C4DD

Bristol Water Clearly Resilient

Our action plan to enhance our systems thinking approach to resilience in the round

August 2019

1. Foreword

This document is a further revision to our business plan supporting document, “Bristol Water… Clearly Resilient” (C4), originally updated in April 2019.

This latest update reflects:

- Improvements we have made since April 2019.
- Further clarification to address Ofwat’s comments in our draft determination to demonstrate the ***benefit that specific investments have in mitigating quantified levels of risk*** – see Section 6.
- Our ***action plan to enhance our systems-based approach to resilience in the round***, an action from Ofwat’s Initial Assessment of Plans (IAP) - see Section 7.

In our original C4 document, we summarised how our plans for AMP7 not only deliver on customer priorities and outcomes but also ensure we are more resilient in the round (see Figure 1 overleaf).

We describe our systems thinking approach in the following sections:

- Section 3 - where we provide our view of what systems thinking means and show how our outcomes and strategy are designed to deliver systems thinking resilience.
- Section 4 - where we describe how systems thinking is already at the heart of our plans.
- Section 5 - where we describe our integrated resilience framework.
- Section 6 - where we detail the line of sight between risks to resilience and outcomes.
- Section 7 – where we provide our action plan to enhance our systems thinking approach to resilience in the round.
- Section 8 – where we describe how we will monitor delivery of our plan and communicate progress.

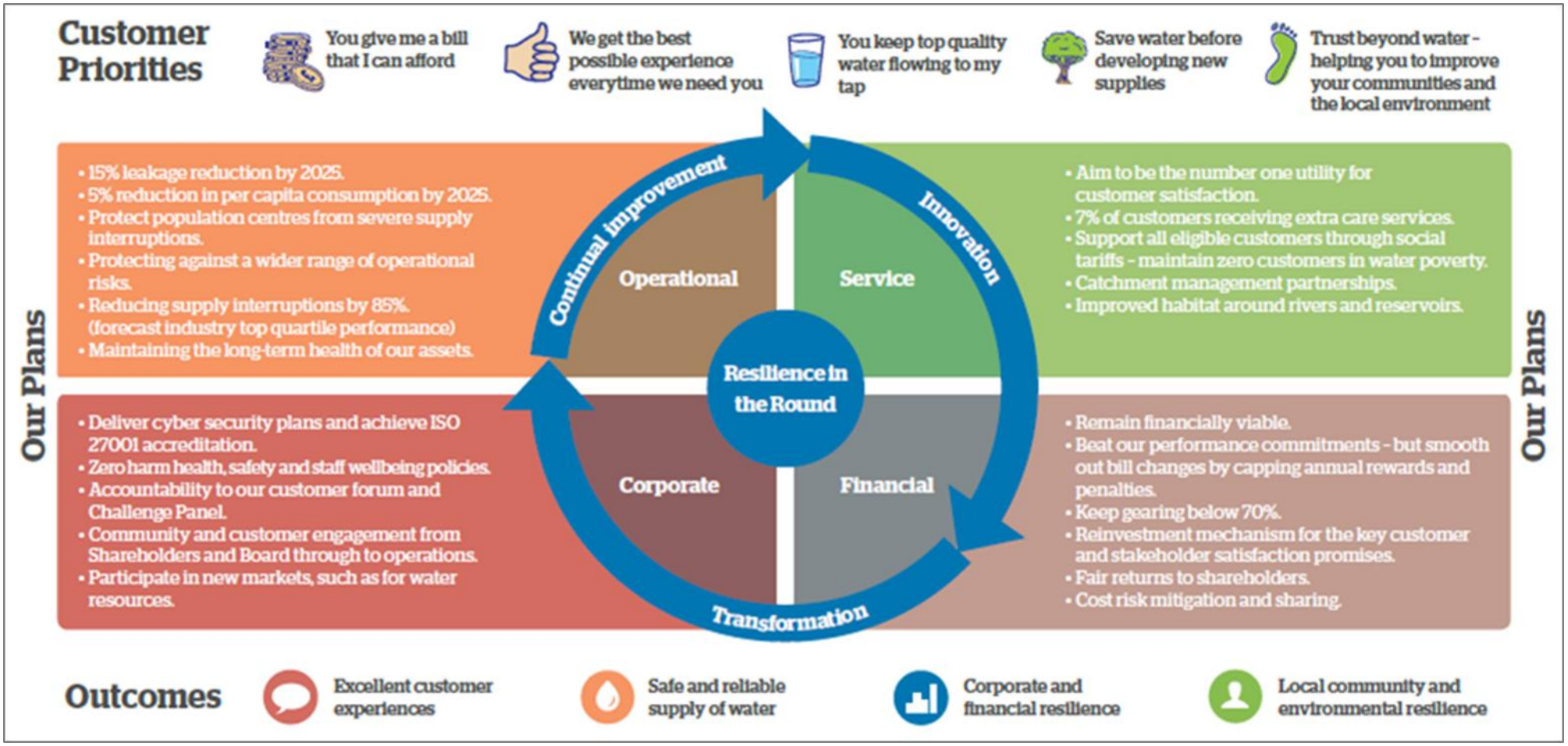

Figure 1: Summary of how our plans deliver resilience in the round

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3. Systems Thinking Introduction

We consider systems thinking to be about ***understanding the whole context*** of a particular challenge with all its connections and interrelationships. This approach helps to identify the root cause of a problem, or source of an opportunity, enabling powerful, long term and cost-effective decision making.

A systems thinking approach is different from traditional analysis because it focuses on how the area being studied interacts with other parts of the system. In contrast, traditional analysis separates the individual elements of what is being studied into smaller and smaller parts. Traditional analysis tends to focus on events (as these are often highly visible and require immediate attention), whereas systems thinking focuses on understanding the interactions that led to the event and the approaches of individuals and organisations which influenced it.

Methods such as causal loop diagrams and tools such as dynamic models can help to understand how a system functions, however systems thinking is also applied through an awareness of the role of structure and interrelationships, and an acknowledgement that there are system responses that we might not yet fully understand.

3.1 Principles of systems thinking

When an organisation adopts systems thinking it recognises that:

- The system is an integrated, complex composition of many interconnected parts (human and non-human) that need to work together for the whole system to function successfully.
- Most systems are open and have important links with the physical and social environments in which they operate.
- Systems can be defined at different levels and can operate alongside each other as well as hierarchically (e.g. the finance system, the decision-making system, the assurance system).
- Silos within a system may in themselves be successful but shortcomings of system design, management or understanding can hold back whole system performance.
- Whole system success requires an approach that focuses on system outcomes rather than functional silo performance.

3.2 The value of systems thinking

Systems thinking has proven value for:

- Problems where solutions are not immediately obvious.
- Complex problems that rely on many factors and seeing the bigger picture and not just part of it. Resilience is an excellent example of this.
- Recurring problems or those that have been complicated by previous attempts to fix them.
- Issues which affect or are affected by actions in the surrounding natural, physical and social environments.

Healthy open systems continuously exchange feedback with their environments, analyse feedback, adjust internal systems as needed to achieve the system's goals, and then transmit necessary information back out to the environment.

At Bristol Water we operate as an organised collection of systems, arranged in hierarchies which are integrated to deliver outcomes to our customers. Our systems also influence and interact with the natural environment, our community and external stakeholders. To ensure our systems are aligned and focussed on achieving common goals, their component parts need to continually exchange information.

We recognise the value that systems thinking can bring to our decision making and investments, particularly to the way we manage our resilience, and we already apply it implicitly in many of the ways we work. The use of systems thinking to inform efficient resilience planning is growing in the water sector, and is a focus across UK infrastructure, as evidenced by the ongoing work of the National Infrastructure Commission. We support these efforts and agree that resilience is enhanced and optimised when different infrastructure sectors and different stakeholders

share information and collaborate in the development of solutions.

We have worked in conjunction with Jacobs on our maturity assessment and development of our action plan. Jacobs are recognised as experts in engineering, technical and innovative thinking, especially in the domain of water supply, climate change and sustainability.

Since submitting our updated business plan supporting document, "Bristol Water… Clearly Resilient" (C4) in April 2019, we have undertaken an assessment of our plan against the *Infrastructure Centre for Infrastructure Futures Interdependency and Planning Management Framework,* which includes activities grouped in to three areas:

- **Problem structuring**: defining system boundaries, identifying interactions and highlighting risks and opportunities.
- **Measurement and appraisal**: establishing criteria for risk treatment and opportunity capture and gathering evidence to track progress.
- **Creating stakeholder understanding**: identifying stakeholders and developing the tools and approaches to encourage collaboration.

We have also asked Resilience Brokers to undertake a peer review of our plan. Resilience Brokers have a track record of working with city-region stakeholders to demonstrate how they can use systems approach in design, planning, implementation and operations to unlock value and drive sustainable performance. An example of their work is with Hunter Water, Australia to explore how systems thinking and modelling could help assess the potential for a Water to Energy strategy that supports the economic and environmental targets for the region.

Stephen Passmore CEO of Resilience Brokers states:

‘’***Bristol Water have made impressive progress in embedding systems thinking as a part of their work to achieve resilience in the round. The Clearly Resilient report documents the comprehensive approach they are taking, from engaging with customers in an accessible way on resilience to their robust framework that links great asset management and increasing resilience maturity to the outcomes customers want. This action plan sets a clear direction the whole organisation is adopting to ensure operational, financial and corporate resilience.’’***

4. Systems thinking at the heart of our plans

Systems thinking has been an important methodology influencing the development of our long-term ambition and PR19 business plan. This can be seen in our future factors and priorities diagram (Figure 2 – explained in more detail in ***Bristol Water…Clearly***, and in the "ambition on a page" summary of our purpose, vision and mission (**Error! Reference source not found.**). We ummarise our approach to systems thinking as a focus on the shared connection to society that our assets, people and activities form with our communities and customers. Improving our knowledge and understanding of this shared connection helps to improve our systems thinking approach to resilience and long term planning.

We use the term "systems thinking" rather than "systems based" as the focus of our resilience framework is to learn about the society we operate in, and to understand how it may affect the services we offer and the investment choices we face in the future.

A key source of value from systems thinking comes from the fact you cannot achieve resilience in isolation. You have to collaborate with others in order to truly understand the system and manage it effectively. Our recent discussion document on social contracts and the conclusions of our event with local and national stakeholders to learn from their experience are good examples of this collaboration.

Our key system interfaces are our links to and interconnections with our communities. Our analysis of the future challenges we are likely to face as a water company found that social challenges, namely the rapid change to society and its wellbeing, are the most significant challenges that we face, in turn affecting what customers expect from their essential service providers (see ***Bristol Water…Clearly*** page 78). For example, several pieces of research predict that affordability challenges will increase in future. These challenges would be exacerbated in the event of an expensive solution to meeting future water demand. Skills gaps may also increase in the future, making it more difficult to meet the evolving recruitment needs of the company. At the same time, increasing water usage combined with climate change would have a negative impact on our local water environment and therefore on social and environmental wellbeing.

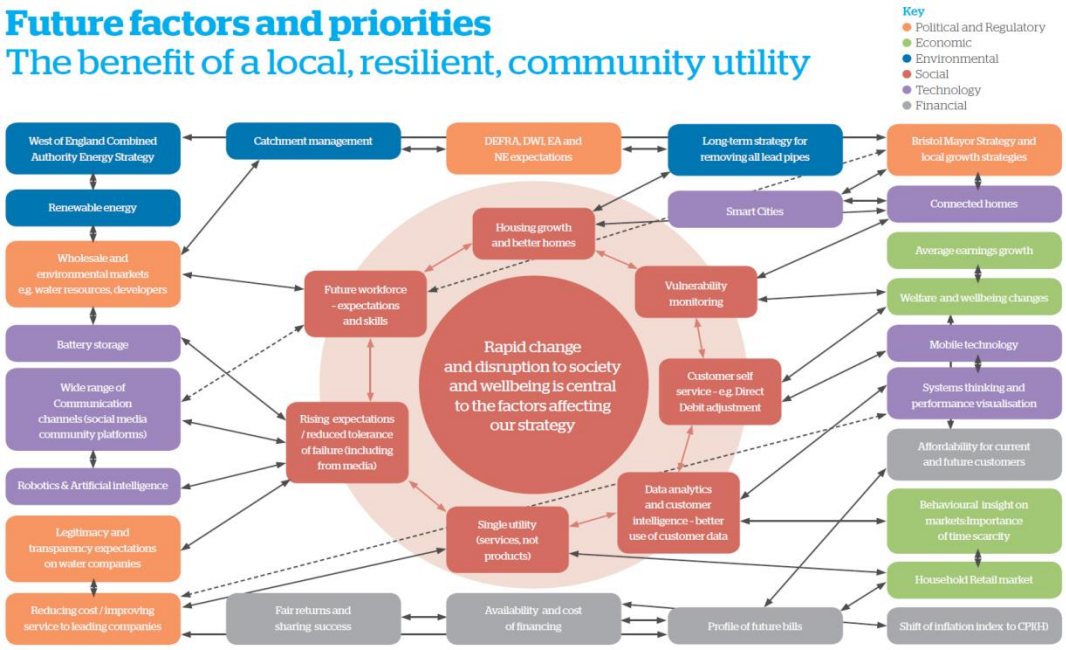


Figure 2: Future factors and priorities

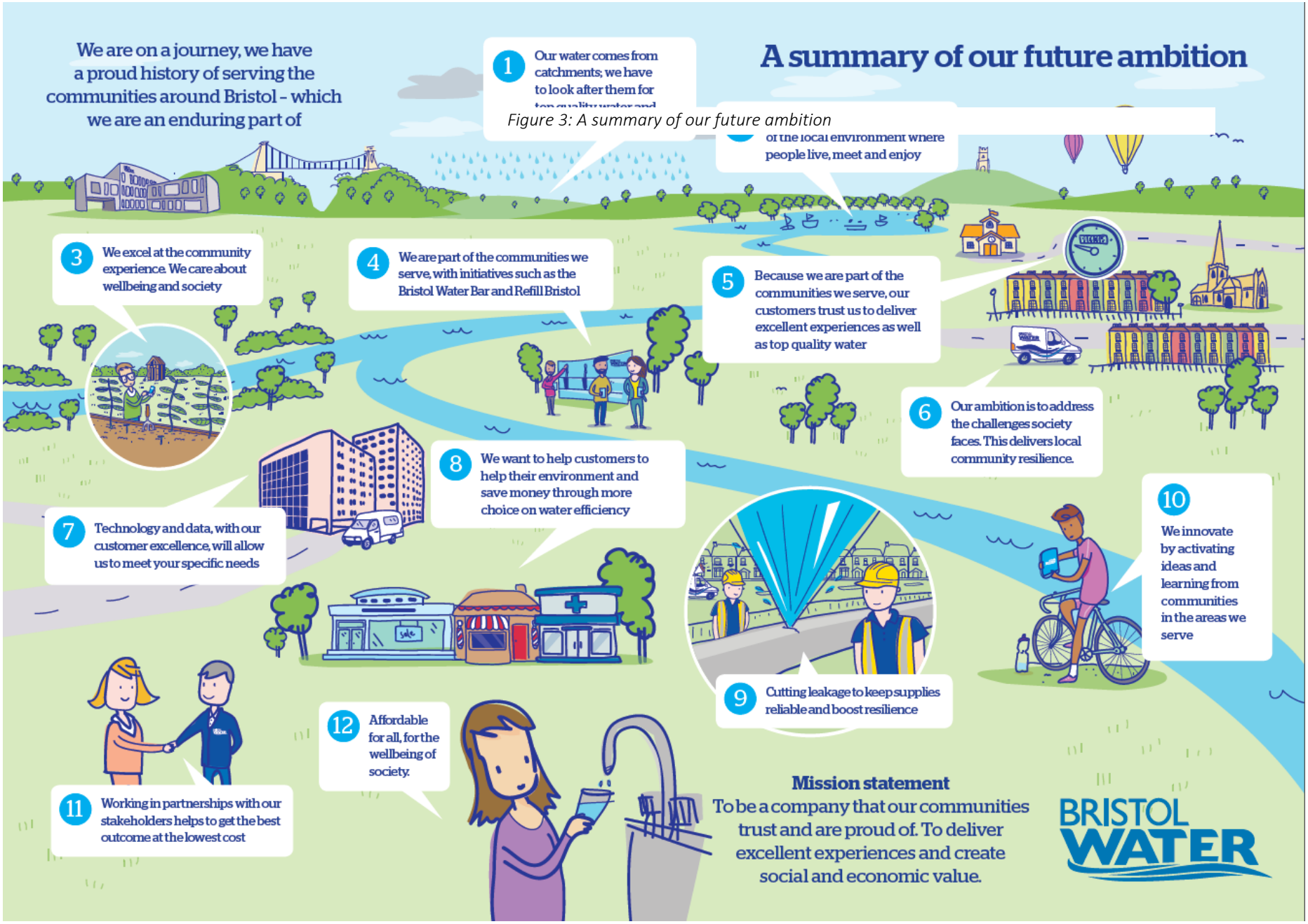


Figure 3: A summary of our future ambition

Our four business plan outcomes recognise this close relationship with our communities and make an explicit link between community wellbeing and resilience:

Outcome 1: Excellent Customer Experiences
This outcome recognises the link between great services to all customers and community wellbeing. For example, this outcome includes additional support for more vulnerable members of society, including those whose circumstances mean that they struggle to pay their bill.

Outcome 2: Local Community and Environmental Resilience
This outcome recognises the link between our protection and enhancement of the environment together with our additional activities to benefit our communities (such as access to free tap water in public spaces) and overall community wellbeing.

Outcome 3: Providing a Safe and Reliable Supply of Water
This outcome is directed at the continued provision of the most essential ingredient to community wellbeing – reliable, high quality tap water.

Outcome 4: Corporate and Financial Resilience
This underpins the delivery of the other three outcomes - maintaining customer trust by manging our finances, looking after our people, providing a framework for resilient and innovative services, providing effective corporate governance and being transparent on how we are performing.

Error! Reference source not found. above emonstrates how our future ambitions are systems based and aligned to community.

Figure 4 shows our business plan outcomes linked to our customer priorities and promises and wellbeing. Further information on our outcomes is given in Section 6, together with a mapping between key mitigations and risks to resilience.

Figure 4: How customer priorities and promises support our plan

4.1 Our social purpose and social contract as systems thinking

By providing a public health solution in 1846, Bristol Waterworks raised awareness of how polluting the local environment caused wider problems. Preventing environmental pollution in urban areas started with providing a social provision and addressing one of the root causes of poverty – expensive and polluted drinking water which limited community wellbeing.

Today, water supplies in the area we serve are almost always top quality. However we concern ourselves with how we can improve this essential service further – better services for the long term at an affordable cost for all, whilst contributing to improving the challenges that society faces.

We reflect this in our **social purpose** – to have a positive impact on the lives of our customers, our communities, our colleagues and the environment beyond the delivery of pure and reliable water

Our Social Contract, published in January 2019, is in recognition of our role in societal wellbeing and not just the provision of an essential service. It describes how we will be accountable and transparent for the social promises which lie at the heart of our purpose, and this requires a complete appreciation of all the factors influencing the wellbeing of the society with which we interact. It builds on our long term ambition document "Bristol Water…Clearly" where we set out our plans to work with other local organisations to help us develop a shared connection with society through an understanding of what consumer and local community concerns and challenges were so we could deliver innovative and sustainable solutions.

Our social contract is a mechanism by which the local community can hold Bristol Water accountable for how we deliver this shared connection. This goes beyond the basic requirement of competitive markets, regulation, legislation and corporate social responsibility. If local people believe we haven't delivered societal benefits then there are financial consequences for us. We believe our Social Contract is unique to the industry. We expect to be accountable for our contribution to societal wellbeing and this requires a sustained focus on the systems which govern it.

A part of the process of embedding our social contract we have been working to link our activities into local and national frameworks.

The Bristol One City Plan was published in January 2019 and sets out a series of visions and targets for the city until 2050 to make Bristol a fair, healthy and sustainable city. The aspiration of the One City Approach is to bring together a large range of public, private, voluntary and third sector partners within Bristol to work collectively to achieve the One City Plan.

We are actively working with the One City Office and a range of local stakeholders to link our activities into the One City Plan, to help to deliver community wellbeing through this framework. An example of our approach is the event which we jointly ran with the Bristol Green Capital Partnership on 12 July 2019 (case study below).

In addition, we have worked with the city to contribute to its resilience strategy, published in December 2016.

Bristol is one of only five cities in the UK selected to be part of the '100 resilient cities' network, Pioneered by The Rockefeller Foundation in 2013, the network is dedicated to "helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century".

Climate change is a huge challenge for society, and even though our water supplies appear to be resilient for the future, we still expect big changes to how we work in order to keep water costs affordable. Bristol was the first city to declare a Climate Emergency, and there is a shared goal in the city to achieve zero carbon by 2030. Achieving this is not possible if Governments or businesses work in isolation – sustainability requires a change in how we all live and work, what we consume and how we develop our approach as citizens. We will need a change in skills as a workforce, so education and learning now is essential.

Our priority through our Social Contract is to build trust that a range of organisations working together can deliver a shared social purpose – the wellbeing of society. We are working with the Bristol Green Capital Partnership which has developed a vision for an environmentally sustainable Bristol. As with our own plans and initiatives, the Bristol One City Plan recognises the importance of environmental sustainability, but addressing it requires social mobility and the whole range of other wellbeing challenges to be addressed. The City plans call for a 10% reduction in water consumption by 2045. Our current plans are more ambitious, looking to achieve a 5% reduction by 2025 and 23% by 2045.

Our founders had a strong social purpose that in modern times we would describe as sustainable development – recognising that the long term quality of the environment required a focus on the pressures that society and public health were placing on it. The solution was innovative 173 years ago – a gravity fed supply of clean water from outside of the city. It was a local solution to what was a global problem, at a time that most of the leaders of society did not care, or if they did care did not have a wide enough vision, to find a sustainable solution. Further growth and private consumption was seen as the way to improve wellbeing, rather than a social solution that required a #hydrosocialcontract.

We think the United Nations Sustainable Development Goals (SDGs) provide a vital framework around which to plan our targets for the long term and the initiatives in our social contract. They are used by some of our partners, such as Bristol Green Capital Partnership, UWE and in the One City plan. They also reflect the principle of taking positive action for sustainability, rather than through negative regulation which will destroy, rather than build trust. And they help to explain the importance of a shared connection to society. If we are to achieve this, organisations such as Bristol Water have to work together to build trust in a positive vision of a sustainable future that is attractive to people – a future they want to be part of.

Part of our systems thinking action plan is therefore to report on our contribution to the One City plan and through our social contract, using the framework provided by the UN SDGs. We show our current mapping in Appendix 1.

We used this mapping, with further detail to contribute to the first voluntary review for Bristol for progress against the UN Sustainable Development Goals. Read more at: http://www.bristol.ac.uk/media-library/sites/cabot-institute-2018/documents/BRISTOL%20AND%20THE%20SDGS.pdf

Case study: Citizens for the Future Event

On 12 July 2019, together with the Bristol Green Capital Partnership we hosted an event "Citizens for the Future – the One City Plan through the lens of future citizens and employees"

The objective of the workshop was to bring together key stakeholders within the city to explore the changes required to the way we live and work to achieve the One City Plan. The specific focus was on turning consumers into citizens.

"Together we face many challenges to grow the fair, healthy and sustainable city imagined by Bristol's 'One City Plan'. Our future citizens (employees, consumers and communities) will need to be knowledgeable, active and empowered to make significant changes to the way that we live and work to achieve the targets set out in the One City Plan." (Extract from event invite)

The event was well attended and there was lively debate through a series of presentations and facilitated workshops. The main focus of discussions was that to achieve the One City Plan, we need to work together to help to shape our future people so that they are citizens, not just consumers. Local stakeholders felt there was a real opportunity to work across public and private sector organisations, across different sectors, to help future generations to feel connected to their communities.

The role of employers is also important. Attendees felt that there will be less of a distinction between work lives and home lives in the future, as work becomes more flexible to address time vulnerabilities which limit opportunity for sustainable development. The next generation increasingly care about the core values of their employers, which is both a challenge and opportunity for the water sector.

The event was well attended by a range of local stakeholders and resulted in 35 specific actions which we are following up through our Resource West Partnership. Examples include:

Help to develop one strategic approach to plastic reduction, using the reusable working group, piloting across the city – City to Sea

Offer free waste audits to local businesses, to help to identify where waste can be reduced – Bristol Waste

Offer to run a workshop on Bristol's clean air plan and/or carbon neutral 2030 plan. Working with any organisation at the workshop – Bristol City Council

The event is an example of our systems thinking approach to resilience – proactively working with a wide range of stakeholders to contribute to local community resilience. In doing so we recognise that providing resilient services and community wellbeing are deeply interconnected.

A full write up from the event can be found here. Examples of feedback we received include:

"I was pleased to be part of this collaborative and engaging Citizens for the Future workshop that explored the ways Bristol citizens can become more locally engaged and active to contribute towards a healthy and sustainable city. Following some inspiring presentations from businesses and charities on the management of waste, water resources and energy in the city there was opportunity to spark ideas and partnerships on topics ranging from public health and education to the environment. The Bristol Green Capital Partnership provides a unique network where we can continue to collectively explore how to improve and influence the ways that citizens value and use our natural resources."
Tamsin Sutton, Environment Agency

"I was inspired by the energy in the room, I thought Mel's talk was fantastic as a reminder of how far we have come & in that respect gave me renewed hope that we can now tackle our shared environmental challenges. I also liked the focus on wellbeing as the foundation and outcome of working towards environmental sustainability."
Libby Sandbrook, Business in the Community

4.2 Next steps for our social contract as part of our systems thinking approach:

In the following section, we describe the key next steps for our social contract as part of our systems thinking approach to resilience. These are reflected in our action plan in Section 7.

4.2.1 Facilitating shared connections

Our customers and communities are examples of key external influences on our view of external systems, one which we have a very close interaction with, both in terms of the services that we provide, and through our employees, partners and suppliers who are part of our communities too. Our communities are not only geographical, but also functional groups with shared interests and connections.

Our aspiration is to build on our existing relationship with these communities to enhance connections and partnerships which foster a shared purpose for the wider benefit of society. These connections and shared value are the foundation of social capital - the connections that link people together and lead then to exchange of knowledge and resources which develops the trust and cooperation which is fundamental for a successful society to operate.

4.2.2 Natural capital thinking

Our social contract aligns with a natural capital approach by seeking to understand and prioritise activities which provide wider benefits linked to the social contract based on the wider benefits to natural, social and human capital.

Our aspiration is to expand this framework to all the investment decisions which we make so that we fully embed societal and environmental issues and benefits into our core business model. Our Biodiversity Index is an important early step on our transition towards embedding a natural capital approach into our organisation.

4.2.3 Embedding our social purpose through building trust for the long-term

The ICS/Bristol Water report "Social Contract for Water – evolution or revolution?" identified three steps to embed the Social Contract ideas, which we see as a parallel for a systems thinking approach because it reflects planning for trust beyond the basics of water supply (and its regulation). The three steps are:

1) Modernising governance for the evolving Social Contract - embedding this into the governance of water companies.

2) Building the shared connection to society – deeper embedding of local communities into company processes to enable them to hold companies to account and to really shape activities.

3) Decision making for the longer term - embedding this into the company's strategic decision making for the long-term, which in turn informs and shapes day-to-day operations on an on-going basis.

Our aspiration is to continue to evolve our social contract, through engagement with our customers, our stakeholders, our employees and the Bristol Water Challenge Panel to embed our social purpose and our contribution to community wellbeing.

Appendix 2 provides a more detailed overview of our Social Contract

4.3 Innovation as part of systems thinking

Our Open Innovation Programme has made strong progress in its links with the local innovation cluster.

The city of Bristol is recognised as a leading technology and innovation cluster in the UK. Bristol Water operates as a pro-active member of this scene in order to access the plethora of innovations available locally that will enable our customer

outcomes as well as support the company's social contract and contribution to the One City Plan.

Our recent open innovation event held in April 2019 brought together a range of stakeholders across the Bristol innovation cluster for a day of collaboration (Figure 5).

One output from the working sessions at the event is that we are now working with Baringa Partners to research and explore how to get resource efficiency and vulnerable support services to the 20-35 age generations and how we engage with landlords in order to support this process.

Figure 5: One of the flyers from the Bristol Water Innovation Event

The rationale for this project reflects the significant challenge which future citizens face in housing – in particular as the next generation. Vulnerability moves from affordability to time and place. If you are renting rather than owning your own home, it is harder to make your lifestyle resource efficient – you may be less able to change your use of water and energy. The outputs from our Youth Board confirm that this is a new area of vulnerability that requires further exploration, beyond the traditional areas considered "hard to reach" where support is currently targeted.

The innovation event itself was centred around our business incubator.

As a result of the interest we have driven to the incubator through the event we are mobilising:

•The development of artificial intelligence as a decision support tool in the control room. This is due to commence in September 2019

•A trial to deploy technology, not yet available on the market, to test dynamic (as opposed to static) pump monitoring (an approach not widely adopted in the industry) and reduce energy usage. This is due to go-live at the end of September 2019

•Support for vertical farming solutions that can dramatically reduce water consumption in comparison to tradition agriculture

As with all innovation, we have also 'failed fast' on potential areas from the event such as the use of algae in the water treatment process and supporting the development of predictive maintenance solutions.

Co-creation with our staff

We have continued to drive innovation internally.

Brainwaves, our internal staff suggestion scheme has been a long running success for us. It is the platform we use to transform many of our ideas into customer benefits. It is a forum for all employees to suggest ideas to make Bristol Water better - more efficient, more focused on our community, a safer environment to work in, a more engaged team, and a better place to work.

Brainwaves is run without constraint; ideas cover staff wellbeing, corporate social responsibility, asset optimisation, health and safety, and customer campaigns. Brainwaves rewards are focused on calibre and intent of the idea, not just whether it is implemented. This ensures that we celebrate any attempt to improve our company.

In 2017/18 more than 120 ideas were submitted and c.10% have been implemented, including the St John's Ambulance First Aid app, and the use of Biobullets to manage zebra mussels. This year we ran our first Brainwaves event; to celebrate everyone who has been involved, either through submitting an idea, being part of the Awards Team, or supporting investigation and implementation of ideas. Winning ideas included:

•Bristol Water Funding/Grant Appeal - this idea considered how to set up a grant and invite local charities to apply for funding, driving our community objectives. We have since launched a Facebook community and a monthly draw giving local charities the chance to win £500.

•Altering the way in which we conduct step testing - this idea focused on how we could alter the way in which we conduct our step test process for

groundwater sources, setting up the membrane plant in a manner that allows us to maintain set flows whilst still filtering the water and preventing the need for super and de-chlorination and crypto monitoring. This idea gives us great potential for cost savings and has since been implemented.

Recent activity:

Brainwaves continues to provide a source of big and small innovations across every area of business ranging from staff wellbeing to engineering optimisation.

Examples of innovation recently mobilised from Brainwaves are:

•Ultrasonic buoys. This technology uses ultrasound on a floating buoy to minimise algae blooms on our slow sand filters. The buoys disrupt the algae in order to minimise their growth

•Tagging Meters – to identify Bristol Water ownership and prevent unauthorised removal of internal meters. This is being rolled out currently with metal stickers

Co-creation with our partners

Across our supply chain, this year we have implemented a number of new contracts. In undertaking these, we have ensured that they maximise innovation beyond what we may have achieved alone. For example:

Information Systems:

Our contract with Wipro operates a co-innovation framework that allows access to an ecosystem of innovation beyond the reach of Bristol Water, for example:

•Annual BW Leadership visits to Wipro Digital PODs/Innovation Centres.

•Use Wipro's Crowdsourcing platform (Topcoder) for faster & cost effective POCs delivery

•Access to Wipro's Partnerships, Start-ups and Alliances (e.g. Wipro Ventures)

•An innovation fund of £20k per year to trial new technologies

Network Maintenance:

We are mobilising our new partners for our network maintenance supply chain. As a central activity, delivering for our customers, innovation has featured as a key element of this:

•The suppliers were assessed and selected upon their approach and experience in delivering innovation and improvements.

•The suppliers are incentivised to outperform by a reward / penalty mechanism that support systems thinking and links to our ODIs.

•The contract operates a target cost mechanism incentivising contractors to innovate because they share the risk of developing the innovation with us but can benefit if actual costs are reduced through its use.

•Bristol Water retains in house control of design phases and our design teams benefit from membership to market scouting services such as the Technology Approval Group and our Open Innovation Program which explores new and emerging solutions.

•We have setup up Early Contractor Involvement mechanisms whereby we benefit from their knowledge of innovation elsewhere in the industry.

Outside of the supply chain, we also work closely with universities to gain access to expertise that can develop novel solutions to challenges we face. A recent example is shown (Figure 6) that of a study with the University of Sheffield where Totex was optimised by avoiding the need for a costly trunk main relining scheme by employing sophisticated operational and management strategies.

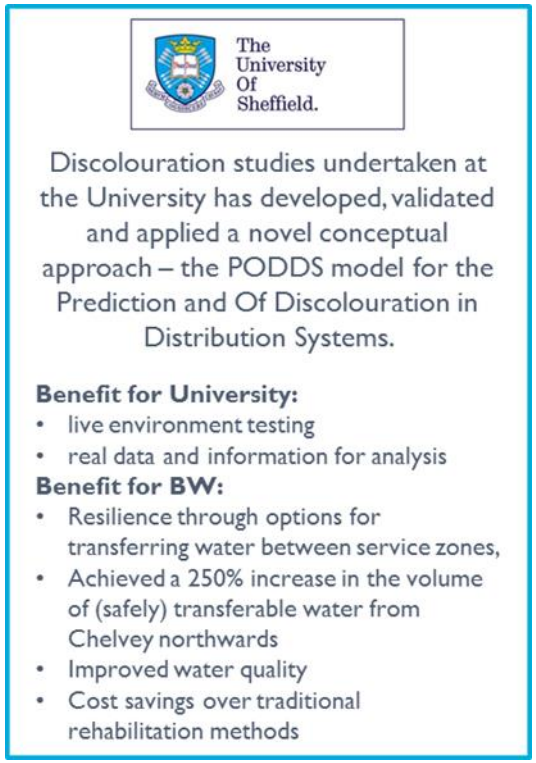


Figure 6: Working with the University of Sheffield on the PODDS model

Appendix 3 provides an update on our innovation framework.

4.4 Further examples of our systems thinking

Our **Water Resources Management Plan (WRMP) process** is another example of our approach to systems thinking. It ensures that we regularly consider the stresses and constraints in our catchments, working with catchment partners to understand challenges and opportunities, and to develop potential solutions. We have taken this engagement a step further to build on relationships to identify other ways we can work together to deliver mutual benefits. **Appendix 4** outlines the characteristics of our WRMP process which we will embed into our broader systems thinking approach.

As well as recognising our interrelationships with the systems of our stakeholders, another important aspect of systems thinking is being able to understand and recognise the role of different types of capital. In AMP6, we introduced an innovative biodiversity performance measure called the **Biodiversity Index.** The Biodiversity Index approach uses a formal and audited process to measure the biodiversity significance of all the company's sites and enables the business to score, assess and quantify the importance of each site for wildlife, based on an assessment of the type, scale and condition of the habitats present at the site. **Appendix 5** provides a more further information on our Biodiversity Index.

Notwithstanding these examples, we understand that we, like the rest of the industry, must do more to formalise and enhance systems thinking by bringing these practices together in a more integrated decision-making process which encompasses all of our outcomes. This will enable us to realise:

- **Better risk management, solution planning and best value outcomes** – by understanding the points in our system where we can have most leverage over overall performance. We can focus our efforts at these points to deliver multiple benefits in a cost-effective manner.
- **Better engagement with our partners and customers** – by understanding how our systems are influenced by the infrastructure, activities and/or interests of our customers and partners in the catchments in which we operate.

The **Mendip Lakes Partnership** is also a great example of our systems thinking in action.

An important risk to our resilience is that pollution events lead to an impact on raw water quality. There is also a risk that the volume and quality of natural habitats for our wildlife will decline. These are a vital part of the ecosystem that supports our ability to deliver our services by providing clean water, food, fuel and protection from flooding and extreme weather; leading to an impact on our community.

Bristol Water in partnership with Catchment Sensitive Farming, Avon Wildlife Trust, Natural England and the Environment Agency, is working with farmers across the Blagdon and Chew Reservoir catchments to improve water quality and enhance habitats.

The partnership provides free specialist advice on soils, nutrients and business management – and support on the new countryside stewardship schemes. It is often less expensive to tackle diffuse pollution problems “at source,” so we may also be able to offer financial support for land management changes or farm improvements that give cost-effective improvements in water quality. As part of the project, we are undertaking an extensive water quality monitoring programme so that we can understand risk areas and identify improvements over time.

Through the project, farmers can access:

- Free soil analysis and management advice
- Free manure and slurry nutrient value analysis
- Free Nitrate Vulnerable Zones (NVZ) compliance checks
- Free Nutrient Management Planning by FACTS qualified advisor
- Free countryside stewardship and catchment sensitive farming grant application advice
- Free infrastructure and water management audits

5. Our integrated resilience framework

Our integrated resilience framework underpins our operations and future plan. This framework is shown in **Error! Reference source not found.**, hich depicts the a clear line of sight between our risks to resilience, planned mitigations, our package of outcomes and our corporate governance framework.

One of the key enablers of our integrated resilience framework will be the maturity of our risk and planning processes through which we understand the hazards which could challenge our ambitions, assess the risk they present, develop options to address them, deliver solutions and monitor their performance to support continual improvement. By applying the risk and planning processes, we ensure a clear line of sight between the factors that influence our systems and the outcomes we aim to deliver to our customers.

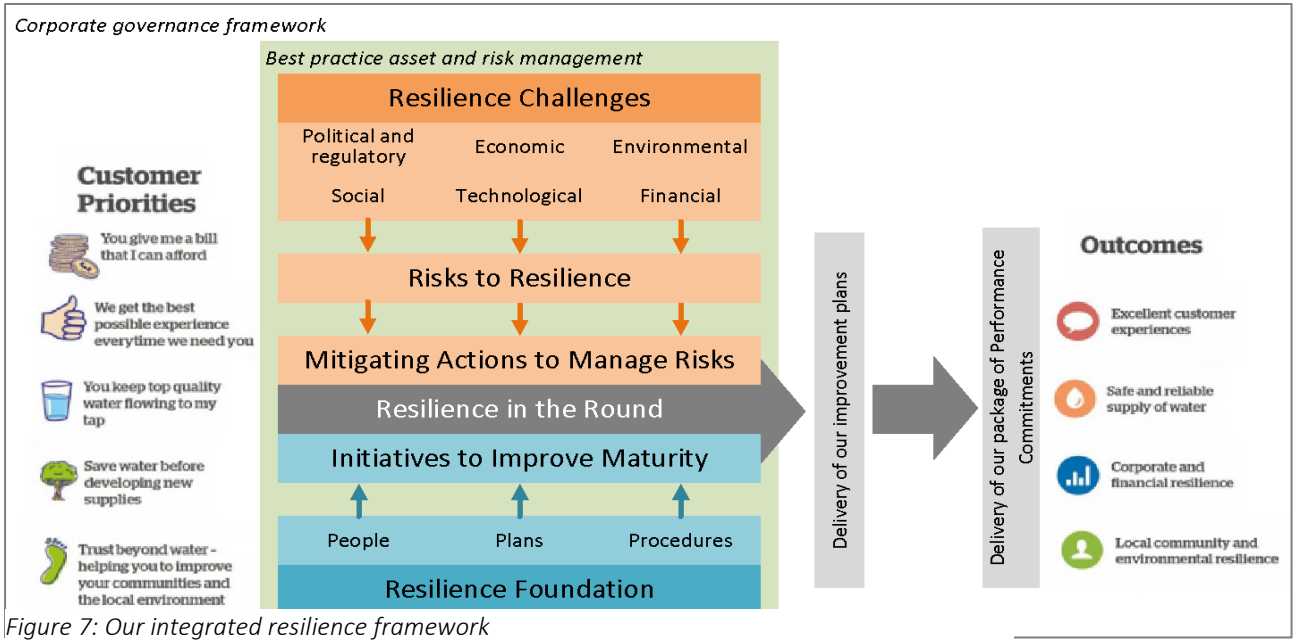


Figure 7: Our integrated resilience framework

Our current approach to delivering resilience in the round has two strands:

- **Resilience risk management:** maintaining a robust approach to understanding the broad range of hazards which could challenge our ambitions, assessing the risk they present, and developing robust options to address them.
- **Resilience maturity improvement:** which continually improves the plans, procedures and people which act as the foundation which allows us to deliver resilient services.

Both of these strands are inherent to our approach to managing our assets in line with best practice procedures as outlined in ISO55001, ISO31000 and ISO9001. They are also supported and assured by our corporate governance framework. It is this package of management tools which we will enhance through our integrated resilience framework.

By applying our strategic and tactical risk and planning processes which extend across these two focus areas, we ensure a clear line of sight between the factors that influence our systems and the outcomes we aim to deliver to our customers.

5.1 Our risk management process

We have a thorough risk management process. Key points to note are:

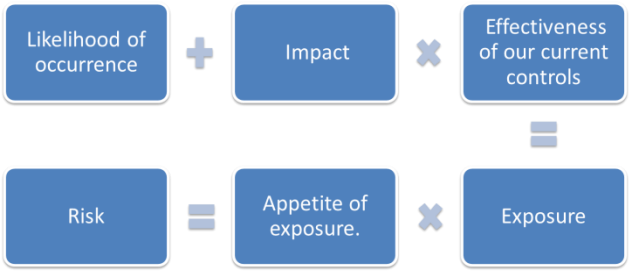
- Our approach to identifying and managing resilience risks has evolved over time and will continually improve, supported by the activities in our action plan.
- Risk identification is based on top down horizon scanning to consider current and future uncertainties and how these might affect our business, our customers and our stakeholders, in addition to bottom up monitoring of asset, organisational and financial performance trends to flag areas of weakness and opportunities to strengthen our position.
- We have considered future challenges to resilience and our strategic response - see ***Bristol Water… Clearly*** for further information.
- We have used the World Economic Forum Global Risk Report that looks at trends in risks to support our evaluation and reflected on the stakeholder engagement to convert the global challenges into a more regional and local view. We then applied a framework to broaden our thinking to make sure we addressed political and regulatory, economic, environmental, social, technological and financial factors.
- When prioritising our risks, we consider the likelihood of occurrence + the impact x the effectiveness of our current controls x appetite of exposure. A copy of our risk register was provided in ***our revised C4 document 'clearly resilient'*** *published in April 2019*.
- We then apply procedures to ensure we consider a broad range of measures to address the risk or capitalise on the opportunity. We monitor progress as the solution is implemented and throughout its life to ensure we continually improve and are flexible to future pressures.

Table 1 outlines the stages of our risk and planning processes.

5.2 Risk quantification

In **Appendix 6** we have included a copy of a paper from our Audit and Risks Assurance Committee in September 2018. The purpose of the paper is to provide the board with visibility of any emerging risks as well as providing a progress update for existing risks. This paper also highlights that following an intensive period of Board engagement during spring 2018, we identified the ten principal risks for our company. This report provides a quantified view of our risks. The ten principles risks were disclosed in our annual report 2017/18 and updated in 2018/19.

When assessing risk we use the following methodology to determine level of risk we currently have:



Likelihood has a range from zero to five, zero being exceptional – 'once every 100 years'; five being almost certain – 'more than once in 15 months'.

Impact also has a range from one to five ranging from minor to catastrophic. Impact can be measured using financial and non-financial indicators such as water quality and health and safety.

Effectiveness of control ranges from one to three: Assigning one means controls are high – that risk control is in place and covers most of the causes or most of the consequences of the risk. Assigning a three would categorise the control effectiveness as low meaning that several of the action plan

elements have not been defined (e.g. deadlines and people responsible, etc.).

We use high, medium and low to categorise the organisation's exposure appetite.

While we capture our inherent risk level (risk with no controls) and our current risk level (as described above) we recognise that there is an opportunity to improve our risk process by forecasting the future level of risk expected once our mitigating plans have been delivered.

In Section 6, we also evidence the relationship between these risks and outcomes for our customers in more detail.

5.2.1 Linking our risk management process to Ofwat's resilience planning principles

Table 1 indicates how the stages of our risk and planning process address each of Ofwat's resilience planning principles:

1. Considering resilience in the round for the long term

The assessment of resilience should show a systematic and integrated understanding of service and systems risk across the entire business. Companies should assess resilience of their systems, and the services they provide, in the round. They should show a clear understanding of the interdependencies across corporate, financial and operational aspects of their business. This assessment should consider short, medium and long-term risks.

2. A naturally resilient water sector

Resilient ecosystems and biodiversity underpin many of the key services provided by companies. This should be considered as part of the decision-making process for ensuring resilient services, as far as this is consistent with companies' role as providers of water and wastewater services.

3. Customer engagement

Companies' plans to manage resilience should consider a full set of mitigating actions and interventions that consider all of the components of resilience, including response and recovery. They should also explicitly consider options that involve cooperation and collaboration with other companies at a regional, or even national, level, where they offer best value (such as transfers and cross boarder planning).

4. Broad consideration of intervention options

Companies' plans to manage resilience should consider the best value solutions for customers in the long term, which may involve long run solutions.

5. Delivering best value solutions for customers

Companies' plans to manage resilience should consider the best value solutions for customers in the long term, which may involve long run solutions.

6. Outcomes and customer-focussed approach

Companies' plans to manage resilience should inform the outcomes they propose. The proposed outcomes on resilience, and the associated stretching performance commitments they set, should also take into account future risks and customer preferences.

7. Board assurance and sign-off

- *Companies' Boards will need to assure us that companies' business plans have been informed by:*
- *a robust and systematic assessment of the resilience of the company's systems and services;*
- *customer views on managing resilience; and*
- *comprehensive and objective assessment of interventions to manage resilience in customers' long-term interests*

Table 1: Risk management process stages aligned to Ofwat's resilience planning principles

Stage	Activities	Traits of a Systems Thinking Approach	Resilience Planning Principles						
			1	2	3	4	5	6	7
Stakeholder Identification and Initial Engagement	• Identify customer groups and other key stakeholders • Initial engagement to understand key challenges, constraints and desires • Broadening of customer and stakeholder group as informed by initial contact • Definition of shared vision • Outlining of clear plan for continual engagement	• Local and regional customer and stakeholder engagement • Acknowledging interdependencies, interrelationships and uncertainties. • Working with our stakeholders.	✓		✓		✓	✓	
Risk identification and verification	• Future factors horizon scanning including global, regional and local risks • Risk ID linked to factors that affect our PCs and corporate goals. • Data collection and integration to support risk assessment. • Risk assessment and verification supported by multi-disciplinary workshops and customer preferences. • Risk assessment includes Asset Health & Risk metrics. • Stress testing exercises to consider interdependencies and cascading risks. • Risks articulated on our Corporate and Strategic risk registers as appropriate and escalated, to Board if where required. • Clear responsibilities for risk mitigation and/or opportunity capture.	• Assessment of external and internal risks in the context of our systems. • Acknowledging interdependencies and uncertainties. • Outcomes and customer focussed approach.	✓					✓	✓
Needs Identification	• Risks evaluated to identify needs (considering risk interactions). • Needs aligned to customer preferences, stakeholder views, and factors that affect our performance commitments and corporate goals.	• Line of sight to our corporate outcomes and customer focused approach. • Working with our stakeholders.	✓					✓	
Option development	• Broad range of options considered (including all 4 R's of resilience and working with processes in the natural environment). • Opportunities for stakeholder collaboration pursued. • Engagement and consultation within and outside the industry to drive innovation.	• Broad consideration of intervention options. • Recognising the value of natural capital to deliver a naturally resilient water sector. • Working with our stakeholders to drive innovation.	✓	✓		✓	✓	✓	
Option assessment	• Option performance assessed. • Consideration of upstream and downstream options. • Whole life costs and benefits estimated (including natural capital components where appropriate). • Customer preferences and willingness to pay considered. • Internal and (as required) external audit.	• Transparent assessment and confidence in decision making. • Outcomes and customer focussed approach.	✓	✓		✓	✓	✓	

5.3 Our resilience maturity assessment

The skills we develop in our people, the way we design our procedures, and the ways we operate our systems and infrastructure means that we are already resilient to many of the challenges we face. We know we can do more however, particularly to enhance the way we account for future uncertainties. We also know we must continually improve as our challenges evolve.

To understand how well the characteristics and attributes of our organisation support resilient outcomes for our customers, we have applied a self-assessment tool to grade our current performance.

5.3.1 Background to the assessment

We worked with Jacobs to apply its resilience maturity assessment, a tool which helps an organisation to understand its attitude to resilience, how it monitors resilience, and the ways in which it uses resilience data to guide decision making.

Jacobs resilience maturity assessment has been developed progressively based on its experience within and outside the water sector, and supported by its recent work with Ofwat on asset health.

The maturity assessment is completed by assigning a score to a series of questions, each designed to assess maturity against different components of resilience. Scores are assigned on a scale from one (aware) to five (excellent), with a score of three indicating competence.

The design of Jacobs' resilience maturity tool is based on the principles of effective asset management, aligned to ISO55001. It also addresses the following key research and policy on resilience:

- The 2019 price review methodology (Ofwat 2017a), by ensuring assessment questions are aligned to each of Ofwat's seven resilience planning principles.
- *Resilience in the Round* (Ofwat 2017b), by ensuring assessment questions address operational, corporate and financial resilience.
- The *Targeted Review of Asset Health* (Ofwat 2017c), by ensuring assessment questions address the observations on asset health raised in this study.

To support the preparation of our business plan, Jacobs developed a modified version of their maturity tool, with its questions aligned to our four pillars of resilience (operational, service, corporate and financial). The maturity tool is comprised of more than 100 questions, which continue to address all of Ofwat's seven resilience planning principles.

5.3.2 Methodology

To apply the resilience maturity tool to assess our current level of performance, each department was required to score itself and provide justification and evidence for the score assigned. Jacobs then moderated the scores, by reviewing the justification responses, any supporting evidence that was made available, and by applying their own experience of assessing and managing resilience across the water sector. A focussed team of Bristol Water staff also supported the moderation process.

5.3.3 Our current and future performance

Figure 8 and Figure 9 show that we consider our mean level of current performance to be at least Competent (a score of 3) across all of our four pillars of resilience, and against all of Ofwat's seven resilience planning principles. We consider our current financial resilience to be Optimising (mean score in excess of 4). Our corporate resilience and operational resilience areas require the most improvement to reach our expected maturity by 2025.

Beyond 2025 we will continue to review and monitor our maturity, and implement further improvement actions as necessary.

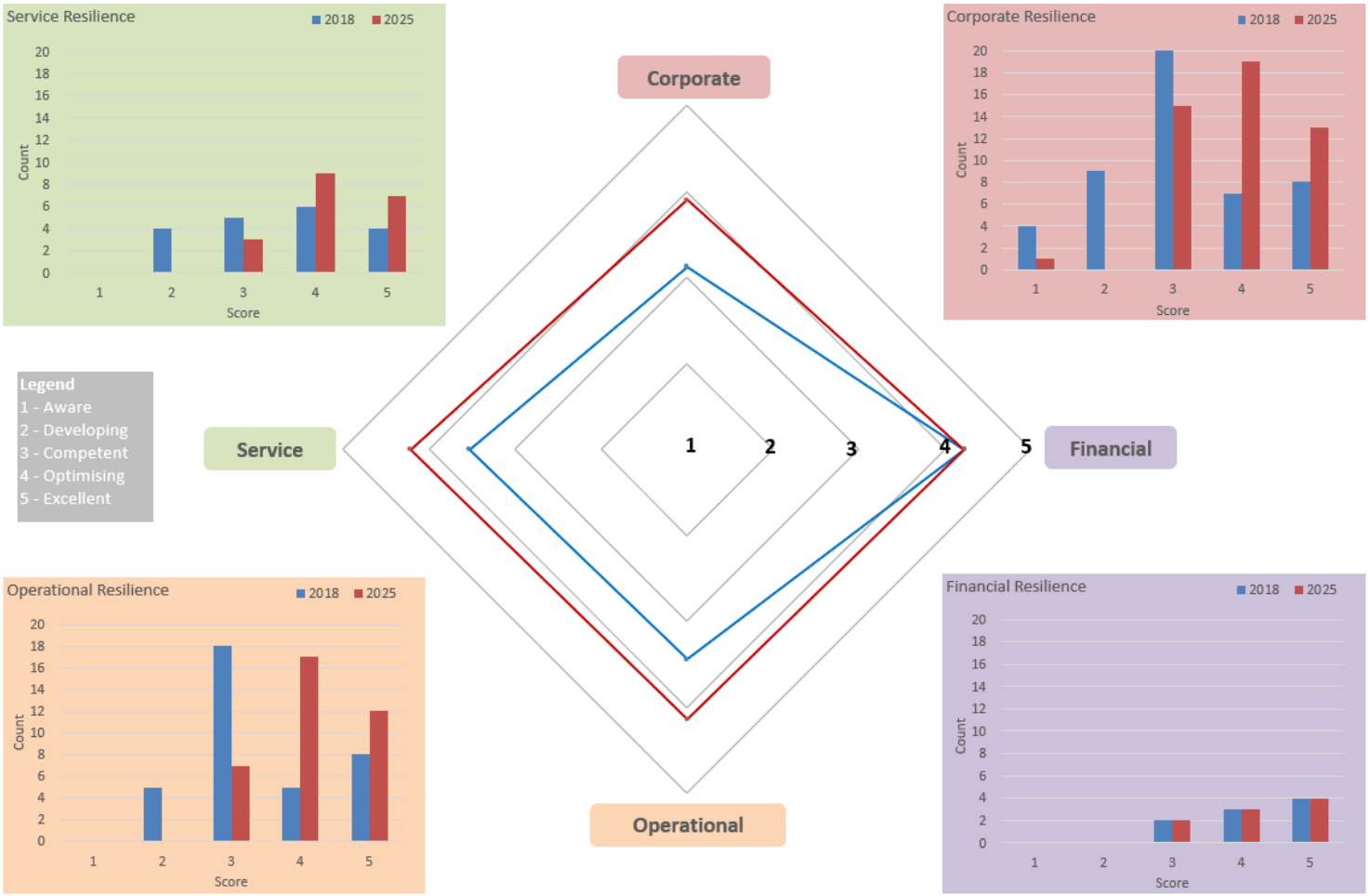


Figure 8: Summary of our maturity against our four pillars of resilience

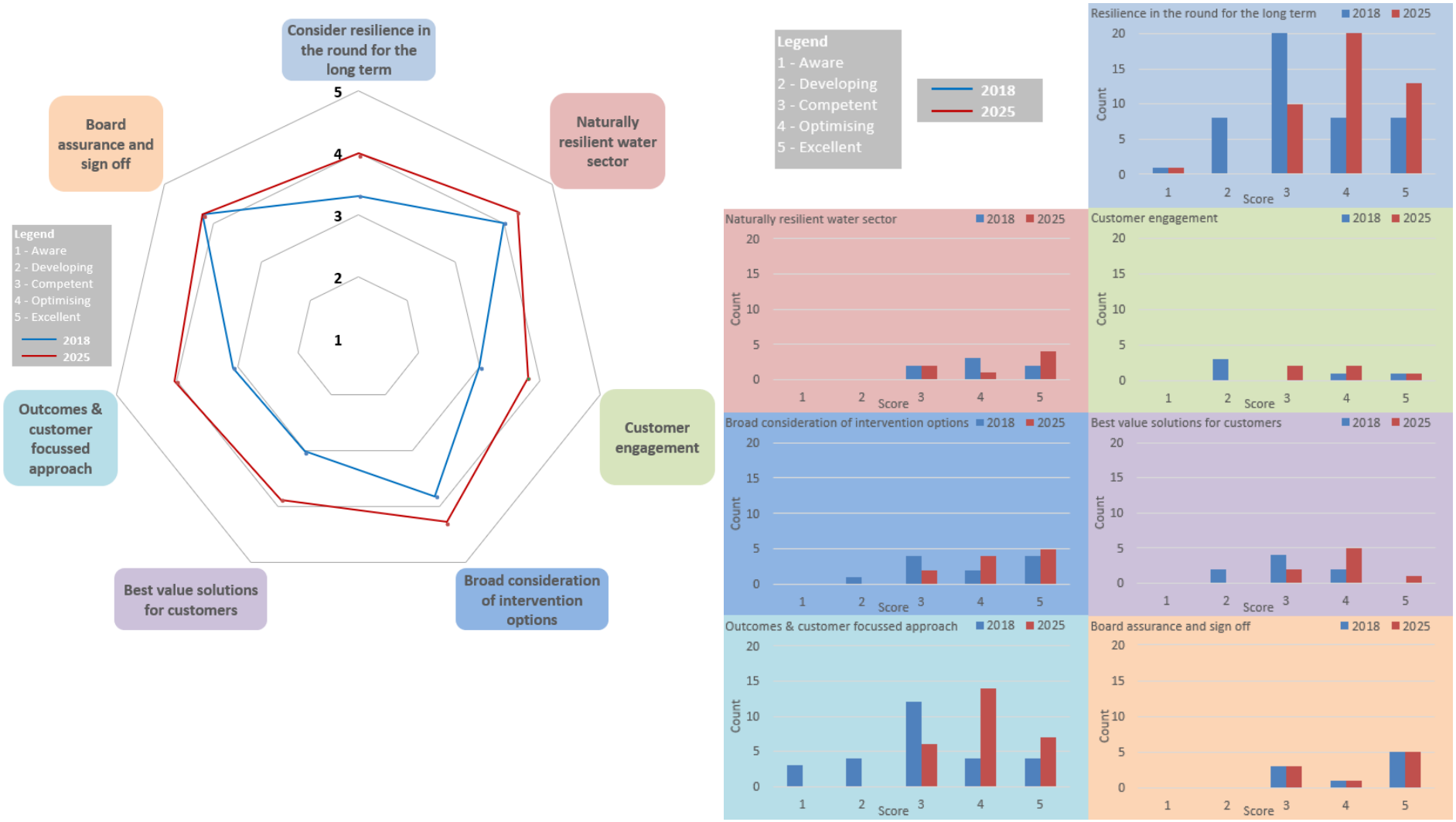


Figure 9: Summary of our maturity against Ofwat's resilience planning principles

Figure 10 maps the highest priority improvement areas in our resilience maturity assessment (those with an improvement gap score of two or more) to the current Bristol Water improvement plans as outlined in section A1 of our Business Plan which will deliver our resilience maturity improvements. Full details of our 2018 maturity assessment scores and our target 2025 scores against the Ofwat assessment areas is given in Technical Annex BRL.C5C.TA01. Our action plan to address these gaps is presented in Section 7.

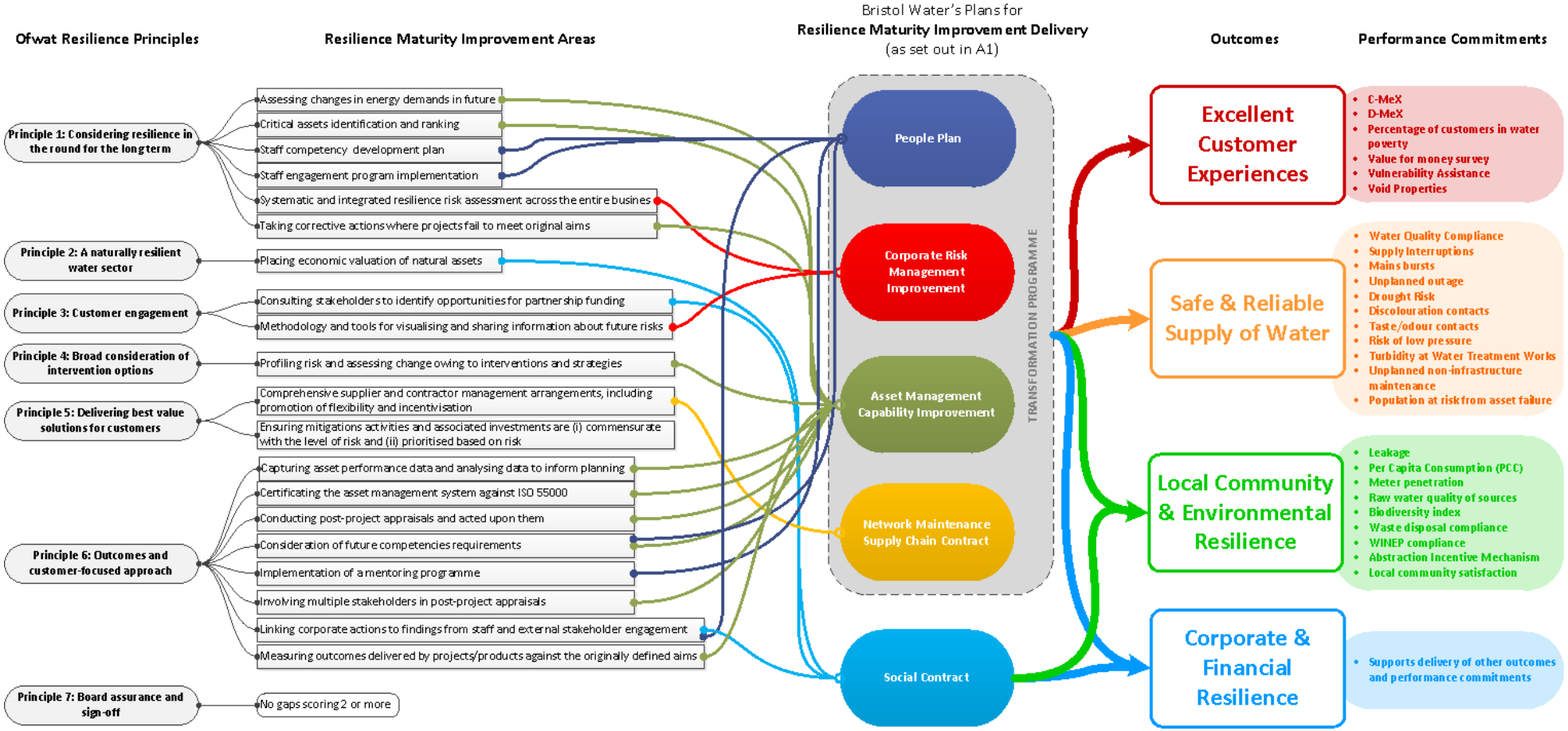


Figure 10: Resilience maturity improvement areas mapped to plans and outcomes

5.3.4 Improving our maturity

We are confident that our updated long term strategy – Bristol Water… Clearly, our Business Plan – Bristol Water For All and our Social Contract with our business transformation plans will deliver the outcomes that our customers have told us they want.

We have ensured that we are clear on which of our plans are improving our resilience by assigning a named plan to each of the resilience questions where we have a gap. For example, we will improve our gap associated with the question - Have you identified all your critical assets and ranked them? By implementing our asset management capability improvement plan. Full details of that gap closure mapping can be found in Technical Annex BRL.C5C.TA01. Short overviews of each of the plans that close the majority of the gaps are outlined below:

Transformation Programme: our transformation spans across the whole of our organisation and is multi-faceted in nature. We have implemented a programme management function that will ensure that all of the projects included within our transformation plan are taken from concept through to successful delivery. The transformation function regularly updates the Executive team and Board of plans and progress. This encompasses:

- **People Plan:** we are analysing the roles and skills that we require for our organisation. We know that we need to improve how we align staff development plans to emerging skills needs. To address this, we are currently rolling out a talent management programme which will help us to identify career paths for all staff and build their capability to either step into the next role, or develop within their existing role. Our suite of training will also develop and expand over time as capability gaps are identified. In 2019 we are rolling out the first iteration of our development streams, intended to ensure staff can access the right training and development materials and receive support for their needs. With this talent management programme in place, we think our understanding of required skills, how we fill these, and how we address succession planning will significantly improve, helping us to move to higher levels of maturity.
- **Corporate Risk Management:** our approach to managing risk helps us to deliver best value by ensuring our schemes are identified using a consistent risk-based process which enables needs to be prioritised, and costs and benefits to be quantified effectively. To further enhance our approach to risk management and improve our maturity, we will work to establish improved ways to account for future uncertainties in our risk assessment and decision making. We will also develop long-term risk profiles which manage global risks all the way through to selection and delivery of mitigation activities. We will work across our business and with our partners to consider how longer term risks and opportunities may evolve, and how we can improve our resilience framework to manage these risks.
- **Asset Management Capability:** Over the course of AMP7, we will continue to enhance our approach to asset management in line with ISO 55001 This will ensure a holistic, integrated, systematic and systemic approach to managing outcomes covering people, processes, systems, organisation and financial dimensions. As part of our asset management maturity improvements, and in line with our Asset Management Strategy, our on-going improvement to asset health and risk assessments will allow us to transparently link asset health indicators to operational decision making. We will use this concept to inform a universal approach to decision making in several departments (including Operations, IT, Asset Management & Finance). Improving our approach across the organisation will allow us to understand the importance of asset health and its associated performance metrics. We are committed to working with the industry to develop robust, forward looking asset health metrics.
- **Network Maintenance Supply Chain Contract:** We are currently undertaking a procurement process with the market to secure partners to deliver a number of operational activities, including distribution mains replacement/ rehabilitation, repairs, new connections etc. The

revised contractual arrangements are a significant change from our current supplier arrangements in terms of the relationship, delivery model and expectations of our supply chain partners. We are implementing an 'intelligent partnership' model which ensures that we retain a lead role in those activities that directly interact with our customers such as scheduling of work as well as incentivising our partners to deliver against our performance commitments. We are also using innovative approaches in our selection process, for example we are assessing potential partners utilising behavioural competency workshops to ensure our values are compatible. This will substantially improve our collaborative working approach with our delivery partners.

Social Contract: our Social Contract will help us have a positive impact on the wellbeing of society, by recognising our purpose to benefit society. By delivering our plans which form our Social Contract, we will be able to demonstrate how these actions are integrated with the community which we are part of, and how stakeholder engagement is entrenched in these plans.

5.4 Delivering resilience in the round

We have defined a series of plans to improve our performance across a range of areas, which all contribute to resilience in the round. These improvement plans address the delivery of our outcomes, AMP7 performance commitments, and the delivery of our 2025 resilience maturity targets. The plans include our PR19 business plan, our wider business transformation programme, and the roll out of our Social Contract.

We have also developed performance commitment delivery strategies, which collate the actions, activities, timescales, and delivery of the improvements we will make across our business in order to achieve our performance commitment targets. These actions span customer services, asset management (e.g. risk, planning, and investment), operations (e.g. people, capabilities, procedures, equipment) and the wider business (e.g. people and culture, data and information) to ensure we have a single integrated plan that focuses on delivering specific performance commitments.

The strategies define the teams responsible for actions from the various areas of the business and track progress against agreed milestones to monitor and manage progress. We will continue to develop and refine our strategies to make sure we continue to focus on priority areas and to adapt our plans in response to performance improvement needs and opportunities.

In our IAP Response to past performance and delivery, we have provided examples of our performance commitment delivery strategies, with summaries of our supply interruptions (customer minutes lost), leakage, customer, and metering strategies.

Through the combined effect of these strategic and tactical plans, we will deliver our resilience maturity improvement, and our customer outcomes, as illustrated in Figure 11.

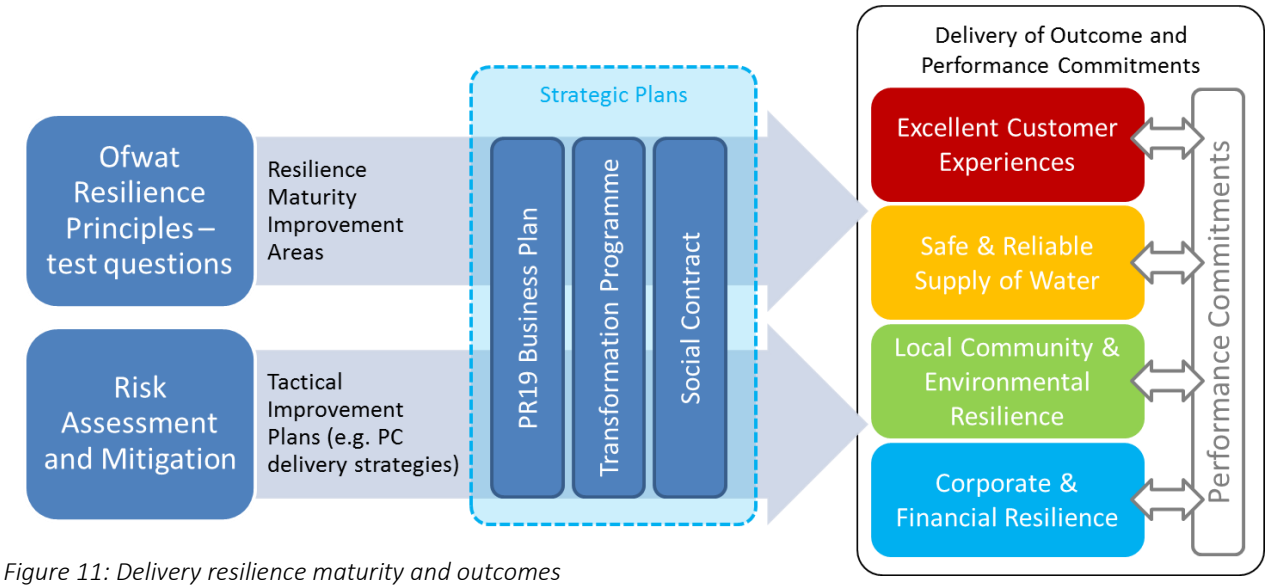


Figure 11: Delivery resilience maturity and outcomes

A good example of how this will work in practice is provided by considering how the combined effect of our strategic and tactical plans enables the delivery of our leakage target. One of the key drivers of our leakage target is to mitigate our long-term supply/demand balance risk. Key enablers for delivering our leakage target are:

1. Performance Commitment Delivery Strategy for Leakage, as delivered by a combination of strategic and tactical plans as follows:

- **PR19 Business Plan – Asset Investment**: delivering Active Leakage Control, Pressure Management, Main Replacement, etc.
- **Transformation Programme – People Plan**: delivering the required training, competencies, and culture
- **Transformation Programme – Network Maintenance Supply Chain contract**: delivering the required operating model and with associated support i.e. plant and equipment.
- **Transformation Programme** – support services: delivering improvements to customer call handling, IT systems (etc.)

2. Resilience Maturity Improvement, which also relies on components of the strategic plans as follows:

- **Asset Management Capability Improvement Programme,** which enables better understanding of how we manage our assets to address resilience (including leakage) risk, and delivers specific improvements to how we:
  - profile risk and assess change owing to interventions and strategies;
  - capture asset performance data and analyse this data to inform planning, and
  - we measure outcomes delivered by projects/products against the originally defined aims.
- **Transformation Programme – Corporate Risk Management**: delivering systematic and integrated resilience risk assessment across the entire businesses, including supply/demand balance and leakage risk.
- **Transformation Programme – People Plan**: delivering succession planning, organisation shape, and long term competencies plan.
- **Transformation Programme – Network Maintenance Supply Chain contract:** delivering comprehensive supplier and contractor management arrangements, including promotion of flexibility and incentivisation.
- **Social Contract**: delivering improvements to how we place economic valuation of natural assets and link corporate actions to findings from staff and external stakeholder engagement.

5.5 Corporate Governance and Assurance

Corporate governance provides the checks and balances on the ways we work to ensure we always act in the long-term interests of our customers, shareholders and wider stakeholders.

We have developed our own corporate governance code ("the BW Code") which combines the UK 2016 Corporate Governance Code ("the Code") and the "Ofwat principles." The "Ofwat principles" are set out in the Ofwat document "Board leadership, transparency and governance" published in January 2014 and enforce the UK Corporate Governance Code. We updated this in our 2018/19 annual report to reflect Ofwat's 2019 principles. We also incorporated our social purpose into a revised Corporate Governance Statement, which makes it clear on accountability of the Board for this as part of the standard UK Corporate Governance Code arrangements. This is a clear statement of the Board of the importance of our social purpose, and reporting on this in our annual "Trust Beyond Water" statement and mid-year reporting will include our progress on this systems thinking action plan. We set out our commitment to this specific transparency point at the end of the action plan in section 7. Our revised corporate governance statement is available on our website at https://www.bristolwater.co.uk/wp-content/uploads/2019/07/Bristol-Water-Corporate-Governance-Statement-July-2019.pdf

Our Board is committed to running Bristol Water in the best long-term interests of our customers, shareholders and wider stakeholders. The Board and its committees have overall responsibility for the management of Bristol Water and its regulated business. They set our values and standards, make strategic decisions, and provide leadership for the long term success of the company.

We believe this success can only be achieved if the activities of the company are supported by appropriate governance processes, within a framework of effective controls, enabling risks to be managed and the necessary financial and human resources to be maintained to allow the Company to meet its objectives.

Key aspects of our approach to corporate governance and assurance are as follows:

- The board monitors the company's compliance with its statutory and regulatory obligations to its customers, shareholders, regulators, other stakeholders and the environment.
- The board is responsible to all of the company's stakeholders for the approval and delivery of the strategic objectives of Bristol Water, by ensuring that all financial, technical and human resources are in place and also lead the Company within an effective framework of monitoring and managing risk.
- The board executes overall control of the company's affairs by reference to the schedule of matters reserved for its decision. These include the approval of strategy, financial statements, major capital expenditure, and authority levels for expenditure, treasury, and risk management policies.
- One of three key board committees is the Audit and Risk Assurance Committee (ARAC) which reviews the integrity of financial information, financial controls and risk management.
- The board has overall responsibility for the system of risk management and internal control, and for reviewing its effectiveness, whilst the role of management is to implement the Board policies on risk and control.
- The board encourages a culture of risk identification and management across all aspects of the business, coupled with business continuity plans as an extra line of defence should unforeseen risks emerge or management controls fail.

The board has provided assurance statements as part of the Business plan submitted on 3 September 2018 and additional clarification as requested as part of the initial assessment of plans process.

6. Our Resilience Outcomes

Through our integrated resilience framework (described in Section 5 above) we are confident the outcomes that we have chosen are ones which clearly link to resilience. We believe we have a clear understanding of our current resilience maturity, and also a sound understanding of risks to our resilience which have the potential to disrupt the outcomes we are aiming to achieve not just in the next AMP but also beyond 2025.

In this section we outline the benefits that specific actions and investments have in mitigating quantified levels of risk and/or increasing system resilience.

We have taken a holistic approach to determining best action and investment to delivering outcomes for our customers. This approach supports our system thinking approach not just in AMP7 but also into the future.

There are four key strands to our approach that ensure that we deliver outcomes for our customers. They are:

- Customer and Community Actions
- Business Transformation
- Innovation
- Asset Investment

Customer and Community Actions

Our overarching commitment is to engage with our local communities to understand their evolving needs beyond water, to assess how and where we can add social and economic value through the services that we provide, and to then deliver initiatives that achieve great community outcomes.

We have described in Section 4.1 of this document how delivering our social contract by engaging with our customers and the communities that we operate in support our system based approach to delivery of our outcomes for our customers.

Business Transformation

The past few years have been challenging for Bristol Water and the water sector as a whole. Since the last Price Review, the associated CMA referral and the "prescribed" status of the company under Ofwat's monitoring framework (which we have since been promoted from), we have responded to our challenges by beginning to transform ourselves. We have re-shaped our company to reduce costs and respond to regulatory targets, reflected in the 14% reduction to our customers' bills in 2015. At the same time, we have targeted ambitious improvements to our services, such as a 12% reduction in leakage targets by 2020, delivering a large metering programme, ensuring 0% of our customers are in water poverty (by offering social tariff assistance to those who need it most) and completing one of our largest investments - the Southern Resilience Scheme.

Since our last plan in 2014, we have made radical changes. We have a new management team in place. We have a new majority (80%) UK-based shareholder in iCON Infrastructure, who are well versed in owning and operating water and other regulated infrastructure companies both within the UK and globally, who are backed by long-term investors. Our Board has also changed (we have for example a new Independent Non-executive Director whose focus will be to foster close community links and who will engage directly with the BWCP in relation to our social contract) and has established much stronger corporate governance and assurance of our plans. Our organisation and our operations have been overhauled and strengthened - over 25% of current employees have been carefully selected and recruited over the last three years. However, our transformation is by no means complete and we will continue to evolve over the coming years.

Key areas of our transformation programme are outlined below:

We have undertaken a root and branch review of how we deliver our key operations including transformation of:

- Our sourcing strategy for maintenance activities
- Productivity improvements of operational activities
- Targeted focus on contractual efficiencies
- Upgrade of our core IT operational platforms

In addition, we have:

A suite of low-carbon initiatives and innovations to reduce the volume and cost of energy used such as:

- Solar generation
- Gas generation
- Pump schedule optimisation

A series of process improvements to drive higher output at reduced cost such as:

- Improved reporting, control and systems for project delivery
- Automation of high-effort manual processes

A range of initiatives focussing on driving cost improvements across system, site and process levels, for example:

- Whole-system optimisation to ensure least cost works are used at maximum output.
- Improved use of our data – e.g. Network Energy Optimisation Management System - a new information system that allows fully informed decision to be made on when to run electrical equipment to achieve the required water flows which minimizes the cost of electrical power used in the pumping equipment.
- Optimised maintenance plans for least whole life cost, including a shift further towards planned work.
- Chemical optimisation to reduce spend

We are developing our asset management capability and reducing the cost of operating our assets through innovative technical solutions such as artificial intelligence in water production to reduce the use of energy and chemicals. We are also investing in robotics process automation to reduce overheads.

Our People Plan has been developed to identify and grow the core competencies and ways of working required to meet our Business Plan commitments by 2025. This includes Organisation Design, Leadership and Capabilities, Performance, Reward and Recognition, and Career Development.

Transforming the customer experience

Our Customer programme delivers on our Business Plan outcome of Excellent Customer Experiences (supporting our aim for Bristol Water to be Number 1 for Customer Experience). This is underpinned by extensive customer engagement to provide clarity on our customers' needs, and a robust prioritisation methodology to drive the sequencing of activities. The programme is made up of over 200 customer initiatives. Examples are:

- Support all eligible customers through social tariffs.
- An increase in the number of customers who receive extra care services through our Priority Services Register from 1.6% of customers to 7%.
- Continue to be one of the leading performers in providing excellent services to retailers, and to improve our developer service response to the same level.
- Provide customers with more choice on the way that they interact with us and the services that they receive.

All of our transformation plans are highly ambitious, impacting all areas of the company, with ambitious change and targets underpinned by continued capability growth and service improvements.

Innovation

Bristol Water has a strong history of innovation and this has had a wider impact on the rest of the industry. We take a structured approach to identifying innovations, supported by a transformation process that helps to implement innovation and realise benefit. We also seek continuous improvement via a daily focus on using innovation to improve our work.

We have described in Section 4.3 of this document how delivering our innovation framework by engaging with our customers and the communities that we operate in support our system based approach to delivery of our outcomes for our customers.

Asset Investment

Our plan is focussed on operating cost and maintenance expenditure. The expenditure is a smooth level of investment each year, which is an efficient way of delivering our investments and emphasises that even the enhancement expenditure is mostly "maintenance-like" in our delivery approach.

Around 60% of our investment programme relates directly to specific performance commitments and priorities. The remainder of the investment relates to asset health and maintenance. The DWI investment programme for instance is linked to legal water quality obligations and is considered in our Compliance Risk Index penalty- only ODI.

Retail capital investment falls, as half of our billing system and customer journey investment has been accelerated into 2019. These costs are delivered through Pelican and therefore are shared with Wessex, although investment is also included to meet the specific needs of our customers.

Most investments link to multiple priorities, which reflects our holistic approach, but the diagram below demonstrates how the major areas of our investment plan contribute to performance commitments and customer priorities, where there is a direct relationship. Customer experience measures do not directly require new investment.

In **Appendix 7** we have included an intervention by intervention assessment of performance commitment benefit impact in terms of our operational and service resilience as well as our impact on outcomes.

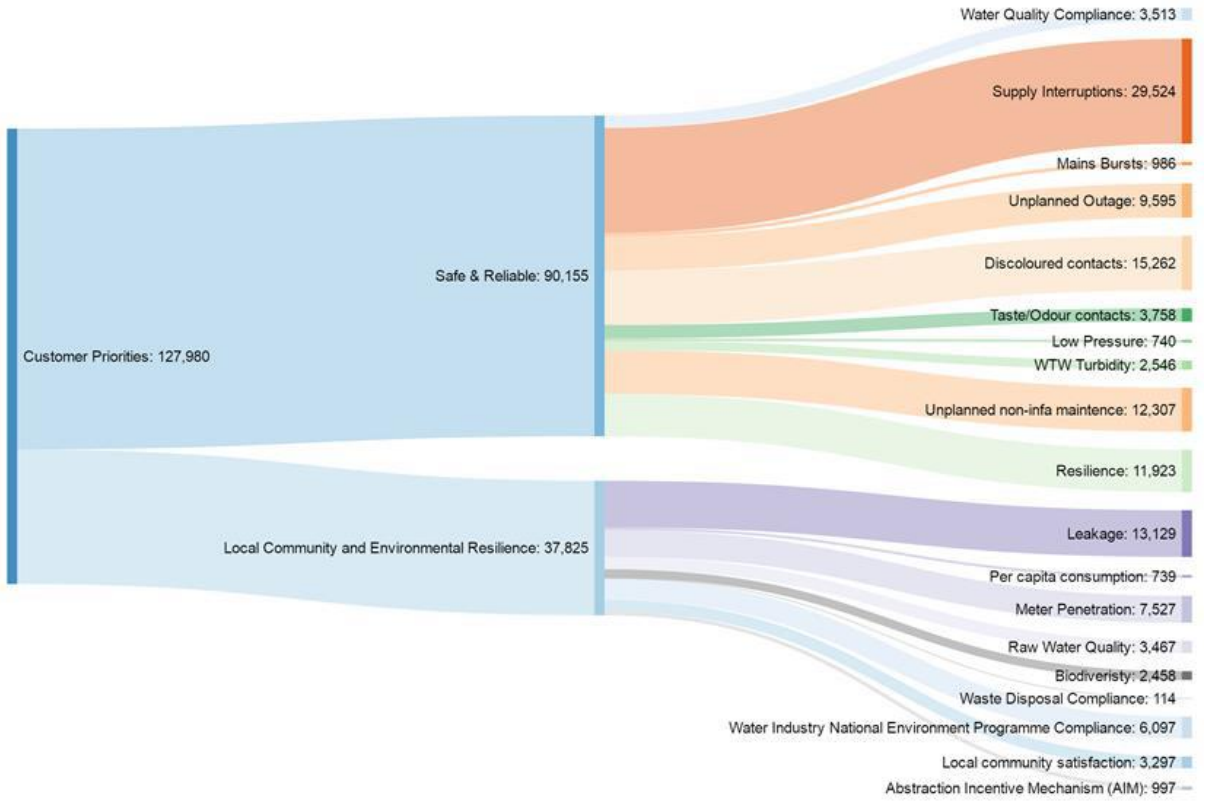


Figure 12: Sankey diagram showing how areas of our investment plan contribute to performance commitments and outcomes– totex £m

In this section we have summarised how each of our actions and investments contribute to our outcomes, with a high level summary in Table 2 below. We have organised the remainder of this section by each of the four key outcomes we are aiming to achieve. In reality, our measures typically support more than one of our customer outcomes. The sub-sections below focus on the dominant outcome for simplicity.

		Transformation							
Mapping investments and resilience to outcomes	**Investment plan**	**Asset management transformation**	**Customer experience**	**Network optimisation**	**Transformation - People**	**Transformation - Supply chain**	**Social contract**	**Innovation pipeline (new)**	**Examples**
Water quality compliance (CRI)	47%			24%	16%			13%	Biobullets, NOEM
Water supply interruptions	81%				19%				Network monitoring, valve investments
Leakage	100%								
Per capital consumption	27%		18%				47%	9%	Resource West
Mains repairs	81%	11%				8%			20km minimum replacement
Unplanned outage	100%								Base maintenance
Risk of severe interruptions in drought		100%							Leakage, metering, PCC - creates spare water for West Country Water Resource supply
Priority services for customers in vulnerable circumstances			60%		10%		30%	10%	The Workshop social entrepreneurs
Customer contacts about water quality - appearance	89%			11%					Calm DMA , NOEM
Customer contacts about water quality - taste and smell			74%					26%	Supply information
Meter penetration	69%		11%			12%	8%		Beat the Bill, Youth Board, Education, Resource West
Properties at risk of low pressure	36%	64%							Stretch benefits from network optimisation
Turbidity	90%							10%	Base maintenance and continuous monitoring for compliance
Unplanned maintenance non-infrastructure	77%	23%							Base maintenance and asset management as stretch
Population at risk of asset failure	100%								Builds on asset management systems thinking
Customers in water poverty %							100%		Metric matches partnerships
Percentage of satisfied vulnerable customers			100%						Resilience
Void properties						100%			Pelican (joint with Wessex)
Raw water quality of sources	100%								Specific catchment management innovations
Biodiversity index	13%						87%		Stretch reflects partnerships not Base or statutory requirements
Waste disposal compliance								100%	Reed bed and Blagdon fish farm discharge
WINEP Compliance	100%								Method of delivery requires people and social contract
Local community satisfaction					25%	25%	50%		Partnerships and collaboration as a new business model e.g. Resource West
Abstraction Incentive Mechanism								100%	Wessex - Shipton Moyne abstractions

Table 2: Mapping investment and actions and system resilience to outcomes

6.1 Outcome: Excellent Customer Experiences

Our future factors planning (Section 4) helped us to identify areas such as customer vulnerability, affordability, innovation, and markets as the key challenges influencing our ability to deliver Excellent Customer Experiences. Table 3 shows how we have linked these challenges to the top 10 risks as outlined in our Annual Report 2017-18 and, in turn, how we developed a series of strategic and tactical measures to address them. The targets we will use to track our performance are also presented.

Table 3: Line of sight from challenge to Excellent Customer Experiences Outcome

Global Challenges (World Economic Forum)	Bristol Water Future Factors and Priorities	Bristol Water Top 10 Risk Areas	Our Plans and Commitments to Address the Risk		Resilience Pillars Addressed	Our Targets		Our Customer Outcome
						By 2025	Long Term	
Stressed economics and social protection Polarisation of Society Changing demographics	Vulnerability monitoring Welfare and wellbeing changes Average earnings growth Affordability for customers Profile of future bills Rising expectations/reduced tolerance of failure Wide range of communication channels Robotics and artificial intelligence Customer self service Data analytics and customer intelligence Behavioural insight on markets Household retail market Single utility Wholesale and environmental markets Reducing cost/ improving service to leading companies	2. Customer satisfaction 5. Business resilience 7. Financial resilience 8. Regulation and legal 10. Business planning	Strategic	Bristol Water… Clearly	Operational, service, corporate, financial	Deliver on our mission 'to be a company which our communities trust and are proud of. In doing so, we will deliver excellent experiences and create social and economic value		Excellent Customer Experiences
				Bristol Water for All	Operational, service, corporate, financial	Deliver industry upper quartile or better levels of service.		
				Social Contract	Operational, service, corporate, financial	To have a positive impact on the lives of our customers, our communities, our colleagues, and on the environment beyond the delivery of pure and reliable water.		
				Customer Engagement Plan	Service, Corporate	To identify, engage and collaborate with all our customers to help us deliver excellent customer experiences.		
			Tactical	C-MeX PC and Delivery Strategy	Service	C-MeX Score: TBC	C-MeX Score: TBC	
				D-MeX PC and Delivery Strategy	Service	D-MeX Score: TBC	D-MeX Score: TBC	
				Retailer satisfaction	Service	TBC	TBC	
				% of Customer on PSR	Service	%: 7	%: 7%	
				% of satisfied vulnerable customers PC and Delivery Strategy	Service	%: 85	%: 100	
				% of customers in water poverty PC and Delivery Strategy	Service	%: 0	%: 0	
				Value for money PC and Delivery Strategy	Service	% survey respondents: 83	% survey respondents: 90	
				Void properties PC and Delivery Strategy	Service	% connected properties: 1.8	% connected properties: 1.8	

Below we provide some examples in more detail of how we intend to deliver our excellent customer experiences outcome.

6.1.1 Satisfied vulnerable customers

To meet our outcome of excellent customer experiences, we have promised our customers that we will provide inclusive services that meet customers' individual needs, especially when they are most vulnerable. We are aiming for zero water poverty.

In order to deliver this we will be undertaking a number of key actions:

- Reach out to more customers in need of financial assistance by working jointly with Wessex Water to partner with a number of charities.
- Continue to ensure that we minimise the number of customers in water poverty by increasing the awareness of the support we offer.
- To eliminate water poverty, and to support all customers who may be at risk of it, including through our social tariffs (up to an additional 12,000 customers over 2020-25).
- Do more to ensure that those customers who can afford to pay their bill do so, reducing bills for all our other customers. Improve our data and processes through our new billing system to help us collect payment from those customers who can pay, reducing bills for all other customers.
- Boost community awareness of the support we provide by collaborating with local councils, housing associations and advice agencies to identify customers who could benefit.
- A 'Vulnerability' initiative - Working with local stakeholders to help provide extra support to those customers who need it, through extra care services or social tariffs and debt advice.
- Bristol Water for All sharing mechanism to potentially fund return funding to customers via lower bills (sharing rate based on gearing performance).

Within our social contract we have a 'Vulnerability' initiative - Working with local stakeholders to help provide extra support to those customers who need it, through extra care services or social tariffs and debt advice.

Our Innovation plan is also contributing to our target. We have been part of an initiative to sign-post our vulnerable customer services with the energy sector – through Western Power Distribution. In January 2019, we signed a joint data sharing agreement with our local gas distribution network, Wales & West Utilities, Western Power Distribution, and Wessex Water which puts us ahead of the industry's national data share ambition. We are in the process of retrospectively registering customers who signed up to WPD and provided their consent from April 2018 to now. Once this group of customers have been successfully registered we will look to register the additional customers alongside any new WPD registrations going forward. We plan to expand our partnership working using technology to improve our vulnerable customer services.

In addition, we are also making significant progress with our preparations for the national data share in line with the utility industry. We are active participants on the working group and are fully committed to being ready for the pilot in October 2019 and subsequent 'go live' date in April 2020. We have already started mapping our services to new industry standard codes and are exploring training options for our customer facing employees to spot and capture needs which go beyond our existing water service requirements

Understanding vulnerability leads to us improving our service resilience for example during incidents prioritising our alternative water supply for early provision.

6.1.2 Customer Measure of Experience (C-Mex score)

To meet our outcome of excellent customer experiences, we have promised our customers that we will achieve customer excellence, meeting their priority that they get the best possible experience every time they need us.

We intend to transform our services, to keep pace with customer expectations, aiming to become the number one utility for customer satisfaction as measured by the UK Customer Satisfaction Index (UKCSI).

We will achieve this by delivering our transformation programme. Revolutionising our customer service proposition, optimising current customer interactions and providing our customers with timely access to job status information via their channel of choice. The programme has a number of constituent projects including a new website, an integrated single view of the customer, and end-to-end case management. Some of the projects we will deliver are:

- Developing cross-utility service offerings that connect with customers and communities
- Improve our communication channels and deliver a faster response to our customers
- Update our billing systems with Pelican
- Make more use of Apps and new communication routes, such as Alexa skills
- Review our end-to-end processes to focus on all aspects of customer excellence
- Make it easier for our customers to find out what they need from us by offering multiple channels and self–serve options
- Equip our employees with the knowledge and technology they need to provide great customer care through all our customer channels
- Invest in new technology to give our staff the information and systems we need to ensure we consistently meet the timescales we have promised our customers
- Invest in our digital technology so our customers can access information at a time of their choice
- Work with other utility companies and local councils to reduce the impact that roadworks have on traffic disruption in our supply area
- Make improvements to our billing system to help us to identify if our customers need any of the additional services which we offer. Use data to improve our service, like sharing our street works information with third parties so customers can see the impacts of our work on traffic and plan accordingly.

Our social contract also supports us to achieve our target. It has:

- A 'lakeside' initiative - Promoting and facilitating the enjoyment of our sites through recreational activities such as fishing, sailing, walking, cycling and birdwatching
- A ‘Community Engagements’ initiative - Working collaboratively with community groups to address issues that impact the wellbeing of the community.
- An ‘Education’ initiative - Inspiring current and future customers and providing opportunities for customers and staff to develop skills and experience. Influencing resource efficiency behaviour to bill-payers through harnessing the power of the next generation.
- Bristol Water for All sharing mechanism to potentially be used for additional community initiatives (as a result of UKCSI performance).

Improving our performance and taking a partnership approach will help us improve our service resilience.

6.2 Outcome: Local Community and Environmental Resilience

Our consideration of future factors and priorities has identified regional and catchment stakeholders, legacy assets, regional growth, smart cities/homes, renewables, and regulatory obligations as some of the key challenges influencing our ability to deliver local community and environmental resilience. 6.2-1 shows how we have linked these challenges to the top 10 risks as outlined in our Annual Report 2017-18 and, in turn, how we developed a series of strategic and tactical measures to address them. The targets we will use to track our performance are also presented.

Table 4: Line of sight from challenge to Local Community and Environmental Resilience Outcome

Global Challenges (World Economic Forum)	Bristol Water Future Factors and Priorities	Bristol Water Top 10 Risk Areas	Our Plans and Commitments to Address the Risk		Resilience Pillars Addressed	Our Targets		Our Customer Outcome
						By 2025	Long Term	
Climate change and a degrading environment	West of England Combined Authority Energy strategy Defra, DWI, EA, and NE expectations Catchment management Long term strategy for renewing all lead pipes Renewable energy Wholesale & environmental markets Smart cities Bristol Mayor Strategy & local growth strategies Housing growth and better homes Connected homes Battery storage	1. Health, safety, environment 4. Water quality 10. Business planning	Strategic	Bristol Water… Clearly	Operational, service, corporate, financial	Deliver on our mission 'to be a company which our communities trust and are proud of. In doing so, we will deliver excellent experiences and create social and economic value		Local Community and Environmental Resilience
				Bristol Water for All	Operational, service, corporate, financial	Deliver industry upper quartile or better levels of service.	-	
				Social Contract	Operational, service, corporate, financial	To have a positive impact on the lives of our customers, our communities, our colleagues, and on the environment beyond the delivery of pure and reliable water.		
				Water Resources Management Plan	Operational, Service	Ensure there is sufficient supply of water to meet demand from all customers over 25-year planning period		
				Catchment Management Plan	Operational, Service	Mange our catchments in collaboration with our partners to improve environmental outcomes, community benefits and to make our water supplies more resilient.		
			Tactical	Environment Investment Case, supported by: • Raw water quality of sources PC and Delivery Strategy • Biodiversity index PC and Delivery Strategy	Operational, service	• Kg of P loss: 531 • Biodiversity Index: 17,711	• Kg of P loss: 541 • Biodiversity Index: 18,723	
				Customer Meters Investment Case, supported by: • Meter Penetration Delivery PC and Delivery Strategy • Per Capita Consumption PC and Delivery Strategy	Operational service	• % metered supplies: 75 • Litres/head/day: 135	• % metered supplies: 90 • Litres/head/day: 110	
				Leakage Investment Case, supported by: • Leakage PC and Delivery Strategy	Operational	• Megalitres per day: 36.5	• Megalitres per day: 35	
				New Development Investment Case, supported by: • Meter Penetration PC and Delivery Strategy	Service	• % metered supplies: 75	• % metered supplies: 90	
				Abstraction Incentive Mechanism PC and Delivery Strategy	Operational, service	• Megalitres: 2,843.40	• Megalitres: 2,843.40	

				Customer Commitment Performance Strategy, supported by:
				• Local Community Satisfaction PC and Delivery Strategy
				  ○ Biodiversity index PC and Delivery Strategy
				  ○ Per Capita Consumption PC and Delivery Strategy
				  ○ % of satisfied vulnerable customers PC and Delivery Strategy
				  ○ % of customers in water poverty PC and Delivery Strategy
					Service, corporate	• Biodiversity Index: 17,711
						• Litres/head/day: 135
						• %: 85
						• %: 0
							• Biodiversity Index: 18,723
							• Litres/head/day: 110
							• %: 100
							• %: 0	

				WINEP Compliance PC and Delivery Strategy	Operational	% WINEP compliance: 100	% WINEP compliance: 100	
				Waste Disposal Compliance PC and Delivery Strategy	Operational	% compliance: 100	% compliance: 100	

Below we provide a few examples in more detail of our key activities and investments presented by target area.

6.2.1 Metering

To meet our outcome of improving local community and environmental resilience, we have promised our customers that we will promote water efficiency and metering which will result in us supporting customers to reduce water use by 5% - 7 litres of water per person per day[1]. We will need to install an additional 68,000 meters, resulting in 75% of supplies being metered by 2025. Our longer term ambition is to achieve 82.5% by 2030 and 90% by 2050.

We are transforming our business to support delivery of our metering programme. We have revised our contract to ensure our delivery partner is incentivised to deliver our targets. We have restructured our scheduling function and Network teams to improve efficiency and productivity. We have retrained our staff and empowered them to ensure we achieve customer satisfaction. The introduction of monitoring and triage will ensure that we manage SLA performance. As well as reviewing our operating procedures we are also reviewing, revising and embedding a new operating model which will include working hour.

In addition we seek to raise customer awareness by:

•Employ Marketing & advertising specialists and create a campaign to raise awareness and improve feed in;

•Revise systems to ensure ease of use and reduced drop out;

•Engage with customers in local community activities and with local community groups;

•Ensuring that our message of reduced Per Capita Consumption is built on and sustained through metering

•Developing a campaign that supports the business branding and ethos

•Implementing interactive connections with the customer to support engagement in the future

Our social contract supports us by delivering the following initiatives:

•An 'Education' initiative - Inspiring current and future customers and providing opportunities for customers and staff to develop skills and experience. Influencing resource efficiency behaviour to bill-payers through harnessing the power of the next generation.

•A 'Resource West' initiative - Working with local partners to deliver a joined up approach to resource efficiency across different sectors – combining resources and amplifying messages to customers

•An 'Academic Partnerships' initiative - Linking academic research to business challenges and experience to tackle key issues such as resource efficiency. Providing opportunities for learning through MSc projects and other partnerships

In terms of being innovative – we will of course look to use smart metering technology and targeted marketing.

Operational and service resilience is improved. Metering provides the fairest and most consistent means of charging for water and allows us to engage with customers on water efficiency to reduce their bills and drive down water demand. Further it provides information on consumption at each property which helps identify customer side leakage. This benefits both customers and Bristol Water and helps provide a long-term resilient supply to customers.

6.2.2 Water Industry National Environment Programme

To meet our outcome of improving local community and environmental resilience, we have promised our customers that we will build biodiversity and protect the environment by improving habitats around rivers and reservoirs, equivalent to 5 hectares of high quality new habitat.

[1] The context for the systems thinking action plan reflects our revised business plan rather than any changes that result through the remainder of PR19. This reflects that this document was submitted in advance of Ofwat's Draft Determination consultation, and we would update this action plan post PR19 Final Determinations in any case.

We will investigate how downstream river ecology is affected by Blagdon and Chew Valley Reservoirs. We have firstly assessed the extent the reservoirs do cause impacts and are in the process of implementing options trials to understand what we can do to reduce or mitigate impacts. This work is being undertaken in consultation with the Environment Agency.

We have collaborated in an investigation into the influences on water quality in the Congresbury Yeo downstream of Blagdon Reservoir. This work was co-funded by Bristol Water, Wessex Water, the Environment Agency and Yeo Valley Farms, and the aim was to understand the relative pressures on the river reach and the interventions required to achieve Good Ecological Potential under the WFD.

Since 2015 we have carried out a programme of assessment to determine the effect on our abstractions on Eel passage. We are working in partnership with the European Sustainable Eel Group, Wildlife Trusts and Rivers Trusts to help deliver these benefits, using our innovative Biodiversity Index approach to measure the benefit that our actions create for the environment.

The Environment Agency has also in February and March 2017 issued position statements on the management of potential impacts from transfer of invasive non-native species through raw water transfer systems. For existing systems that are already in use, this management approach is anticipated to be delivered through a risk assessment and longer-term planning for how any potential transfer of invasive species could be prevented or mitigated and this has been reflected in the WINEP. No new transfers are currently proposed in our Water Resources Management Plan for water bodies that are not currently connected and assessment of the risk of options has included an appraisal for each option of the risk that this may represent in transferring alien invasive species between water bodies.

EA has now identified through the draft WINEP a total of ten locations operated by Bristol Water that may require further investigation. These are abstractions that may potentially have an impact on other water bodies, although this has not yet been confirmed. Investigation into these abstractions and the impact they may have on the environment will therefore enable an informed assessment of whether it may be appropriate in future to reduce the rate of abstraction from these sources.

The WINEP requirements are:

- Develop a company-wide Biodiversity Action Plan linked to our natural capital accounting tool, the Biodiversity Index.
- Monitor, investigate and mitigate issues around invasive non-native species on our sites and relating to raw water transfers.
- Investigate abstractions which might be causing deterioration under the Water Framework Directive (WFD), and where required consider options to mitigate effects.
- Continue work to reduce effects of our reservoirs on downstream river water bodies to meet WFD objectives.
- Undertake investigations to determine causes of catchment water quality issues and potential to improve raw water quality using innovative approaches.
- Implement programmes of catchment management to improve water quality in certain sources and to maintain condition of nationally designated sites.
- Implement eel protection as required under the Eel Regulations 2009 and according to EA policy.

Our social contract has a 'Conservation' initiative - Protecting and enhancing natural resources through the proactive management of our sites and through measuring and improving biodiversity.

By investing and acting we improve Operational resilience, because our actions help to mitigate against climate change and degrading environment.

6.3 Outcome: Safe and Reliable Water Supply

Our future factors planning identified infrastructure health and risk as key challenges influencing our ability to deliver Safe and Reliable Water Supply. Table 5 shows how we have linked these challenges to the top 10 risks as outlined in our Annual Report 2017-18 and developed a series of strategic and tactical measures to address them. The targets we will use to track our performance are also presented. Our tactical measures utilise delivery strategies to improve all aspects of our performance and ensure we achieve our performance commitments.

Table 5: Line of sight from challenge to Safe and Reliable of Water outcome

Global Challenges (World Economic Forum)	Bristol Water Future Factors and Priorities	Bristol Water Top 10 Risk Areas	Our Plans and Commitments to Address the Risk		Resilience Pillars Addressed	Our Targets		Our Customer Outcome
						By 2025	Long Term	
Deteriorating assets	Long term strategy for removing all lead pipes Catchment management Defra, DWI, EA and NE expectations Systems thinking and performance visualization Data analytics and customer intelligence Robotics and artificial intelligence	1. Health, safety, environment 3. Operational resilience 10. Business planning	Strategic	Bristol Water… Clearly	Operational, service, corporate, financial	Deliver on our mission 'to be a company which our communities trust and are proud of. In doing so, we will deliver excellent experiences and create social and economic value		Safe and Reliable Supply of Water
				Bristol Water for All	Operational, service, corporate, financial	Deliver industry upper quartile or better levels of service.	-	
				Strategic Asset Management Plan	Operational, service, corporate, financial	Deliver an asset management system meeting the requirements for competence of ISO55001.	Continual improvement in our asset management maturity.	
				Water Resources Management Plan	Operational, Service	Ensure there is sufficient supply of water to meet demand from all customers over 25-year planning period		
				Drought Management Plan	Service	Deliver agreed drought action levels of service		
			Tactical	Distribution Mains Investment Case, supported by: • Supply interruptions PC and Delivery Strategy • Mains bursts PC and Delivery Strategy • Customer contacts (appearance) PC and Delivery Strategy	Operational, service	• Mins/property/yr: 1.8 • Bursts per 1,000km: 133 • Contacts per 1,000 people: 0.43	• Mins/property/yr: 1.0 • Bursts per 1,000km: 130 • Contacts per 1,000 people: 0.1	
				Trunk Mains Investment Case, supported by: • Water quality compliance PC and Delivery Strategy • Supply interruptions PC and Delivery Strategy • Customer contacts (appearance) PC and Delivery Strategy	Operational, service	• Compliance risk index: 0 • Mins/property/yr: 1.8 • Contacts per 1,000 people: 0.43	• Compliance risk index: 0 • Mins/property/yr: 1.0 • Contacts per 1,000 people: 0.1	
				Treated Water Pumping Stations Investment Case, supported by: • Properties at risk of low pressure PC and Delivery Strategy • Unplanned maintenance – non-infra PC and Delivery Strategy	Operational, service	• No. of properties: 60 • No. of jobs: 3,272	• No. of properties: 20 • No. of jobs: 3,272	
				Network Monitoring Investment Case, supported by: • Properties at risk of low pressure PC and Delivery Strategy • Supply interruptions PC and Delivery Strategy	Operational	• No. of properties: 60 • Mins/property/yr: 1.8	• No. of properties: 20 • Mins/property/yr: 1.0	
				Treatment Works Strategic Maintenance Investment Case • Unplanned maintenance – non- infra PC and Delivery Strategy	Operational	• No. of jobs: 3,272	• No. of jobs: 3,272	
				Resilience Investment Case, supported by: • Population at risk from asset failure PC and Delivery Strategy	Operational, service	• No. of people: 290,000	• No. of people: 0	
				Customer contacts (taste and odour) PC and Delivery Strategy	Service	Contacts per 1,000 people: 0.25	Contacts per 1,000 people: 0.1	
				Turbidity performance at WTW PC and Delivery Strategy	Operational	No. of failures: 0	No. of failures: 0	
				Unplanned outage PC and Delivery Strategy	Operational	%: 1.74	%: 1.74	
				Risk of severe restrictions in a drought PC and Delivery Strategy	Operational	%: 0	%: 0	

6.3.1 Mains Bursts

To meet our outcome of delivering a safe and reliable supply of water, we have promised our customers that we will keep top quality water flowing to their tap. To achieve this we aim to achieve industry top quartile in the level of supply interruptions our customers' experience. One of the major root causes of supply interruptions is mains bursts and therefore we are targeting to reduce the number of bursts that we experience.

Deciding how to mitigate risks on our network of pipes is a good example of our systems thinking approach to delivering outcomes. Although we have assessed the risk that each of our assets pose and developed totex intervention options for each risk, we have also considered how to achieve the optimum amount of benefits across a whole package of interventions. This means that when we are selecting pipes for replacement/refurbishment – we are not only targeting bursts but also targeting improvements in areas such as supply interruptions, leakage, water quality, meter penetration, lead service pipe reduction etc.

- Undertaking over 37 interventions to upgrade our distribution mains using a zonal approach
- Completing 13 target mains replacement interventions
- We will increase our levels of network monitoring in order to predict where bursts will occur, leading to a proactive approach of early intervention.

Much of our revised approach to managing our assets is as a result of transforming our asset management capability.

We are also transforming our operating model including structure, operating hours, working practices and procedures. These changes will complement our new strategic partnerships with the companies that we have chosen to deliver our work activities. These contracts are now based on a more sophisticated intelligent partnership basis, where we incentivise our partners to deliver our outcomes. We will continue to be innovative in this area, looking at robotics, smart materials and developments in monitoring equipment so that we can become even more predictive in our approach to managing our assets.

Investing and taking actions to improve our mains bursts performance will lead to improvements in our operational and service resilience.

6.3.2 Population at Risk from Asset failure

We have a long term ambition to improve the resilience of our supplies. Our initial target is to improve resilience so that issues with one of our critical assets (e.g. one of our key pumping stations, service reservoirs or mains) do not affect more than 10,000 people by 2030, and in the long term, will not affect more than 3,000 people for more than 24 hours. This delivers our customer promise of boosting protection and leads us to deliver the outcome of a safe and reliable supply of water.

Through our improved asset management capability we have undertaken an innovative series of modelling activities to establish critical assets that have a low likelihood of failure but a high consequence. By high consequence we mean interruptions to our customer's supply of water for more than 24hours. Historically when we experience events that take more than 24hours to recover supplies it is because we have an interdependency on others for example 3rd party apparatus such as critical gas infrastructure, high voltage cables, sewers etc. or extreme conditions such as flooding that hinder our ability to recover and restore.

From our assessments we have identified a number of interventions that will allow us to mitigate against these low likelihood – high consequence events.

Our programme of intervention includes:

- Undertaking a System Resilience Assessment to develop an improved understanding of the risk including root causes, likelihood and potential risks during planned operational activities; and
- Implementing a programme of measures to address risks to the resilience of critical mains, including mains duplication, installation of manual and dynamic valves and turbidity meters

- Employing innovative approaches in the use of Dynamic Boundary Valves to enable us to improve how we can react to severe disruption events. This allows us to divert or introduce water to an isolated section of the network quickly.

And as above, we are also transforming our operating model including structure, operating hours, working practices and procedures. These changes will complement our new strategic partnerships with the companies that we have chosen to deliver our work activities. These contracts are now based on a more sophisticated intelligent partnership basis, where we incentivise our partners to deliver our outcomes.

Investing in these critical assets will allow us to improve operational and service resilience.

6.4 Outcome: Corporate and Financial Resilience

Our future factors thinking identified corporate and financial sustainability, including the changing workforce and cyber security, as some of the key challenges to delivering Corporate and Financial Sustainability. Table 6 shows how we have linked these challenges to the top 10 risks as outlined in our Annual Report 2017-18 and developed a series of strategic and tactical measures to address them. The targets we will use to track our performance are also presented.

To evaluate the performance of our management measures, we regularly stress test key aspects of our corporate and financial resilience. Section 6.4.1 explains how we have considered the impact of a range of scenarios on our corporate risks, what impact this may have on our long term viability, and how we can respond.

Table 6: Line of sight from challenge to Corporate and Financial Resilience Outcome

Global Challenges (World Economic Forum)	Bristol Water Future Factors and Priorities	Bristol Water Top 10 Risk Areas	Our Plans and Commitments to Address the Risk		Resilience Pillars Addressed	Our Targets		Our Customer Outcome
						By 2025	Long Term	
Corporate and Financial Sustainability, including changing workforce and cyber security	Legitimacy and transparency expectations on water companies Availability and cost of financing Affordability for future and future customers Profile of future bills Fair returns and sharing success Reducing cost/improving service to leading companies Mobile technology Future workforce – expectations & skills Systems thinking and performance visualisation	1. Health, safety, environment 3. Operational resilience 6. Cyber security 9. Organisation change 10. Business planning	Strategic	Bristol Water… Clearly	Operational, service, corporate, financial	Deliver on our mission 'to be a company which our communities trust and are proud of. In doing so, we will deliver excellent experiences and create social and economic value		Corporate and Financial Resilience
				Bristol Water for All	Operational, service, corporate, financial	Deliver industry upper quartile or better levels of service.	-	
				Board Assurance Statement	Operational, service, corporate, financial	Demonstrating at Board level how we are delivering trust, confidence and assurance on the issues most relevant to our customers		
				Transformation Plan • Introduction of company values • Operational performance • People plan • Asset management capability • Technology • Supply chain collaboration	Corporate	Improving all aspects of our corporate performance to provide a stable foundation to deliver on which we can deliver improved customer outcomes.	Proactively monitor trends in the challenges we face to maintain corporate resilience and boost performance.	
				Health, Safety and Wellbeing Strategy	Corporate	Deliver the initiatives which enable us to target zero harm and enhance the wellbeing of our staff.		
				IT Strategy	Corporate	Ensuring IT and communications are a resilient enabler for optimised, effective operations and corporate services as well as a platform for innovation	Delivering a truly digitally enabled organisation where ways of working have been transformed by leveraging emerging technologies	
				Delivery Partner Strategy	Corporate, financial	Align our goals with those of our supply chain.		
			Tactical	Cyber Implementation Plan	Service, corporate	Maintaining a robustly assured position with regards cyber security via continued adherence to Cyber Essentials Plus and other relevant standards		
				Business Continuity Plan	Service, corporate	To ensure we continue to deliver a good quality service during events and that we recover quickly.		

6.4.1 Case Study: Stress Testing

In our 2017/18 annual report we outline how the organisation has been stress tested over a forward-looking ten year horizon to assess the potential impact of the company's principal risks and uncertainties and the effectiveness of available mitigating actions.

Scenarios that have been assessed are summarised in Table 7. Some of the scenarios modelled demonstrated that additional shareholder support may be required towards the end of AMP7. What actions are taken will depend on the circumstances at the time, including the severity and duration of the scenario. The company and shareholders are committed to maintaining a credit rating that is above the minimum investment grade level and currently maintains Moody's Baa1. In an extreme scenario, a fall in rating to the minimum investment grade level would tighten the financial constraints that the business is managed under, whilst continuing to meet regulatory licence obligations and covenants.

The only group company relevant to the viability assessment of Bristol Water is the retail service functions provided by Pelican, which are inherently considered within the scenarios set out above.

The results of the stress testing for the ten-year period to March 2028 have been reviewed and challenged by the board, including combinations of the individual scenarios listed above. Following this review, the mitigating actions, along with the protections that exist under the regulatory regime are deemed to be sufficient to maintain financial viability over the assessment period. We therefore consider we are well placed to meet the challenges that our customers and regulators will expect of us. Therefore the Directors have a reasonable expectation that the company will continue in operation and meet its liabilities as they fall due for the ten-year period ending March 2028.

We commissioned our external auditors, PricewaterhouseCoopers to undertake a review of our viability statement.

Table 7: Summary of Stress Testing

Scenario	Link to Principal Risks and Uncertainties	Impact on Long-Term Viability
Economic outlook The strategic plan utilises inflation forecasts from the Office for Budget Responsibility and an implied future LIBOR curve based on current market expectations. Both high and low inflation and interest scenarios have been modelled, along with a scenario where a spike in inflation occurs in between bills being set and contractual inflation / debt indexation being applied. This impacts revenues, expenditure and interest costs.	• Financial resilience	High or low inflation both impact long-term viability in different ways. High inflation increases the value of our indexed-linked debt – putting pressure on gearing and other financial ratios whereas low inflation can reduce profitability due to lower revenue.
High expenditure Expenditure over and above the level assumed in the plan could arise due to a number of reasons, e.g. to address operational performance issues, due to input price pressure, or inability to deliver efficiencies. We modelled scenarios where opex and capex allowances were overspent in general, as well as some more specific and extreme scenarios including a substantial movement in the energy markets (high opex) and the permanent loss of a major water source (high opex for immediate corrective action followed by significant capex to construct an alternative supply). Unfunded pension liabilities are not a plausible scenario for Bristol Water.	• Health, safety & environment • Customer satisfaction • Operational resilience • Water quality • Business resilience • Financial resilience	Expenditure levels higher than those assumed in the revenue determination put pressure on financial ratios and would require additional funding through either debt or equity.
Fines Substantial fines could arise due to legal breaches (including data breaches under the General Data Protection Regulations) or severe Health & Safety incidents. The impact of a substantial fine has been considered in conjunction with an increase in expenditure to address the underlying issues. This is an example of an exceptional event that could affect costs and cash flows.	• Health, safety & environment • Water quality • Cyber security and data protection	The financial impact of a fine and any remedial action will but put pressure on ratios and require additional funding through debt or equity.
Uncertain regulatory environment There is a substantial amount of uncertainty regarding the regulatory environment, including the determination of revenue for future AMPs. A range of possible scenarios and outcomes have therefore been modelled.	• Regulatory change • Business planning process and assurance	The determination of revenues could have a significant impact on financial viability. The PR19 methodology is challenging, but the determination will be made in the context of the broader regulatory model.
Poor performance against performance commitments The strategic plan assumes a level of rewards & penalties based on current expectations, impacting both revenue and RCV up to 2020 and revenues after 2020. This scenario was considered both in isolation and in conjunction with a continued underperformance in future AMPs.	• Health, safety & environment • Customer satisfaction • Operational resilience • Water quality • Financial resilience • Organisational change	Revenue penalties have an impact of financial viability in the near future and put direct pressure on financial ratios. RCV penalties are spread over a longer period of time, reducing the immediate impact on financial viability but delaying the benefit to customers.

7. Our systems thinking action plan

The services and outcomes we deliver to our customers rely on a complex set of relationships between a number of operational, corporate and financial systems. Some of these systems fall entirely under our control however many also interact with or influence the systems of other stakeholders. The natural environment is the foundation to all these systems.

In addition to this complex picture, and in order to deliver outcomes over the long-term, we must effectively identify and plan for future uncertainties, such as climate change, technological advancements, and even things we do not yet understand.

Our view of our current performance is that we already have established key relationships with a number of stakeholders within our communities and we work collaboratively to mitigate against risks to resilience.

In the next 12 months we expect to through our social contract identify further stakeholders and form new partnership to improve resilience to the communities which we operate in.

By the end of AMP7 we aspire to be recognised as being a mature organisation in terms of systems thinking approach to maturity.

Being aware of complex interactions and adapting decision making procedures accordingly is at the heart of systems thinking and we know that we must embed this approach into our ways of working if we are to sustain high levels of resilience. We already apply systems thinking to many of our procedures and resilience initiatives, such as through the Social Contract, WRMP and Biodiversity Index.

These examples, and the processes and procedures which drive them, gave our Board the necessary confidence (after scrutiny of our approach) to state that our business plan will deliver resilience in the round for our customers).

We are committed to the continual improvement of our approach to resilience in the round and believe that maturity in our people, plans and procedures and tools will ensure we achieve our ambitions in an efficient, robust and cost-effective manner. Strong resilience maturity supports all other components of our integrated resilience framework (introduced in Section 5) and ensures our business as usual resilience risk management is robust, consistently applied and transparent.

Table 8 presents our systems thinking action plan. To develop it we have:

- Reviewed our existing ways of working against Ofwat's IAP challenge, its guidance in Resilience in the Round (2017), its seven resilience planning principles, and its observations in our draft determination.
- Engaged widely within our business to understand what we do well and what we can improve.
- Worked with consultants to evaluate our current performance and identify focus areas for future enhancement.
- Agreed and reported proposed actions, supported by a plan and governance process for monitoring and performance assessment.

To develop the action plan we started with the initial thoughts in our original C4 document and developed specific actions associated with each. We then defined additional actions to address the areas for improvement identified through our resilience maturity assessment (see Section 5.2).

To test the robustness of our plan, we considered our breadth of actions against the ***Interdependency and Planning Management Framework*** developed by the ***International Centre for Infrastructure Futures*** which comprises the following three stages:

- Problem structuring: defining system boundaries, identifying interactions and highlighting risks and opportunities.

- Measurement and appraisal: establishing criteria for risk treatment and opportunity capture and gathering evidence to track progress.
- Creating stakeholder understanding: identifying stakeholders and developing the tools and approaches to encourage collaboration.

This process helped us to identify several additional actions.

For all actions, we then assigned a responsible party and a target date for delivery. For the maturity improvement actions, we have also identified the category of improvement. **Appendix 8** indicates how our portfolio of actions addresses each stage of the Interdependency and Planning Management Framework and each of Ofwat's seven resilience planning principles.

We are committed to implementing the activities in this action plan. It has been reviewed and endorsed by our Board and Customer Challenge Group.

Table 8: Our systems thinking action plan

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Overarching				
Deliver our action plan	Corporate risk management improvement	We will: • Develop and implement monitoring and assurance processes for this action plan. **COMPLETED.** • Ensure effective organisational leadership to encourage long-term planning. **COMPLETED.**	Chief Executive Officer	Completed
Taking a systems thinking approach				
Benchmark our systems thinking approaches with other organisations.	Corporate risk management improvement	We will: • Conduct benchmarking against other companies and sectors in systems thinking approaches to resilience, including business continuity management. • To support robust option assessment, explore best practice in multi criteria assessment and develop recommendations. • Share our experience of our social purpose and Social Contract with other utilities.	Director of Strategy and Regulation	April 2020
Further develop our understanding of the broader, open system that we are a part of, including the goals and objectives of the community (this is a requirement of the commitments we make through our Social Contract). Better understand the flows (of information, stakeholder relationships and physical resources) across the boundaries of our systems, so that we can work with stakeholders to influence the wellbeing of society, and local community and environmental resilience.	Social Contract	We will: • Prepare and publish a Social Contract to ensure we continue delivering societal benefits, and to provide a way for local people to hold us to account for how we deliver our actions. **COMPLETED.** • Conduct detailed mapping of our Social Contract activities to the Bristol One City Plan and UN SDGs. Use this to inform ongoing prioritisation of the programme. **COMPLETED** • Undertake stakeholder mapping to capture extent and status of stakeholder relationships and areas of common ambition. **COMPLETED** • Develop new stakeholder links through our Social Contract – utilising our connections through Bristol Green Capital Partnership, the city's Environmental Sustainability Board and the One City Plan. • Continue ongoing customer and employee engagement and participation through the Customer Forum and a new Employee forum, including a direct link to the Board. Ensure adherence to Board governance code and transparency of reporting through 'Trust Beyond Water' statement at year end and interactive performance graphic, including reporting of Social Contract activities through a new performance graphic. This ensures transparency in financial, asset, service, social performance reporting.	Director of Strategy and Regulation	July 2021

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Use an improved understanding of our systems to optimise the way we deliver our business processes, for example to challenge how we support the most vulnerable in society. Develop ways we can meaningfully stress test the system to inform our resilience planning and identify the most effective leverage points in our community. Develop a procedure which ensures we learn from stress testing activities and that communicates the learning back into the system to act more effectively.	Corporate risk management improvement	We will: • Conduct a review of key strategic partners and stakeholders for securing resilience in the round. • Identify and implement required changes to stakeholder and strategic partnerships aligned to resilience strategy. • Hold a series of workshops with partners and stakeholders to update systems mapping at appropriate scale. • Document outcomes of workshops to develop plans and strategies for the systems in question. • Develop procedures to exploit understanding of system interdependencies to link different aspects of resilience (operational, service, financial and corporate) when undertaking planning, risk assessment and mitigation. • Ensure company plans demonstrating system understanding and describe how associated planning tools and processes are implemented and maintained. • Update interdependency planning approach, including associated governance, to align with resilience strategy. • Deliver comprehensive and systems-based water resource and drought planning involving regional planning and collaboration. **COMPLETED.** • Ongoing monitoring of the delivery of the WRMP to inform subsequent plans. • Update resilience stress testing approaches, including operational, service and financial scenarios. • Run resilience stress testing exercises in collaboration with stakeholders. Develop procedure to capture learning from stress-testing exercises, including monitoring the delivery of actions to address observations.	Director of Strategy and Regulation on behalf of Executive Management Team	July 2022

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Develop natural capital accounting tools and methodology to embed these in to ways of working.	Asset management capability improvement	We will: • Develop and implement procedures to identify natural assets and ensure a robust understanding of the natural environment and how ecosystem resilience supports systems resilience. • Develop a framework to quantitatively assess the natural, social, human and economic capital benefits of our social contract activities. • Plans and procedures developed and implemented to undertake and apply economic valuation of natural assets – we will inform our optimisation of investment options based on whole life direct and in-direct costs and benefits on an ongoing basis (this will underpin our investment plans developed as part of the next price review).	Director of Asset Management	April 2023

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Enhancing our integrated resilience framework				
Enhance our integrated resilience framework by: • Recognising that a system is a collection of different elements that together produce results not obtainable by the elements alone. We therefore focus on understanding the whole problem before we try to solve it, and we identify and account for uncertainties to guide our planning. Depending on the level of risk, we may do this by simple conceptual mapping of the system, or detailed numeric modelling. • Translating the problem into measurable requirements, with a line of sight to our resilience pillars and our corporate goals and customer outcomes. • Examining all feasible alternatives, via a proportionate risk-based assessment, before selecting a solution. • Making sure we consider the total system life cycle. • Making sure we test the performance of the total system before delivering solutions. This might be via desk-top exercises, multi-stakeholder workshops, or extensive stress testing, depending on the nature of the risk we are addressing. Documenting everything, monitoring our performance and regularly reflecting on progress with all the stakeholders in our systems to deliver continual improvement.	Asset management capability improvement	To apply the core concepts of systems thinking to our integrated resilience framework for risk assessment and decision making we will: • Develop and implement procedures to identify and understand asset interdependencies. • Formalise plans, procedures and tools in to a clear asset management system and supporting framework. **COMPLETED.** • Develop procedures to ensure option assessment and selection considers the full lifecycle of assets (including decommissioning and disposal). **COMPLETED.** • Develop procedures to ensure option assessment considers a full range of risk mitigation options, including those related to resistance, reliability, redundancy, response and recovery • Develop a suite of asset health and broader resilience indicators which enable effective tracking of systems resilience. • Explore opportunities to collaborate with partners, other water companies and across other sectors to evaluate and address resilience risk. • Develop policies and plans aligned to the systems-based resilience strategy to guide procedures and the application of tools. **COMPLETED.** • Develop series of linked procedures to ensure innovation is supported throughout organisational policies and strategies. **COMPLETED.** • Embed a focus on long-term resilience in policy and strategy, including a clear corporate definition and vision for resilience. **COMPLETED.** • Develop and implement Cyber Security Strategy. **COMPLETED.** • Develop and implement Information Strategy.	Director of Asset Management	By end AMP7

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Improving our resilience maturity				
Aligning the asset management system to ISO 55001	Asset management capability improvement	We will develop our asset management system to align with ISO 55001. We have established an on-going asset management capability improvement programme which includes annual assessment of our asset management system against the ISO 55001 39 subject areas. In April 2019, our system will be assessed by a third party for the third consecutive year. Our objective for the subsequent assessment, in April 2020, we are targeting an assessment at the level of 'competent' on the asset management maturity scale (i.e. a score of at least three across the majority of the 39 subject areas, which is the minimum requirement to obtain ISO 55001 certification).	Director of Asset Management	April 2020
Assess changes in energy demands in future	Asset management capability improvement	We have established a dedicated energy management team, who are responsible for improving how we assess changes in energy demands in the future. Our on-going Asset Management Capability Improvement Programme will manage the delivery of these improvements. Our Resource West work with Bristol Energy includes promoting water efficiency and energy efficiency advice, which will inform customer information which drives our energy demands. We also have a number of initiatives that effect energy use and source, including through renewable opportunities. • We will identify and quantify energy demands and potential sources. **COMPLETED.** • We will assess and forecast near and longer term future changes in energy demand.	Director of Asset Management	April 2021

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Develop methodology and tools for visualising and sharing information about future risks	Corporate risk management improvement	Future risks are visualised though our long-term ambition document "Bristol Water... Clearly", which was a structured approach to considering the external context for our business strategy and plans. Short and medium term risks contributing to this are visualised in the corporate risk framework. The short term reporting on our website in the interactive performance graphic describes risks in terms of current performance. We also are developing visual presentations in our Social Contract, which captures risks (linking back to the initial analysis in Bristol Water… Clearly) and opportunities in terms of the wider influences and benefits from our activities. In terms of visualising asset risks more specifically, the dedicated Asset Information and Performance team, who are responsible for defining and planning improvements to our methodology and tools for visualising and sharing information about future risks. Our on-going Asset Management Capability Improvement Programme will manage the delivery of these improvements. We will integrate this with wider company-wide risk management improvements. We will: • Develop and implement methodology and tools for visualising and having an open data approach sharing future risks and project data in a common data environment. For example data shared through Resource West Partnership.	Asset Management Director	April 2021
Profile risk and assess change owing to interventions and strategies	Asset management capability improvement	We have an established a dedicated asset risk and planning team whose responsibilities include: • Assessing remaining life, failure risk and impact on service. • Assessing, monetising and profiling risk, defining interventions, and assessing the change in risk owing to interventions and strategies. A number of process improvements have been identified and are being implemented. Our on-going asset management capability improvement programme will manage the delivery of these improvements.	Director of Asset Management and Chief Financial Officer	April 2021

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Ensure mitigation activities and associated investments are (i) commensurate with the level of risk and (ii) prioritised based on risk	Asset management capability improvement	The corporate risk register includes asset, operational, regulatory and compliance risks and considers both internal and external hazards. We track emerging risks and opportunities, changes in risk (quarterly), whether action plans are considered sufficient, and the direction of impact, probability and mitigating controls. This process is overseen by the audit and risk committee (ARAC) as a formally constituted sub-committee of the Board overseen by an independent non-executive director. We will: • Develop and implement set of procedures to assess asset failure risk, remaining life, and impact on service. Apply this information to prioritise investments. • To support horizon scanning, undertake demand analysis and assessment of option performance against alternative futures (demand, regulation, climate, technology). **COMPLETED.** • Use planning horizon epochs to evaluate risks, costs and benefits to understand change over time. • Compile and analyse hazard and failure event data for all asset types to inform understand of risk. **COMPLETED.** • Profile changes in risk over time and assess the impact of interventions and strategies on residual risk (monetised where possible). **COMPLETED.**	Director of Asset Management and Chief Financial Officer	April 2021

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Link corporate actions to findings from staff and external stakeholder engagement	Social Contract	We will link our corporate actions to findings from staff engagement as our engagement plan develops. The employee engagement survey (annual) includes corporate and individual team action plans, where appropriate. For instance, the strategy & regulatory team employee engagement survey identified a need to plan PR19 project delivery into our wellbeing plan as part of an outcome of our engagement survey. This resulted in creative thinking, in particular a holiday souvenir competition that matched relaxation with the competitive instinct of the team. The engagement idea for team diversity in a project was taken forward to a video about the team's perception of customers that formed part of National Customer Service Week. We also link our corporate actions to findings from external stakeholder engagement through our Social Contract - as part of using our purpose and corporate values as a promise from the executive to our staff and external stakeholders, and with an employee forum with a route to a non-executive director to hold the executive collectively to account for this development. We plan to measure success further through national surveys (e.g. Times 100 best companies to work for), building on the benchmarking within the existing employee engagement survey. The Social Contract has initiative owners who select themselves based on their interests, which is a key part of the values and employee engagement approach to business change. We will: • Develop, implement and sustain staff engagement programme. • Act on the findings from staff and external stakeholder engagement to implement initiatives which boost corporate resilience.	Director of Legal Affairs and HR	April 2021
Identify and rank critical assets	Asset management capability improvement	We have undertaken analysis to identify our critical network mains and their ranking and we are rolling out criticality assessment to our non-infrastructure assets. The critical mains analysis from a customer perspective is reflected in our >10,000 population centres resilience metric, with a ten-year programme to provide dual-supplies to over 800,000 people, building on the existing strong resilience following 2018 completion of the Southern resilience scheme. • We will implement procedures to ensure identification and ranking of critical assets across all asset types.	Director of Asset Management	April 2023

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Capture asset performance data and analysing data to inform planning	Asset management capability improvement	We have an established dedicated Asset Information and Performance team whose remit includes: • Managing our GIS and SAP systems, and improving how we capturing asset performance data in these systems. • Improving how we capture asset performance data and how we analyse it to inform our asset investment and planning. • Capturing asset performance data to inform our understanding of asset interdependencies • Improving our predictive and prescriptive analytics capability Our on-going Asset Management Capability Improvement Programme will manage the delivery of these improvements. This team has the responsibility for reporting all non-financial Company Performance Areas. Our company performance is reviewed formally on a monthly basis with the executive, their direct reports, and is reported to the Board along with the CEO report. This includes actual and forecast performance levels. Our mid and year-end assurance processes include consistency checks with monthly report, to test the accuracy of decision making and monthly reporting. Our performance management approach leads to timely and frequent operational decisions (e.g. leakage, network operations, customer experience, business retail market operations performance). Any performance areas in jeopardy are escalated to executive level. Our approach ensures that our asset information and business decisions directly link. We will: • Develop systematic maintenance data collection programme supported by a storage system, tools and procedures to optimise asset performance. • Work with the sector to develop robust forward looking asset health metrics. • Develop procedures to ensure option assessment and selection considers the full lifecycle of assets (including decommissioning and disposal). • Compile and analyse hazard and failure event data for all asset types to inform understand of risk. • Implement integrated set of procedures to capture asset performance data and transform this in to robust information to inform asset planning.	Director of Asset Management	End of AMP7

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Measure outcomes delivered by projects/products against the originally defined aims	Asset management capability improvement	We have established an Investment Programme Governance Framework, which ensures we track and measure the outcomes delivered by projects/products against the originally defined aims; and which ensures we include multiple stakeholders in post-project appraisals. This includes third parties, as well as internal teams and construction partners. Strategic projects, including non-asset focused projects have similar post project appraisals by the Executive Management Team and/or the delegated steering group. The Social Contract and the community ODI includes a route for third party lessons learned inherent in community initiatives delivery, and the governance allows wider stakeholder concerns or opportunities, including from general performance (input into how as well as what we deliver) to be considered in full. The terms of reference and benefit measurement objectives in our evolving Social Contract also contribute significantly to this improvement description. We will: • Measure outcomes delivered by projects against originally defined aims to support continual improvement. Use this information to take corrective action where projects fail to meet defined aims. **COMPLETED.** • Develop and apply suite of performance measures that enable evaluation of the delivery of schemes against customer outcomes, including for response & recovery activities. **COMPLETED.** • Ensure post-project appraisals are conducted on all major schemes and the findings acted upon to support continual improvement. • Ensure multiple stakeholders are involved in post-project appraisals.	Director of Asset Management	End of AMP7
Take corrective actions where projects fail to meet original aims	Asset management capability improvement			
Conduct post-project appraisals and acted upon them	Asset management capability improvement			
Involve multiple stakeholders in post-project appraisals	Asset management capability improvement			
Systematic and integrated resilience risk assessment across the entire business	Corporate risk management improvement	We are reviewing our current approach to company-wide resilience risk management with the aim of improving it to ensure it is systematic and integrated across the entire business. We will: • Refresh corporate Risk Management process to ensure consistent risk assessment and scheme prioritisation across all departments. • Ensure risk mitigation interventions are prioritised and selected commensurate with the level of risk and certainty of risk reduction. **COMPLETED.** • Improve business cases to outline expected, quantified residual risk following investment. • Conduct joint evaluation of business cases with key strategic partners.	Chief Financial Officer / Director of Asset Management on behalf of the Executive Management Team	End of AMP7

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Consult stakeholders to identify opportunities for the collaborative delivery and funding of schemes	Social Contract	We have already utilised a number of partnership funding opportunities and provided funding to other organisations, for example funding our Sustainable Urban Nexus project (SUNEX) through the University of West of England, working with Imperial College on our calm-DMA project, sponsoring Bristol Green Capital Partnership which provides links to 850 other organisations, funding social mobility mentorship through Ablaze and the Refill campaign through City to Sea. Through our Social Contract we are working with stakeholders to identify further opportunities for partnership working and funding. Our voluntary sharing reinvestment fund linked to the Social Contract will also help other organisations explore matched funding. We will: • Use our innovation framework, including the Workshop innovation hub, to find further R&D joint funding opportunities. • Consult with stakeholders to identify opportunities for collaborative funding and delivery of schemes.	Director of Strategy and Regulation	End AMP7
Comprehensive supplier and contractor management arrangements, including promotion of flexibility and incentivisation	Project Delivery	We are currently undertaking a renewal of our Network Maintenance Supply Chain contracts, to go live from October 2019. Our approach to renewing the NMSC contracts is to establish comprehensive supplier and contractor management arrangements, so that we have a partner delivery approach which promotes flexibility and incentivisation. This model through our transformation programme will then inform other areas of contracts. We will: • Develop AMP7 comprehensive supplier and contractor management arrangements which include the promotion of flexibility and appropriate incentivisation. **COMPLETED.** • Develop supplier and contractor management arrangements for AMP8 and beyond.	Chief Financial Officer	End of AMP7

Objective	Maturity Improvement Category	Summary of improvement plan	Responsibility	Target / Review date
Identify and develop the future competencies we need	People Plan	The Board and Executive Team have set the company purpose and values, through which the culture of the company is changing. As part of this change, a People Plan has been produced and is in the process of being implemented. The People Plan includes: • A competency framework which considers current and future competency requirements. Our competency expectations sit under the Board strategic objectives and are based on our values. COMPLETED • A staff engagement programme including annual employee surveys. • A Talent Development Programme - which develops high performing and high potential staff and allows participants to progress along career development paths • On-the-job training programmes • Staff coaching programme • The development of work experience and apprenticeship programmes • Values based development and recruitment • Mentoring programme • Develop and implement training to enhance systems thinking understanding across all teams. We are also developing an employee forum, which is connected into our Social Contract and is linked to our internal communication of values and performance. It has Board scrutiny, and includes an executive pledge that allows all staff to challenge any actions that are not in line with our values. This allows the employee elements of the Social Contract and People Plan to be aligned. We also have externally facing mentoring programmes (such as through the local education charity Ablaze), which support social mobility whilst also providing development opportunities to employees.	Executive Management Team	April 2019

8. Reporting progress

Updating our customers and key stakeholders

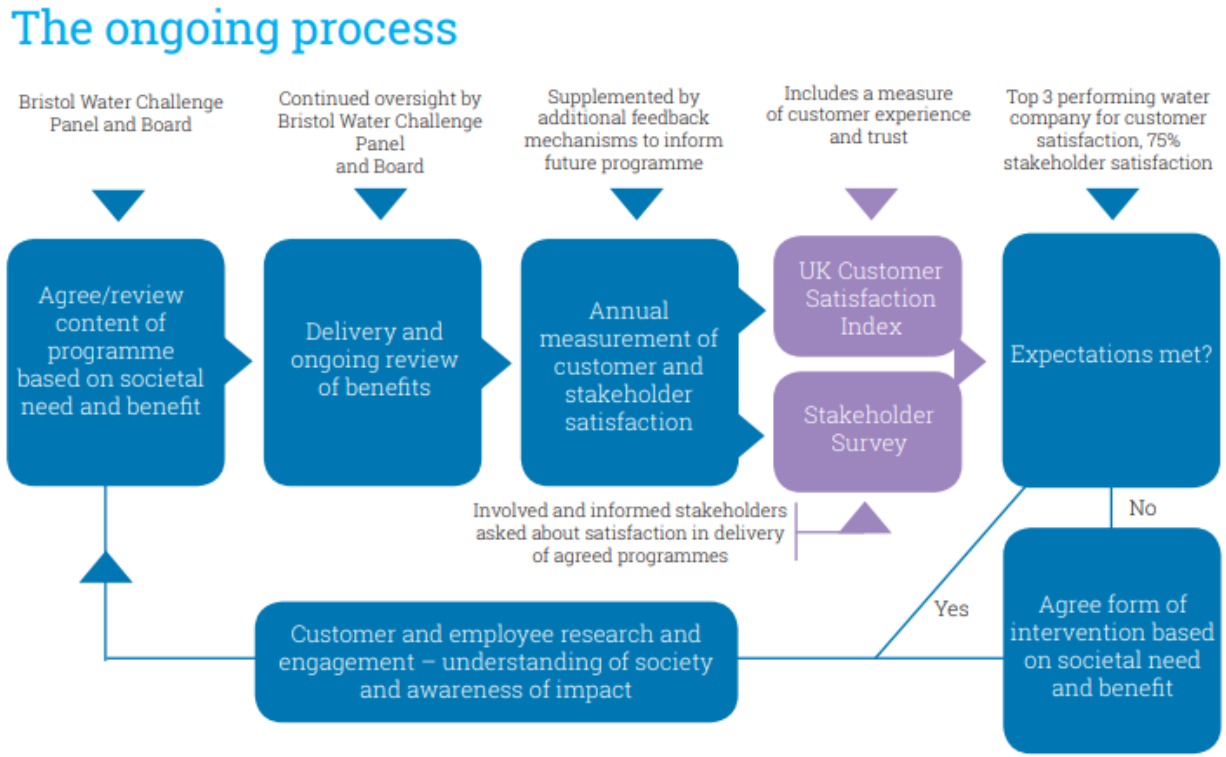
We are transparent on our financial, asset, service and social performance. The Social contract process provides a link to stakeholders.

As is indicated by our Social Contract processes diagram below:

Each year we report on the previous year's performance.

We publish our Trust beyond water statement at year end, with interactive performance graphic. Plus the new social contract performance graphic.

Stakeholder satisfaction – is an outcome and part of social contract process.



Updating our Board & Challenge Panel

We report on resilience maturity periodically, as part of our Corporate Risk Framework.

Delivery of the action plan directly links to the dividend and executive remuneration which is overseen by the remuneration committee.

The Board will engage with the employee forum periodically.

The Bristol Water Challenge Panel will receive periodic updates during regular meetings. The chair of the Challenge Panel will also attend the Board meeting periodically.

Mid Year Reporting

We also commit to continuing our mid-year performance reporting. This will include progress on our systems thinking action plan, as well as our social contract. This provides a focus in advance of year end reporting, and is the best time to use comparators to other companies that should be part of a systems thinking approach. This allows engagement updating plans for the following year and beyond, and provides time for dialogue with stakeholders.

Year end provides the more formal reporting of the previous year, and the opportunity to describe the outcome of the discussion based on the mid-year review.

9. Appendix Index

Appendix 1 - Mapping to UN Sustainable Development Goals

Appendix 2 - Further detail on our social contract

Appendix 3 - Further detail on our innovation framework

Appendix 4 - Further detail on Water Resources Management Plan

Appendix 5 - Case Study: Biodiversity Index

Appendix 6 - ARAC Paper on corporate risks

Appendix 7 - Capital Investments – Line of sight to outcomes

Appendix 8 - Action Plan aligned to Resilience Frameworks

10. Appendix 1 - Mapping to UN Sustainable Development Goals

UN Sustainable Development Goal	Bristol Water initiative
	
	We already have zero water poverty in Bristol, working with charities such as Step Change to deliver our range of social tariffs. Our Bristol Water For All social contract mechanism may help to fund social tariffs if our initiatives don't work Our staff also raise money for WaterAid, who help to eliminate poverty through global access to clean water and sanitation
	Sunex stands for Sustainable Urban food-water-energy NEXus. We are working with UWE and other partners to develop efficient supplies of energy, water and food for urban regions. The project has received funding from the EU. Bristol is one of four case study city regions taking part (Berlin in Germany, Doha in Qatar and Vienna in Austria have also been selected).

	Our whole strategy is focused on good health and wellbeing. Our flagship lakeside leisure facilities at Chew Valley, Blagdon and Cheddar enable up to half a million visitors a year enjoy the South Bristol/Mendip lakes & countryside. We apply a co-creative inclusive approach to refurbish facilities; including picnic and play areas, car parks, nature trails, footbridges and info signs. Equality of access is our priority so all can enjoy the health and well-being benefits from access to this high quality water environment. Our partners include The Woodford Restaurant, Salt & Malt Restaurant, Chew Valley Lake Sailing Club, Cheddar Watersports Club, Bristol Reservoirs Fly Fishing Association, Chew Valley Ringing Station, Volunteer Bird Wardens and Natural England
	We focus on two key aspects – building social mobility through how we develop the workforce of the future, and educating future consumers on the water environment and resource efficiency to deliver a sustainable future. We combine these together – for instance our Youth Board brings the views and ideas of young adults into our decision making. Spawn to be Wild helps ecology today and tomorrow by working with primary and secondary school children to learn about the ecology and life-cycle of eels. Students get the opportunity to raise and care for elvers (young eels) in their classroom and release them into Blagdon lake. 

		We have signed up to the Social Mobility Pledge, and gender equality is a key focus for our employee forum, which forms part of our social contract governance process. Our staff provide role-models for future careers, particularly for STEM subjects and careers. We provide mentoring through Ablaze, a local charity that aims to inspire and motivate students to raise their aspirations and stay engaged with education. Activities delivered encourage students to set personal goals and work out their own plans for achieving them.
		Clean water is our core social purpose, and is embedded in our history.
		We are investing in renewable energy, using the expertise of others we work with in promoting resource efficiency through our Resource West partnership, which includes Bristol Waste and Bristol Energy
		We are a highly skilled industry, requiring a range of technology, scientific and engineering skills. Our incubator “The Workshop” is supporting a range of entrepreneurs and social entrepreneurs to start up and develop their businesses.

		Building resilient infrastructure, promoting inclusive and sustainable industrialisation and fostering innovation is a key part of our core purpose as an organisation. We have committed to combining our resource efficiency efforts with other utilities, and will extend this to housing associations, landlords, water retailers and others. Our approach to biodiversity will help others achieve the "Vision for an Environmentally Sustainable Bristol" goal that all new developments achieve high standards of design for wildlife, water and wellbeing by 2036
		We provide a safe and reliable supply to all, and address vulnerability by delivering services in partnership with those working with hard to reach consumers. We have more work to do to make our services as inclusive as possible, and we are at an early stage of tackling this long-term ambition.
		Our whole Bristol Water For All Social Contract focuses in sustainability of life, work and the environment for the communities we serve. We support the Bristol Green Capital Partnership because they share this goal. The "Vision for an Environmentally Sustainable Bristol" includes a goal that Bristol's larger employers (100+ employees) use natural capital accounting and are net positive in their impacts by 2030. Our Biodiversity Index and Social Contract Mechanisms will help us achieve this aim.
		Resource West is our Partnership with other utilities and organisations to jointly promote water, waste and energy efficiency as a combined package of action that consumers can take. Our Water Bar and the Refill campaign promote the benefits of tap water consumption by promoting activity without single use plastics.

	Reducing water consumption and leakage also helps to reduce carbon. We are also working to reduce our own carbon impact with a greater use of renewable energy, using the expertise of our Resource West partners. The plan for an environmentally sustainable Bristol targets 25% of electricity consumed in Bristol generated for renewables sites within the city by 2030, this is a goal we will measure our progress against.
	Our raw water quality outcome measures how catchment management work with farmers will deliver reductions in phosphorus loads in the rivers feeding our lakes and water supply. We work with the Avon Wildlife Trust, such as at Herriots Pool Nature Reserve. This is a nature reserve next to Chew Valley Lake and supports international important wildfowl. The southern end around Herriot's Bridge is a nature reserve where islands, lagoons, bays and channels have been created to provide safe areas for birds to roost, nest, feed and shelter. The rich waters of the lake teem with aquatic insects and water plants, which provide both protection and food. 
	Our Biodiversity Index ensures that we go well beyond our minimal legal obligations. It ensures a net gain in terms of the quality of habitats on land that we own. We are also committed to using the tool where we work on other land – for instance we improved habitats such as for bats as part of our Southern Resilience Scheme by using our Biodiversity Index Tool with our contractors.

		Transparency and accountability is central to our Social Contract. We are measuring both customer satisfaction and community stakeholder satisfaction with the way we work. If we don't deliver to the satisfaction of our partners, our Board will agree further investment in initiatives or social outcomes with the Bristol Water Challenge Panel, our customer forum and our employee forum. We have appointed a non-executive director with a specific role to represent the community stakeholder and employee perspective in our Board discussions, and changed our corporate governance to reflect our social purpose.
		Partnerships are key to our social contract. One of our reasons for sponsoring the Bristol Green Capital Partnership was because of their focus on the UN Sustainable Development Goals, and their focus on the Bristol One-City Plan. This also benefits the areas we serve outside of the city of Bristol, through the West of England Combined Authority strategy, and as our activities cover all the communities we serve equally.

11. Appendix 2 - Further detail on our social contract

Our Social Contract is the mechanism by which we will deliver our purpose to have a positive impact on the lives of our customers, communities, colleagues and the environment beyond the provision of a pure and reliable supply of water. Our Social Contract is closely linked to our Local Community and Environmental Resilience outcome, and is a key part of our corporate resilience.

Our Social Contract is an example of a systems thinking approach that benefits long-term resilience. At a strategic level is the consideration that the future planning of the water industry is becoming harder because of the disruption to society and a sense of lack of wellbeing and confidence in institutions serving the public. As we set out in our Social Contract, what is required is a shared connection to society – communities are resilient if people feel connected to them. Forming a connection to communities and the organisations that support them is a key part of the resilience of Bristol Water.

As an example, customers will be vulnerable if they do not know where to turn during an event. Community groups help to build connections that allow us to understand and respond to those who are vulnerable, and to reduce vulnerability through building a connection to society. That is the ambition of our purpose – and in the long run delivers more efficient and effective water services. It is a hard concept to explain and explore, but our Social Contract and the report of the recent launch event demonstrates the positive opportunities to collaborate and innovate that have arisen when we have achieved this in the past, and the huge range of future opportunities we and our partners see.

Our Social Contract helps to rebuild trust which supports on-going legitimacy – reducing for example, risks such as customers refusing to pay their bills or ignoring calls for resource efficiency.

Not only this however, but our Social Contract also supports adaption to the risks that we face as a society. This is important because the capacity to adapt and respond to current or future risks and opportunities is largely a function of the social component of an integrated system – such as local values, interests and policy making. These adaptions do not happen spontaneously, but require a connection between individuals, community groups and businesses, often through partnerships and collective movements, as well as through changes made by local and national policy makers. Forward looking decisions are required.

The characteristics of our Social Contract linked to systems thinking are:

- The contract ensures that social and environmental goals are not ignored in favour of short-term economic outcomes.
- It encourages collaboration between individuals, businesses and local policy decision makers.
- It encourages partnership working and ways of connecting individuals to their communities, motivating collective power in action to increase resilience and development of stronger local relationships. This results in enhanced trust and influence, which is seen by local communities to be more legitimate than those influences coming from distant national frameworks.
- It aims to promote the wellbeing associated with social connections, creating a greater sense of community with greater inclusivity and cohesion.
- It encourages social learning and participation in decision making, to ensure that all voices are heard and interconnectivities and trade-offs well understood.
- It focuses on the wellbeing of individuals and communities, as this is a factor in their ability to respond to disruption.
- It attempts to address some of the social disruption challenges which are in themselves risk to future resilience (for example, growing economic disparities and lack of social mobility).
- It encourages partnership working to identify and support vulnerable individuals.

- It aims to reduce the social, financial and health impacts from risks, for example, the impact of climate change on water availability and quality.

Figure 13 presents one of the key components of our Social Contract: our mapping of stakeholder influence and their impact on each of our initiative areas. The 'stakeholder influence' is the aggregation of the one to five influence of our stakeholders, and the size of the bubble reflects the one to five impact on delivering our Performance Commitments (i.e. the strength of influence the stakeholder network system has on our delivery for customers). Figure 14 also presents the stakeholder mapping; this shows the mapping for Resource West and their impact on customer outcomes.

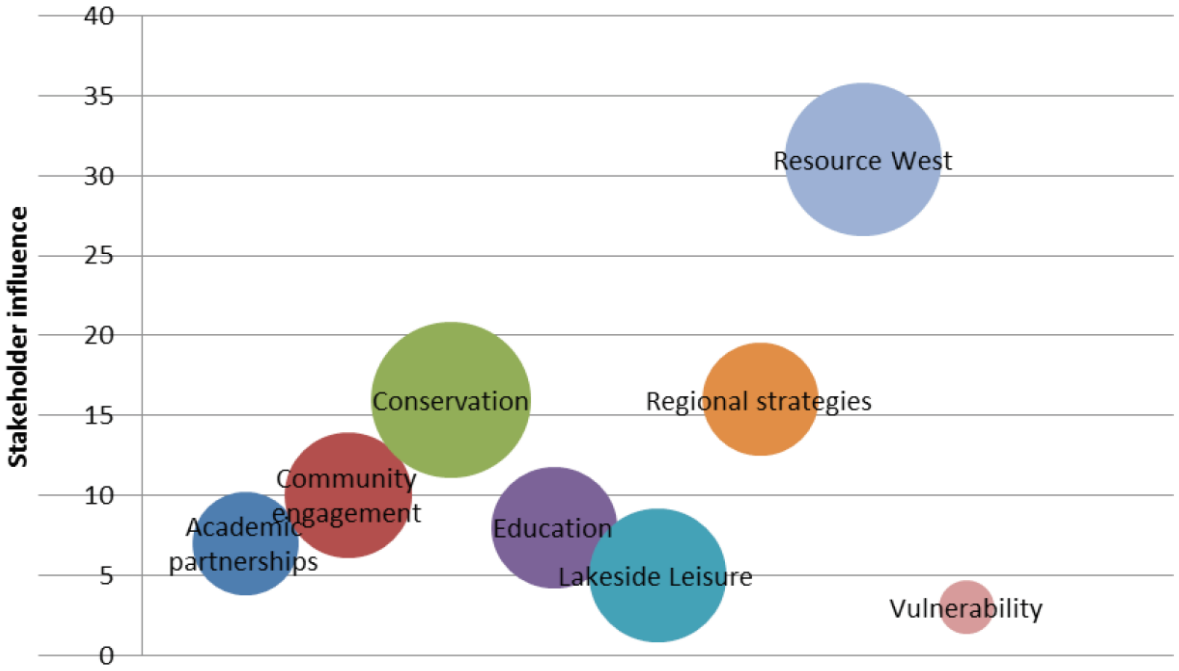


Figure 13: *Customer priorities for our initiatives*

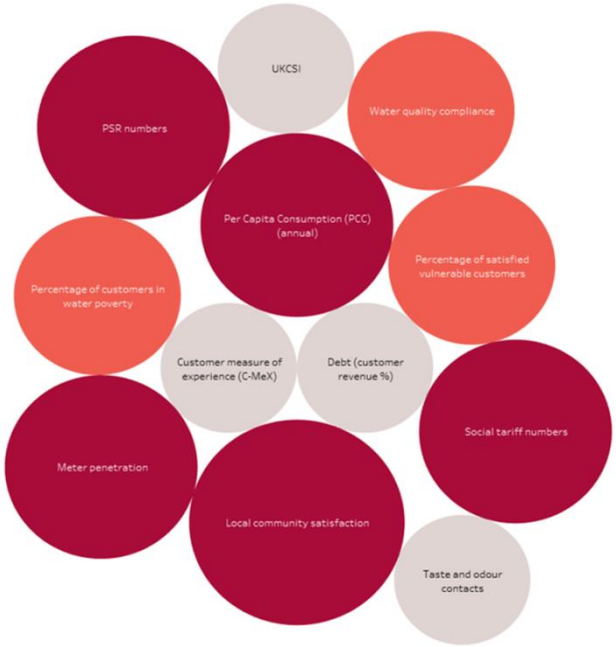


Figure 14: Stakeholder mapping - impact of Resource West on Bristol Water customer outcomes

Our Social Contract helps to understand the inter-connections between resilience risks and mitigations so that the mitigation can address several risks and be based on the appreciation of trade-offs in impact. For example:

- Many sources predict that affordability challenges will increase in future - these would be exacerbated in the event of an expensive solution to meeting future water demand.
- Skills gaps may also increase in the future, making it more difficult to meet the changing recruitment needs of the company.
- At the same time, increasing water usage combined with climate change would have a negative impact on our local water environment and therefore on social and environmental wellbeing.

Our Social Contract provides a line of sight between these different challenges and attempts to address their connectivity through the solutions that we develop as a company with our partners. In this example, the solution that we have identified as part of our Social Contract is to invest in education and training, through which we will:

- Raise awareness of the value of water with future consumers, who will likely also influence their parents and other current consumers.
- Support social mobility through targeted mentoring and work experience programmes.
- Address skills shortages through raising aspirations and providing targeted training.
- Raise awareness of the company brand to support a level of trust and response to water efficiency campaigns.
- Work with other utilities to provide joined up messaging on energy and water efficiency and reduced waste, contributing to the resilience of wider parts of the integrated community system.

The link between community wellbeing and resilience

There is an established link between community wellbeing and resilience. This is for two reasons:

1) Many aspects of community wellbeing also contribute to community resilience (for example environmental wellbeing is linked to the capacity that the environment has to adapt to change to meet the needs of local communities in future).

2) Personal resilience (the ability to deal with shocks and disruption) is linked to personal wellbeing, such as health and level of connection to society.

The colour graded Figure 15 overleaf illustrates the link between the programmes of initiatives within our Social Contract and the benefit to community wellbeing. This information will be used within the Social Contract framework to help prioritise resources based on the benefits of an individual activity within the Social Contract.

In our latest customer forum in February 2019, we sought the views of our customers on our Social Contract. This session was a great example of involving our customers in our systems thinking approach. The purpose of the session was to:

- To understand customer views on our Social Contract.
- To understand customers priority areas for our Social Contract activities.
- To understand how we can refine our list of activities and where to prioritise focus.
- To jointly develop our approach to customer participation on the Social Contract.

Our customers responded very positively to the concept of Social Contract and felt passionately about some of the initiatives which were discussed. They recognised the topics of discussion from previous customer forums and were pleased to continue to be involved in the process of shaping the programme. We went through various stages of understanding priorities for customers as individuals and collectives (See Figure 16 for an example of the outputs). We compared them to our own initiatives, ultimately leading to our customers helping us to prioritise our initiatives.

Building on the excellent feedback gained during the session we asked customers how they would like to be involved in the future. The preference was for continued involvement in the Social Contract via the customer group.

Further information on our Social Contract can be found at www.bristolwater.co.uk/socialcontract and also within document A1 of our April submission.

		Contribution to:			
Social Contract programme	**Examples of community benefits**	**Social wellbeing**	**Human wellbeing**	**Environmental wellbeing**	**Economic wellbeing**
Education and employment	• Providing a range of employment routes and opportunities • Supporting skills development • Supporting social mobility • Educating future consumers on the value of water				
Academic partnerships	• Researching sustainable food energy and water customer behaviours • Supporting post graduate education				
Supporting vulnerable customers	• Connecting 'hard to reach' vulnerable customers to support networks				
Resource efficiency (Resource West)	• Reduced resource use and reduced waste				
Lakeside Leisure	• Increasing access to recreation facilities				
Conservation	• High quality water environments • Biodiverse green spaces				
Regional strategies	• Reduced congestion from road works • Policy changes to reduce water use				
Community engagement	• Connecting individuals to their community Partnerships to resolve community challenges				

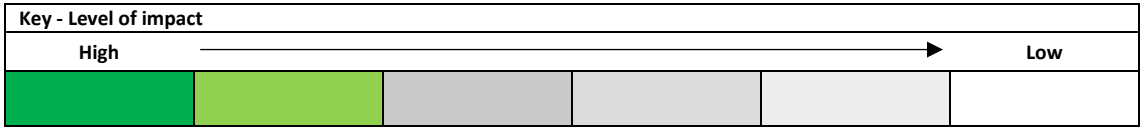
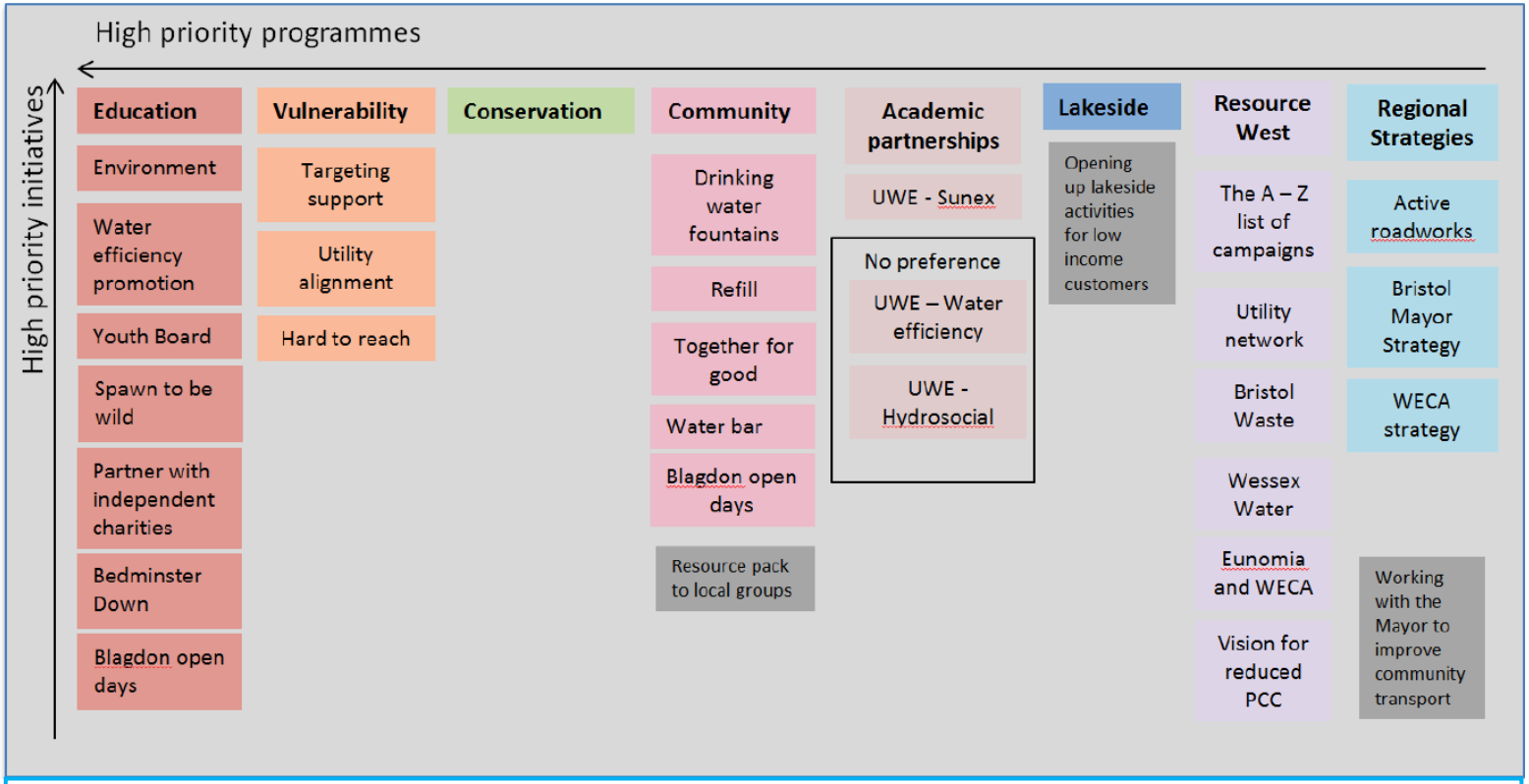


Figure 15:: *Links between initiatives of the Social Contract and benefit to community wellbeing*



Our February 2019 customer forum did not reveal any substantial data on customer's prioritisation of 'Conservation' or 'Lakeside' programmes. We intend to undertake further customer research covering these areas in the near future.

Figure 16:*: Customer forum prioritisation of social contract programmes and initiatives*

12. Appendix 3 - Further detail on our innovation framework

How we use innovation to deliver Resilience

What innovation means to Bristol Water

Bristol Water has a ***strong history of innovation*** and this has had a wider impact on the rest of the industry. We take a structured approach to identifying innovations, supported by a transformation process that helps to implement innovation and realise benefit. We also seek continuous improvement via a daily focus on using innovation to improve our work.

Case Study: Ice Pigging

One of our most influential innovations has been ice pigging, the process of pumping an ice slurry into a pipe to remove sediment and other unwanted deposits. This technique was developed in partnership with Bristol University, and today has many applications in the water sector and is also expanding into other industries such as oil and food manufacturing. Our partnering approach to innovation continues to this day.

Innovation as a core business activity

Innovation is part of our everyday working. All the specialist teams that generate progress and change within our business feed innovations into their design processes, whether that be Asset Management teams looking to make interventions, IT reviewing our digital capabilities, the Customer team seeking to engage customers with the value of water, or our Business Change teams pursuing efficiencies within our processes. We foster this spread of activities across our business, to allow an unhindered and independent approach.

Our Innovation Framework

Our Innovation Framework ensures we put the right building blocks in place to steer and monitor innovation. It also ensures that we foster an innovative corporate culture from the ground up.

We steer and monitor innovation by:

Maintaining clear priorities;

Being aware of innovative ideas by, for example:

- Conducting market scouting against our technology needs assessments
- Relationships with industry bodies such as UKWIR, membership on the GDF Suez Technical Committee
- Running open innovation events with British Water;
- Overcoming barriers to innovation; and
- Ensuring leadership oversight of progress.
- Collectively, these activities help us identify where innovative solutions are required, to invite internal and external ideas and to pilot potential solutions.

We foster a culture of innovation through:

- Partnerships with research organisations, supply chain partners and academics;
- Ensuring that staff have the resources and support to convert innovation into action;
- A network of innovation champions;
- The sharing of our successes; and
- Embedding the customer voice throughout our business, so that innovation focus is responsive to their priorities.

Our innovation framework is another example of our approach to systems thinking. It ensures that we manage innovation holistically across our internal boundaries, company and industry boundaries in order to drive new ways of working. It recognises that innovation does not happen in an industry bubble but in a much larger collaborative ecosystem of academics, entrepreneurs, intrapreneurs (internal innovators) and across our supply chain.

A key part of the innovation framework is our Open Innovation program openly sharing key challenges with this wider ecosystem rather than limiting solution development to just our own research and development capabilities. Our Business Improvement and Innovation team facilitate the strategic focus on the future innovations we pursue through Open Innovation. Our Innovation Challenges add focus to this process and reflect a combination of our four strategic objectives published in Bristol Water… Clearly, and our Technology Needs. Our Technology Needs are assessed through a series of workshops with our asset management teams, to explore where we would most benefit from innovation.

All our innovations are tracked centrally by our Business Improvement and Innovation team to review how we are using innovation to meet our outcomes and strategic objectives, to assess how ambitious we are being, and to understand whether we are successfully bringing ideas to fruition. We produce a regular Innovation Health check to show how we are progressing (see example at the end of this document).

Our **Transformation function** works with our Innovation team, to manage a 'pipeline' of opportunity which could transform our business. The Innovation team is our 'eyes on the horizon', carrying out the initial testing of ideas in line with our business objectives. When these ideas reach a compelling level of maturity they move into the Transformation function for implementation.

Open innovation

Open innovation is the way we share our innovation challenges with the wider community. We do this through a number of channels:

Market scanning: activities we undertake aligned to our technology needs in order to bring forward potential new solutions that we can feed into our business-as-usual asset planning processes.

Innovation events: last year we partnered with British Water to run an innovation exchange which invited a series of innovative suppliers to pitch their solutions to our innovation needs. Those of most promise were taken through to trial, including: a floating work platform to eliminate scaffolding requirements; under pressure pipe inspection technology; and low maintenance, bufferless chlorine and turbidity monitors.

Our website: we publish our innovation challenges on our website to continuously invite potential solutions, not limiting ourselves to specific events such as the innovation exchange.

Co-creation: a new initiative this year, we have established a business incubator, The Workshop, to support start-up businesses that provide solutions which address our innovation challenges. All innovation requires investment, but not all innovations are monetary, and this mechanism provides an effective route for the business to benefit from innovation whilst also contributing to our local economy. It is also an environment that enables failure without penalty, where monetary investments inherently carry more risk and can thereby reduce the opportunity for exploration in pursuit of a return on investment for customers and shareholders. It is a mechanism for us to make our business estate open to early stage innovators in order to accelerate the development and our adoption of their solutions. We incubate businesses that can support the innovation challenges published on our website. The business incubator is not something we do alone and have partnered

with Business West, The West of England Growth Hub and Enterprise Europe Network in order to support us in attracting and supporting the most promising start-up businesses

Examples of our recent innovations include:

Technology for the near-real-time adaptive operation of our networks to improve resilience, leakage and incident management - from our partnership with Imperial College;

The use of Bio-bullets to tackle zebra mussels, which can accumulate in large numbers and clog up filters at our treatment works. The Bio-Bullet has an inner centre that is toxic to mussels, but harmless to other organisms. The mussel-killing chemical is environmentally-friendly and fully approved for use in drinking water treatment.

Pontoons for working over water to reduce health and safety risks - Innovation Exchange;

Robotic process automation to automate repetitive tasks across our business; and

Our pop-up Water Bar, which helps connect communities to water and to reduce use of plastics – winner of the Outstanding Innovation Water Industry Achievement Award.

13. Appendix 4 - Further detail on Water Resources Management Plan

Our 2019 WRMP defines our plan for how we will

manage and develop our water resources to achieve a secure supply of water for our customers in the long term (at least 25 years), with a focus on drought events where available water is at its lowest, and demand at its highest. Preparing our WRMP and then delivering on its conclusions is a key success factor for our corporate outcome of a safe and reliable water supply.

We recognise that preparing our WRMP requires us to consider all the influences on our potential water supplies, and all the factors which affect water demand. We must therefore understand and interact with the systems of stakeholders in our catchments, the role of our regulators, and the preferences and expectations of our customers. Figure 17 illustrates the inputs, processes, and outcomes of our 2019 WRMP, in addition to its fundamental goal and the feedbacks it has with other plans and activities.

Like other open systems, the inputs, processes and feedbacks are not limited to our own organisation. We therefore conduct on-going consultation throughout the WRMP process with our customers and a diverse range of stakeholders including West Country Water Resources, the River Severn Working Group, the Environment Agency, Natural England, Ofwat, Natural Resources Wales, internal drainage boards and the Bristol Water Challenge Panel.

External influences on our WRMP include climate change, population growth forecasts, customer research demographic profiles and water consumption trends. Internal influences include abstraction licence changes and constraints, interconnectivity and capacity of our network infrastructure. The WRMP process considers numerous scenarios to assess the nature of these interdependencies, and to evaluate the most suitable and cost-beneficial means of managing our long-term resilience against drought risk.

Figure 18 illustrates the role of our WRMP in the context of our broader water supply system. It emphasises how the flows of water from source to tap are influenced by equally important flows of information and data between our teams and our stakeholders. It also shows how our physical assets rely on the natural environment and the ways we work with our stakeholders to manage it.

Figure 18 also illustrates the role of our WRMP in helping us to plan for a secure supply of water for our customers in the long term. To manage shorter term supply of safe and reliable water supply, we use other plans and procedures to manage day-to-day operation of our physical infrastructure and our interactions with stakeholders our neighbouring Water companies, the Environment Agency and local authorities to name a few. Feedback between these plans ensures that our systems are managed effectively in the short, medium and long-term, in line with a clear overarching goal. For example, the programme of water resource management actions identified in the WRMP have been used to develop our PR19 business plan, a plan which in turn includes investment proposals for research and investigation to refine and develop our WRMP approach in future years.

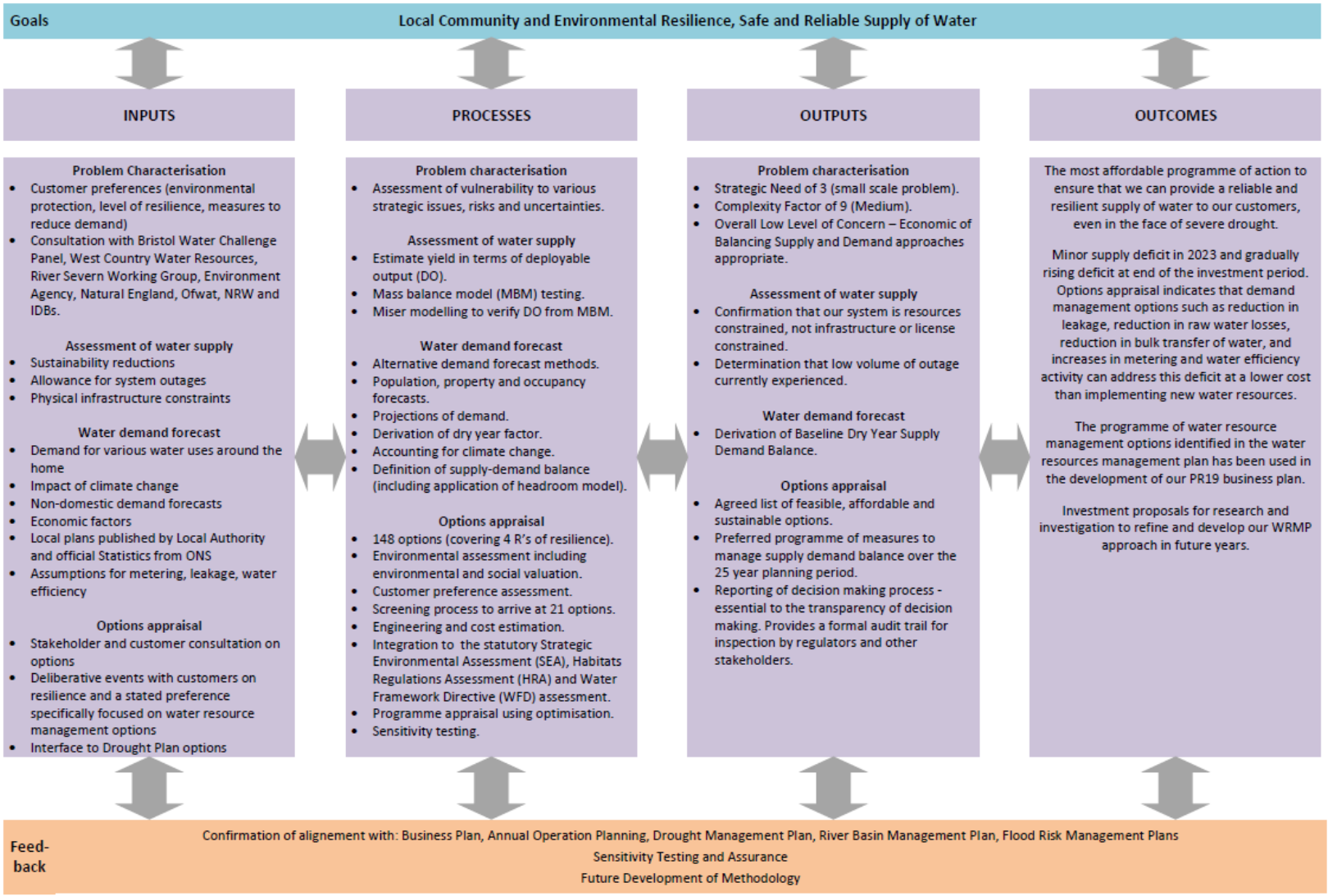


Figure 17: 2019 WRMP inputs, processes, outcomes and outcomes

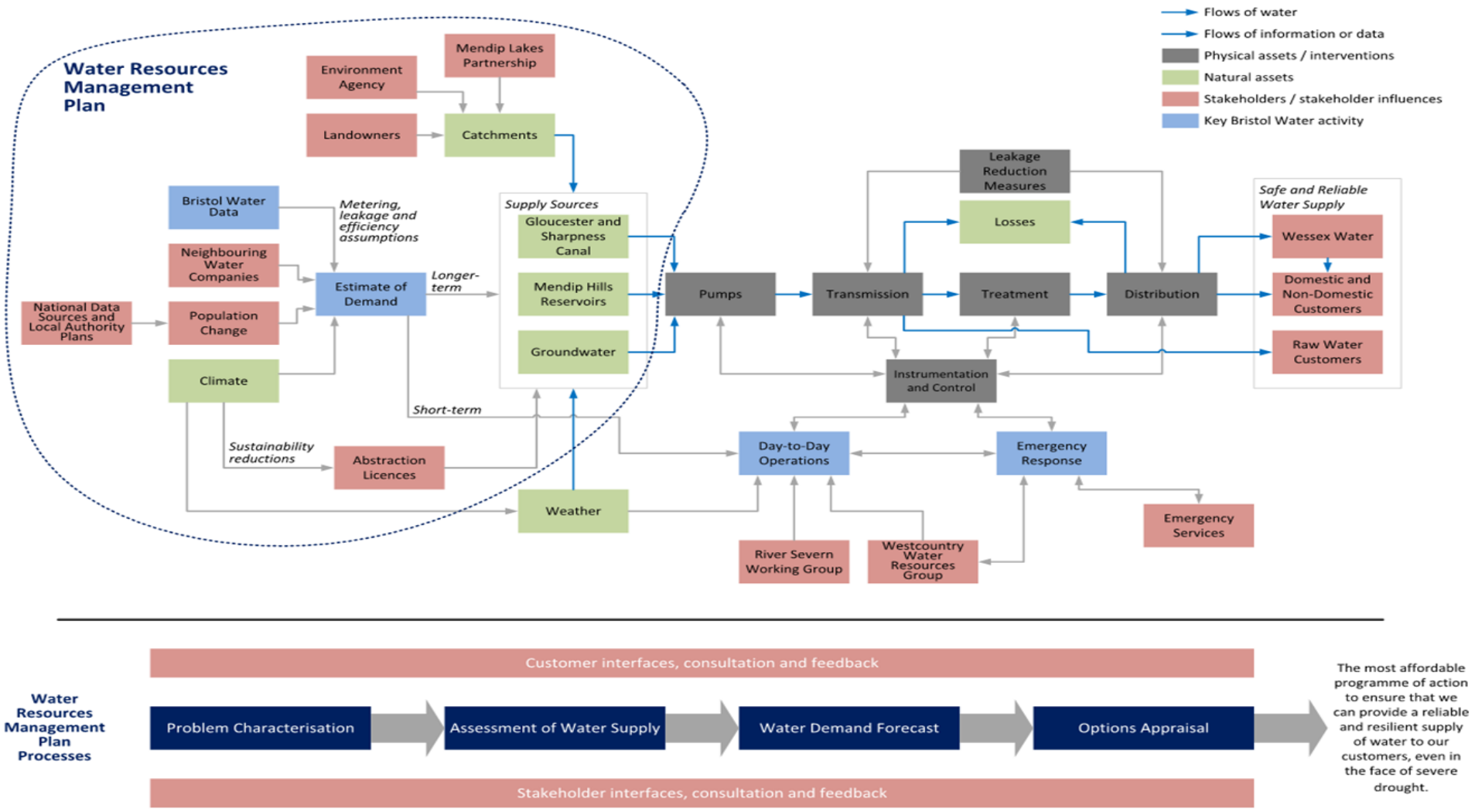


Figure 18: WRMP in the context of our broader water supply system

14. Appendix 5 - Biodiversity Index

Our Biodiversity Index allows us to measure the biodiversity significance of all our sites, in turn enabling us to manage these sites to promote biodiversity value leading to a demonstrable and quantifiable net biodiversity gain.

The Biodiversity Index approach is a significant first step on a path to a full and robust natural capital and ecosystems services approach, of our delivery to our customers. We recognise that natural capital valuation is a principle undergoing significant research and development. We will respond to this evidence base as it emerges and develop our natural capital approach over the AMP7 period, with a view to implementing a new natural capital approach and metric in PR24. This could form an example of a forward looking metric for resilience, something we agree needs collaboration across the industry.

By taking the proactive step to measure and manage biodiversity and the benefits that biodiversity enhancement can bring, we are driving our performance towards greater consideration of biodiversity benefit as an underlying principle in the management of all aspects of our business.

History of the approach

The Biodiversity Index approach began in AMP6 with an initial commitment to create improvement in biodiversity rather than allowing any overall deterioration - and proposals now extend during AMP7 to a quantified numeric benefit (which equates to approximately 5 hectares of improved habitat). Further development of the approach is planned in AMP7, through a strategic company biodiversity action plan and the development of a quantified ecosystems services approach to managing the company's natural assets.

The Biodiversity Index embeds into the thinking behind the activities carried out by the company. For example, during AMP6 this approach has driven changes in management of sites to allow for:

- Greater wildflower cover
- Annual school visits to local tree planting projects and wildlife sensory projects carried out by the company
- Wildlife designed into site management plans
- Engagement with local residents on issues of water efficiency and catchment protection
- Hedge-laying championships
- Over a thousand native species trees planted by local schoolchildren along the length of a new strategic trunk main project.

None of these activities were formally required as part of the company's statutory duties, but in each case these activities present an opportunity to engage with staff, develop customer trust and deliver a real benefit for the environment.

By working closely with local communities and organisations, it has become clear that there are many stakeholders engaged in biodiversity issues - ranging from local landholders, residents' action groups and local charities, through to national charities such as Buglife. These organisations are seeking to find effective ways to deliver environmental improvements and though partnership and participation with the company multiple objectives have been delivered so far in AMP6. The company's participation and partnership in Bristol Green Capital, the Local Nature Partnership, the Mendip Lakes Partnership and many other organisations has enabled the business to build strong relationships with key stakeholders and environmental regulators. Over the AMP6 period the company has established itself within the catchment, building and creating new partnerships. These links have then identified further opportunities for partnership working.

Next steps

Our presence in the local community is extremely strong and Bristol Water is recognised as an important and very active player in the local environment, whether it is establishing the local Mendip Catchment Partnership, supporting one of the UK's most significant bird study sites at Chew Valley lake - where surveys have been on-going for over fifty years - or working with local schools in

the company's award-winning "Spawn to be Wild" eel project, where schools are enabled to keep young eels in specially-managed tanks prior to release at Bristol Water sites as part of the company's endangered species protection programme. Committing to a quantified improvement at these sites, with formal plans to deliver this improvement and engage with the local community on the importance of the local water environment, enables the company to build biodiversity thinking into all aspects of its activities.

This engagement with customers and stakeholders brings multiple benefits to the business. One of the most important of these benefits is with catchment management, where engagement with local landholders can often take time to develop in order to deliver behavioural change to protect water sources. By building links between communities and their local water environment, the importance of management behaviours by all catchment stakeholders is much more straightforward to communicate, whether this is around the use of agricultural chemicals, household water efficiency or changes in farmland management.

Although the biodiversity index approach offers a range of opportunities in embedding a systems thinking approach throughout Bristol Water, we consider that the following may provide the most tangible benefits:

- By developing a quantification of our natural assets, we are able to move towards assessing a full range of ecosystem and social services that our sites and operational activities provide.
- By developing a robust and evidence-based approach to the way we manage and enhance our own sites, we can achieve increased partnership approaches with landholders and key stakeholders in the catchment areas around our water sources.
- By understanding and enhancing the biodiversity of our own sites we gain a better understanding of environmental resilience in the face of climate change.
- By strengthening the links between our business and the community we serve, our customers and stakeholders can become partners in delivering biodiversity benefits away from our own sites through increased habitat quantity, quality and connectivity.
- By engaging with our customers and stakeholders in a partnership approach, our messages on overall water efficiency and the potential need for water-saving behaviour change in the event of drought become more credible and meaningful as the link between the natural environment and human activities will have already been established with our customers.
- By embedding our biodiversity approach into our project management, we can become a trusted partner for regulators and other regulatory stakeholders, enabling a smoother and more flexible approach to planning applications for key projects.
- By having a business that creates quantifiable biodiversity benefits for the environment, we can attract and retain the best employees and deliver the best possible service for our customers.
- By developing evidence to understand direct and indirect benefits of healthy natural assets, we can reduce operational costs and avoid "hard" solutions in cases where a nature-based approach may deliver the same outcome or better.

15. Appendix 6 - ARAC paper on corporate risks

Date	29th November 2018
Meeting	ARAC/Board Meeting – November 2018
Purpose of paper	• To provide the half-yearly update to existing Corporate Risks • To outline newly identified Emerging Risks for discussion and potential inclusion and scoring as Corporate Risks
Authors	Rachel Jordan and Robin Poole

Introduction and Recap of principal risks disclosed in the Annual Report

An intensive period of Board engagement during spring 2018 culminated in identifying the ten principal risks that were disclosed in the Annual Report 2017/18 (by sub-category), which are summarised below.

Corporate Risk Category	Corporate Risk Sub-category	Risk Name	Exec Responsibility	Role holder	Exposure	Risk Appetite	Appetite Adjusted Exposure	Movement
Operations	Health, safety & environment	Severe H&S Accidents	Chief Executive Officer, Asset Management Director	Mel Karam, David Smith	12.0	Lower	14.4	-
		Network Event			10.5	Lower	12.6	-
		Environmental incident during asset construction			10.0	Lower	12.0	-
		Unplanned Site pollution event			10.0	Lower	12.0	-
		Assaults on Staff			10.0	Lower	12.0	2.4
	Customer satisfaction	SIM Score	Chief Customer Officer	Ben Newby	14.0	Moderate	14.0	2.0
	Operational resilience	Leakage Targets	Asset Management Director	David Smith	14.0	Moderate	14.0	3.5
		Strategic Mains Burst			10.0	Lower	12.0	-
	Water quality	Metaldehyde In Raw Water	Director of Strategy and Regulation	Iain McGuffog	12.0	Lower	14.4	-
	Business resilience	Pandemic Disease	Company Secretary, Asset Management Director	Colin Caldwell, David Smith	10.0	Lower	12.0	-
		Loss of GSC			10.0	Lower	12.0	-
		External Events Affecting Key Third Parties			10.0	Lower	12.0	-
		Critical Site Access Denial			10.0	Lower	12.0	-
Corporate	Cyber security and data protection	Cyber Security	Chief Customer Officer	Ben Newby	10.0	Lower	12.0	New risk
		Data Protection	Chief Financial Officer, Company Secretary	Jeremy Rudd, Colin Caldwell	10.0	Moderate	10.0	- 0.8
	Financial resilience	Volatile Material Costs	Chief Executive Officer, Chief Financial Officer	Mel Karam, Jeremy Rudd	10.0	Moderate	10.0	-
Regulatory and Legal	Regulatory and legal environment	Upstream Separation	Director of Strategy and Regulation, Company Secretary	Iain McGuffog, Colin Caldwell	10.0	Moderate	10.0	- 2.0
		Abstraction Reform			9.0	Moderate	9.0	-
		Introduction of HH Competition			6.0	Moderate	6.0	- 6.0
Corporate	HR management (to be reported as Organisational change)	End to end resourcing	HR Director	Geraldine Buckland	10.0	Higher	8.0	- 1.6
Regulatory and Legal	Business planning	Price Review Submission and Process	Chief Executive Officer, Director of Strategy and Regulation	Mel Karam, Iain McGuffog	14.0	Lower	16.8	-

Half Yearly Update to Corporate Risk Register (page 1 of 2)

The corporate risk register has been reviewed in its entirety by risk owners and directors. Risks have been rescored (by likelihood, impact and control effectiveness) and the results presented below, along with the movement in the appetite adjusted exposure of the risk since March 2018.

Risks in bold boxes are those that were disclosed as principal company risks at the year end.

Six emerging risks have been identified as potential new Corporate Risks to be added to the Corporate Risk Register and monitored going forward. These are highlighted in yellow below.

Corporate Risk Category	Corporate Risk Sub-category	Risk Name	Current Risk Scenario	Likelihood	Impact	Control Effectiveness	Exposure (I+L)*C	Appetite Adj. Exposure (I+L)*C*A	Movement since March 18	Principal Risk at March 18
Corporate	**Financial resilience**	Volatile Material Costs	Increased costs for Energy World demand for chemicals remains high. This will drive up prices and decrease availability of materials.	3.0	2.0	2.0	10.0	10.0	0.0	Y
		Fraud	Deterioration of economy and general increase in poverty potentially driving individuals to undertake illegal acts.	1.0	4.0	2.0	10.0	10.0	0.0	
		Balancing competing pressures in organisational strategy	Risk that inefficient solutions proposed as a result of cultural perception of the Company's requirements	2.0	3.0	2.0	10.0	10.0	0.0	
		Shareholder Value Generation	We cannot support expected shareholder dividend with current financing structure	2.0	2.0	2.0	8.0	8.0	0.0	
		Capital Programme Cost Control	Risk of overspending or underspending in delivery of the capital programme.	2.0	3.0	1.5	7.5	7.5	0.0	
		BEPS	BWG (formerly CSE Water) is the highest level of consolidation, and the legislation will affect the whole group. BW have applied for a group PBIE election (had to be applied for before the end of the relevant year end). Subsequently, received clearance from HMRC regarding the potential tainting of the election from the pension asset. However, there has been a change in the legislation over Summer 2018, to confirm that a pension asset which has arisen in the course of business will be treated as a qualifying asset for the legislation. The PBIE is a 5 year election, but the election will need to be reviewed each year to ensure that BWG still meet the conditions of the exemption. It will also need to be reconsidered if there are changes to the group structure. If, the group no longer meet the criteria than the GRR will have to be considered?	4.0	0.0	1.0	4.0	4.0	-1.0	
		Billing & Bad Debt	Customers fail to pay bills.	2.0	2.0	1.0	4.0	4.0	0.0	
		Bank Funding (Short Term)	Not getting as much income as expected.	1.0	3.0	1.0	4.0	4.0	0.0	
		Bank Funding (Long Term)	Market funding dries up	1.0	3.0	1.0	4.0	4.0	0.0	
		Accounting Error	Material error made in accounting or financial control.	1.0	3.0	1.0	4.0	4.0	0.0	
		Pension Scheme Exposure	Assumptions being incorrect	2.0	1.0	1.0	3.0	3.0	0.0	
		Cumulo Rates	The current valuation has been agreed and will increase each year in line with inflation until the next formal review	0.0	0.0	1.0	0.0	0.0	0.0	
		Transformation Delivery	The Transformation programme doesn't succesfully deliver the benefits and efficiencies needed for the AMP7 Business Plan.	3.0	4.0	2.0	14.0	14.0	0.0	
	People management	End to end resourcing	Due to a culture of change, people may become unsettled and therefore there is a risk of losing experienced people. Being able to manage the aspirations of individuals and groups of individuals also provides challenges, requiring strong leadership	2.0	3.0	2.0	10.0	8.0	0.0	Y
		Training	Ineffective training resulting in inadequate skills and knowledge, potentially resulting in claims or attrition	3.0	2.0	1.0	5.0	4.0	0.8	
		Poor Industrial Relations	Dissatisfaction results in strike action as a result of continuous change	1.0	3.0	1.0	4.0	3.2	0.8	
		Capability to Deliver	BW doesn't have the people and capabilities to deliver on our Business Plan objectives as effectively or efficiently as needed.	3.0	3.0	2.0	12.0	12.0	0.0	
	Cyber security and data protection	Cyber Security	Loss of head office data and corporate network as a result of Cyber attack.	2.0	3.0	2.0	10.0	12.0	0.0	Y
		Data Protection Act	Risk of Customer or Employee Database breaches with resulting loss of significant amounts of personal data	2.0	3.0	2.0	10.0	10.0	0.0	
		Loss of IT Systems	Loss of head office data centre through disaster	2.0	3.0	1.5	7.5	9.0	0.0	
		Communication System Loss	Voice: Head Office communication network fails	2.0	1.0	2.0	6.0	7.2	2.4	
	Supply chain management	Contract Failure	A current strategic critical contract is terminated, and cost of new contract is greater than existing contract.	3.0	2.0	2.0	10.0	10.0	0.0	
		Maintaining Strategic Supplies	We have a single supplier for a key chemical who is unable to supply (due to contamination, terrorist attack, force majure etc.)	2.0	2.0	2.0	8.0	8.0	0.0	
		Fuel Supplies	Tanker Drivers' strike exceeds 10 days and company is unable to operate and staff can't get to work	2.0	2.0	2.0	8.0	8.0	0.0	
		Outsourcing of Customer Services (Pelican)	Main risk being scored is a loss or breach of customer data or a major IT failure	2.0	3.0	1.5	7.5	7.5	-2.5	
Operations	**Asset management**	Operational non-infrastructure error	Inappropiate operation valves on process plan. Incorrect chemical dosing regimes. Failure to set up instruments or equipment correctly to define target or trigger values.	3.0	3.0	2.0	12.0	12.0	0.0	
		Quality of Deliverables	The deliverables of the capital programme are not to the required quality and could not necessarily be used as beneficially, economically and effectively as expected after these are handed over to the Company.	2.0	3.0	2.0	10.0	10.0	0.0	
		General condition of the company's estate	A health and safety inccident occuring as a result of weather or activity on our estate e.g. tree falling down	3.0	2.0	2.0	10.0	10.0	-2.0	
		Aged Deterioration (infrastructure assets)	The deliverables of the capital programme are not to the required quality and could not necessarily be used as beneficially, economically and effectively as expected after these are handed over to the Company.	2.0	3.0	2.0	10.0	10.0	0.0	
		Delivery on time	Failure to deliver final determination schemes within AMP	3.0	2.0	2.0	10.0	10.0	2.0	
		Electrical Equipment Condition	A fire in switch gear. Electrocution due to inadequate insulation and potential exposure to asbestos.	3.0	1.0	2.0	8.0	8.0	0.0	
		Aged Deterioration (Non-infrastructure assets)	Customer impact (loss of supply) or prosecution from HSE (Infrigement of regulations or direct result of injury or death), EA and Ofwat.	3.0	2.0	1.5	7.5	7.5	0.0	
	Customer satisfaction	SIM Score	Ofwat - failing to meet ODI target and getting a penalty over the AMP plus the reputational impact, Customers, CC Water, CCG	4.0	3.0	2.0	14.0	14.0	0.0	Y
		Stakeholder Communications	Misleading media, customers, regulators and other stakeholders, leading to adverse reputational effect.	2.0	1.0	2.0	6.0	6.0	0.0	
		Company Non-Restricted Information	Release of sensitive information into the public domain	2.0	2.0	2.0	8.0	8.0	0.0	

Half Yearly Update to Corporate Risk Register (page 2 of 2)

Corporate Risk Category	Corporate Risk Sub-category	Risk Name	Current Risk Scenario	Likelihood	Impact	Control Effectiveness	Exposure (I+L)*C	Appetite Adj. Exposure (I+L)*C* A	Movement since March 18	Principal Risk at March 18
Operations	**Operational resilience**	Strategic Mains Burst	Burst on a large trunk main on high risk location. Eg. Culverts.	5.0	2.0	2.0	14.0	16.8	0.0	Y
		Leakage Targets	Missing Performance Commitment (5-year average leakage value)	4.0	3.0	1.5	10.5	10.5	-3.5	
		Physical infrastructural and non-infrastructure Failure (Third party damage to our assets)	Customer impact (loss of supply) or prosecution from HSE (Infrigement of regulations or direct result of injury or death), EA and Ofwat.	3.0	1.0	2.0	8.0	8.0	0.0	
		Assault/Sabotage on Site	Metal theft (happens in non-critical sites)	3.0	1.0	1.0	4.0	4.8	0.0	
		Transition to New Network Model	Transition to new Network model impacts on operational performance and delivery of targets	3.0	3.0	2.0	12.0	12.0	0.0	
	Health, safety & environment	Network Event - Uncontrolled Discharge/Discolouration	Dewatering of excavation leads to discolouration of local watercourse and complaints registered to Environment Agency. This will lead to costs to the business and potential prosecution	5.0	2.0	2.0	14.0	16.8	4.2	Y
		Severe H&S Accidents	Death. RIDDOR reportable that DID result in a visit from HSE	2.0	4.0	2.0	12.0	14.4	0.0	
		Unplanned Site pollution event	A typical scenario would be where delivery of chemicals to a site by tanker led to damage to the tanker, causing loss of integrity of storage systems (e.g. vehicle collision with above-ground tank)	2.0	3.0	2.0	10.0	12.0	0.0	
		Assaults on Staff	Assault or threat to members of the staff.	3.0	2.0	2.0	10.0	12.0	0.0	
		Unpermitted Routine Discharge	An example would occur if a pumping station has cooling water on site and this is discharged to a local watercourse. If this discharge is not registered with EA then the routine discharge would be required to have an environmental permit.	4.0	2.0	1.5	9.0	10.8	0.0	
		Waste disposal at Stowey	Marginal damage to watersource (Chew Valley lake) as a result of waste disposal at stowey, requiring additional monitoring and change to source use	2.0	1.0	2.0	6.0	4.8	0.0	
		Environmental Compliance	Failure to deliver adequate compliance with statutory requirements of the current NEP or other legal environmental duties.	1.0	3.0	1.5	6.0	7.2	0.0	
		Environmental incident during asset construction	Engineering works damaging protected or not environments	3.0	2.0	1.0	5.0	6.0	-6.0	
	Business resilience	Pandemic Disease	Flu pandemic (or any other event leading to prolonged unavailability of significant numbers of staff or specialists).	2.0	3.0	2.0	10.0	12.0	0.0	Y
		External Events Affecting Key Third Parties	Long term loss of power supplies to major treatments works.	2.0	3.0	2.0	10.0	12.0	0.0	
		Critical Site Access Denial	Fire within Head Office	2.0	3.0	2.0	10.0	12.0	0.0	
		Loss of Gloucester Sharpness Canal	Loss of raw water supply from the Gloucester Sharpness Canal Breach of the canal would result in canal levels falling below abstraction depths. Purton and Littleton TWs would be unable to produce treated water. Potential loss of supply to >200,000 people.	2.0	3.0	2.0	10.0	12.0	0.0	
		Loss of Major Water Source	Major raw water source becomes unavailable long-term e.g. poor raw water quality in impounding reservoir, borehole, river, Sharpness Canal etc. e.g. oil, farm waste entering source or prolonged raised turbidity.	2.0	2.0	2.0	8.0	9.6	0.0	
		Continuity Planning Exceeded	Business Continuity planning preparations are exceeded e.g. prolonged severe winter stretching resources combined with major burst.	2.0	2.0	2.0	8.0	9.6	0.0	
		Dam Burst	Dam burst. Loss of major source - adverse cost impact including unplanned capex. Potential downstream catastrophic damage including potential loss of life.	1.0	5.0	1.0	6.0	7.2	0.0	
		Loss of Treatment Works Output	Pump failure and limited output	1.0	3.0	1.0	4.0	4.8	0.0	
		Operational infrastructural error	Incorrect operation of valves and washouts cauing a major incident. Not following the program correctly.	1.0	3.0	1.0	4.0	4.0	0.0	
		Obsolescence of Mobile Platform	Current mobile working platform becomes obsolete before a replacement can be developed and put in place	2.0	3.0	2.0	10.0	10.0	0.0	
	Water quality	Metaldehyde In Raw Water	BW fails to adequately deal with metaldehyde (Catchment management initiatives within the River Cam catchment area has been very successful in mitigating the risk of increased metaldehyde entering the canal via the River Cam. However, we still see increased levels of metaldehyde coming in to the canal from the lower reaches of the River Severn)	4.0	2.0	2.0	12.0	14.4	0.0	Y
		Water Quality operational risk	Clevedon incident reflected good test of operational responses. Loss of operational headroom due to effectiveness of maintenance regime also tested through managing nitrates at Purton.	3.0	3.0	1.0	6.0	7.2	-3.6	Y
		Treatment Chemical Delivery	Incorrect chemical delivery that leads to major media coverage	2.0	4.0	1.0	6.0	7.2	0.0	Y
		Cryptosporidium Contamination	Potential for failure of barrier plants or other filtration / coagulation systems. Damage to stored water structures allowing ingress of the protozoa or animals know to be vectors. Potential for inappropriate operation, or failure, of treatment processes.	1.0	4.0	1.0	5.0	6.0	-1.2	Y
	Water resources	Climate Change	Recent observations indicate that climatic risks (e.g. harsh winters, extremes of temperature / rainfall) are becoming more frequent, but this is uncertain. This could lead to deliberation and delay (Government, regulator, industry and Bristol Water) in funding / investing in systems and infrastructure to manage climate change impacts. Public expectation that our systems have 100% resilience (which they don't).	2.0	3.0	2.0	10.0	10.0	0.0	
		Drought	A drought more severe than the drought of 1933/34 (near failure of system)	1.0	4.0	1.0	5.0	5.0	0.0	
		Flooding of Assets	Flooding of critical BW sites and assets could lead to impossibility of operating processes or repairs which would effect the business continuity	2.0	2.0	1.0	4.0	4.0	0.0	
Regulatory and Legal	**Regulatory and legal environment**	Abstraction Reform	DEFRA reform proposals reduce the availablility of water to us and/or increases our underlying cost base. EA Hands off flows for River Severn due to increased pressure from North West to South East Water Trading. Outcome from water resource investigations in 2022. This has reduced with Severn management and transfer direct from Wales. Although NIC has proposed greater national transfers and EA/Ofwat will support this approach, the main focus is on regional strategies through the West Country Water Resources Group.	4.0	2.0	1.5	9.0	9.0	0.0	Y
		Upstream Separation	Ofwat have introduced separate price controls for water resources for PR19. Ahead of this companies allocate RCV separately into the water resources and network plus elements of the business. However the business plan has no new water resource expenditure, but bidding framework for leakage and network plus applies during 2018. Bid Assessment Framework published and being used in contracting.	3.0	2.0	1.5	7.5	7.5	-2.5	
		Introduction of HH Competition	The introduction of retail competition for domestic customers introduces costs that are not covered by revenues, and increases BW's wholesale costs going forward.	1.0	3.0	1.5	6.0	6.0	0.0	
		Unacceptable business risk arising from the regulatory framework	Receiving an unacceptable determination due to the PR19 plan process	3.0	3.0	2.0	12.0	12.0	0.0	
	Business planning	Price Review Submission & Process	Receiving an unacceptable determination at PR19	3.0	4.0	1.5	10.5	12.6	-4.2	Y
	Regulatory and legal compliance	Contractual Breaches	Uncapped damages claims from breach of contract where we have obligations which are material to the timing and scope of the contract which we do not fulfill (act or omission).	2.0	3.0	2.0	10.0	10.0	0.0	
		Charges and Tariffs	Tariffs for customer or wholesale charges incorrectly set resulting in underfunding of business, or over-collection of revenue from customers - resulting in adverse PR and regulatory consequences.	2.0	3.0	2.0	10.0	10.0	0.0	
		Incorrect Regulatory Data Provision	This risk relates to mis-reporting of company performance data in the Annual Performance Report, either accidentally or deliberately. This would result in a range of regulatory action by Ofwat, dependent on the severity of the issue. This could include fines or investigations into the company. More minor contraventions are recognised through Ofwat's Company Monitoring Framework (CMF) which provides a view on the quality of the Company's reported data and assurance. Bristol Water is currently in the lowest "prescribed" status in this framework.	3.0	3.0	1.5	9.0	9.0	-1.5	
		Competition Law Breaches	Medium case scenario - referral to CMA, finding in our favour, no adverse PR.	3.0	3.0	1.0	6.0	6.0	0.0	
		Sensitive Information Leakage	Unauthorised access to, or leaking of sensitive information. Event involving inadvertent non-compliance with regulations becomes public knowledge before reporting to regulator. Whistle-blower. Theft of laptop or memory stick containing security data or operational plans and drawings.	1.0	3.0	1.5	6.0	6.0	0.0	
		Maintaining adequate procedures under the Bribery Act	Facilitation payments & Supply Chain - complaint made to SFO, there would be an investigation against the individual and the company, prosecuted via the corporate act.	2.0	1.0	1.0	3.0	3.0	0.0	
		Developers' Contributions	Providing incorrect financial terms to developers or SLPs.	3.0	2.0	1.0	5.0	5.0	0.0	
		CRT Arbitration	Failure to reach a CRT arbitration settlement that is in the best interests of Bristol Water (i.e. a settlement which is equal or less than our current annual payments of c. £1.8m)	3.0	4.0	2.0	14.0	14.0	0.0	

Risks that have been scored more favourably, i.e. the appetite adjusted exposure score has decreased are as follows with key reasons:

Risk Name	Appetite Adjusted Risk Exposure	Movement since March 18	Commentary on Current Score	Current Action Plan
BEPS	4.0	- 1.0	BWG will qualify for the PBIE which should mean that there is adverse impact on the corporation tax charge. The interest on the shareholder loans are already caught by the anti-hybrid tax rules; will need to review any changes to the shareholder loans and the impact going forward.	No change
Outsourcing of Customer Services (Pelican)	7.5	- 2.5	DR tested twice a year and Wessex IT provide all cyber security services. Comms network failure in Feb proved DR capability in place although not needed. GDPR compliance now signed off and completed as required for the introduction for the new legislation	Annual DR testing plan to cover system risk Cyber security annual review and actions to cover data breach. GDPR activity signed off following Pelican Board in April and completed as required for the introduction for the new legislation
General condition of the company's estate	10.0	- 2.0	Impact level of risk has been reassessed as it is unlikely that national media coverage would occur if the risk were the materialise. This has been downgraded to regional media coverage possible.	No change to action plan -maintenance requirements continue to be identified and funds are allocated on a risk base approach. A proactive scheduled maintenance programme is in place.
Environmental incident during asset construction	6.0	- 6.0	Completion of SRS without incident means that the principal engineering risk period for AMP6 has passed without significant event	Ongoing toolbox talks to communicate key issues to operators, site waste management plans for key projects producing large amounts of waste, structured environmental surveys and habitat surveys including protected species and heritage/archaeology. BW Environment Manager acts as key point of liaison for schemes and works with contractor environmental teams to deliver projects within environmental constraints.
Leakage Targets	10.5	- 3.5	A significant number of controls are in place through a framework of Leakage Streategy and Leakage Delivery. These interventations have already resulted in reduction in leakage. However the impact of these interventions have been adversly affected by a number of weather related events.	- The leakage strategy and delivery plan for 2018/19 and 2019/20 has been implemented to target leakage levels for the remainder of AMP6 - Clear view on the various target leakage levels (ODI and Actual) to be achieved and monitored through KPI reporting. - Deployment of dedicated leakage control manager with repsonsibility of Active Leakage Control. - Improvement to reporting and a suit of periodic performance reports - Leak repair improvements achievedby setting up dedicated teams to reduce the number of outstanding leak repairs(Intelligent Client model) - - Deployment of additonal leakage control staff in key areas; leakage inspectors - Purchasing of addtional logging equipment to improve the location of leaks. - Increase planned leavle of mains for replacement based on burst frequency
Cryptosporidium Contamination	6.0	- 1.2	Clevedon is out of service and will not be returned to service until UV is installed as a mitigation against the Crypto risk	The controls have shown to be effective, with Clevedon TW out of supply until mitigation in place - likely UV (revised medium risk in DWSP). One other supply has similar lack of crypto protection
Water Quality operational risk	7.2	- 3.6	The revised structure has now been embedded into normal day-to-day activities. Consequently , although there is and always will be an ongoing increased risk that operator action/inaction or error could cause a Water Quality issue this is being managed as 'Business as Usual'	Tight controls in place with regard operation of the Network and monitoring of customer contacts. Automated alarms in place at treatment works to indicate when problem has occurred and allow remedial actions. Changes to operating regime to be considered carefully in DWSPs
Price Review Submission & Process	12.6	- 4.2	The PR19 business plan was submitted in September 18 and an initial assessment of company plans will be published on 31 January 2019. The impact and likelihood score are unchanged, reflecting that the inherent uncertainty remains. However, the submission of the plan, PWC and other external opinion on its quality, and the effective engagement with Ofwat (and low number of queries), are reflected in an improvement in the confidence in the controls. The external context of the review is challenging, which might indicate an increase in likelihood, but until the IAP is received this is balanced by assessment compared to other company plans.	The PR19 action plan successfully delivered what all indications suggest are a high quality plan to Ofwat, and one reflect a stretching ambitious plan, but deliverable based on the planned transformation. Scenario planning in advance of the IAP assessment from Ofwat will be used to develop the future action plan, but currently the programme is clearly managing the uncertainty.
Incorrect Regulatory Data Provision	9.0	- 1.5	The risk is decreasing as a result of improvements in data reporting; 1. Expanding on the information we include within our financial viability statement. 2. Expanding the scope of our technical auditors, Atkins, to require them to audit our underpeformance penalties and outperformance payment calculations. 3. Expanding on the informaiton included with our Compliance with Principles of board Leadership, Transparency and Governance, particualrly on our directors' renumeration and group structure. 4. Including information from our technical auditor within the Risk & Compliance Statement. 5. Clearly identifying and explaining the planned assurance actitivities needed to address our targeted risk areas in our Assurance Plan. 6. Including further information within our Data Assurance Summary about the outcome of our targeted assurance activities 7. Publishing a new interactive performance graphic 8. Working with Ofwat and the Bristol Water Challenge Panel to agree improvements to the outcome definitions we report against In addition, only minor queries were received from Ofwat following submission of the 2017/18 APR; this suggests we are likely to receive good results in the Company Monitoring Framework 2018 (due to be released in January 2019). However, we will review the control confidence only once the mid-year report conclusion, given the exceptions to the Risk & Compliance statement on SIM and GSS, and the external focus on our complaint levels.	The Economic Regulation team are currently undertaking the mid-year performance report. The lessons learned from this process will form the basis of an action plan for reporting in next year's APR.
Upstream Separation	7.5	- 2.5	Ofwat accepted the RCV allocationand the Bid Assessment framework has been published.	The bidding framework has been developed and is integrated into the approach to future contracting.

Risks that have been scored less favourably, i.e. the appetite adjusted exposure score has increased are as follows with key reasons:

Risk Name	Appetite Adjusted Risk Exposure	Movement since March 18	Commentary on Current Score	Current Action Plan
Communication System Loss	7.2	2.4	Backup systems regularly tested. However, if there is a telephony failure due to a cable strike there is limited mitigation in place at this time. As recovery site and Head Office are supplied by same cable.	Investigating routing SIP traffic into alternate site and routing over existing network into Barrow
Poor Industrial Relations	3.2	0.8	New union representatives have seen a different dynamic with members that require a greater level of support from within the business to achieve collaboative approaches and maintain our union partnership good practice ensuring continued belief that the likelihood of strike action is low	Continue to deliver union partnership model
Training	4.0	0.8	Some core issues remain, namely the positioning and support of line managers around course profile and attendance, although this is seeing improvements. Need to move to more proactive stance on training (particularly Stat / Man), work underway to achieve this aim over the coming months.	Continue with identified actions
Delivery on time	10.0	2.0	Delivery of SRS is one outcome of the Final Determination and its completion does not significantly reduce the risk of the overall programme not being achieved: all outcomes need to be achieved.	Ongoing programme monitoring
Network Event - Uncontrolled Discharge/Discolouration	16.8	4.2	Minor increase in perceived risk during changeover of Kier network maintenance	Set up toolbox talks for operational staff, to be delivered by Environment Manager. Engage more closely with network transformation team on pollution risks

Emerging Risks

The following risks have been identified as new corporate risks and will be added to the corporate risk register and monitored going forward.

Corporate Risk Category	Corporate Risk Sub-category	Risk Name	Current Risk Scenario	Likelihood	Impact	Control Effectiveness	Exposure (I+L)*C	Appetite Adj. Exposure (I+L)*C*A
Corporate	Financial resilience	Transformation Delivery	The Transformation programme doesn't succesfully deliver the benefits and efficiencies needed for the AMP7 Business Plan.	3.0	4.0	2.0	14.0	14.0
	People management	Capability to Deliver	BW doesn't have the people and capabilities to deliver on our Business Plan objectives as effectively or efficiently as needed.	3.0	3.0	2.0	12.0	12.0
Operations	Operational resilience	Transition to New Network Model	Transition to new Network model impacts on operational performance and delivery of targets	3.0	3.0	2.0	12.0	12.0
	Business resilience	Obsolence of Mobile Platform	Current mobile working platform becomes obsolete before a replacement can be developed and put in place.	2.0	3.0	2.0	10.0	10.0
Regulatory and Legal	Regulatory and legal environment	Unacceptable business risk arising from the regulatory framework	Receiving an unacceptable determination due to the PR19 plan process	3.0	3.0	2.0	12.0	12.0
	Regulatory and legal compliance	CRT Arbitration	CRT arbitration dispute has a significant on-going financial impact on the company.	3.0	4.0	2.0	14.0	14.0

16. Appendix 7 - Capital Investments – Line of sight to outcomes

		Performance Commitment measures that are a good indicator of resilience															
Capital Investment contribution towards achieving target	47%	81%	100%	81%	100%	89%	0%	69%	100%	36%	0%	0%	0%	27%	77%	13%	100%
	Percentage contribution to the capital element of performance improvement																

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
01.001.02	Trunk Mains	Pipe Bridge H&S Improvements	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing in our trunk mains provides multiple benefits in service performance for our customers. We improve the quality of our water as well as reducing supply interruptions to customers. This improves our**
01.001.03	Trunk Mains	Isolation valve replacement on Pucklechurch-Willsbridge main	0%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.001.04	Trunk Mains	Isolation valve replacement on Purton-Pucklechurch main	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.001.08	Trunk Mains	Slipline 7" Ashley Road Roundabout to Greenbank Cemetery	2%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
01.001.14	Trunk Mains	Slipline 24" Chase reservoir to Lodge Road	49%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**service and operational resilience, leading to the outcomes of safe and reliable supply of water.**
01.001.16	Trunk Mains	Slipline 10" Speedwell Road to Rose Green Road	22%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.001.17	Trunk Mains	Slipline 15" Speedwell Road to Rose Green Road	26%	0%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.001.20	Trunk Mains	Hotwells tunnel pipework and thrust restraint improvement works	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.001.21	Trunk Mains	Install Leakage Monitors at 25 locations where trunk mains cross railway lines	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.002.04	Trunk Mains	Wayleave Management	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.002.05	Trunk Mains	Exceptional Sites	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
01.002.07	Trunk Mains	Hydrant Replacement	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Multiple	Distribution Mains (Inc. DOMS)	Replacement/Refurbishment of 87.5km of mains pipe	0%	0%	5%	95%	0%	34%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing in our distribution mains will result in an improved level of performance in relation to our supply interruptions**
02.003.01	Distribution Mains (Inc. DOMS)	Replacement of loose jumper hydrants with through flow hydrants on large diameter mains	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
02.005.02	Distribution Mains (Inc. DOMS)	Planned customer mins lost reduction	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**and mains burst frequency. There will also be a benefit in relations to contacts about the appearance of our water. All of which lead to an improved operational and service resilience delivering a safe and reliable supply of water.**
14.001.01	Distribution Mains (Inc. DOMS)	Current DOMS Programme (100 WWMD per year=500 WWMD total)	0%	0%	0%	0%	0%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
04.001.01	Treated Water Pumping Stations	Barrow Backwell Hill - Refurbishment	0%	1%	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%	2%	0%	0%	**Investing in our treated water pumping stations will result in an improved level of performance in relation to our supply interruptions, properties at risk of low pressure and unplanned maintenance. Improving this performance level provides us with**
04.001.02	Treated Water Pumping Stations	Beggar Bush PS - Replacement	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	3%	0%	0%	
04.001.05	Treated Water Pumping Stations	Dry Hill PS - Replacement	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	1%	0%	0%	
04.001.06	Treated Water Pumping Stations	Tetbury (Tower and High Lift) PS - Refurbishment	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	6%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
04.001.08	Treated Water Pumping Stations	Purton High Lift PS Resilience	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	**more operational and service resilience. All of which lead to the outcome of a safe and reliable supply of water.**
04.002.01	Treated Water Pumping Stations	PS Base Maintenance (Minor Works)	0%	1%	0%	0%	0%	0%	0%	0%	0%	47%	0%	0%	0%	0%	12%	0%	0%	
06.001.01	Bulk Meters and PRVs	MCERT Meter Installations	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Enhanced accuracy of our effluent flow (MCERT2) meters will contribute to monitoring the efficiency of our treatment works, and ensure that in complying with Environment Agency discharge conditions we are safeguarding the water quality of our lakes and rivers. leading to our outcome of Local and Community Resilience.**
06.001.02	Bulk Meters and PRVs	Bulk Meter Replacement Programme	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Will improve the outcome of local community resilience by reducing leakage levels. Improving our service resilience.**

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
07.002.01	Customer Meters	Continue meter options programme	0%	0%	0%	0%	0%	0%	0%	65%	0%	0%	0%	0%	0%	76%	0%	0%	0%	**Improves our ability to meet supply and demand challenges now and into the future by reducing personal consumption levels (PCC). Leading to service and operational resilience delivering the outcome of local community and environmental resilience.**
07.003.01	Customer Meters	Continue selective metering on change of occupancy programme	0%	0%	0%	0%	0%	0%	0%	19%	0%	0%	0%	0%	0%	22%	0%	0%	0%	
07.004.01	Customer Meters	Testing programme for large commercial meters >60mm	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
07.006.01	Customer Meters	Replacement of Customer Meters	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
11.001.01	New Development	New Development Expenditure	0%	0%	0%	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
08.001.02	Network Ancillaries	Nurseries - Lead CP Replacement	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing in our network ancillary assets will result in improved performance in relation to our leakage and water quality compliance. This will lead to improved operational and service resilience, delivering our outcome of local community and environmental resilience and a safe**
08.001.06	Network Ancillaries	Lead CP replacement-maintenance or other (Inc. customer driven and in conjunction with new supplies).	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
08.001.07	Network Ancillaries	Lead communication pipes replaced for quality (where lead > 8 microg/l)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
08.002.01	Network Ancillaries	Replacement of Stop Taps	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
																				and reliable supply of water.
09.001.01	Network Monitoring	Install increased network monitoring over AMP7	0%	13%	3%	4%	0%	6%	0%	0%	0%	22%	0%	0%	0%	1%	0%	0%	0%	**Investing in network monitoring assets leads to improved performance in many areas. It allows us to become more proactive in our management of our assets and as a result improves our operational and service resilience. Leading to delivery of the safe and reliable supply of water and the local community and environmental resilience outcomes.**
09.001.03	Network Monitoring	Install pilot trial of 240 transferable noise loggers over 30km of distribution main	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
10.001.02	Leakage	ALC to Reduce Leakage by 15%	0%	0%	23%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing and taking action to improve our leakage performance will result in an**
10.001.03	Leakage	Pressure Management	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
10.001.04	Leakage	All other areas (Capex)	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**improved level of operational and service resilience leading to delivery of the local community and environmental resilience outcome.**
10.001.05	Leakage	Leak Stop (Customer side leak repair (supply pipes))	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
100.002.03	Base Maintenance	Base Maintenance - Infrastructure - Network Analysis	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**To achieve reliability of our infrastructure assets we invest in our communication pipes; each property has a single feed from our mains infrastructure pipes and therefore has zero redundancy. Although we respond quickly and recover our customer's supplies in a unplanned situation we also consider investing to offset further deterioration of this asset cohort is required.**
100.002.05	Base Maintenance	Base Maintenance - Infrastructure - Communications Pipes	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
100.002.06	Base Maintenance	Base Maintenance - Infrastructure - Mains and Communication Pipes: Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
100.003.01	Base Maintenance	Base Maintenance - Non-Infrastructure - M&E	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**We operate an integrated network of assets coupled with redundancy designed into our non infrastructure sites. Redundancy along with the resistance provided by the nature of assets we have installed for example telemetry and the maintenance regimes we deploy have historically resulted in very few failures that would lead to loss of output which would impact the outcome of a safe and reliable supply of water to our customers. We need to continue to invest in our assets in order to maintain this track record.**
100.003.02	Base Maintenance	Base Maintenance - Non-Infrastructure - Treatment Works Civils	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
100.003.03	Base Maintenance	Base Maintenance - Non-Infrastructure - Service Reservoir Inspections	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
20.001.01	Water Resources	Water Resource Management Investigations	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Regular inspection of our water**

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
20.002.02	Water Resources	Large Raised Service Reservoirs Proactive and Statutory Maintenance (S10 & S12)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**resource assets ensures that we deliver operational and service resilience.**
20.002.04	Water Resources	Large Raised Service Reservoirs Statutory Inspections	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
20.002.05	Water Resources	Large Raised Raw Water Reservoirs Statutory Inspections	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
20.002.99	Water Resources	Large Raised Raw Water Reservoirs Proactive and Statutory Maintenance (S10 & S12)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
20.003.02	Water Resources	Appointed Lakeside Recreations Works - Regulatory Requirements Only	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
20.003.03	Water Resources	Appointed Lakeside Recreation Works - Non Regulatory Elements	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
21.001.02	Raw Water Distribution	Blagdon to Says Lane Data Collection and Studies.	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing in studies to gather data to support our long term strategies leads to improved operational and service resilience over the long term.**
21.001.03	Raw Water Distribution	Axbridge to Barrow Data Collection and Studies.	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
22.001.20	Raw Water Pumping Stations	Axbridge PS - Barrow Zone Refurbishment	0%	0%	0%	0%	21%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	**Investing to improve our unplanned outage**

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
																				performance results in improved operational and service resilience. Leading to delivery of the safe and reliable supply of water.
24.001.01	Treatment Works Strategic Maintenance	Alderley TW WSZ401 plumbosolvency control - Orthophosphoric Acid Dosing	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**To a large extent we operate an integrated network of assets coupled with redundancy designed into our water treatment works. Redundancy along with the resistance provided by the nature of assets we have installed for example telemetry and the maintenance regimes we deploy have historically resulted in very few failures that would lead to loss of output which would impact the outcome of a safe and**
24.001.10	Treatment Works Strategic Maintenance	Cheddar Tw raw water deterioration trials extension	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
24.006.07	Treatment Works Strategic Maintenance	Stowey Ozone Plant Refurbishment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	21%	0%	0%	
24.008.01	Treatment Works Strategic Maintenance	Alderley TW cryptosporidium barrier plant - fit new membranes and increase capacity to 7Ml/d	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%	0%	
24.008.04	Treatment Works Strategic Maintenance	Chelvey TW cryptosporidium barrier plant - fit new membranes for existing 20Ml/d capacity;, Chemical tank replacement, softener tank removal & waste collection containment.	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	17%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
24.010.06	Treatment Works Strategic Maintenance	Banwell TW Unvalidiated UV Plant - Cover SSFs and decommission LL pumping station and UV treatment.	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	0%	0%	**reliable supply of water to our customers. We need to continue to invest in our assets in order to maintain this track record.**
24.010.08	Treatment Works Strategic Maintenance	Banwell Membrane Replacement	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
24.012.02	Treatment Works Strategic Maintenance	Purton High Lift PS 11kV System Safety and Refurbishment	0%	0%	0%	0%	37%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
25.001.02	ICA and Telemetry	Obsolete PLC & Telemetry Replacement	0%	0%	0%	0%	36%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing in our telemetry and control systems leads to improved service levels of unplanned outage and supply interruptions. Resulting in improved operational and service resilience. This leads to the outcome of providing our customers with a safe and reliable supply of water.**

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
31.001.01	Resilience	Whitchurch to Stowey 21" improvements	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	**Investing to protect our customers from low likelihood, high consequence events. Leads to improved operational and service resilience. Delivering the outcome of a safe and reliable supply of water.**
31.001.02	Resilience	Forum to Millmarsh replacement	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
31.003.03	Resilience	System Resilience Analysis	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
31.003.04	Resilience	Critical Pipe Resilience > 10k, 50% delivered in AMP7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	80%	
31.003.04-S1	Resilience	Well to Glastonbury/Street new main (incorporated within intervention 31.003.04)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	
32.001.01	IT	A Configured Asset Maintenance Regime	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Out IT investment improves our operational and service resilience. During AMP6 we have invested in our cyber resilience . All of our AMP7 investment puts the customer at the heart of our investment. This will lead to improved corporate resilience.**
32.001.02	IT	A Proactive IT Service Desk	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.03	IT	An Integrated Procurement Experience	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.04	IT	Asset Data Collection Framework	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.05	IT	Business Process Automation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
32.001.06	IT	Capital Delivery Support	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.07	IT	Communications and Networking	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.08	IT	Consistent User Experience on a Consolidated Set of Devices	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.09	IT	Consolidated Asset Mapping Information	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.10	IT	Effective Collaboration & Knowledge Management	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.11	IT	Effective IT to Deliver Enterprise Information Mgmt	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.12	IT	Effective Organisation & Knowledge Management	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.13	IT	Efficient Energy Usage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.14	IT	Enable Big Data Analytics	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.15	IT	Enhanced Field Force Toolsets	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
32.001.16	IT	Enhanced Interaction with Suppliers	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.17	IT	Enhanced Interaction with Third Parties	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.18	IT	Enterprise Document Management	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.19	IT	Extended Customer Contact Channels	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.20	IT	Externally Presented Operational Updates	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.21	IT	Governance for Effective Enterprise Information Mgmt	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.22	IT	In-depth Customer Analytics	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.23	IT	In-Field Operational Support	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.24	IT	Internally Integrated Applications	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.25	IT	Maintain & Upgrade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
32.001.26	IT	Operating Systems Refresh	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.27	IT	Outage & Risk Assessment Solution	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.28	IT	Provide a Seamless, Uninterruptable Service	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.29	IT	Retail Market Competition Enhancements	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.30	IT	Single View of the Customer	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.31	IT	Streamlined Accurate and Timely Reporting	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
32.001.32	IT	Water Resource Market Participation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.001.01	Management and General (Inc. Production Buildings)	Offices & Depots Remedial Work	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Much of the investment in our management and general investment case aims to offset an increase in risks to us as an organisation. This will lead to us maintaining our**
33.001.02	Management and General (Inc. Production Buildings)	Company Buildings Refurbishment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
33.001.03	Management and General (Inc. Production Buildings)	Office Equipment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**level operational and service resilience.**
33.001.04	Management and General (Inc. Production Buildings)	Wellbeing (Kitchens/toilets/washing facilities	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.002.01	Management and General (Inc. Production Buildings)	Transport & Plant Purchase & Adaptation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.01	Management and General (Inc. Production Buildings)	Health And Safety General	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.02	Management and General (Inc. Production Buildings)	Health And Safety Active Fire Prevention	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.03	Management and General (Inc. Production Buildings)	Health And Safety Asbestos Removal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
33.003.04	Management and General (Inc. Production Buildings)	H&S Working at Height Improvements	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.05	Management and General (Inc. Production Buildings)	H&S Confined Spaces	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.06	Management and General (Inc. Production Buildings)	H&S Chemical Plant	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.07	Management and General (Inc. Production Buildings)	H&S Electrical Safety	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.08	Management and General (Inc. Production Buildings)	H&S Hazard Rectification	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.003.09	Management and General (Inc. Production Buildings)	Live Spares and Training Centre	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
33.004.01	Management and General (Inc. Production Buildings)	SEMD (1 - ALL) (previously Reservoir Cover Alarms Upgrade)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.005.01	Management and General (Inc. Production Buildings)	River Reg Control Gates	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.005.02	Management and General (Inc. Production Buildings)	ISO 50001 (continuous efficiency Initiatives)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.005.03	Management and General (Inc. Production Buildings)	ISO 14001: Environmental Management System	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.005.04	Management and General (Inc. Production Buildings)	Project Work - Next PR24	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.005.05	Management and General (Inc. Production Buildings)	Drought Baseline Monitoring; Drought Plan development	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
33.005.06	Management and General (Inc. Production Buildings)	Water Resources Management Plan development	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.006.01	Management and General (Inc. Production Buildings)	Business Improvements & Innovation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.007.01	Management and General (Inc. Production Buildings)	Benefits Portal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
33.007.02	Management and General (Inc. Production Buildings)	Cascade Upgrades	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
26.001.01	Management and General (Inc. Production Buildings)	Building Maintenance Base Expenditure	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
26.001.02	Management and General (Inc. Production Buildings)	Major Repairs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
26.002.01	Management and General (Inc. Production Buildings)	Asset Data Survey and Update	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
26.002.02	Management and General (Inc. Production Buildings)	Annual condition surveys	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
34.001.01	Environment	Abstraction Investigations & Options Appraisals	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing in our environment results in an improvement on our raw water quality of sources as well as improving our biodiversity index. This supports the offsetting the impact of climate change and a degrading environment leading to operational and service resilience providing the outcome of local community and environmental resilience.**
34.001.02	Environment	Adaptive Management of Flows & River Restoration	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%	
34.001.03	Environment	Eel Protection	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	0%	
34.001.04	Environment	Invasive Species & Biosecurity Investigations	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%	
34.001.05	Environment	Recreational Transfer of Invasive Species - Management Implementation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%	0%	
34.001.06	Environment	Strategic Biodiversity Action Plan	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	38%	0%	
34.001.07	Environment	Catchment Management Delivery (Regulatory)	0%	0%	0%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	

Intervention ID	IC Title	Description	Water quality compliance % contribution	Supply interruptions % contribution	Leakage % contribution	Mains Bursts % contribution	Unplanned outage % contribution	Appearance contacts % contribution	Taste-Odour % contribution	Meter penetration % contribution	Raw water quality of sources % contribution	Properties at risk of receiving low pressure % contribution	Energy Efficiency % contribution	Waste Disposal Compliance % contribution	WTW Turbidity % contribution	Per Capita Consumption % contribution	Unplanned maintenance – non-infrastructure % contribution	Biodiversity index % contribution	Population at Risk from Asset Failure % contribution	Resilience Impact
34.001.07-1	Environment	Catchment Management Delivery (Regulatory) - METALDEHYDE ONLY	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
34.001.08	Environment	Catchment & Water Quality Investigations	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
34.001.09	Environment	Riparian Habitat & Reed bed investigations	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	31%	0%	
34.002.01	Environment	Catchment Management - Blagdon & Chew	0%	0%	0%	0%	0%	0%	0%	0%	68%	0%	0%	0%	0%	0%	0%	0%	0%	
03.003.01	Service Reservoirs and Towers	Service Reservoir Inspections	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**Investing in studies to gather data to support our long term strategies leads to improved operational and service resilience over the long term.**
		Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**0%**	**100%**	**100%**	**100%**	**0%**	**0%**	**0%**	**100%**	**100%**	**100%**	**100%**	

17. Appendix 8 - Action Plan aligned to Resilience Frameworks

Action	Timeframe	Responsibility	Objective	Maturity Improvement Category	ICIF Focus Area	Bristol Water Resilience Pillar				Ofwat Resilience Planning Principles						
						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Ensure effective organisational leadership to encourage long-term planning.	Completed	Chief Executive Officer	Deliver our action plan	Corporate risk management maturity	Creating Stakeholder Understanding			**X**		**X**						**X**
Develop and implement monitoring and assurance processes for this action plan	Completed	Chief Executive Officer	Deliver our action plan	Corporate risk management maturity	Measurement and Appraisal			**X**								**X**
Identify and quantify energy demands and potential sources.	Completed	Director of Asset Management	Assess change in energy demands in future	Asset management capability improvement	Problem Structuring	**X**				**X**						
Develop procedures to ensure option assessment and selection considers the full lifecycle of assets (including decommissioning and disposal).	End of AMP7	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Measurement and Appraisal	**X**				**X**			**X**			
Compile and analyse hazard and failure event data for all asset types to inform understand of risk.	End of AMP7	Director of Asset Management and Chief Financial Officer	Ensure mitigation activities and associated investments are commensurate with the level of risk and prioritised based on risk	Asset management capability improvement	Problem Structuring	**X**				**X**						
Prepare and publish a Social Contract to ensure we continue delivering societal benefits, and to provide a way for local people to hold us to account for how we deliver our actions.	Completed	Director of Strategy and Regulation	Further develop our understanding of the broader, open system that we are a part of	Social Contract	Creating Stakeholder Understanding			**X**		**X**		**X**			**X**	

Action	Timeframe	Responsibility	Objective	Maturity Improvement Category	ICIF Focus Area	Bristol Water Resilience Pillar				Ofwat Resilience Planning Principles						
						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Formalise plans, procedures and tools in to a clear asset management system and supporting framework.	Completed	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Overarching	X				X			X	X	X	X
Develop AMP7 comprehensive supplier and contractor management arrangements which include the promotion of flexibility and appropriate incentivisation.	Completed	Chief Financial Officer	Comprehensive supplier and contractor management arrangements	Project Delivery	Creating Stakeholder Understanding			X		X					X	
Conduct detailed mapping of our Social Contract activities to the Bristol One City Plan and UN SDGs. Use this to inform ongoing prioritisation of the programme	Completed	Director of Strategy and Regulation	Further develop our understanding of the broader, open system that we are a part of	Social Contract	Creating Stakeholder Understanding			X		X		X			X	
Undertake stakeholder mapping to capture the extent and status of stakeholder relationships and areas of common ambition	Completed	Director of Strategy and Regulation	Further develop our understanding of the broader, open system that we are a part of	Social Contract	Creating Stakeholder Understanding			X		X						
Develop and implement Cyber Security Strategy.	Completed	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Overarching			X		X						X
Develop policies and plans aligned to the systems-based resilience strategy to guide procedures and the application of tools.	Completed	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Overarching			X		X	X	X	X	X	X	X
To support horizon scanning, undertake demand analysis and assessment of option performance against alternative futures (demand, regulation, climate, technology).	Completed	Director of Asset Management and Chief Financial Officer	Ensure mitigation activities and associated investments are commensurate with the level of risk and prioritised based on risk	Asset management capability improvement	Measurement and Appraisal			X		X						

Action	Timeframe	Responsibility	Objective	Maturity Improvement Category	ICIF Focus Area	Bristol Water Resilience Pillar				Ofwat Resilience Planning Principles						
						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Develop series of linked procedures to ensure innovation is supported throughout organisational policies and strategies.	Completed	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Overarching			**X**		**X**	**X**	**X**	**X**	**X**	**X**	**X**
Embed a focus on long-term resilience in policy and strategy, including a clear corporate definition and vision for resilience.	Completed	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Overarching			**X**		**X**						
Profile changes in risk over time and assess the impact of interventions and strategies on residual risk (monetised where possible).	Completed	Director of Asset Management and Chief Financial Officer	Ensure mitigation activities and associated investments are commensurate with the level of risk and prioritised based on risk	Asset management capability improvement	Measurement and Appraisal		**X**			**X**						
Ensure risk mitigation interventions are prioritised and selected commensurate with the level of risk and certainty of risk reduction.	Completed	Chief Financial Officer / Director of Asset Management on behalf of Executive Management Team	Systematic and integrated resilience risk assessment across the entire business	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**			**X**	**X**		
Measure outcomes delivered by projects against originally defined aims to support continual improvement. Use this information to take corrective action where projects fail to meet defined aims.	Completed	Director of Asset Management	Measure outcomes delivered by projects/products	Asset management capability improvement	Measurement and Appraisal		**X**			**X**				**X**	**X**	
Deliver comprehensive and systems-based water resource and drought planning involving regional planning and collaboration.	Completed	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Overarching		**X**			**X**	**X**	**X**	**X**	**X**	**X**	**X**

Action	Timeframe	Responsibility	Objective	Maturity Improvement Category	ICIF Focus Area	Bristol Water Resilience Pillar				Ofwat Resilience Planning Principles						
						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Develop and apply suite of performance measures that enable evaluation of the delivery of schemes against customer outcomes, including for response and recovery activities.	Completed	Director of Asset Management	Measure outcomes delivered by projects/products	Asset management capability improvement	Measurement and Appraisal		X			X					X	
Deliver our people plan including, competency framework, staff engagement programme, talent development programme, work experience and apprenticeship programmes, values based development and recruitment, mentoring programme and training to enhance systems thinking understanding across all teams.	Apr-19	Executive Management Team	Identify and develop the future competencies we need	Corporate risk management maturity	Overarching			X		X						
Development of the asset management system to align with ISO 55001	Apr-20	Director of Asset Management	Aligning the asset management system to ISO 55001	Asset management capability improvement	Overarching			X		X	X	X	X	X	X	X
Conduct benchmarking against other companies and sectors in systems thinking approaches to resilience, including business continuity management	Apr-20	Director of Strategy and Regulation	Benchmark our systems thinking approach	Corporate risk management maturity	Measurement and Appraisal			X		X	X	X	X	X	X	X
Share our experience of our social purpose and Social Contract with other utilities.	Apr-20	Director of Strategy and Regulation	Benchmark our systems thinking approach	Corporate risk management maturity	Creating Stakeholder Understanding			X		X		X			X	
To support robust option assessment, explore best practice in multi criteria assessment and develop recommendations	Apr-20	Director of Strategy and Regulation	Benchmark our systems thinking approach	Corporate risk management maturity	Measurement and Appraisal		X			X			X		X	
Develop, implement and sustain staff engagement programme.	Apr-21	Director of Legal Affairs and HR	Link corporate actions to findings from staff and external stakeholder engagement	Social Contract	Creating Stakeholder Understanding			X		X						

Action	Timeframe	Responsibility	Objective	Maturity Improvement Category	ICIF Focus Area	Bristol Water Resilience Pillar				Ofwat Resilience Planning Principles						
						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Act on the findings from staff and external stakeholder engagement to implement initiatives which boost corporate resilience.	Apr-21	Director of Legal Affairs and HR	Link corporate actions to findings from staff and external stakeholder engagement	Social Contract	Creating Stakeholder Understanding			**X**		**X**						**X**
Assess and forecast near and longer term future changes in energy demand.	Apr-21	Director of Asset Management	Assess change in energy demands in future	Asset management capability improvement	Measurement and Appraisal	**X**				**X**						
Use Asset Risk and Planning Team to continue assess asset remaining life, failure risk and impact on service	Apr-21	Director of Asset Management and Chief Financial Officer	Profile risk and assess change owing to interventions and strategies	Asset management capability improvement	Measurement and Appraisal	**X**				**X**						
Use Asset Risk and Planning Team to assess, monetise and profile risk, defining interventions, and assessing the change in risk owing to interventions and strategies	Apr-21	Director of Asset Management and Chief Financial Officer	Profile risk and assess change owing to interventions and strategies	Asset management capability improvement	Measurement and Appraisal	**X**				**X**						
Develop and implement methodology and tools for visualising and sharing information about future risks and project data in a common data environment. For example, data shared through Resource West partnership	Apr-21	Director of Asset Management	Develop methodology and tools for visualising and sharing information about future risks	Corporate risk management maturity	Problem Structuring			**X**		**X**					**X**	
Refresh corporate Risk Management process to ensure consistent risk assessment and scheme prioritisation across all departments.	End of AMP7	Director of Asset Management and Chief Financial Officer	Ensure mitigation activities and associated investments are commensurate with the level of risk and prioritised based on risk	Asset management capability improvement	Problem Structuring			**X**		**X**						**X**
Use planning horizon epochs to evaluate risks, costs and benefits to understand change over time.	Apr-21	Director of Asset Management and Chief Financial Officer	Ensure mitigation activities and associated investments are commensurate with the level of risk and prioritised based on risk	Asset management capability improvement	Problem Structuring		**X**			**X**						

Action	Timeframe	Responsibility	Objective	Maturity Improvement Category	ICIF Focus Area	Bristol Water Resilience Pillar				Ofwat Resilience Planning Principles						
						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Develop and implement set of procedures to assess asset failure risk, remaining life, and impact on service. Apply this information to prioritise investments.	Apr-21	Director of Asset Management and Chief Financial Officer	Ensure mitigation activities and associated investments are commensurate with the level of risk and prioritised based on risk	Asset management capability improvement	Problem Structuring		X			X			X		X	
Ensure adherence to Board governance code and transparency of reporting through 'Trust Beyond Water' statement at year end and performance graphic, including reporting of Social Contract activities through a new performance graphic. This ensures transparency in financial, asset, service and social performance reporting	Jul-21	Director of Strategy and Regulation	Further develop our understanding of the broader, open system that we are a part of	Social Contract	Measurement and Appraisal			X		X						X
Develop new stakeholder links through our Social Contract - utilising our connections through Bristol Green Capital Partnership, the city's Environmental Sustainability Board and the One City Plan.	Jul-21	Director of Strategy and Regulation	Further develop our understanding of the broader, open system that we are a part of	Social Contract	Creating Stakeholder Understanding			X		X						
Continue ongoing customer and employee engagement and participation through the Customer forum and a new Employee Forum, including a direct link to the Board.	Jul-21	Director of Strategy and Regulation	Further develop our understanding of the broader, open system that we are a part of	Social Contract	Creating Stakeholder Understanding			X		X					X	X
Conduct a review of key strategic partners and stakeholders for securing resilience in the round	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Creating Stakeholder Understanding			X		X						
Identify and implement required changes to stakeholder and strategic partnerships aligned to resilience strategy	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Creating Stakeholder Understanding			X		X						

Action	Timeframe	Responsibility	Objective	Maturity Improvement Category	ICIF Focus Area	Bristol Water Resilience Pillar				Ofwat Resilience Planning Principles						
						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Hold a series of workshops with partners and stakeholders to update systems mapping at appropriate scale.	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Problem Structuring			**X**		**X**						
Develop procedures to exploit understanding of system interdependencies to link different aspects of resilience (operational, service, financial and corporate) when undertaking planning, risk assessment and mitigation.	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**			**X**	**X**		
Ensure company plans demonstrate system understanding and describe how associated planning tools and processes are implemented and maintained.	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**						
Update interdependency planning approach, including associated governance, to align with resilience strategy	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Problem Structuring		**X**			**X**						
Document outcomes of workshops to develop plans and strategies for the systems in question	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**						
Update resilience stress testing approaches, including operational, service and financial scenarios	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**						

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						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Ongoing monitoring of the delivery of the WRMP to inform subsequent plans	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**					**X**	
Run resilience stress testing exercises in collaboration with stakeholders. Develop procedure to capture learning from stress-testing exercises, including monitoring the delivery of actions to address observations.	Jul-22	Director of Strategy and Regulation on behalf of Executive Management Team	Use an improved understanding of our systems to optimise the way we deliver business processes	Corporate risk management maturity	Problem Structuring		**X**			**X**					**X**	
Implement procedures to ensure identification and ranking of critical assets across all asset types.	Apr-23	Director of Asset Management	Identify and rank critical assets	Asset management capability improvement	Problem Structuring	**X**				**X**						
Develop a framework to quantitatively assess the natural, social, human and economic capital benefits of our social contract activities	Apr-23	Director of Asset Management	Develop natural capital accounting tools and methodology	Asset management capability improvement	Problem Structuring		**X**			**X**	**X**				**X**	
Develop and implement procedures to identify natural assets and ensure a robust understanding of the natural environment and its role in systems resilience	Apr-23	Director of Asset Management	Develop natural capital accounting tools and methodology	Asset management capability improvement	Problem Structuring		**X**			**X**	**X**				**X**	
Plans and procedures developed and implemented to undertake and apply economic valuation of natural assets – we will inform our optimisation of investment options based on whole life direct and in-direct costs and benefits on an ongoing basis (this will underpin our investment plans developed as part of the next price review).	Apr-23	Director of Asset Management	Develop natural capital accounting tools and methodology	Asset management capability improvement	Measurement and Appraisal		**X**			**X**	**X**					

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						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Develop supplier and contractor management arrangements for AMP8 and beyond	End of AMP7	Chief Financial Officer	Comprehensive supplier and contractor management arrangements	Project Delivery	Creating Stakeholder Understanding			**X**		**X**					**X**	
Develop systematic maintenance data collection programme supported by a storage system, tools and procedures to optimise asset performance.	End of AMP7	Director of Asset Management	Capture asset performance data and analysing data to inform planning	Asset management capability improvement	Measurement and Appraisal	**X**				**X**						
Work with the sector to develop robust forward looking asset health metrics	End of AMP7	Director of Asset Management	Capture asset performance data and analysing data to inform planning	Asset management capability improvement	Problem Structuring	**X**				**X**						
Develop and implement procedures to identify and understand asset interdependencies	End of AMP7	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Problem Structuring	**X**				**X**						
Develop procedures to ensure option assessment considers a full range of risk mitigation options, including those related to resistance, reliability, redundancy, response and recovery	End of AMP7	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Measurement and Appraisal	**X**				**X**			**X**		**X**	
Develop suite of asset health and broader resilience indicators which enable effective tracking of systems resilience.	End of AMP7	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Problem Structuring		**X**			**X**						
Explore opportunities to collaborate with partners, other water companies and across other sectors to evaluate and address resilience risks	End of AMP7	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Creating Stakeholder Understanding		**X**			**X**			**X**	**X**	**X**	

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Consult with stakeholders to identify opportunities for collaborative funding and delivery of schemes	End of AMP7	Director of Strategy and Regulation	Consult stakeholders to identify opportunities for the collaborative delivery and funding of schemes	Social Contract	Creating Stakeholder Understanding			**X**		**X**						
Use our innovation framework, including the workshop innovation hub, to find further R&D joint funding opportunities	End of AMP7	Director of Strategy and Regulation	Consult stakeholders to identify opportunities for the collaborative delivery and funding of schemes	Social Contract	Creating Stakeholder Understanding			**X**		**X**						
Develop and implement Information Strategy.	End of AMP7	Director of Asset Management	Enhance our integrated resilience framework	Asset management capability improvement	Overarching		**X**			**X**						**X**
Ensure multiple stakeholders are involved in post-project appraisals	End of AMP7	Director of Asset Management	Measure outcomes delivered by projects/products	Asset management capability improvement	Creating Stakeholder Understanding		**X**			**X**				**X**	**X**	
Improve business cases to outline expected, quantified residual risk following investment	End of AMP7	Chief Financial Officer / Director of Asset Management on behalf of Executive Management Team	Systematic and integrated resilience risk assessment across the entire business	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**					**X**	
Conduct joint evaluation of business cases with key strategic partners	End of AMP7	Chief Financial Officer / Director of Asset Management on behalf of Executive Management Team	Systematic and integrated resilience risk assessment across the entire business	Corporate risk management maturity	Measurement and Appraisal		**X**			**X**					**X**	

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						Operational	Service	Corporate	Financial	1	2	3	4	5	6	7
Implement integrated set of procedures to capture asset performance data and transform this in to robust information to inform asset planning.	End of AMP7	Director of Asset Management	Capture asset performance data and analysing data to inform planning	Asset management capability improvement	Problem Structuring		**X**			**X**						
Ensure post-project appraisals are conducted on all schemes and the findings acted upon to support continual improvement.	End of AMP7	Director of Asset Management	Measure outcomes delivered by projects/products	Asset management capability improvement	Measurement and Appraisal		**X**			**X**					**X**	

x = action complete