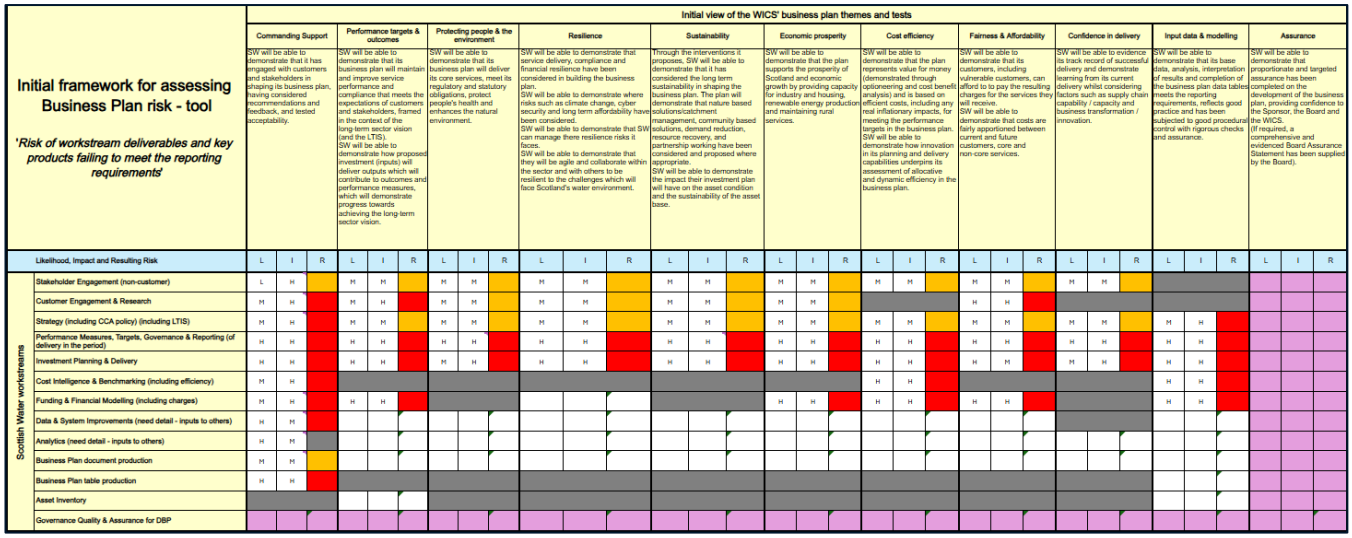

Figure 5: Initial framework for assessing Business Plan Risk

Step 1b Second risk assessment to target assurance

In February 2025 the Basis of Preparation Documents, which set out how each element of the plan was to be developed, were used to undertake a second risk assessment. This second assessment identified where Scottish Water's planning could fail to deliver a plan that meets customer and stakeholder needs, could be non-compliant with the WICS reporting requirements and as a result, facilitate the prioritisation of the proportionate level of assurance activity. This reviewed:

- the likelihood of a reporting error due to the source of the base data or complexity of the processing/ analysis, and
- the impact if an error should occur, particularly on customers' and stakeholders trust and confidence, and our reputation.

This risk assessment was undertaken using the information productions risks under the five risk sources which are identified in the table below for each of the workstream packages:

Table 1: Step 1b Risk assessment

Risk source	What to consider when looking for risk
Data	Integrity – are there known inconsistencies and weaknesses in the source data used for the analysis. Capture – is the source data captured manually or automatically and is there scope for error to be introduced through the collection, transfer and collation methods. Validity – is the source data considered to be representative of the company and the WICS reporting requirement and is it sufficiently accurate.

Risk source	What to consider when looking for risk
	Volume – how many and how large are the data sources required to produce the information. Verification – are there sufficient controls and assurance processes in place for the collection and storage of the source data.
Analysis & processing	Integrity – are there known shortfalls or inadequacies in the data storage, transfer, collation, processing and analysis. Basis of preparation – is the documentation sufficiently detailed to ensure consistent and repeatable production of reliable information. Complexity – how complex/complicated is the combination of data sources, and how complex/complicated are the necessary analytics needed to produce the information. Assumptions – how many assumptions or estimation exercises are required for the production of the information and are they reasonable. Checking – is the analysis subject to procedural controls and effective checks. Resourcing – are there enough resources available to produce the information and are they sufficiently familiar with the base data, reporting requirements and analytical approaches to produce it reliably. Is there a potential single point of failure.
Assurance & checking	Integrity – have there been shortfalls in the checking processes for similar information used in annual reporting or ad-hoc information provision. Suppliers – where 3rd parties are supplying base data or processed data are there requirements for quality control and is there evidence it has been completed to the satisfaction of Scottish Water. Frequency – are the data, analysis and information subject to regular and sufficient quality control and assurance. Resourcing – do the individuals completing checks and assurance have sufficient time and support for completing their assurance activities and do they have routes to escalate actions to improve the information prior to submission.
Change	Familiarity – is the information required by the WICS known and understood by the business or is it unfamiliar to the data providers. Consistency – are the data sources, analytical resources, assurance resources expert and experienced in producing the information, or similar information for other reporting activities.

Risk source	What to consider when looking for risk
	IT changes – have there been any planned or unplanned introductions or changes to systems which could have impacted the integrity of the source data or analytical capability. Contractual changes – have there been any changes to contractual terms or suppliers which could have impacted the integrity of the source data or analytical capability.
Sensitivity	Ministerial Objectives – is the information being produced critical to demonstrating how Scottish Water is meeting the requirements of the Scottish Government. Reputation – would the provision of incorrect information materially damage the reputation of Scottish Water with customers, government or the regulator.

Step 1b Risk assessment to focus assurance tests against key themes at work package level (rolled up to workstreams)

The process is to assess each of the work packages under each workstream as High, Moderate or Low against each of the risk source categories to make a workstream level information production risk assessment and identify the workstream level assurance requirement.

To identify the overall workstream level information production risk assessment the following rules are applied:

- If the assessment within the **Sensitivity** risk source category is identified as **High** then the default Workstream level information production risk assessment is always **High** defaulting the Workstream level assurance requirement to **External 3rd line** as well as 1st & 2nd lines.
- If the assessment within in the **Sensitivity** risk source category is not identified as **High** then the following rules are to be applied:
    - 3 or more **Low** assessments the Workstream level information production risk assessment is **Low** with the Workstream level assurance requirement identified as Internal 1st & 2nd lines
- 3 or more **Moderate** assessments the Workstream level information production risk assessment is **Moderate** with the Workstream level assurance requirement identified as Internal 3rd lines as well as 1st & 2nd lines
- 3 or more **High** assessments the Workstream level information production risk assessment is **High** with the Workstream level assurance requirement identified as **External 3rd lines** as well as 1st & 2nd lines
- No more than 2 of any assessments then an average of all assessments should be assessed and sense checked to identify the Workstream level information production risk assessment and the Workstream level assurance requirement

An example of the assessment template can be seen below:

H	External 3rd line
M	Internal 3rd line
L	Internal 1st & 2nd line

No	Workstreams/Work packages	Information production risks					Workstream level information production risk assessment	Workstream level assurance requirement
		Sensitivity	Data	Analysis & processing	Assurance & checking	Change		
1	**CC Adaption, Policy & Legislation**							
	Scottish Government Policy Development	Low	Low	Low		erate	L	Internal 1st & 2nd line
	Climate Change Adaptation Mitigation	High	High	Hi		rate	H	External 3rd line
2	**SG & WICS Strategic Review Process**							
	Strategic Review Process	Low			derate	Moderate	L	Internal 1st & 2nd line
4	**Submission Governance**							
	Submission Process			Low	Moderate	Moderate	M	Internal 3rd line
5	**Quality & Assurance**							
	Assurance	erate	Low	Low	Moderate	Moderate	M	Internal 3rd line
6	**Business Plan Document production**							
	Basis of Preparation for the production of the BP document	Moderate	Low	Low	Low	Low	L	Internal 1st & 2nd line
7	**Technical Appendices**							
	Production of Technical Appendices	Moderate	High	High	High	Moderate	H	External 3rd line

INDICATIVE EXAMPLE ONLY

Figure 7: Assessment template example

2.5 Roles and Responsibilities

This section details the responsibilities of the different assurance providers under each section of the Three Line model described in section 6.4.1 above, as well as the Scottish Water Board's role in Risk Management for the SR27 Final Business Plan.

2.5.1 Assurance Responsibilities

First line assurance – data owner checks (1a)

First line: Checks carried out by the people doing the work (1a)

Who: Data owners. Data owners are the people doing the work and they are responsible for ensuring that what they produce is correct and in line with the WICS' reporting requirements.

What: Data owners check what they have done and whether it is accurate. They record the processes adopted to develop their component of the plan using a Basis of Preparation document and produce their deliverable(s). They confirm that the Basis of Preparation covers all the required data, that the data production has followed the Basis of Preparation and other obligations and record any concerns, assumptions and risks and agree with line leader any residual risks.

When: Before through the creation of the Basis of Preparation, during the activity or when the activity is complete.

First line assurance – line leader checks (1b)

First line: Business manager with oversight responsibilities for data owners (1b)

Who: Line Leaders working with data owners.

What: They sample check the data owner's approach and calculations to confirm that the Basis of preparation has been followed, completing a sense check on the data / information / products / key deliverables. They check that robust evidence exists to support the quality of the information. They agree and record with the data owner their concerns, assumptions and residual risks. They check that the commentary has been prepared to align and correctly explains the data / information / products / key deliverables.

When: When the activity is complete.

Second line assurance - management controls (2a)

Second Line management checks on approach and detail (2a)

Who: Senior Leaders

What: Check what the first line has done and sample check whether the resulting information is correct. They review the Basis of Preparation document to confirm it will produce deliverables that comply with the WICS SRC27 Final Methodology and other obligations. They provide evidence of the checks they have undertaken, confirming whether the Basis of Preparation has been followed. They record their assurance observations, challenges and follow up actions (if any) from their checks on the production of the resulting data / information / products / key deliverables. They check that the data and commentary proposed for the SR27 Final Business Plan is consistent and aligned with the Long-Term Strategy and 25 Year Investment Strategy. They check that the assumptions, judgements and confidence grades used are appropriate, reasonable and consistent.

When: Following completion of First Line assurance.

Second line assurance - risk management assurance (2b)

Second Line Regulatory Assurance carry out risk assessments, ensure we are compliant with our legal responsibilities and report to the Board on their findings (2b)

Who: Regulatory Assurance Team

What: Responsible for the overall oversight of the process on a day-to-day basis including assurance and risk assessment. They carry out specific assurance activities to check processes are compliant and have been followed, paying particular attention to dependencies in the overall planning process. They check for consistency between reported information, table commentary and narrative. They monitor risks and outstanding actions through the assurance register.

When: During the process.

Third line assurance – external assurance/audit (3a)

Third line: External independent assurance providers assure defined areas of the SR27 Final Business Plan relevant to their expertise (3a)

Who: External assurance providers

What: Independently checks processes and outputs to make sure that we have followed the WICS reporting requirements, we are compliant with our obligations, have identified all our risks, key assumptions, and developed and implemented plans to manage them. They report at summary level to the Audit and Risk Committee.

When: During and after development of the SR27 Final Business Plan.

Third line assurance – internal audit (3b)

Third line: Internal audit check compliance with the overall assurance approach. (3b)

Who: Internal audit

What: Internal audit sits above the risk management processes of the first two lines of assurance, ensuring that they operate effectively and advising on how they could be improved. Internal audit assesses the effectiveness of governance, internal controls and risk management across the organisation. Delivery of the SR27 Final Business Plan, and the associated assurance approach that supports it, forms part of Internal Audit's annual audit plan. Internal Audit report directly to the Audit and Risk Committee.

As part of its remit, Internal Audit check that there is an appropriate assurance approach exists, that it is robust fit for purpose, and it is being applied as intended. This includes undertaking independent sample checks of SR27 outputs to confirm compliance with our obligations and ensure that Business Plan reporting risks have been properly identified and managed.

When: During and after development of the SR27 Final Business Plan.

Audit and Risk Committee

Delivers overall process assurance to the Board:

Who: Audit and Risk Committee

What: The Audit and Risk Committee provide oversight and challenge on governance, internal control and risk management arrangements on behalf of the Board. It tests that internal controls are in place, proportionate and operating effectively and provides assurance that the plan has been developed in accordance with Scottish Water's governance approach.

The Committee has a specific responsibility of reporting to Board on the satisfactory implementation of the assurance plan, compliance with the regulator's reporting requirement and any material risks or issues discovered as part of the assurance. This informs the Board's ability to make an appropriate Board Assurance Statement.

When: During and after development of the SR27 Final Business Plan and following completion of the assurance activities.

Scottish Water Board

Receives assurance from the Audit and Risk Committee and management: Approves the SR27 Final Business Plan and signs the Board Assurance Statement.

Who: Scottish Water Board

What: Scottish Water Board is not directly involved in conducting assurance activities. Instead, it requires management and the Audit & Risk Committee to demonstrate the quality, completeness and compliance of the SR27 Final Business Plan with the regulators reporting requirements. This assurance enables the Board to approve the SR27 Final Business Plan and make an appropriate Board Assurance Statement to WICS.

Following receipt of the necessary reports and assurances, the Board formally considers the evidence, agrees its conclusions, and records its decisions in the Board's minutes prior to submission of the SR27 Final Business Plan to the WICS.

When: Following completion of the assurance activities and reporting from the Audit and Risk Committee.

2.5.2 Risk Management and the Role of the Board

The following figures are extracts from our "Annual Report and Accounts 2024/25 Performance and Prospects" which lay out our overall Risk Governance and Assurance Framework and explains the risk-related responsibilities of Scottish Water Board and the Audit and Risk Committee.

OUR APPROACH TO RISK MANAGEMENT

At Scottish Water, we navigate a complex and ever-changing risk landscape, managing extensive infrastructure within a highly regulated industry. Effective and systematic risk management is at the heart of our operations. It helps us stay aware of and understand the various factors, both within and beyond our control, that impact our work.

We are committed to a responsible and innovative approach to risk management. Our well-established, integrated Risk Management System is designed to help us maintain a clear understanding of risks in the dynamic environment in which we operate[36]. Central to our risk management strategy are three key pillars: **Awareness**, **Competence**, and **Management**, as illustrated in [Figure 1].

Our approach is designed to improve how we assess and prioritise our activities, enabling us to make more confident and effective decisions, whether we are responding to immediate issues or anticipating future challenges. By reducing threats and maximising opportunities, our system empowers our people to not only meet but exceed our organisational goals and strategic ambitions. This ensures that we are always prepared to tackle the challenges ahead, securing a sustainable and successful future for Scottish Water.

Figure 1 -
Our Approach to Risk Management

[36] The scope of Scottish Waters Risk Management System includes both Scottish Water and our subsidiary, Scottish Water Horizons Limited. In compliance with the Water Services (Governance Code) Directions 2013, it excludes operational risk management for Scottish Water Business Stream Limited. The Board of Scottish Water Business Stream Holdings Limited oversees the financing risks associated with Business Stream, while Business Stream's Board is responsible for its own risk management. Water Industry Commission for Scotland The Convention of Scottish Local Authorities Private Finance Initiative.

RISK GOVERNANCE AND ASSURANCE FRAMEWORK

We are committed to a responsible approach to risk assurance and compliance. As such we have established a robust and effective risk governance framework, underpinned by the three-line assurance model, to ensure we manage risks effectively and responsibly.

The overall leadership and accountability for our risk governance framework lie with the Board, supported by the Audit & Risk Committee, the Executive Leadership Team, and its sub-groups. As illustrated in [Figure 2,] these governance groups play crucial roles in ensuring that our risk management activities are both in place and effective.

Figure 8: Our Approach to Risk Management

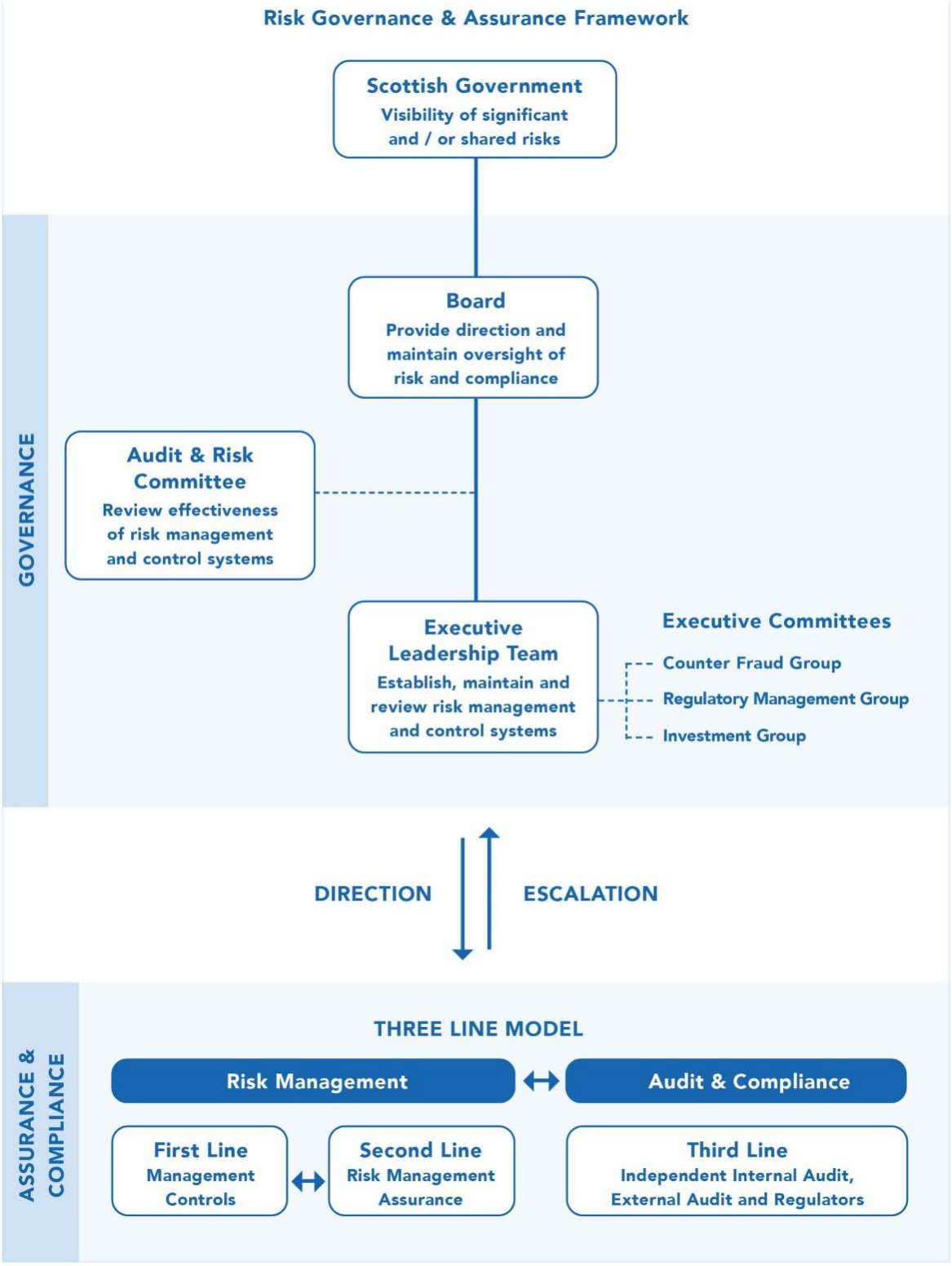

Figure 9: Risk Governance and Assurance Framework

2.6 Assurance Process

The SR27 Assurance process was designed with support from external experts, Alium Blue, to ensure that it was fit for purpose. A risk-based approach was developed to allow assurance activities to be appropriately targeted across all areas of the SR27 Final Business Plan. The following section covers the following different elements of the Assurance Process.

2.6.1 Themes and Tests

The themes and tests were derived from a review of the Draft Ministerial Objectives 2027-33 and WICS SRC27 Final Methodology. These were reviewed and agreed with WICS as part of the co-creation of the Assurance Plan. The results of this analysis was used to develop the assurance plan and the development of the SR27 Final Business Plan structure.

Table 2: Key themes and tests

Key theme	Tests
Commanding support	Scottish Water will be able to demonstrate that it has engaged with customers and stakeholders in shaping its business plan, having considered recommendations and feedback, and tested acceptability.
Performance targets & outcomes	Scottish Water will be able to demonstrate that its business plan will maintain and improve service performance and compliance that meets the expectations of customers and stakeholders, framed in the context of the long-term sector vision (and the Long-Term Strategy). Scottish Water will be able to demonstrate how proposed investment (inputs) will deliver outputs which will contribute to outcomes and performance measures, which will demonstrate progress towards achieving the long-term sector vision and how the outcome measures contribute towards the Scottish Government's National Performance Framework (NPF).
Protecting people & the environment	Scottish Water will be able to demonstrate that its business plan will deliver its core services, meet its regulatory and statutory obligations, protect people's health and enhances the natural environment.
Resilience	Scottish Water will be able to demonstrate that service delivery, compliance and financial resilience have been considered in building the business plan. Scottish Water will be able to demonstrate where risks such as climate change, cyber security and long term affordability have been considered. Scottish Water will be able to demonstrate that Scottish Water can manage their resilience risks it faces. Scottish Water will be able to demonstrate that they will be agile and collaborate within the sector and with others to be resilient to the challenges which will face Scotland's water environment.

Key theme	Tests
Sustainability	Through the interventions it proposes, Scottish Water will be able to demonstrate that it has considered the long term sustainability in shaping the business plan. The plan will demonstrate that nature based solutions/catchment management, community based solutions, demand reduction, resource recovery, and partnership working have been considered and proposed where appropriate. Scottish Water will be able to demonstrate the impact their investment plan will have on the asset condition and the sustainability of the asset base
Economic prosperity	Scottish Water will be able to demonstrate that the plan supports the prosperity of Scotland and economic growth by providing capacity for industry and housing, renewable energy production and maintaining rural services.
Cost efficiency	Scottish Water will be able to demonstrate that the plan represents value for money (demonstrated through optioneering and cost benefit analysis) and is based on efficient costs, including any real inflationary impacts, for meeting the performance targets in the business plan. Scottish Water will be able to demonstrate how innovation in its planning and delivery capabilities underpins its assessment of allocative and dynamic efficiency in the business plan.
Fairness & Affordability	Scottish Water will be able to demonstrate that its customers, including vulnerable customers, can afford to pay the resulting charges for the services they will receive. Scottish Water will be able to demonstrate that costs are fairly apportioned between current and future customers, core and non-core services.
Confidence in delivery	Scottish Water will be able to evidence its track record of successful delivery and demonstrate learning from its current delivery whilst considering factors such as supply chain capability / capacity and business transformation / innovation.
Input data & modelling	Scottish Water will be able to demonstrate that its base data, analysis, interpretation of results and completion of the business plan data tables meets the reporting requirements, reflects good practice and has been subjected to good procedural control with rigorous checks and assurance.

Key theme	Tests
	Scottish Water will be able to demonstrate that it has improved the evidence and analysis which has supported its decision making.
Assurance	Scottish Water will be able to demonstrate that proportionate and targeted assurance has been completed on the development of the business plan, providing confidence to the Sponsor, the Board and the WICS. Scottish Water will be able to demonstrate to customers and industry stakeholders how it has ensured the robustness of its information and establish a high degree of confidence in its business plan. The Board of Scottish Water will be able to sign a comprehensive and evidenced Board Assurance Statement.

2.6.2 Assurance Map

An assurance map is a structured means of identifying and mapping the main sources and types of assurance in an organisation across the three lines of defence and coordinating them to best effect.

It provides clarity on how risks are being managed and where assurances come from. It helps in identifying gaps and overlaps in assurance activities. It ensures all significant reporting risks are covered without unnecessary duplication.

Below is an example of the assurance map:

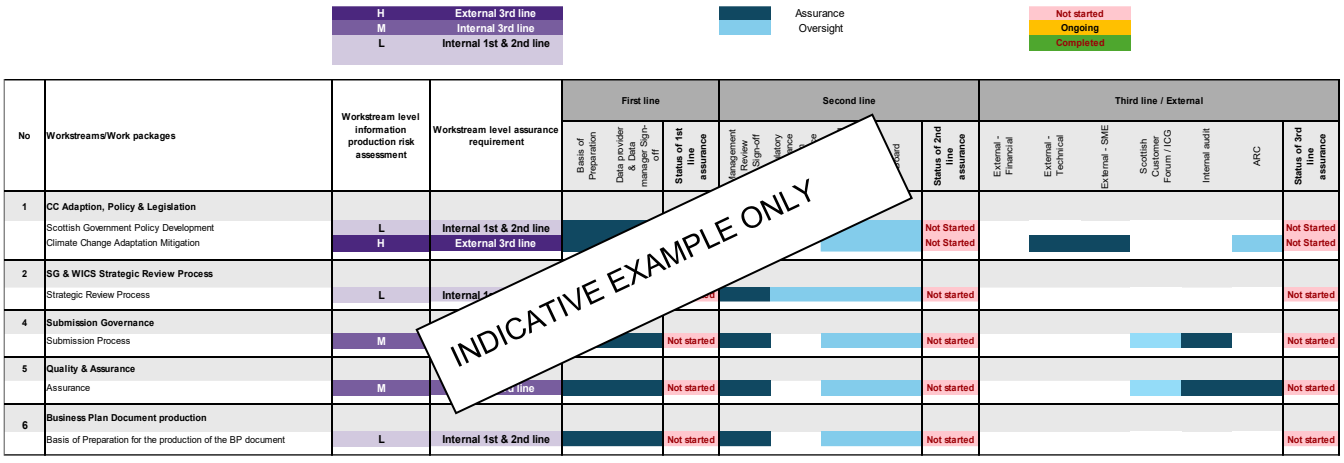

Figure 10: Draft assurance map

This assurance map was developed following the second stage of the risk assessment process above. The assurance map for SR27 Final Business Plan also includes the assurance and oversight registers described in the next section.

2.6.3 Assurance and Oversight Registers

Throughout the development of the plan information has been shared with the internal and external governance groups which were detailed earlier in this Technical Appendix.

In addition to this, a record of all assurance and audit activities is recorded in the sub sections of the Assurance Map. This provides a record of all assurance checks, audits, quality control checks and governance sign offs. This document identifies the owners for every item of the SR27 Final Business Plan Document, Technical Appendices, Date Tables and commentaries and records when the different signoffs for assurance and governance were completed.

2.7 The Risk Analysis Process

2.7.1 The Purpose and Structure of the SR27 Risk Analysis

The risk analysis undertaken for SR27 Final Business Plan is designed to provide confidence to both Scottish Water Board and external stakeholders that, as far as reasonably practicable, all material risks—both threats and opportunities—are identified, evaluated, and managed. The analysis supports Scottish Water Board's ability to assure WICS, stakeholders and customers that the SR27 Final Business Plan represents an appropriate balance between service delivery and cost, and that Scottish Water is prepared to respond to both expected and unforeseen challenges.

The risk analysis process is structured around two principal perspectives:

- Risks outwith management control: These are external risks, driven by macroeconomic, legal, exogenous, or revenue factors, which Scottish Water must respond to rather than control.
- Risks within management control: These are risks that Scottish Water can directly influence or mitigate through operational or strategic actions.

This dual approach is fundamental for evidence-based decision-making and for providing assurance to all stakeholders. The following figure summarises this approach:

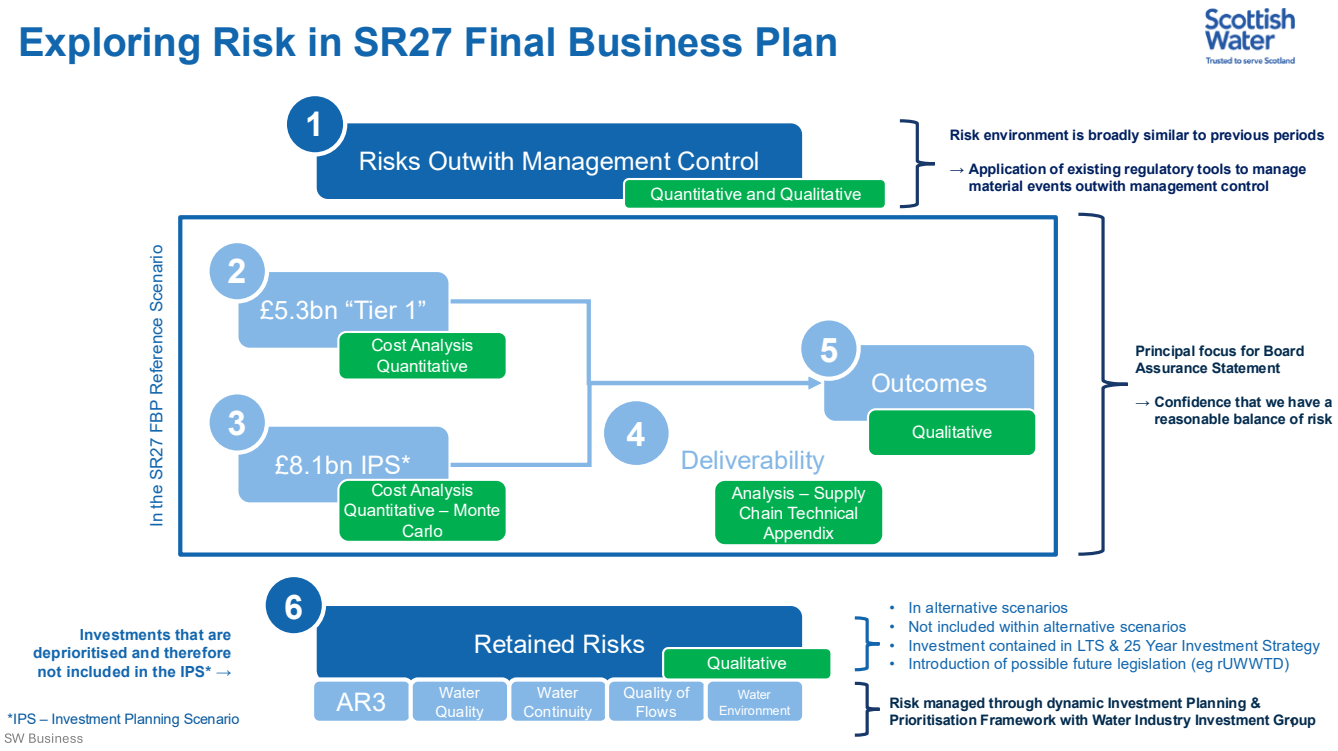

Figure 11: Exploring Risk in SR27 Final Business Plan

2.7.2 The Identification of Risks

The identification of risks follows a structured methodology, combining external intelligence, internal risk register reviews, and subject matter expert engagement. Specifically, Scottish Water utilises:

- Horizon scanning to capture emerging global and sectoral risks, including climate change and geopolitical developments.
- Review of internal risk registers at the corporate, directorate, and functional levels, as well as analysis of legacy risks from previous regulatory cycles (SR15, SR21).
- People-centric engagement, including Scottish Water Board workshops and targeted interviews with subject matter experts, to capture nuanced or evolving risks.

This approach ensures that all significant threats and opportunities are identified, including those that may not be immediately apparent from data alone.

2.7.3 Data Collection and Modelling

Risk data is drawn from a blend of internal sources (historical data, asset management systems, previous modelling) and external intelligence (government risk registers, macroeconomic forecasts). Where empirical data is limited, expert judgement and qualitative assessments are used to calibrate assumptions and address gaps.

Quantitative risk analysis is principally conducted using Monte Carlo simulation. For risks outwith management control, 5,000 iterations are run for each risk, while 10,000 iterations are used for risks within management control. This probabilistic modelling approach enables the Scottish Water Board to understand the full range of possible outcomes and to stress-test assumptions under different scenarios.

2.7.4 Risk Categorisation and Assessment

Risks are systematically categorised into:

- Macroeconomic risks (e.g., inflation, interest rates)
- Revenue risks (e.g., household revenue collection, changes in billing arrangements)
- Legal and obligation risks (e.g., legislative changes, compliance obligations)
- Exogenous risks (e.g., extreme weather events, cyber-attacks, pandemics)
- Operational and investment risks within management control (e.g., cost overruns, supply chain capacity, deliverability)

Each risk is assessed for likelihood and impact, using both quantitative ranges (e.g., P10–P90 confidence intervals) and qualitative commentary.

2.7.5 Board Engagement and Feedback

Scottish Water Board, supported by the Executive Leadership Team, has had the opportunity to explore the approach applied to risk and the corresponding outcomes of the assessment at various stages of the development of the SR27 Final Business Plan.

Most recently, at the December 2025 workshop, Scottish Water Board scrutinised the risk environment, emphasising the increasing headwinds from climate change, querying the cost risk symmetry between Tier 1 costs and the investment plan risks, and the practical implications of optimism bias in the investment plan. Scottish Water Board's feedback prompted further refinement of both the risk assessment and the mitigation strategies, ensuring that the final analysis reflected the most current understanding and Scottish Water's priorities.

The Board also confirmed the importance of governance controls and the Investment Planning Prioritisation Framework (IPPF) in managing project and programme-level risk.

2.7.6 The Role of the Audit & Risk Committee

The Audit and Risk Committee provides assurance to the Scottish Water Board on risk matters.

A special Audit and Risk Committee was convened in January 2026 to review the finalised risk analysis, challenge the robustness of the process, and recommend to the Scottish Water Board that the risk environment associated with the SR27 Final Business Plan is tolerable.

This process ensures that risk management is not only a management responsibility but also subject to independent scrutiny and Scottish Water Board sign-off.

2.8 Third Line Assurance Provision

2.8.1 Independent Assurance of Draft and Final Business Plan

The main external assurance of the SR27 Draft and Final Business Plans has been undertaken by Binnies UK. Binnies have experience of supporting clients across the UK water industry in delivering high-quality, transparent, and robust regulatory reporting to stakeholders, regulators, and the public. Binnies were appointed after a competitive procurement process undertaken under a framework agreement. The scope of the assurance procurement, the technical capability questions and scoring were co-created with WICS. This provided WICS with the confidence that the assurance would be independent and free from conflicts of interest. The output of the Binnies UK assurance is reported in their Assurance Report which will be included as part of the SR27 Final Business Plan Submission.

2.8.2 Independent Customer Group (ICG)

In the development of its SR27 Final Business Plan, Scottish Water is being challenged to demonstrate that plans are reflective of customer expectations. Utilising its experience and expertise, the Independent Customer Group (ICG) will draw upon evidence to challenge Scottish Water's understanding and incorporation of customers' needs and expectations in its SR27 Final Business Plan.

For the SR27 Draft Business Plan the ICG produced an Interim Assurance Report which was shared with Scottish Water and other sector stakeholders (as appropriate). Their assurance focused on the quality of the research at this stage of the process and considered if the customer research relied upon was credible, well designed, comprehensive, robust, unbiased, inclusive and independent. The ICG also considered whether the research follows best practice to provide best value.

The ICG will publish a Final Assurance Report alongside Scottish Water's publication of its SR27 Final Business Plan. The ICG will, at this stage, take an updated view on the quality of research and will also assess whether Scottish Water's SR27 Final Business Plan visibly reflects customer views. The ICG will be looking for Scottish Water to provide a clear rationale as to the decisions it has taken in relation to incorporating customers' views and preferences.

The ICG will also maintain a log of its challenges to Scottish Water and the responses it receives throughout the process, this will be made available to Scottish Water and Consumer Scotland at regular intervals. The ICG will publish the challenge log alongside their Assurance Report at the end of the process to demonstrate the impact of the Group.

2.8.3 Other Assurance and Advice

Additional assurance and advice was undertaken for some areas of the SR27 Final Business Plan which was provided by other assurance providers. This assurance was targeted to areas where more specialized understanding was required or the risk assessment warranted additional checks. This assurance included:

- external analysis of capex cost data by ChandlerKBS, Arcadis and M^2;
- peer review of the efficiency submission by First Economics;
- external assessment of Management Approaches by AtkinsRealis;
- external assurance on the financial model by EY;
- Additional assurance of large projects, defined as projects with a total project value above £100m; and PFI contracts maturing in the 2027-33 regulatory period by Gleeds.
- external assurance and advice on individual investment projects, programmes or scoping exercises, as appropriate;
- the support of external experts (i.e. Stantec and PA Consulting) in the creation and completion of Business Plan materials.

Reports covering these elements of assurance have been made available as part of the Business Plan Submission.

2.8.4 Assurance of Projects over £100m and PFI Contracts Maturing in the 2027-33 Regulatory Period.

Within the WICS SRC27 Final Methodology, and reinforced in their feedback, WICS requires projects and programmes meeting certain criteria (>£6m and Gate 50 and beyond) to be supported by investment case evidence covering a range of key information categories. The WICS methodology also states that there are additional requirements on two specific categories of projects:

- Large projects, defined as projects with a total project value above £100m; and
- Private Finance Initiative funded projects, recognising that Ministers have requested WICS undertake a full examination of Scottish Water's approach to establishing the options and costs of the 4 PFI contracts maturing in the 2027-33 regulatory period.

There are 5 projects identified that meet the £100m assurance threshold, one of these projects Black Esk was reviewed by WSP on behalf of WICS, alongside North Berwick WWTW which is close to the £100m assurance threshold, and did not require additional assurance. The remaining four projects Turiff WTW, Glenfarg WTW, Juniper House and West Central Bioresource had already had some external assurance undertaken during their development. To ensure consistency, Gleeds were appointed to review the existing external assurance to ensure that it met the requirements of WICS and to undertake assurance of any elements which had not been reviewed previously. The reports on this external assurance are available as part of the Business Plan submission.

2.8.5 Binnies Assurance/Oversight

Draft assurance audits were undertaken by Binnies during March and April 2025 followed by Final assurance audits in November 2025. The audits focused on the following areas.

- SR27 Draft and Final Business Plan Data Tables and Commentary
- Review of the robustness of the systems and processes used to produce the information;
- Identification of the key assumptions made by Scottish Water in preparing its data tables and review of the reasonableness and materiality of those assumptions; and
- Assurance of the accuracy, completeness and comprehensiveness of the data.

During the audit process any actions required to be addressed were recorded in a Risks, Assumptions, Issues and Dependencies (RAID) log. Each item was recorded and allocated the following classification:

Table 3: Action classifications

Corrective action classification	Description
Blue	An opportunity for the business to improve its data and/or analysis for subsequent Business Plan submissions
Green	A minor concern with the data, analysis, assumptions or internal controls that would be unlikely to have an impact on the SR27 Business Plan

Corrective action classification	Description
Amber	A concern with the data, analysis, assumptions, internal controls or failure to comply with the WICS methodology/guidance that could have an impact on the SR27 Business Plan
Red	A material concern with the data, analysis, assumptions, internal controls or failure to comply with the WICS methodology/guidance that could have a significant impact on the SR27 Business Plan

The urgency was also recorded identifying whether it needed to be addressed for SR27 Draft or Final Business Plan or whether it was a longer term business improvement.

The following stages were been implemented:

Figure 12: Assurance stages

Each stage ensures that the appropriate levels of assurance and governance checks have been undertaken ahead of the completion of the BAS.

These systems of control are designed to reduce the frequency of issues and inaccuracies, significantly reduce the risk of material error, and to provide assurance on the accuracy and appropriate completeness of the material provided in the SR27 Final Business Plan.

3 Assurance Findings and Follow-up Activities

3.1 Assurance of the SR27 Draft Business Plan

Following the completion of the assurance of the SR27 Draft Business Plan, Binnies provided a draft and then final audit report highlighting the findings of the audit. This also included areas of recommended improvement between the submission of the SR27 Draft and Final Business Plans. This report was submitted to the Audit and Risk Committee along with an assurance statement from the Director of Strategy and Regulation confirming that the agreed assurance process has been undertaken. Following the Audit and Risk Committee scrutiny, the Scottish Water Board approved the submission of this SR27 Draft Business Plan and delegated the Alex Plant as CEO to sign the Board Assurance Report on behalf of the Scottish Water Board.

3.2 Change Control between SR27 Draft and Final Business Plan

Following the submission of the SR27 Draft Business Plan a change control process was initiated to track changes to SR27 Final Business Plan products between draft and final submission. Multiple sources of potential change such as query/audit actions, customer research, stakeholder feedback and investment plan updates meant a requirement to maintain a single view of all proposed changes and for these to be reviewed 'in the round'. This prevents uncontrolled changes to SR27 Final Business Plan products, ensuring integrity and alignment across all products. It also provided the programme leadership with visibility and direction of any material changes.

The product updates were controlled to strike a balance between central controls and allowing product owners to make changes. Any material changes required escalation and review with Strategic Planning Group asked to make decisions on these changes when appropriate.

By keeping a controlled track of all the changes approvers were able to be sighted on changes throughout the process enabling a smoother sign off at the end of the process. The change control process also provides confidence in the assurance process that changes between the SR27 Draft and Final Business Plans have been fully documented and controlled.

3.3 Assurance Findings and Reporting in the SR27 Final Business Plan

Following the Binnies completion of the assurance of the SR27 Final Business Plan, a list of issues and actions was identified as described above and subsequently addressed by Scottish Water.

Binnies provided a draft and then final audit report highlighting the findings of the audit. This report found that:

"Overall, the assurance process confirms that Scottish Water's final SR27 Business Plan provides a sound and reliable basis for final submission. While a small number of minor errors, omissions, and incomplete data lines were identified, these were either resolved during the process or addressed between the assurance process and final submission. The systems, controls, and methodologies underpinning the plan are robust, and the accompanying commentary appropriately explains assumptions and constraints. Taken together, the findings provide

confidence that the Business Plan is accurate, comprehensive, and aligned with WICS guidance, supporting a well-justified and transparent submission for the 2027–2033 regulatory period."[1]

Gleed's assurance reports on the evidence case for large projects and Private Finance Initiative (PFI) were completed, finding a range of instances of 'green' good practice and 'amber' observations across the different projects and programmes assessed. Gleeds found no 'red' non-conforming areas that would lead to a major issue if not addressed.

Improvement recommendations from both Binnies and Gleeds were either addressed within the SR27 Final Business Plan submission or captured within longer-term improvement plans.

The Binnies report, Gleeds reports, internal assurance statements and the other assurance materials listed above were submitted to the Audit and Risk Committee, along with an assurance statement from the Director of Strategy and Regulation confirming that appropriate assurance processes had been undertaken. Following Audit and Risk Committee scrutiny of assurance materials and statements, the Audit and Risk Committee recommended that the Scottish Water Board sign the Board Assurance Statement.

Ahead of The Board meeting, the Chief Executive Officer signed the Assurance and Governance Statement confirming that the appropriate governance and assurance had been completed and that the Final Business Plan is appropriate for submission. Taking account of this statement, and the recommendation from the Audit and Risk Committee, The Board then agreed to sign the Board Assurance Statement and the submission of the SR27 Final Business Plan.

All of the assurance materials referenced are included in the SR27 Final Business Plan submission.

3.4 Overall Balance of Risk

The finalised risk analysis demonstrates that Scottish Water's SR27 Final Business Plan strikes an appropriate and evidence-base balance between ambition and caution, and between service and cost. The Scottish Water Board has concluded that, on balance, the risks associated with the SR27 Final Business Plan are tolerable and manageable, enabling submission of the plan with confidence.

The analysis confirms:

- External risks, particularly those related to climate change and macroeconomic volatility, have increased, but Scottish Water's mitigation and recourse mechanisms are reasonable.
- Operational and investment risks within management control are well understood, with strong governance, ongoing monitoring and established processes to manage cost, deliverability and performance challenges.
- The approach to retained risks—those consciously accepted due to affordability or prioritisation decisions—is transparent, with defined arrangements for dynamic reprioritisation should circumstances change.

3.5 Risk Mitigation and Governance

Scottish Water will deploy a range of risk mitigation approaches, combining proactive and reactive strategies. Proactive measures include horizon scanning, scenario planning, and embedding

[1] Binnies UK (2026), SR27 Scottish Water Final Business Plan Assurance Report, page 4.

resilience in investment programmes. Reactive measures rely on robust internal governance mechanisms and established external recourse options (including regulatory controls and the use of dynamic investment planning and prioritisation framework and, where necessary and in exceptional circumstances, government support).

3.6 Board Assurance of Risk

The SR27 Final Business Plan risk analysis process is comprehensive and robust, combining rigorous identification, assessment, and mitigation of risks with robust governance and continuous engagement.

On the basis of the process followed and the findings presented, the Scottish Water Board is satisfied that the risks associated with the SR27 Final Business Plan are well understood, appropriately balanced, and are tolerable to enable submission of the SR27 Final Business Plan to WICS.