



Our Business Plan for 2020 – 2025

Appendix 9 – Ensuring Long-Term Resilience

September 2018

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1 Our approach to resilience planning

1.1 Resilience in the round

Context

Affinity Water has a strong track record to assess resilience in our planning activities. We have used extensively the Cabinet Office 4Rs model (Resistance, Reliability, Redundancy and Response & Recovery) in our previous plan. For the development of our 2020-2025 plan, we have considered short, medium and long-term resilience in a round. We have been working with others to improve our approach to resilience, considered review of various resilience activities, explored stakeholder's thoughts, carried out risk assessment and defined internal strategy. Our resilience approach therefore includes customer resilience; financial; corporate; operational, our people and environmental resilience.

Purpose of the Resilience Appendix

The Resilience Appendix highlights our methodology and strategy to maintain adequate level of resilience for Affinity Water customers while ensuring the customer bills remain affordable, in line with Ofwat's methodology for resilience in the round and for the long term.

Our view on Resilience in the round

Resilience is the ability to cope with and recover from disruption, anticipate trends and variability to maintain services for people and protect the natural environment, now and in the future¹. In recent years the focus has moved away from a traditional infrastructure-based approach to focus on resilience outcomes for customers and the environment. We are prepared for and developed resilience against the shocks and stresses experienced but we must continue our assessment to identify new emerging risks. We noticed certain global trends, like climate change, population growth, sector skill gaps, supply chain failure and cyber threat, which bring challenges to planning, but our responsibility towards customers remains.

We recognise the need to be resilient in all aspects of our business, hence our approach fully integrates operational, financial, corporate and reputational resilience on the short, medium and long-term. We know the key is to adopt a joined-up system-based approach to provide the best value service to customers.

We have engaged with a wide range of stakeholders on our approach to resilience, including customers during our business plan consultation and other water companies. We have explored opportunities to collaborate on better integration of water resources through the WRSE and WRE groups.

We worked with an independent consultant, Arup and used their industry framework, to assess our resilience maturity and benchmark us against others in the industry. It allowed us to evaluate our resilience position and identify key risks and weaknesses in different areas of resilience. The details of the approach to maturity assessment and results of the assessment are covered in the Independent Review of Maturity Assessment of the resilience in the round (Annexe D of this document).

¹ Water and Wastewater Resilience Action Group and Task and Finish Group

1.2 Our resilience Strategy

At the start of the 2010-2015 regulatory period, we decided to evolve and move the business forward and started building the basis for a new vision and an open culture, adopting a more straight-forward and transparent relationship with our regulators. During 2015-2020, we have progressed with our improvements and established a dedicated, cross-function resilience team which has worked to prepare the Affinity Water Resilience Framework. The team has taken a holistic approach, based on our company strategy and values, incorporating all aspects of ‘resilience-in-the-round’, thoroughly exploring how the traditional and newer aspects of resilience tie together, whilst placing customers and environment at the heart. We have developed our resilience strategy around the outcomes from our resilience framework, and considered input from our stakeholders, customers and communities, exploring their concerns on affordability and intergenerational equity.

Key elements of our strategy:

- We continuously appraise emerging issues and priorities, through screening, engaging with customers, analysing our operational data and horizon scanning to give us an integrated understanding of potential disruptions to the service in the round and for the long term.
- We evaluate the impact of identified risks on resilience and we consider a broad range of intervention options including interventions to improve resistance, reliability, redundancy and response & recovery.
- We make the right decisions to provide best value for customers - this includes considering whole-life cost, sustainability and safety aspects, as well as adequation with our 25-year Water Resource Management Plan and existing asset plans, in line with our policy and standards.
- We ensure that our delivery approach is outcome and customer focussed, that we have sufficient high-quality water to meet the needs of customers whilst leaving more in the environment.
- We work in partnership with local stakeholders to build resilient ecosystems, improve biodiversity and deliver catchment management initiatives
- We constantly strive to reflect on and adapt from our own and the wider sector past events and implement effective measures to ensure greater resilience to customers.
- We use well-established but also new and innovative technology to continuously improve our assets and their management, in order to enhance service delivery, reduce our environmental impact.
- We have developed a robust crisis management approach and we maintain strong engagement with regulators and Local Resilience Forums – we have set up an emergency planning and response function which includes a formal Emergency Response team.

Collaboration through Local Resilience Forums (LRF)

In March 2018 we hosted our first forum - where we invited in all our colleagues from the LRFs across our eight communities to talk about planning for emergencies, sharing current levels of risks, giving drought updates and sharing best practice. Our regulators and neighbouring water companies also attended to take part in a joined-up day of discussions.

1.3 Our resilience framework

Our Resilience Framework is depicted conceptually by the diagram in Figure 1 below. The cogs represent our 6 main resilience themes, comprising governance and our five capitals model. These broadly align to the Ofwat’s model of operational, corporate and financial resilience, but we have enhanced the framework to embrace three areas that are essential for us - customers & communities, environment and people. Considering Ofwat’s model, we do recognise the need for having the right systems and the right leadership as part of our corporate resilience which in effect will make us more competent and efficient in serving our communities. Having the robust infrastructure in the right place, people who know how to operate it with a minimal footprint on the environment, will ensure a minimal interruption to customers. Finally, our financial security and ability to invest in our assets will bring the best value solutions to customers and form financial resilience. We expand on each of those areas in more details in section 4.



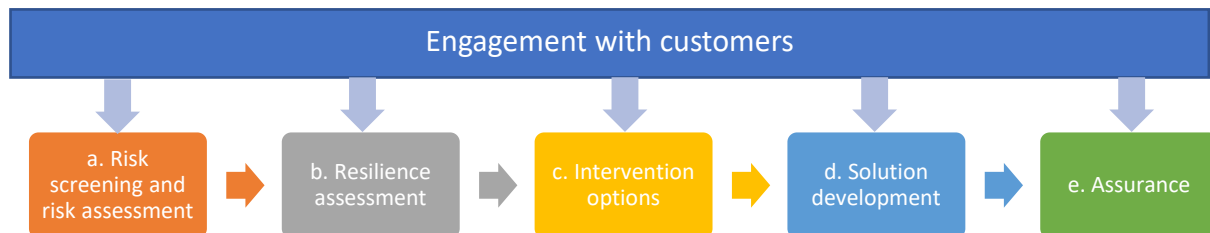
Figure 1: Affinity Water Resilience Framework

Our framework ensures we will continue to improve our resilience through effective working, communication and collaboration, considering all internal and external resilience interdependencies.

There are strong correlations between those 6 areas - if any of those are weak, it could impact our ability to reliably supply water despite good levels of infrastructure resilience. For example, we underwent an extensive and thorough flood protection programme in AMP5 to increase our flood protection levels at our operational sites. However, if we had not also considered the interdependency aspects of the supply chain to deliver the chemicals required for treatment during a prolonged flood event, our sites would still be vulnerable.

1.4 Our resilience assessment methodology

Our methodology for resilience assessment is in line with Ofwat's seven principles for resilience in the round and for the long-term. It considers the assessment and understanding of risks to our systems and services provided in the round for short, medium and long-term considering environment aspects as part of our decision-making. It was originally developed in AMP5 based on the UKWIR resilience guidance and updated for PR19 as we developed our strategy. In particular we incorporated recent industry methodology², simplified to suit our business - it follows a standard 5-step approach.



- a. **Risk screening:** we first focused on identifying key shocks and stresses and their associated resilience risks, based on an analysis of our systems and processes. The starting point for those was understanding customer priorities and the impact of key shocks and stresses on Outcome delivery using consequences to our Outcomes. We ranked those by impact, using our four customer Outcomes. This is further explained in section 2 of this report.
- b. **Resilience assessment:** we reviewed and assessed risks, identifying gaps and mitigations through facilitated workshops, using the Cabinet Office's 4Rs model approach³, in consultation with representatives from our operational, corporate and financial communities. Using this methodology, a resilience score was allocated against each risk for every community, before and after mitigation.
- c. **Intervention options:** we developed mitigation plans where gaps were identified. We identified PR19 plan interventions and made recommendations for further resilience work. Several schemes were taken forward to the Business Plan using an optimisation process. All aspects of the risk register were considered in terms of risk and consequence. We analysed customer and operational data and consulted with customers and CCG on our plans
- d. **Solution development:** we identified mitigations to include in our WRMP and Business Plan
- e. **Assurance:** further engagement with customers (Phase 3 – revisiting & assuring), challenge and validation from Arup and PwC, assurance by Atkins and Board assurance.

Figure 2 below provides more details on our methodology, which includes the Risk Screening, Resilience Risk Assessment and Implementation of Resilience Solution, as described by point a), b) c) and d) above. It shows at which points of the process we engaged our customers and gained the assurance and sign off, as described in point e) above. Our methodology considers

² [Measuring resilience in the water industry](#), Arcadis/United Utilities, June 2017

³ [Keeping the country running: Natural Hazards and Infrastructure](#), October 2011

the assessment and understanding of risks to our systems and services provided in the round for short, medium and long term. It takes into account the environment as part of our decision-making.

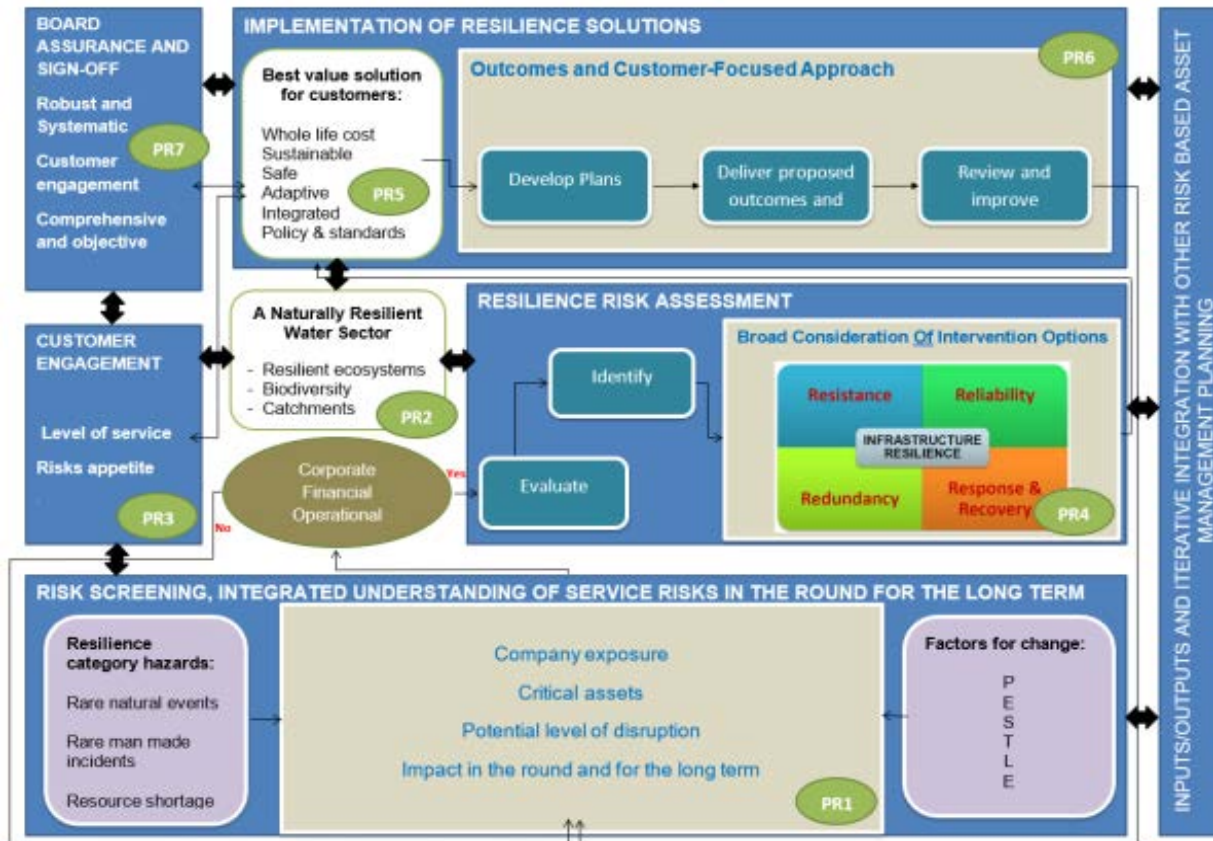


Figure 2: Affinity Water methodology for Resilience

The Resilience Risk Assessment process, using the Cabinet Office’s 4Rs model approach⁴, was further mapped and illustrated by Figure 3 below.

⁴ [Keeping the country running: Natural Hazards and Infrastructure](#), October 2011

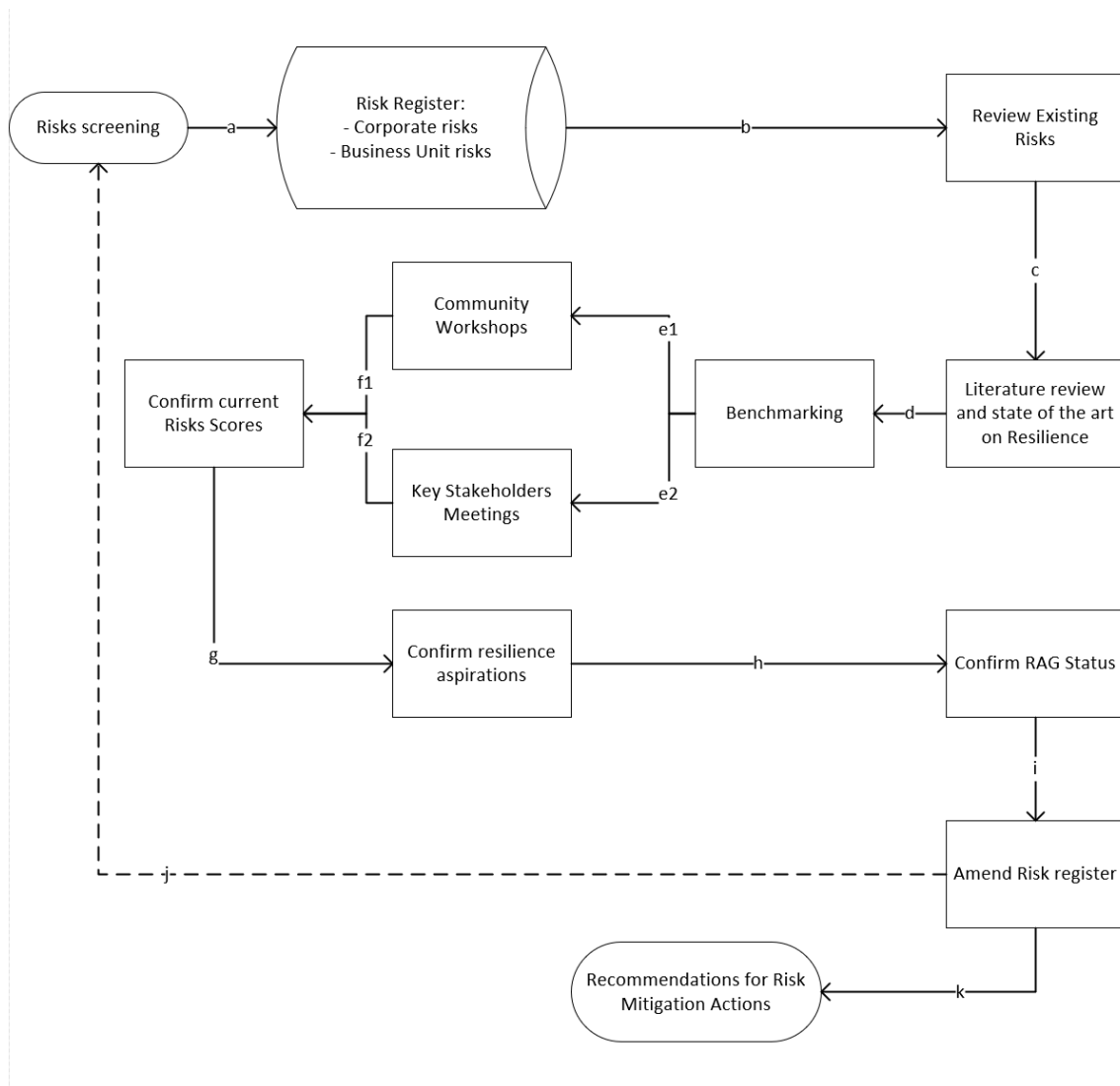


Figure 3: Resilience Risk Screening and Mitigation Actions

During the preparation for PR19, we reviewed the existing risks listed in our list register (b)

Following the risks review, a literature review and a state of the art on resilience was carried out(c).

We then benchmarked our risk against our findings from the literature review (d)

E1: to ensure a robust assessment and capture potential gaps we held resilience workshops in each of our 8 communities (e1) with key operational staff which included our production, distribution and water quality team representatives. We also met our strategic stakeholders, these included emergency response representatives, our operation control centre, risk management and the relevant risks and compliance managers (e2).

The outcomes of these meetings and interviews were used to confirm our risks scores (f1 and f2) and to propose our resilience aspiration for each of the risks category (g). Based on these resilience aspirations and the current risks, the RAG status of the risks were adjusted(h) and amended in the risk register (i). This work has enabled us to generate a list of recommendations for risk mitigation actions(k). All identified mitigation options went through an optimisation and optioneering process in line with our resilience methodology, where the preferred solution is the option that presents the best value for customers. This means the solution has the best whole life cost, is sustainable, safe, able to fit with our current and future processes and assets and is in line with our policies and standards.

Our risk management process

Our process to manage risk is represented in Figure 4 below. It is cyclical in nature and is made up of five key elements:

1. Establishing the context
2. Risk identification
3. Risk analysis
4. Risk evaluation
5. Risk management

On-going monitoring and review is carried out in each team to ensure continued application of the risk process and the risk action plan.

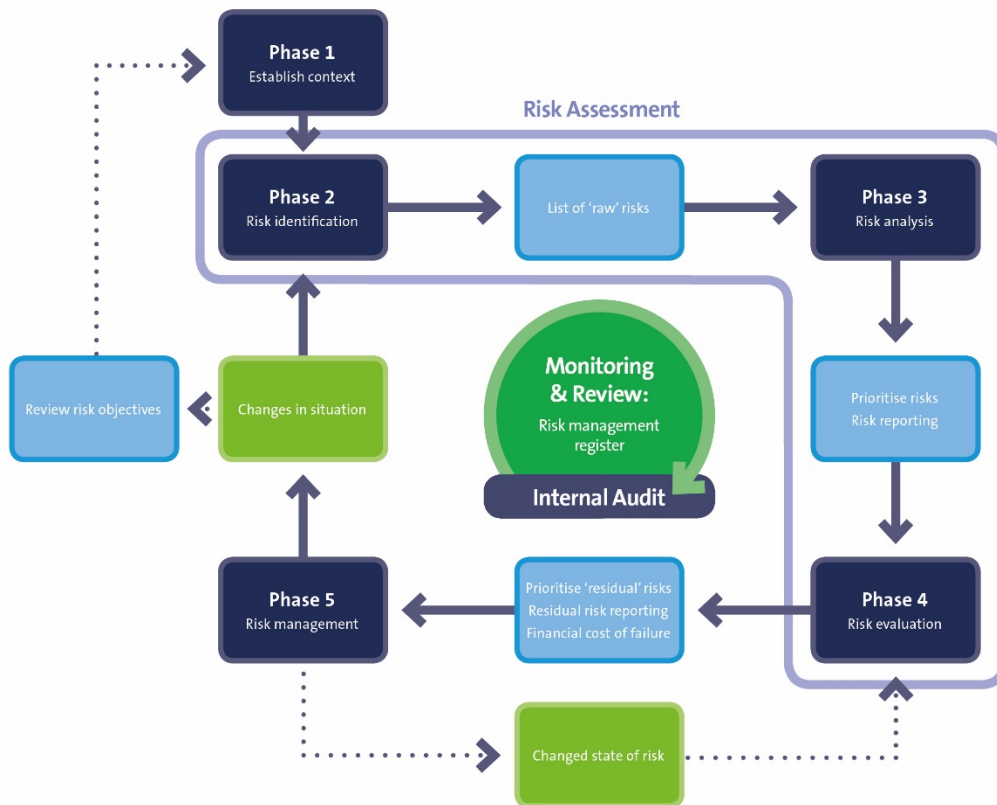


Figure 4: Risk management process overview

Communication and consultation is a key aspect of risk management and is promoted where there is a positive risk culture. It ensures common understanding and openness to best address risks.

2 Understanding shocks stresses and impact on services

2.1 Assessment of shocks and stresses

As part of the risk screening of our methodology (presented in Figure 2), we carried out an assessment of key shocks and stresses faced by Affinity Water, drawing on from the list of hazards originally defined by UKWIR⁵ refined by Arup and augmented from our Strategic Risk Register, which sets out the challenges that are relevant to water companies.

Shocks are described as disruptive events, which impact the ability to provide a high-quality service. In the water industry, acute shocks include sudden events such as floods, fires or cyber-attacks.

Stresses are chronic conditions which weaken the function of the organisation or system long-term. Examples highlighted in particular by Ofwat include population growth and climate change. Stresses are also often felt as shocks when they reach a tipping point.

To respond effectively to shocks and stresses it is important to be aware of existing and emerging shocks, stresses and trends and to identify those relevant to Affinity Water's operations.

This identified 78 key shocks and stresses. We believe that the list represents the most comprehensive and up-to-date list of shocks and stresses relevant today to water companies.

We carried out a risk-based prioritisation of all 78 shocks and stresses using our Outcomes Framework. The aim was to identify our current exposure to different potential disruptions, as well as inform our future residual exposure post mitigations. The assessment results give us a current and future score for each of the 78 hazards identified. These hazards were then prioritised based on their potential impact on Outcome delivery using consequences to our Outcomes.

The assessment outcome provided us with a current and future score for each of the 78 hazards. Each of those was also given a score based on their impact on four different Outcomes, those are listed in the table number 1 overleaf. The process of our shocks and stresses assessment is explained in the Figure number 5 overleaf.

⁵ Making a Business Case for PR14: Good Practice Guide to Resilience Planning, 2013 (page 9)

Table 1: Shocks and Stresses impacting four operational outcomes

Enough Water		Water Quality	
Leakage Abstraction licence changes Heatwave / extreme heat Catchment/site contamination event Extreme river pollution Extreme reservoir pollution Demographic change National infrastructure failure Failure of climate change mitigation and adaptation Nuclear incident Unmanageable inflation Lifestyle change Rising urbanisation Urban creep Inequality and increasing income disparity Catchment/site contamination event State collapse or crisis Failure of regional, national, global planning Growth vs recession Changing regulation, policy and international governance		Terrorist attack Cyber attack Climate change (incl. drought and sea level rise) National infrastructure failure Third party interventions (e.g. misconnections, metal theft, emptying inappropriate materials into manholes) Nuclear incident Lightning strike Water supply contamination Resource scarcity incl. fuel Changing regulation, policy and international governance	
Service disruption		Value for money	
Ageing infrastructure Severe cold weather Asset failure Fire events Heatwave / extreme heat Terrorist attack Cyber attack Aircraft crash Surface water flooding National infrastructure failure Storms and gales Third party interventions (e.g. misconnections, metal theft, emptying inappropriate materials into manholes) State collapse or crisis Failure of regional, national, global planning Pandemic Space weather State provision of services Access loss for maintenance/supply Major fuel crisis Changing regulation, policy and international governance		Ageing infrastructure Leakage Climate change (incl. drought and sea level rise) Surface water flooding Failure of climate change mitigation and adaptation Data fraud/theft/loss Environmental change incl. invasive species Land use change Dam failure Severe energy price change Bad Debt Unmanageable inflation Increased cost of borrowing Inequality and increasing income disparity Supply chain failure Digital revolution State provision of services	
Hoax calls Fluvial flooding Earthquake Nuclear incident Landslip/subsidence Coastal flooding Power cuts Power outages Extreme vandalism IT failure Lightning strike Ground water flooding Tsunami Telecommunication failure Supply chain failure Industrial disputes Civil unrest Epidemic Solar flare Chlorine - supply chain War Materials shortages Resource scarcity incl. fuel		State collapse or crisis Failure of regional, national, global planning Financial crisis Skills shortages, shortage of skilled labour Unemployment and underemployment Epidemic Pandemic Transport disaster Rising chronic and lifestyle diseases Macro industry change Legal structures War Resource scarcity incl. fuel Migration Changing regulation, policy and international governance Structural change	

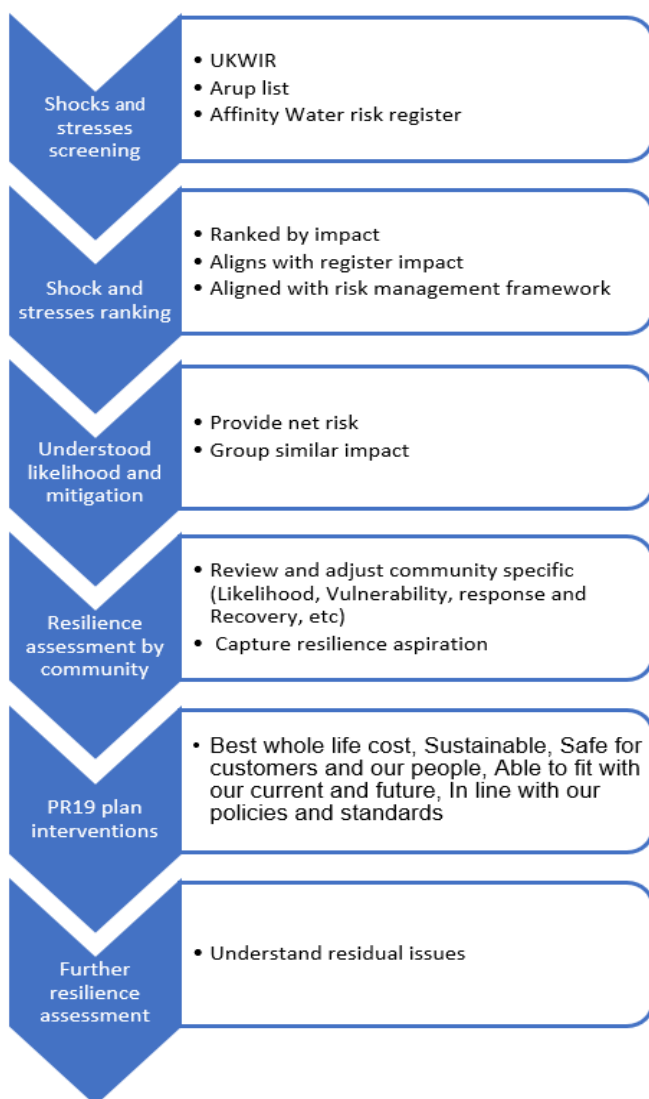


Figure 5: Our risk screening method

Figure 5 above summarises the process of our shocks and stresses assessment. Each shock or stress was associated to the relevant business risk to generate score before and after proposed mitigations. This was to ensure that our approach was aligned and consistent with our risk management framework. The shocks and stresses were then ranked based on impact and net score. Figure 6 below shows our top 20 shocks and stresses.

Shocks	• Severe cold weather	[3]
	• Asset failure	[4]
	• Supply chain failure	[6]
	• Fire events	[7]
	• Heatwave / extreme heat	[8]
	• Terrorist attack	[9]
	• Cyber attack	[10]
	• Catchment/site contamination event	[12]
	• Extreme river pollution	[13]
	• Extreme reservoir pollution	[14]
• Major accident e.g. aircraft crash on site	[16]	

Stresses	Rank
• Ageing infrastructure	[1]
• Leakage	[2]
• Abstraction licence changes	[5]
• Digital revolution	[11]
• Climate change (incl. drought and sea rise)	[15]
• Surface water flooding	[17]
• State collapse or crisis	[18]
• Demographic change	[19]
• National infrastructure -impact on our services	[20]

Figure 6: Our top 20 shocks and stresses

For ease of consultation with our communities and customers, all shocks and stresses were grouped together into 13 categories based on their impact on customer outcome delivery. They were later reviewed and consulted during the community workshops with our network, production and water quality colleagues, as well as reviewed by our people and financial teams.

13 categories include:

Limited finances for the business – Financial resilience	}	Corporate
Poor customers and communities experience and resilience		
Workforce not fit for the future		
Changing governance		
Supply Chain failures		
Environmental degradation and impact on raw water quality	}	Operational
Supply unavailability		
Flooding of our sites		
Critical asset failures		
Infiltration		
Widespread Telemetry/IT failures		
Terrorism & cyber attacks		
Population growth and planning uncertainty		

2.2 Our Operational risks

Our operational resilience is defined as our ability to avoid, cope with and recover from disruption to our infrastructure’s performance and skills to operate and maintain this infrastructure. The exact scope of our operation resilience section was guided by key risks categories in the operational resilience, listed in section 2.1 of this document.

We focus on ensuring that our assets are reliable and as resistant as reasonably practical. There is an emphasis on response to failure and recovery of those assets. We ensure that we can bring back critical assets within 24 hours. These include long term outage of our top four water treatment works by criticality (Egham, Iver, Clay Lane and Horsley Cross).

Risks, derived from our shocks and stresses exercise, included in the scope of operational resilience are summarised in the table below (Table 2).

Table 2: Operational shocks and stresses

Shocks and stresses	Current mitigations
<ul style="list-style-type: none"> • Ageing infrastructure • Leakage • Severe cold weather • Asset failure • Abstraction licence changes • Fire events • Heatwave / extreme heat • Terrorist attack • Cyber attack • Catchment/site contamination event • Extreme river pollution • Extreme reservoir pollution • Climate change (incl. drought and sea level rise) and failure of climate change mitigations. • Aircraft crash • Surface water flooding • Demographic change • National infrastructure failure • Storms and gales • Hoax calls • Third party interventions (e.g. misconnections metal theft) and vandalism • Fluvial flooding • Earthquake • Nuclear incident • Landslip/subsidence • Coastal flooding • Power cuts outages • Data fraud/theft/loss • Environmental change incl. invasive species • Land use change • IT and telecommunication failure • Dam failure • Lightning strike • Ground water flooding • Tsunami • Water supply contamination • False positive alarms 	<p>Our operational systems have high resilience mostly thanks to:</p> <ul style="list-style-type: none"> • capital maintenance programme • leakage reduction programme • availability of 4x4 vehicles, wheel chains, but response depends on the severity and duration • transfer/supply mitigations, leakage and PCC reductions • preparedness and recovery plans, supply 2040 transfers • SEMD measures • InfoSec • catchment management, river restoration, treatment schemes • river monitoring and response • currently protected against 1:60 drought event, but investing to meet 1:200 (with or without drought permits) • low water use developments, regional reservoir • enforcement of network regulations • flood mitigation for 35 sites to >1:200 flood event • standby generation strategy • data protection and compliance with GDPR • campaigns to remove invasive species and procedures on our sites to prevent spread • cloud first strategy • lightening protection on sites • satellite phones in case of an emergency. • tailored communication for vulnerable customers

2.3 Our Financial risks

Our Financial Resilience is defined as our ability to avoid, cope with and recover from disruption to our finance and instability of the financial market. Please refer to the Financial Appendix for financial risks.

2.4 Corporate risks

Our Corporate resilience is defined as ability of our governance, accountability and assurance processes to avoid, cope with and recover from adversity, as well as anticipating changes in our corporate operation. Risks derived from our shocks and stresses included in the scope of our corporate resilience are listed in the table 3 below.

Table 3: Corporate shocks and stresses

Shocks and stresses	Current mitigations
<ul style="list-style-type: none"> • Supply chain failure including chlorine • Digital revolution • State collapse or crisis • Failure of regional, national, global planning • Industrial disputes • Skills shortages and shortage of skilled labour • Growth vs recession • Civil unrest • Unemployment and underemployment • Epidemic and pandemic • Transport disaster • Rising chronic and lifestyle diseases • Macro industry change • Change to legal structures • State provision of services • Company structural change • War • Materials shortages • Major fuel crisis • Resource scarcity incl. fuel • Migration • Changing regulation, policy and international governance 	<ul style="list-style-type: none"> • workforce skill plan • graduate program and apprenticeship • diversity and inclusive strategy • e-learning, webinar • professional development, mentoring • leadership training • flexible working • pension scheme and benefits • office 365 • business continuity plan, succession planning • access priority at petrol station • quarterly audit committee meetings where risks are reviewed • established risk assessment process and emergency planning • macro-economic scenarios as part of our strategic risks • tailored communication for vulnerable customers • Stakeholder mapping and man-marking

2.5 Our resilience risk metrics

To ensure a robust and consistent resilience assessment across all Affinity Water, a suite of metrics around key resilience concerns were developed based on industry methodology⁶. The resilience metrics and the scoring method are based on our Risk Screening and Company Risk Management Framework.

These metrics are composed of scores with regards to our exposure to environmental, water contamination, ability to supply water, failure of critical assets, malicious damage and IT risks.

Metrics Process Map

Throughout the resilience assessment we can measure current and future resilience levels and identify the gaps that require investment. We can articulate, appraise and value resilience requirements and develop resilience metrics and propose possible Output Delivery Incentives (ODI).

We outlined our resilience strategy which was defined following the process described by Figure 7 below.

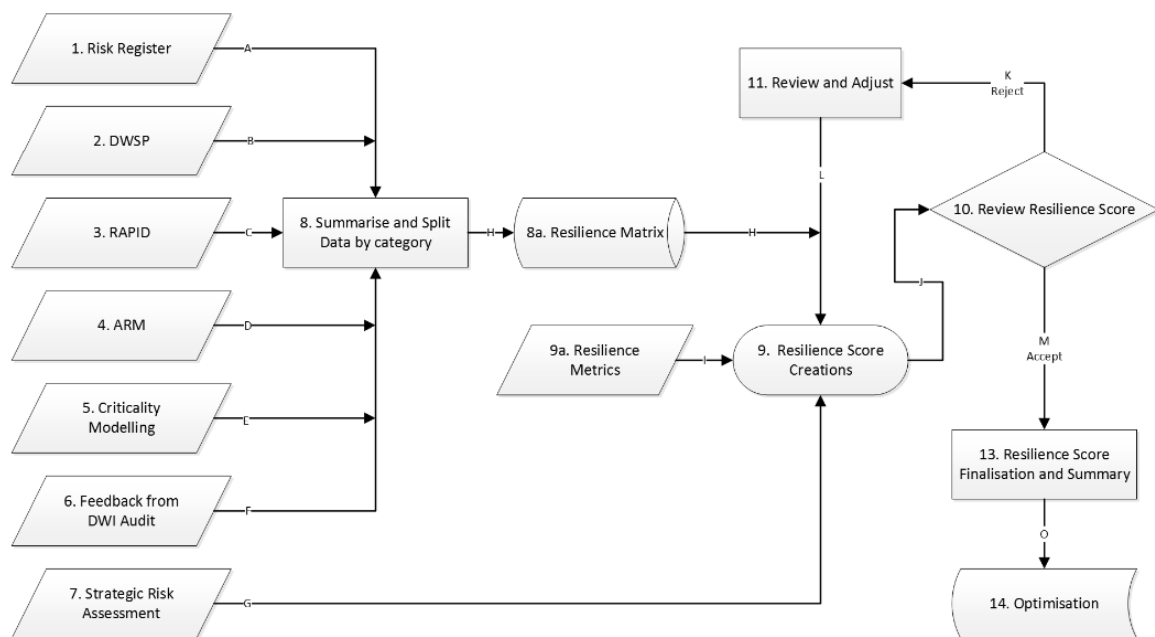


Figure 7: Resilience Metrics Process Flow Diagram

To ensure accurate outputs are produced for the resilience scores, the input data sources highlighted above are rigorously tested and reviewed by key data stewards and criticality evaluated for quality assurance processes.

⁶ [Measuring resilience in the water industry](#), June 2017

Resilience metrics

Our resilience metrics focuses mostly around the operational resilience and considers risk exposure to floods and storms, critical asset failure, maintaining water quality, unavailability of supply, but also covered malicious damage and terrorism, IT interruptions and impact on catchment and environment. We took a bottom up risk approach and managed to measure multiple hazards in one metric. Detailed metrics are presented in tables in the Annexe A.

Considering risk and control measures planned for 2015-2020, as well as the resilience metrics we were able to score resilience in each of our 8 communities and identify gaps which led to investment recommendations. A portfolio of recommendations was optimised and based on that a resilience investment finalised.

3 Assessment results

3.1 Shocks and stresses assessment results

Shock and stresses assessment is the first step in our methodology. The aim of this risk screening was to identify our current exposure to different potential disruptions, as well as assess our future exposure post mitigations. Assessment outcome provided us with a current and future net risk score for each of the 78 hazards identified in the table 1 in section 2.1 of this report, based on the likelihood and severity of the hazard occurring. The score for each risk category was derived as an average score of all hazards listed in each category. This provided us with understanding of service risks in the round.

The current and future score is shown in the figure 8 below.

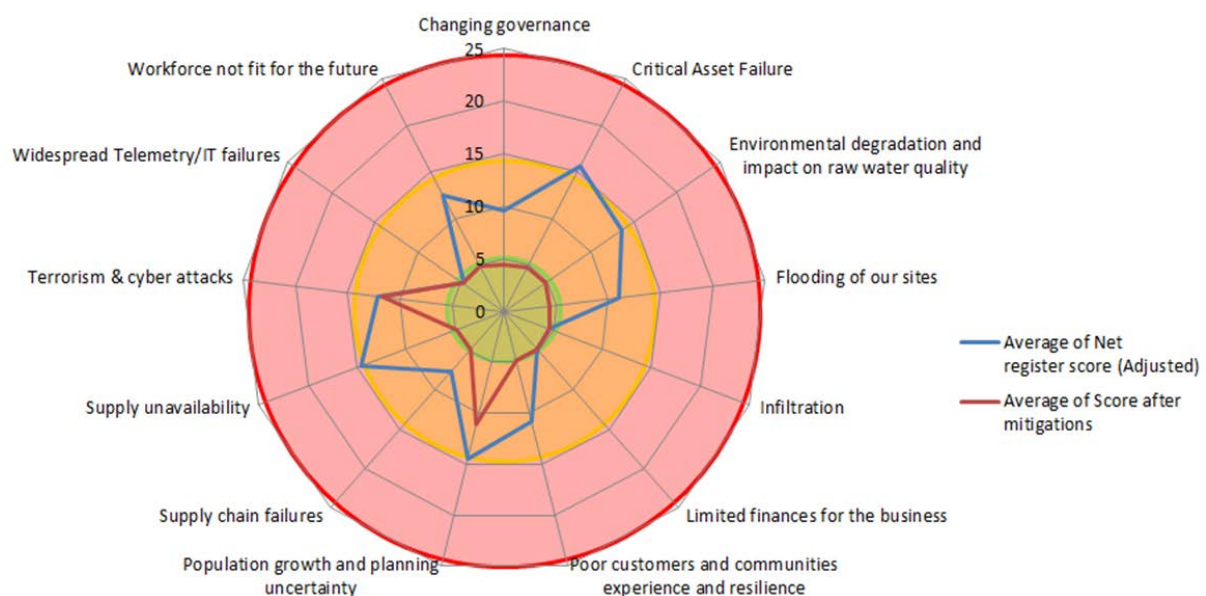














Figure 8: Average score per risk category now and at the end of 2025 (after mitigations)


Most of our risk categories were scored as amber, hence requiring mitigations. Critical asset failure achieved the lowest current score (red) and is recognised in the business as the area for significant improvement. All mitigations are listed in relevant tables in sections 2.2, 2.3 and 2.4., but also summarised in the table 4 below, based on those the future score was derived. We are aiming to become green in all categories where improvement is in our control. In case of the population growth and planning, there is a lot of uncertainty in the current economic climate, hence we aspire to improve our score through implementation of our WRMP and local planning, but realise we may not achieve green by the end of 2025. Similarly, with regards to the terrorism and cyber-attack, we put in place all viable security measures, but may not be able to confidently achieve green due to unpredictability of attacks and changing technology.

Table 4: Existing risks and mitigations

Current shocks and stresses		What we have achieved so far
	Ageing water infrastructure leading to critical asset failures [1, 2, 4]	Accelerated mains renewals to achieve stable serviceability in AMP5 Automated all of our production sites, improved resilience of our key sites by removing single points of failures, and installed standby generation at critical sites Rolling out a new telemetry system in 2018-19 Compliance with ISO55001, Asset Management Assessment
	Widespread IT failure [1], cyber-attacks [10] and data loss/theft	Upgraded ageing IT infrastructure, moved 60% to Cloud computing, Complied with data protection and GDPR regulations Achieved Level 3 NCC assessment and awarded UK Government's Cyber Security Essentials+ certification in 2017
	3rd party event - large fire [7], plane crash on our site, [16] nuclear incident, pandemic	Set up an Emergency Response Team, developed and tested Business Continuity Plan
	Terrorism, vandalism and malicious damage [9]	Developed our Emergency Response, SEMD measures, Reservoir isolation plans, Physical site security upgrades, Mutual Aid, Alternative water supply
	Climate change and extreme weather conditions resulting in severe winters [3], heatwaves [8], droughts [15] or floods [17]	Implemented flood mitigation for our 35 high priority sites ⁷ Reviewed our drought management plans, planned for 1 in 60-year drought event Planning for a 1 in 50-year severe winter / heatwave event
	Environmental degradation and impact on water quality [5, 12, 13, 14, 15,]	Delivered industry-leading catchment management, biodiversity and river restoration schemes. Reduced abstraction by 42Mld Installed pollution monitoring systems at intakes/sources and new treatment plants for pesticides and nitrates Developed land management programme to protect wildlife and enhance biodiversity on our sites ⁸
	Changing regulations and governance [5]	Compliant with Board Leadership, Transparency and Governance Principles (2014). UK Corporate Governance Code (2018) Annual Assurance Plan, Ofwat's Company Monitoring Framework Certification of Management Systems.
	Increased reliance on our supply chain [6]	Transformed our operating model, insourcing key elements (M&R, DS, Asset Delivery, IT), Key framework contracts Using ultraviolet disinfection and producing some chemicals onsite
	Sector skills gap and digital revolution [11]	Developed apprenticeship and graduate programme for all departments, developed Leadership training, promoted STEM
	Economic and social change leading to limited finances for the business [18]	Our financial resilience is regularly tested through modelling and stress testing. More information is provided in the Financial Appendix
	Financial management	Increased transparency, our structure and accounts are published in annual report
	Disengaged and non-resilient customers & communities [19]	Delivering our Integrated water saving (IWS) programme, increasing awareness of current use. Re-launched our Education Centre and outreach programme

⁷ [Adapting to Climate Change](#), Affinity Water, August 201











⁸ [Working with the Environment \(website\)](#), Affinity Water, 2017

		Reduced bills by 6% over 2015-2020, keeping water bills low compared to other utilities
	Population growth and planning uncertainty [19, 20]	Liaised with planning authorities to improve visibility of new housing developments and to provide input into local plans Achieved year-on-year leakage and demand reductions

3.2 Resilience risk assessment results

Resilience risk assessment is a second step in our resilience assessment methodology which allows us for a broad consideration of intervention options.

We carried out a resilience risk assessment based on our Risk Register, described in section 1.4 of this document. Our top resilience risks are summarised in Figure 9 below. The table shows our current strengths and areas for improvement, based on the results of our resilience risk assessment.

Resilience risks		Description	2020
	Critical asset failures	Interruptions and low pressure is a key concern for customers Vulnerability of our larger sites Impact of national infrastructure projects and abstraction reductions on the criticality of our assets	A
	Widespread failure of IT & telemetry	Mitigating external dependencies such as reliability on other service providers	G
	Terrorism and Cyber-attacks	Physical resistance to terrorism Information security failure	A
	Infiltration	Ensuring water reaching customers' tap is of high quality	G
	Supply unavailability (or constrained)	Decreasing supply base due to drought, abstraction reductions and legislation Lack of interconnectivity and water trading in the South East	A
	Flooding of our sites	Impact of national infrastructure projects such as HS2 and abstraction reductions on the criticality of our assets	A
	Environmental degradation impacting on raw water quality	Managing catchments to ensure the natural environment is more resilient	A
	Limited finances for the business	Financial stability to protect customers, ability to withstand economic shocks and stresses	G
	Workforce unfit for the future	Ensure we have a digital, agile, flexible and resilient workforce as well as an established supply chain strategy	A
	Changing governance and regulation	Improve transparency of governance & political influence Assurance of information Processes & systems	G



	Disengaged and non-resilient customers & communities	Ensuring bills remain affordable and that customers are in control, supporting communities in their ambitions, enabling them to thrive 24/7 response to customer needs	G
	Population growth leading to demand increase	Continued growth in our area, with a number of garden cities and villages, and infill developments	A

Figure 9: Key resilience risks in 2020-2025 and beyond

We currently have a medium operational resilience, driven by a diversity of water sources, good network inter-connectivity and established imports from neighbouring companies, but we need to improve short-term resilience to customers, especially in terms of pressure and availability of supply. Our people resilience also requires improvement, especially in terms of talent acquisition, retention and succession planning.

We are facing a large population growth, significant drought risk and climate change impact in our area going forward, therefore we will need to further reduce wastage through water efficiency and leakage reduction to minimise impact on the environment – this plan requires a significant change in behaviours and innovative approaches, we will trial some new schemes in our ‘fast data’ and environmental pilot projects.

Additional resources (Upper Thames Reservoir) also need to be progressed and could be required as soon as 2035, as a shared regional resource for the Southeast, transforming AW Central as a key Hub in the South East water grid, enabling West-East and North-South transfers.

Our approach fully integrates operational, financial, corporate and reputational resilience on the short, medium and long-term. Our proposals in this Price Review are the enablers, fitting between our Water Resource Management Plan, where we set out our strategy for the next 25 years or and beyond, and our Annual Wholesale Portfolio Plan, to ensure that we can provide our customers with dependable, high quality and affordable water now and in the future.

4 Our resilience themes

4.1 Our Governance

Our governance resilience is detailed in our Trust, Confidence and Assurance Appendix – 11, the section below provides a high-level overview on key themes of our Governance resilience.

Quality assurance & certification

We take our duties and obligations seriously and responsibly manage the risks to our reputation. Our management system meets the quality assurance demands and expectations of all our regulators and shareholders. The policies and procedures of the management system provide clear instructions and information to minimise the risks and to provide records that demonstrate our compliance. The management system is structured around established management processes incorporated into the International Standards Organisation ISO and OHSAS documents and as an enhancement, Affinity Water subscribes to an accredited third-party assessment of our management system.

Through this assessment, the Affinity Water business has retained accredited certification for its management system covering OHSAS18001:2007 Health & Safety, ISO14001:2004 Environment and ISO9001:2008 Quality Assurance throughout the 32 man-day assessment visits carried out in 2017/2018. The management system is considered mature and is currently going through a planned transition to meet the requirements of the 2015 versions of these ISO standards with the new ISO45001:2018 version being integrated within the plan for late 2019 delivery. The Quality Assurance procedures and system continue to reflect the expectations of our customers and the Environmental procedures will continue to support CRC, GHG, ESOS 2019 requirements with the system meeting the Environment Agency expectations on preventing pollution and minimising our environmental impact. There have been no notifiable pollution events in 2017/2018 however, the company has continued to be proactive with regards to the potential environmental impact from bursts on the water network and have reported 83 burst events to the Environment Agency during the period.

Risk management

We have an established framework for identifying, evaluating and managing the key risks we face. A key aim is to foster a culture in which teams throughout the business manage risks as part of their management of day-to-day operations. Operational risks are recorded and assessed, including existing management and control processes, and action plans are prepared, if necessary, for further mitigation. Activities against these plans are monitored on an on-going basis. Operational risks are also ranked by our teams during the year. Based on these rankings the most significant risks are discussed by our senior management and included in the strategic risk register, which is reviewed by the Board and the Audit Committee. The latter reviews senior management's work on risk management and reports to the Board on the effectiveness of risk management processes.

Strategic risks are assessed in terms of their potential impact on achievement of the Company's strategic objectives and are categorised as operational, regulatory and financial.

Business continuity planning

We have a comprehensive Business Continuity Plan in place, it defines the company functions that are critical to the business; initially in the short-term and in a more protracted incident; particularly the ability of the company to continue to operate without premises, IT or sufficient

staff. Our planning for and response to emergency events is founded on a gold, silver, bronze command structure which ensures that tactical operational decisions are made at an operational level while strategic co-ordination takes place at the highest levels of our business. This is consistent with best practice principles developed under the Civil Contingencies Act 2004 and government advice to water companies under the Security and Emergency Measures Direction 1998. The Executive Management Team members discharge the role of Gold Command on a 24/7, 365 days per year basis, thereby ensuring appropriate oversight of emergency planning and response activities at the highest organisational level, and effective communication with our Board. Our Emergency Plan, which is revised continuously, shows who, what and where information is in order to prepare and react to an emergency situation.

4.2 Our Environment

The ability to supply our customers with water is directly affected by the availability of water in the environment. Approximately 65% of the water we abstract is from groundwater sources and the remainder is from surface water. We rely on rainfall to replenish the water which is used by our customers and by the environment, and the weather can therefore have a significant impact on the resilience of our business. We continuously manage our water resources as efficiently as possible to maintain a supply of high quality water to meet the demands of our customers, while ensuring the sustainability of our resources and minimising any impacts on the environment. To enable this, we carefully monitor the baseline water resource situation and the water usage of our customers in each of the three regions.

We recognise that our operational and strategic actions have the potential to cause environmental impacts, particularly for sensitive habitats in our area such as chalk streams, wetlands and designated sites. We have a responsibility as a statutory undertaker to ensure that we comply with all relevant environmental legislation, and through compliance to ensure that any environmental impacts of our actions are identified and minimised.

How the natural environment impacts resilience of our business

Water companies in England are legally required to supply water to private consumers and businesses within their area. As set out in the Water Industry Act 1991, Affinity Water must prepare and maintain a Water Resources Management Plan (WRMP) that sets out how the company intends to maintain the balance between water supply and demand. The WRMP must take a long-term view, setting a planning period that is appropriate to the risks in relation to supply and demand, but which covers at least the minimum statutory period of 25 years.

The WRMP is complemented by Affinity Water's Drought Management Plan (DMP), which sets out the short-term operational steps to be taken during a drought to enhance available water supplies, manage customer demand and minimise environmental impacts.

A Strategic Environmental Assessment (SEA) was carried out as part of the development of our WRMP. The SEA is undertaken in parallel with the Habitat Regulations Assessment (HRA) and preliminary Water Framework Directive (WFD) assessment of the dWRMP19. This ensures an integrated approach to environmental assessment; such that environmental considerations are integral to the development of the 'best value programme' of options for each Water Resource Zone (WRZ) under consideration.

There are 14 objectives that the SEA uses to assess options and programmes. These include if there: will be an impact to 'the resilience of the local environment and Affinity Water assets to climate change', will an option 'lead to the loss or degradation of priority habitats/species or lead to the creation of new priority habitats' and 'avoid adverse impact on surface and groundwater levels and flows' amongst others looking at soil quality, carbon footprint, landscape character and biodiversity.

By undertaking this SEA, it is hoped that risks and concerns with how we are proposing to solve our supply demand balance deficits can be identified and removed or mitigated to ensure we produce a plan which is resilient to future concerns.

Another aspect of the WRMP19 whereby the natural environment could impact against our resilience as a business is in the baseline figures which comprise our supply demand balance. Items such as deployable output (DO) have been assessed using historic droughts and worse droughts than ever recorded to provide a more severe planning scenario to meet. By planning to more extreme conditions, we can ensure we would be resilient to a 1 in 200 drought event.

As described in the draft WRMP, the current key environmental challenges for resilience in the water sector are:

- Naturally occurring droughts and floods;
- extreme cold events;
- climate change causing increased frequency of extreme weather events;
- environmental degradation and impacts on water quality;
- planning uncertainty due to all the above.

Our Water Resource Management Plan and Drought Management Plan are designed to ensure that we remain resilient through all the above challenges.

The DMP details short term operational actions that we would take during a drought, in order to manage and, where possible, improve our water resource position to make water available to customers whilst minimising impact on the environment. This plan does not include any plans for permanent changes in the operation of the company and parts of it may or may not be required during any given drought event. Our DMP highlights potential short-term environmental impacts of its implementation and we will undertake monitoring to assess and mitigate these temporary impacts wherever possible.

How our business impacts the natural environment

Abstraction influences on river flows within our supply area are a legacy of post war water resources development. Finding a sustainable balance between the provision of public water supply and the environmental requirements of nationally rare habitats like chalk streams, continues to be a challenge. We have been investigating the impact of our public water supply abstractions over the last six Asset Management Plan (AMP) periods and at present we have a programme of nine studies and ten implementation schemes to be delivered between 2015 and 2020.

The National Environment Programme (NEP) is a list of environmental improvement schemes defined by the Environment Agency (EA) to ensure that water companies meet European and national targets related to water bodies. Our current NEP includes investigations, options appraisals and implementation schemes relating to the environmental impact of our abstractions. The implementation schemes include 'morphological mitigation works' (river restoration and habitat enhancement) and fish screening. Our NEP also includes our Sustainability Reduction Programme, where we are reducing a number of our abstractions. Our Biodiversity project aims to meet our duties under the Natural Environment and Rural Communities (NERC) Act and our Catchment Management programme (NEP for Water Quality) is delivering our obligations under Article 7 of the Water Framework Directive.

In addition to the investigations carried out as part of NEP, a Strategic Environmental Assessment has been undertaken as part of the development of our WRMP. This report aims to assess all potential environmental impacts on arising from the options identified within the Plan.

Our DMP includes several supply-side actions which have the potential to result in environmental impacts. In particular drought permits and drought orders are drought management actions that, if granted, allow more flexibility for us to manage water resources and the effects of drought on both public water supply and the environment. Drought permits and drought orders have to be applied for by water companies to allow for increased abstraction during times of droughts, and these can cause environmental impacts.

We identified twelve sources within our Central region and four sources within our Southeast region that have the capability for either increased abstraction or cessation/reduction of river support under a drought order or drought permit. An environmental assessment has been undertaken for each river affected by these sites and full Environmental Assessment Reports (EAR) have been compiled. Copies of these are available to view at our offices upon request. The EARs aim to establish the likely environmental impacts of using the drought permits, as well as setting out associated monitoring and mitigation plans to ensure any effects are captured and minimised during use of the drought permits. Figure 10 shows the process for preparing our EARs.

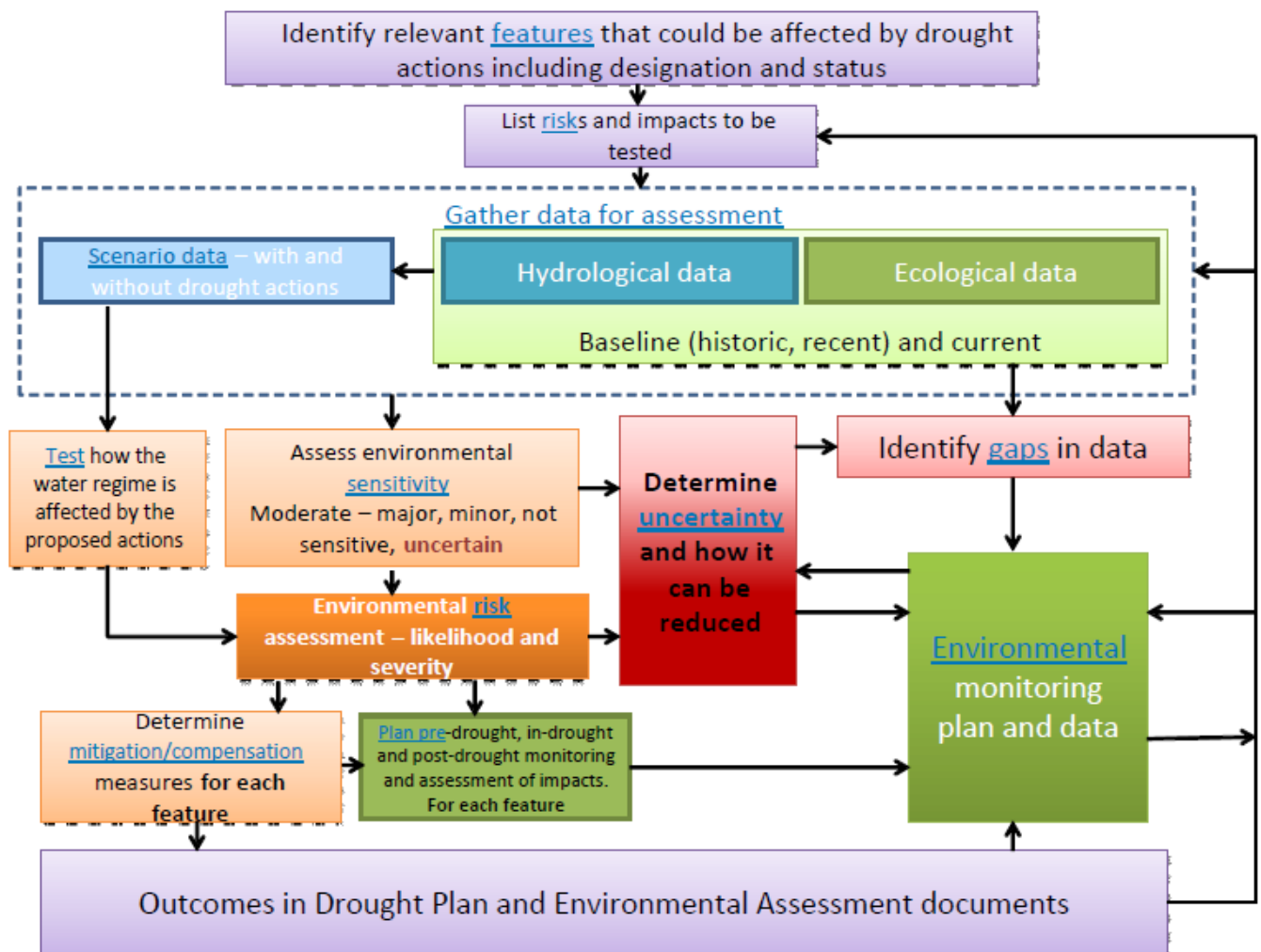


Figure 10: Flow chart of how to prepare an environmental assessment

How agriculture impacts our resilience

The intensification of farming in England since World War Two led to fundamental changes in the land use and the way land is managed in our catchments. Further intensification of

agriculture to meet the needs of a growing population has led to a shift towards growing more crops over winter instead of spring. This shift towards winter cropping and the greater prevalence of bare ground during this period has led to increased degradation and erosion of soils and subsequent losses to water. Consequently, this has also led to an increase need for greater inputs of nutrients and crop protection products to increase yields to maintain competitiveness of individual farm businesses in a challenging and fluctuating global food production market, which is likely to be exacerbated further by the effects of climate change. The increased inputs required to maintain and increase yields has led to deterioration in water quality affecting the resilience of our ability to supply wholesome drinking water, particularly during the autumn/winter period. The intensification of agriculture and increased use of heavy machinery has also led to issues such as soil compaction. This impacts on the natural drainage of water resulting in increased run-off and increased sediment losses. This can lead to a reduction in natural recharge which we depend on replenishing our aquifers affecting our resilience during periods of drought. Greater sediment losses and associated pollutants causing deterioration in water quality also lead to reduce capacity for water bodies to hold and move water leading a greater risk of flooding which can impact on our assets.

Arable and livestock farming is the dominant land use across our supply region affecting the quality of the groundwater we abstract and in the ~10,000km² upstream Thames River Basin, much of which is outside of our supply area, affecting water quality at our River Thames water treatment works. The predominant water quality challenges we face, both in surface and groundwaters arise from diffuse pollution from agriculture including: turbidity caused by soil and sediment losses to water; pesticides losses to water from the field and farmyard particularly following rainfall events; nitrate leaching into groundwater from agricultural fertiliser usage and coliforms and e-coli from livestock.

Farmers have been implementing more sustainable approaches to food production. Over the past 20 years fertiliser use has decreased. However, due to the time it takes for water to move through our aquifers, there is a delayed response to water quality and we are observing increased concentration of nitrate in groundwater which is likely to continue for decades to come. We have undertaken hydrogeological modelling to predict this future trend in our nitrate affected sources and inform our catchment management schemes. Pesticide use is more targeted with fewer active ingredients used. However, these fewer actives are used in greater quantities across our catchments and with limited application windows we observe increased peak concentrations which provide a greater challenge to the resilience of our treatment processes.

Our catchment management for water quality programme seeks to identify of sources of agricultural pollution risks through the development of Drinking Water Safety Plan catchment risk assessments. A programme of work is undertaken through the Water Framework Directive “no deterioration” driver delivered through the Water Industry National Environment Programme for Water Quality (WINEP WQ) which aims to identify key pollutant pathways and work in partnership with farmers and land owners to identify and implement catchment-based approaches to reducing diffuse pollution from agriculture.

For further information on the development of the catchment management for water quality programme, see section 4: Environmental Enhancements Programme of Appendix 6 - Wholesale Technical Appendix.

Farmers recognise the need to improve their environmental performance at the same time as producing high quality food⁹. The uncertainty around Brexit and the Common Agricultural Policy presents significant challenges to agricultural sector. However, the creation of a new

⁹ Catchment Management Declaration by the University of Cambridge Institute Leadership

framework signals an opportunity to design bespoke policies that put water and the environment at the heart of farming practices which could deliver simpler, more cost-effective agriculture and environmental performance providing a greater resilience to both the agriculture and water sectors. The New Farming Rules for Water and 25 Year Environment Plan, both published by the government in 2018 aim to address diffuse and point source pollution risks to the water environment. However, addressing these challenges cannot be achieved by just through regulation. Delivery on the ground of these and future measures cannot solely be achieved by government, or any single sector such as the water industry. Catchment solutions are multi-sector and highly inter-connected. There is a need for collaborative and partnership working to get local-level action to deliver innovative, sustainable solutions to improve resilience, both for our public water supply and for agricultural businesses.

How we strengthen our resilience against agriculture

Agricultural resilience is about equipping farmers to absorb and recover from shocks and stresses to their agricultural production and livelihoods. Some shocks are short-term, others long-term. Some come suddenly while others are predictable. By working in partnership to address these changes, we can identify more sustainable methods of farming that provide a greater resilience our business in terms of improvements in raw water quality.

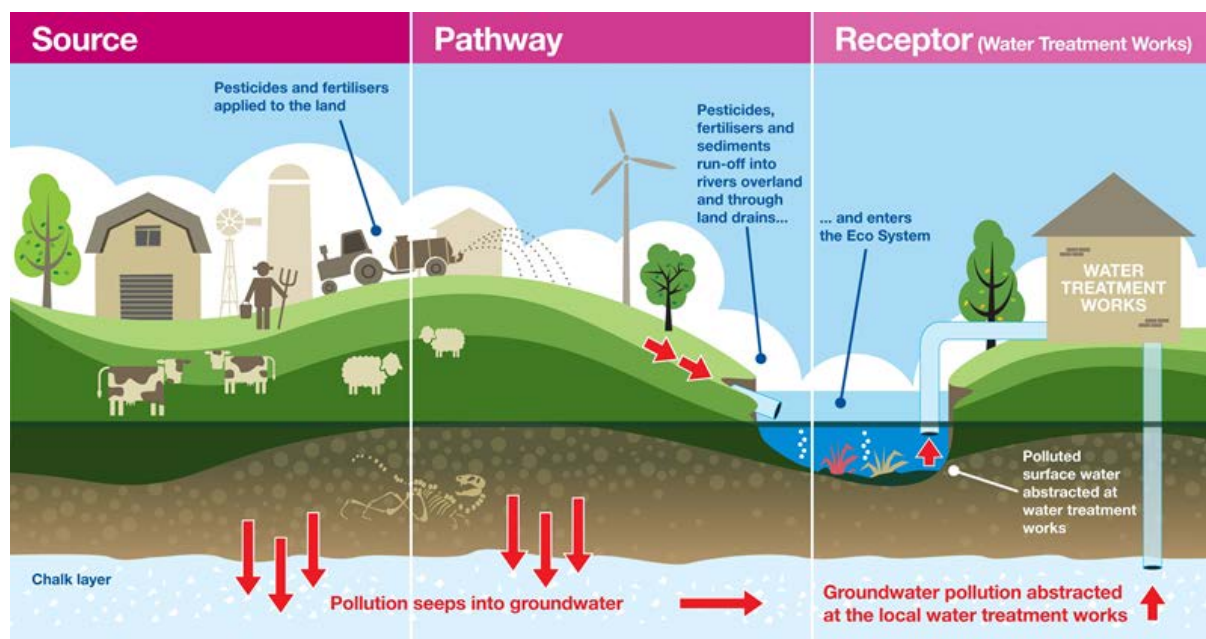


Figure 11: Affinity Water Source, Pathway, Receptor image used as part of our agricultural engagement

Our catchment management for water quality programme, established in 2010, aims to identify the sources and mitigate the pathways for diffuse and point source pollution (see figure 11) from agriculture that impacts on our resilience to supply wholesome drinking water. The programme that has been developed for our 2020-2025 plan seeks to develop partnerships and work collaboratively with a wide range of stakeholders to identify catchment-based mitigations to increase our resilience to agricultural pollution challenges.

The way the land is managed has the potential to affect the quality of the water the environment can provide – for better or for worse. The knowledge and experience we have gained from our catchment management schemes in 2010-2015 and 2015-2020 has shown that improved soil management can have multiple benefits for the resilience of our public water

supply, both in terms of quality and quantity of water availability. Our approach will be to work alongside individual farm businesses to develop more sustainable soil and nutrient management plans with a focus on water resource protection through a Payment for Ecosystem Services (PES) mechanism. Payment for ecosystem services takes the view that farmers need to manage their land very carefully to keep surface and ground water clean, or slow water down on their land to encourage more sustainable drainage and natural recharge of groundwaters. It is important to recognise that to achieve this, farmers will need to go above and beyond current regulatory requirements to achieve best practice. In many cases at cost, to provide clean water, and reward them for keeping water clean. PES needs a clear seller and a clear buyer – the farmer is the “seller”, and the water company is the “buyer”. It gives us a way to pay farmers for keeping water clean, which ultimately provides greater resilience at the treatment stage.

We acknowledge that this cannot be achieved in isolation. It will be important to work in partnership with the agricultural sector and other stakeholders including catchment partnerships, regulators and other ecosystem services beneficiaries. This will facilitate the identification and implementation of effective measures to address the challenges affecting water and develop appropriate Natural Capital mechanisms and incentives to realise multiple ecosystem services benefits. In recognition of this need, we have become a signatory to the Catchment management declaration developed by the Cambridge Institute for Sustainability Leadership. The declaration calls for greater collective action and will support the delivery of many elements of the 25 Year Environment Plan. In addition, we have been headline sponsor and proud supporter of the Groundswell Conservation Agriculture event since 2017. Groundswell is an independent show and conference, 'by farmers for farmers', focusing on emerging methods of soil regeneration, reducing inputs and increasing profitability in arable and mixed farming which can all lead to greater resilience, both for agriculture and the water environment.

Our green infrastructure

We have a legislative and regulatory obligation for the conservation of biodiversity and control of non-native invasive species. We are required to protect and where appropriate enhance priority species/habitats on our landholdings. Our 2015-2020 Biodiversity Program will help achieve these obligations.

During the third year of 2015-2020, 93 landholdings in Communities 1-6 were surveyed for protected species and habitats. This included a number of sites that previously had not been surveyed for ecological purposes. As well as this, several specialist ecological surveys were undertaken including butterfly, moth, reptile and bat surveys. In total, 196 different species were recorded of which 27 were priority species, as indicated in the UK Post - 2010 Biodiversity Framework. In addition to these findings, our main achievements have included the completion of tree surveys across every site in the central region and invasive species identification, treatment and eradication at 24 sites. There has also been progress with the strategic partnership with the Herts and Middlesex Wildlife Trust with the production of three management plans aiming to deliver significant biodiversity and access improvements at three Local Nature Reserves (LNRs). This has also included guided walks and talks to engage with the public along with volunteer work parties, including three with Affinity Water staff. A number of Barn Owl and Kestrel boxes have been installed in addition to the many already located in Hertfordshire with the aim to provide a nesting site in areas with suitable habitats.

In the Brett Community (WRZ8), bird surveys were undertaken at 6 key sites following the preliminary surveys in year 2. From these surveys, 93 different species have been recorded of which 6 are protected. In addition, a management plan has been implemented at a key site in the Dedham Vale Area of Outstanding Natural Beauty and bird boxes have been installed at five new sites.

In the Dour Community (WRZ7), woodland management plans have been implemented at four sites to ensure the future management of woodlands is in the best interest for biodiversity potential. One site out of 151 was found to contain invasive non-native species but additional surveys have been carried out to ensure that no new specimens have been found on our landholdings, thus complying with our legislative obligations. Further work is also being carried out to monitor the threat of ash dieback and to monitor important populations of dormice and lady orchids on our landholdings. Additionally, a project to install a pond at a key site has been implemented with surveys expected to be carried out in year 4 to assess the increase in biodiversity.

4.3 Our Finances

Our financial resilience is detailed in our Financial Appendix – 10.

4.4 Customers and Communities

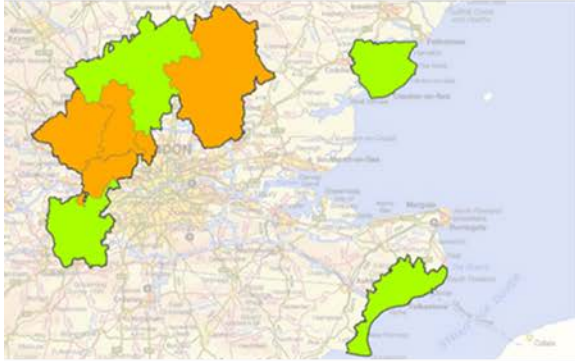
Our customers and community resilience is detailed in our Community Approach Appendix– 8, the section below provides a high level overview on key themes of our Customers and Community resilience.

How our resilience protects our customers

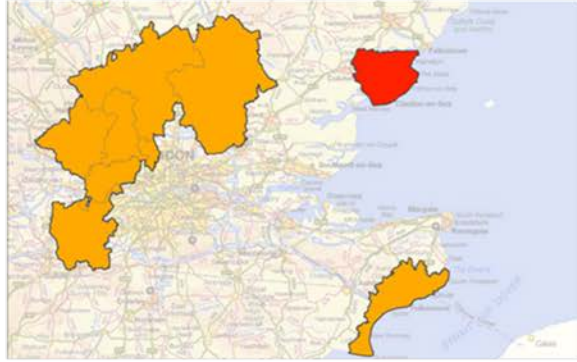
The core of our business is delivering a good quality service to our customers. We understand interruptions on our sites (related to our physical network or IT infrastructure), management of our catchment, skilling of our people; all may have an impact on customer's experience and quality of service. Affinity Water covers a diverse area of supply ranging from remote and rural areas, through little towns, to very dense areas of North London. Customers we supply stretch from dwellings, farms, small businesses to very sensitive and water dependant settings like hospitals, pharmaceutical manufactures or national high priority sites like Heathrow airport. That means challenges and risks we face differ from community to community.

To help us understand the difference between our communities, we completed the Resilience Risk Assessment, described in section 1.4, for each community separately. We scored each of our communities based on different risk category following the metrics described in section 2.5. Results of the analysis are displayed in the Figure 12 overleaf.

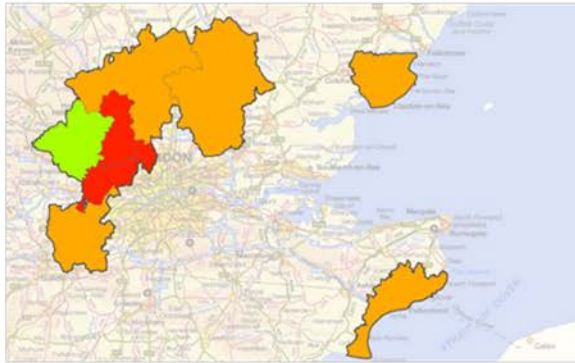
Flooding



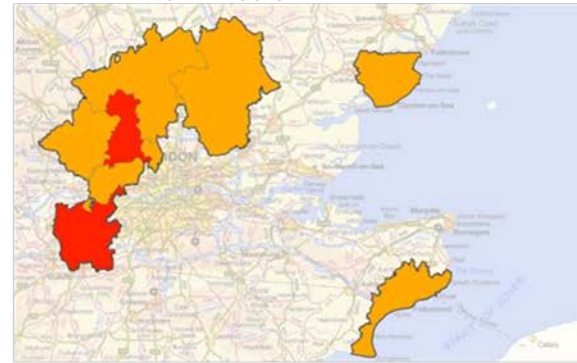
Critical Asset Failure



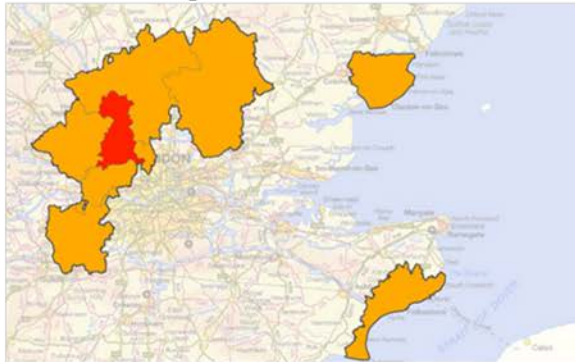
Contamination of the network



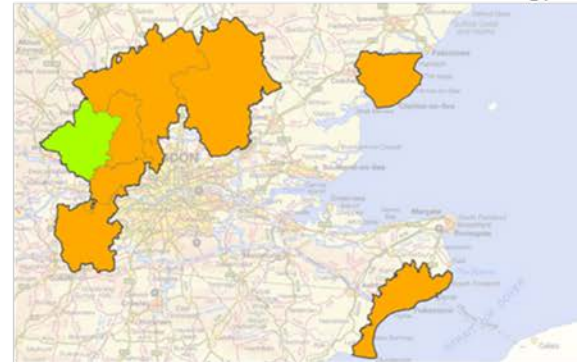
Unavailability of supply



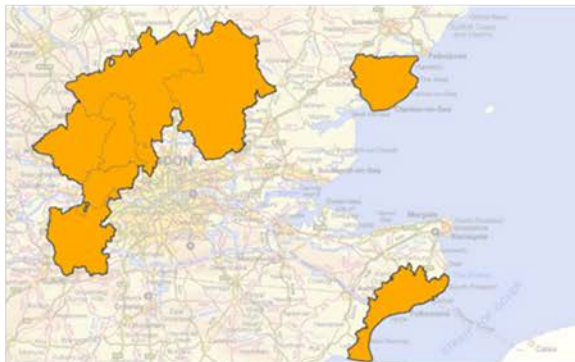
Malicious Damage



Telecommunication and Information Technology



Environment and catchment








1	Unknown or very poor	
2	Poor	
3	Fair	
4	Satisfactory	
5	Excellent	

Figure 12: Risk score per community

Average flooding protection of our production sites is fair across our communities. With a significant investment to protect our main and most vulnerable abstraction sites in AMP5 we are well protected to a 1 in 100 + 20% flooding events. Communities marked with amber have a fair level of protection which is mostly due to changes to their vulnerability following ongoing sustainability reductions from some of our sources.

Critical asset failure is scored as fair across all communities, with the exception of Brett. This is due to our high reliance on the Horsley Cross treatment works, which supplies majority of the Brett community. Work around improving the site and firming up our contingency plans in Horsley Cross is being accelerated due to DWI undertaking in AMP6.

Maintaining water quality of the network is scored as satisfactory and fair in most communities, the only community of concern is Colne where the score is low. The reason for it is an increased vulnerability of sites, due to storage back up being less than 12 hours and some single source of failure in the network. Duration of impact, in case of the major asset failure, is estimated to last between 12 – 24 hours and an impact of the event would affect up to 50% of properties in the community.

Unavailability of supply is scored fair across the company, with the exception of two communities Wey and Colne which score was low. Both of those communities were scored low in the same areas: likelihood as the interruption to supply caused by drought or exceptional demand occurred in the last 2 – 5 years and may occur in the next 5 years; and vulnerability as both of the communities have a number of single sources of failure and a storage back up is in some areas less than 12hours.

Malicious damage was scored as fair across all communities. All our high priority sites have a very high level of security and individual Emergency Response Plans (ERP) developed and practised, small sites have a mixture of staff on site and CCTV, and generic ERP developed. Also in case of the damage to the site the max impact will affect up to 25% of the properties in communities.

Telecommunication and IT was scored as fair across the company with the Misbourne community scored as satisfactory. In majority, we have some alternative or manual arrangement in place to control event in case of the failure, we have generic ERP and most of the time the failure will affect up to 25% of properties in communities.

Environment and catchment was scored consistently as fair across all communities. The reason for it is, our staff is on site to carry out regular surveys in the catchment areas, we have generic ERP developed, we manage up to 75% of our catchment and in case of an incident up to 25% of properties in community will be affected.

Based on the score for individual risk categories, we can summarise the resilience of Affinity Water as fair. Impact of incidents on our customers is minimised by storage able to support the demand from 12 to 24 hours. We have no more than 2 critical assets within the system, where a critical asset is described as the single cause of failure to the whole of the system. We do the ongoing maintenance and monitoring of our assets to minimise the likelihood of failure, maintain good security of our sites and flood protection to ensure customers are supplied with water in the adverted conditions. We carry regular surveys of our catchment areas and work closely with customers who may affect the quality of our catchment (i.e. farmers). We have raw water controls in place which minimise the service risk to water supply (i.e. reservoirs, mixers, mobile PAC plans) and significantly reduce risks to water quality and headroom to meet demand.

4.5 Our People

Affinity Water is expected to provide good quality water every day in a manner which protects our environment, is effective, efficient and safe. A 24/7 service which is reliant upon a system of networks, infrastructure assets, technology and people (directly employed and through our

supply chain); all working collaboratively and who understand the importance of what they do and how they do it.

People resilience is about ensuring we have the right culture and workforce – inclusive, diverse, skilled, agile and engaged - to deliver operational and customer excellence. We know our employees take pride in working for a local organisation which holds strong values such as ours and our aim is to become an employer of choice within our local community. Equally, we understand the competition for talent - in a context of increasing skills-scarcity, nationalist boundaries and changing workplace preferences (of current and future generations) - will continue to challenge our workforce resilience. The **rise of digital, automation and customer expectations for a 24/7 service** already demands a level of efficiency, productivity and re-skilling, putting pressure on our people capacity, systems and processes to adapt. These complex challenges are felt across ours and other sectors, making the case for cross-industry partnership and collaboration more fundamental to delivering sustainable responses.

Our strategy to enable people resilience

During 2015-2020, we have recognised the importance of a people strategy, aligned to our business plan which will ensure we have the necessary people capacity and capability to deliver our commitments to customers and communities. The priorities outlined in our people strategy (Figure 13) seek to address these resilience challenges and opportunities; and reinforce our aim to deliver a culture where colleagues and supply chain partners experience **“a great day everyday”** at Affinity.

The Affinity Way promotes resilience by emphasising the importance of empathy, inclusivity, communication, community as core tenets of Affinity culture. By engaging in a proactive and ongoing dialogue with colleagues, partners, customers and stakeholders, Affinity ensures it is continually ‘listening’ to feedback from diverse sources and perspectives. In doing so we extend our ability to horizon scan and detect ‘weak signals’ before issues escalate. This requires relentless focus on recruiting and promoting diversity of both thought and our workforce profile.

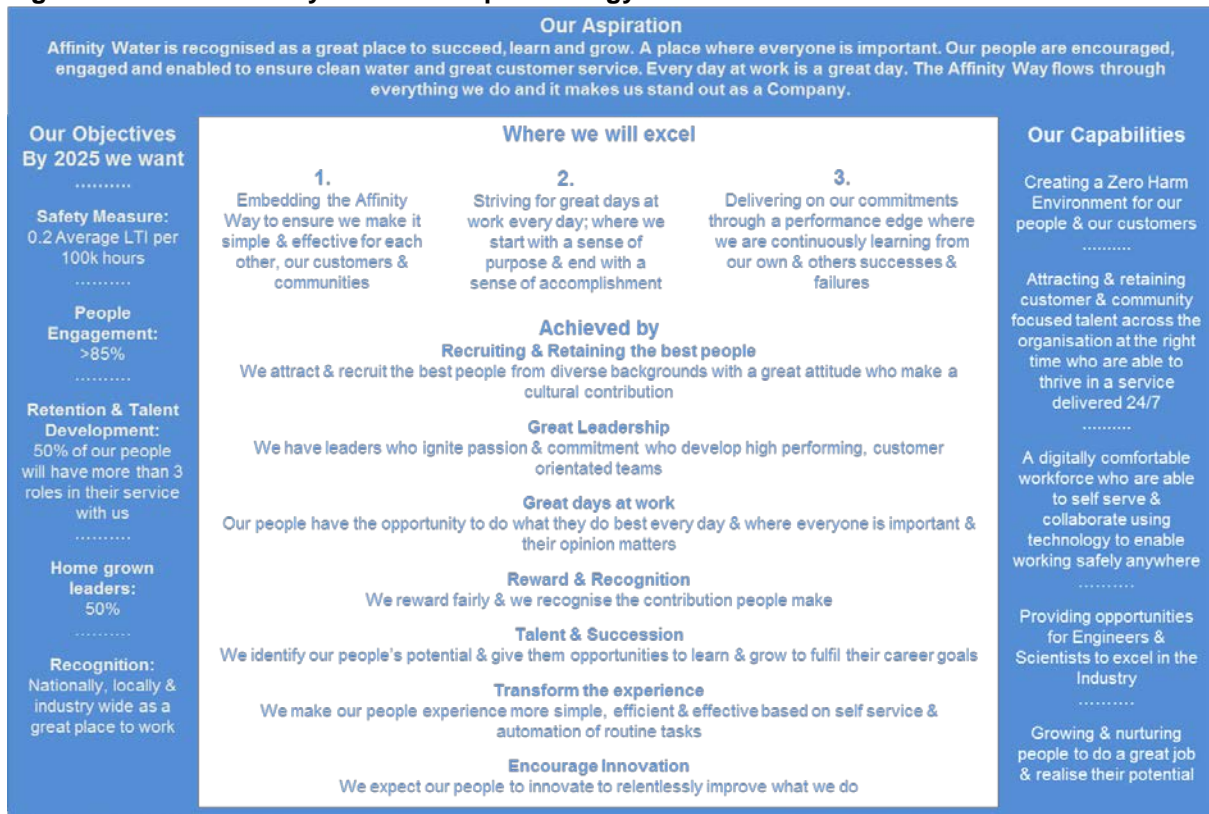
To underpin and guide our strategy, we are developing a workforce plan to address the deliverability aspect of our 2020-2025 Business Plan; how we deliver the demands of everyday business as usual, respond to emergencies and events whilst also ensuring longer-term business and sector resilience. It sets out these macro forces challenging our environment, sector, business model and the specific impacts and imperatives for our current and future workforce. In support of this, we have commissioned a report to assess our level of people resilience addressing issues such as retention, retiring attrition rate, ethnicity inclusion, demographic balance, succession planning and gender. The plan also informs how we will manage our suppliers; ensuring contracts are sufficiently robust and resilient.

Our People Strategy, **“A great day every day”** describes how we are continually investing in our people to do a great job for customers whilst building and addressing people resilience. Employee engagement is a key indicator of people resilience and customer satisfaction and thus a consistent priority for our managers and leaders. We have a good reputation within the industry and locally as a good employer and we will seek to maintain this through a culture which:

- enables a great day at work every day, achieved through great leadership which ignites passion and commitment, a focus on teamwork, safety and wellbeing
- provides roles which enable people to do what they do best every day and where they can learn and grow; this includes maximising our apprenticeship levy to ensure we are continually maintaining a multi-skilled workforce
- provides competitive market rates of pay and great benefits
- provides increasing opportunities for people to work the way they choose while fully maintaining our commitment to customers

We are active participants in our industry bodies, e.g. EU Skills, Institute of Water, HR Forums. We collaborate with other water companies to share knowledge and for example create learning content. We also expect our people to engage actively in their own professions and fund their membership to do so. The Affinity Way demonstrates we will listen and talk to anyone and each other to enhance our continuous learning from what and how we deliver.

Figure 13: Our Great Day at Work People Strategy



Key risks and challenges for people resilience

The world is changing at an ever-increasing pace and our industry must adapt to those changes. The process to supply water to 3.6 million people has changed little over the years although technological advances have improved how it is done and will continue to do so. Our people will drive and experience this change most. We have and will continue to have a clear understanding of the macro issues affecting our people resilience. The biggest risk for our people resilience emerging from the resilience risk assessment is the **workforce not being fit for purpose** which can be further broken down into:

- Not being able to attract and retain people with the skills we need to operate in an ever increasing 24/7 environment.
- Changing market for talent and increasing talent mobility and flexible working. In the 'gig economy' it could be, talent will stay with the organisation less.
- Digital revolution - retooling and reskilling our workforce as digital and automation both displaces and creates new roles.

We are committed to building a workforce ready to flex and adapt to the inevitable changes, focusing on reducing risks and meeting challenges in these areas. Our people strategy priorities and demonstrates our investment for the next AMP and beyond.

How we will tackle these challenges and achieve our strategy

We will continue to evolve the initiatives we have begun in the later part of this AMP to ensure our people and our people practices sustain resilience. We also plan to add to these during the early stages of 2020 to 2021 to maximise the potential gains during the remaining period.

Risks	Mitigations
<ul style="list-style-type: none"> Workforce not fit for purpose 	<ul style="list-style-type: none"> Maintaining the company culture which enables a great day at work every day, achieved through great leadership which ignites passion and commitment, a focus on teamwork, safety and wellbeing. Supporting professional development, mentoring, leadership training, graduate program. Roles which enable people to do what they do best every day and where they can learn and grow (training, e-learning, webinars). Maximising our apprenticeship levy to ensure we are continually maintaining a multi-skilled workforce (including MBA apprenticeships). Competitive market rates of pay and great benefits. Providing increasing opportunities for people to work the way they choose while fully maintaining our commitment to our customers (flexible working, Office 365).

Our People Strategy, “A great day every day” will ensure we are continually investing in our people’s development to do a great job, which means we are doing the right thing for our customers. This includes a focus on wellbeing, we are already on our way to achieving the Farmer Stevenson Enhanced Standards. We are partnering with other water companies to develop skills, which is achieving cost efficiencies as well as an opportunity to learn from the successes of our peers. Summary of our initiatives impacting our People Resilience is listed in the Table 5 below.

Table 5: Initiative improving people resilience

<p><u>Wellbeing</u></p> <ul style="list-style-type: none"> ○ Achievement of the Farmer Stevenson Enhanced Standards ○ An effective framework to support the life events of our workforce ○ Managers understand and can support the wellbeing of our people 	<p><u>Harmonisation</u></p> <ul style="list-style-type: none"> ○ Review of employment terms and conditions to ensure competitive benchmarking ○ Align working hours to operational and customer requirements ○ Ensure parity and fairness to optimise workforce engagement 	<p><u>Reskilling</u></p> <ul style="list-style-type: none"> ○ Understanding viability and impact of Artificial Intelligence ○ Reskilling programmes for our people to build a resilient workforce ○ Reskill people for the likely changes in skills required
<p><u>Early Careers</u></p> <ul style="list-style-type: none"> ○ Promotion to STEM career choices, as a company and as an industry ○ Utilise the apprentice levy to invest in our future workforce ○ Always have a defined number of early career apprentices and graduates ready to succession plan 	<p><u>Workforce Planning</u></p> <ul style="list-style-type: none"> ○ Use data to map and understand our workforce for the next AMP ○ Build on the data to help define talent pipelines and pools required to be resilient ○ Enable effective succession planning based not only on opinion but on data intelligence 	<p><u>Performance Edge</u></p> <ul style="list-style-type: none"> ○ Utilise improved digital innovation for best in class performance management based on Objectives and Key Results (OKRs) ○ Define job families, levels and career frameworks to give our people clear career progression ○ Use data to ensure performance driven results
<p><u>Innovation</u></p> <ul style="list-style-type: none"> ○ Utilise cloud-based data capture to get the best from our people, giving them the tools to manage effectively ○ Introduce Artificial Intelligence to optimise people efficiency ○ Promote a culture of digital innovation 	<p><u>Collaboration</u></p> <ul style="list-style-type: none"> ○ Work not alone but collaborate with industry via the Water HRD forum and Water Delivery Group ○ Partner with EU Skills to share and learn from industry best practice ○ Ensure effective people management of sub- 	<p><u>Continuous Learning</u></p> <ul style="list-style-type: none"> ○ Use the Learning Management System (Tap4Learning) to have a skilled, resilient workforce ○ Blended learning delivered for licence to operate, leadership and delivery excellence ○ Build the Affinity Academy as a learning hub

4.6 Our assets and sites

Our assets and sites refer to our operational network sites and assets as well as the infrastructure allowing those assets to be operated like telemetry equipment, IT servers or land and buildings required for hosting the assets.

Our operational resilience

Following the resilience metrics, we assessed and scored our operational resilience using a traditional approach of the 4Rs model, details of the approach can be found in section 2.5 of this document. This allowed us to score Resistance, Reliability, Response & Recovery and Redundancy in each of our communities. The results were approved by our community leads and are shown in the Figure 14 overleaf, where 0 represents unaware and 5 processes imbedded in BAU.

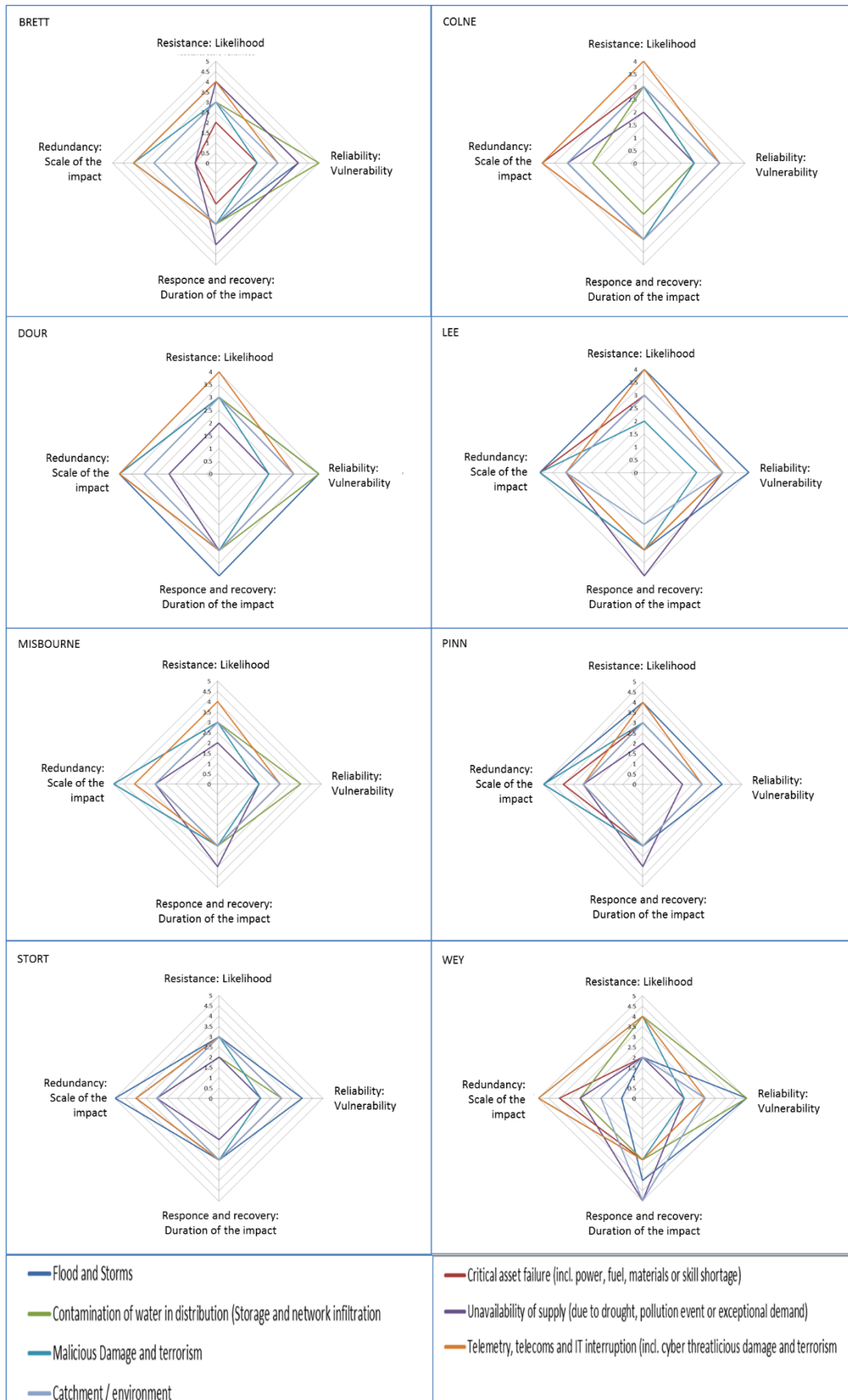


Figure 14: Resilience score per community

Our operational resilience systems have been allocated a medium resilience score through the assessment process due to the fact we have a diversity of water sources comprising of unground, surface water and established imports from neighbouring companies. Our good interconnectivity allows us to transport water from one part of the network to the other depending on the requirement that minimises our exposure to the effect of flooding or mains failure. Additionally, we have many mitigation measures in place, which include reservoir inspections, reservoir isolation plans, recovery plans, trunk main care plans, Drinking Water Safety Plans (which are plans put together following a risk-based assessment of the water journey from catchment to tap) and a Distribution Operation Maintenance Strategy (DOMS) which details how we manage our water network. All of which minimise our exposure to emergency situations and disruptions on the network.

Although we are resilient to operational single events or single year drought, we are vulnerable to longer term or multiple simultaneous events. Under these circumstances our resilience falls and impact on our level of service may result. Our Business Plan therefore includes interventions to further improve our operational resilience, which is further described in chapter 5 Our plan for 2020-2025 of this document.

Our Water Resources Management Plan

Our WRMP planning process is thorough and reflects a very strong modelling approach. Our planning horizon goes beyond the statutory period to 25 years, we look up to 60 years into the future (up to 2080) to address our long term strategic needs. Our aim is to ensure a resilient and sustainable supply of water to our supply area based on our unique set of challenges. Our WRMP process evaluates best value for customers, testing resilience and our levels of service.

Our rWRMP19 has greater resilience than previous plans and there are several key areas of our plan that have an emphasis on securing long term water resource resilience. These aspects of our plan include the following:

- drought resilience - new methodologies for drought impact on our supplies have been developed and tested, these include drought planning for the worst historic event on record and more severe drought events
- regional solutions – assessed options offering improved connectivity with neighbouring companies and third parties. Our plan is aligned with a regional strategy and forms part of a wider regional resilience solution, offering resilience to multiple companies
- long term planning – our EBSD extended methods approach takes our water resource planning beyond the 25-year horizon to 2080, and offers a plan that enables adaptation to future uncertainties
- strategic schemes that offer linked solutions - within our optioneering we have included schemes that offer solutions for single points of failure and are linked to strategic schemes that deliver ‘new’ source water or new treatment solutions
- emphasis on demand management strategies – demand management strategies are an essential aspect of long term resilience and our commitment to a continuation of our water saving programme (including metering and water efficiency initiatives to reduce per household consumption in the long term) will ensure this remains a key area of our long-term strategy
- further leakage reduction – reductions in leakage below the economic level will also help to improve our resilience to drought and population growth.

These aspects of our plan will help to assist in addressing the following long-term drought and non-drought hazards and planning risks such as:

- Reduced availability of supply due to climate change, pollution risk, and possible impact of major infrastructure projects on our sources of supply and sustainability reductions. To mitigate the risk and increase availability of water, our aspiration is to achieve 15% of leakage reduction by 2025 and 50% by 2050, This is a reduction from 2020, assuming we meet our leakage reduction of 162Ml/d at the end of AMP6.
- Increase in demand through climate change and population growth. To mitigate the risk and reduce the demand we set ourselves a target of reducing our PCC to 129l/h/d by 2025 and 110l/h/d in the long term. Reduction is from 2020, assuming we meet our PCC target of 147Ml/d at the end of AMP6.
- Uncertainty relating to large scale infrastructure planning to meet drought hazards, where supply demand deficits may occur beyond the minimum 25-year period. To mitigate the risk, we are considering a long term, 60 years, planning and explore the worst historic drought event on record.

Regional Collaboration in our WRMP

We have taken account of outputs from regional planning groups. In our WRMP we ensure alignment and consistency with national and regional strategies to ensure collaboration and sharing between companies. We have undertaken significant inter-company and third-party collaboration to support potential regional solutions. Identifying options and cross border supplies, from all our neighbouring water companies, has been a crucial component in the development of our WRMP and Business Plan.

An important strategic element of resilience in water resources is the regional context. We have taken a leading role in the Water Resources in the South East (WRSE) project, supported Water Resources East (WRE) and participated on the steering group of the Water UK Long Term Water Resources Plan, working with the Environment Agency and other water companies to assess strategic water supply opportunities across the regions. We have been working with the WRE project, attempting to address water resource planning issues in a new and innovative way, and we aim to support that work in an appropriate way going forward. We believe this approach moves us closer to a proposition of Regional Coordination in the future. We have been instrumental in promoting collaboration and an extension of the scope of the WRSE to include development of regional strategic plans with a decision-making authority.

Our dWRMP19 enhances our operational resilience by:

- sharing resources with neighbouring companies and third-party licence holders
- exploring a wide range of possible futures using scenarios to develop a 'resilience tested plan'
- promoting resilience by having a balanced programme of investment that does not rely on any one single option type.

IT infrastructure and cyber resilience

Over AMP6, we have made significant strides forward on the architecture of the IT estate, moving from self-hosted, long lead time physical infrastructure to a Cloud First approach to hosting. This is one of our unique capabilities allowing corporate resilience for change, through the flexibility of our core infrastructure assets. This approach provides the ability to adapt to emerging changes within the industry and regulations with reduced risk of failure and minimal costs. The Cloud First approach is also enabling our core assets to be resilient by design. The inherent redundant and disaster recovery nature of Cloud based Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) capabilities provides peace of mind to system

availability and business continuity. We have embarked and continue to invest in a significant data and information security (InfoSec) programme. Over the last 3 years there has been a significant increase in our InfoSec maturity which was recorded at level 3 in the independent NCC assessment report of early 2017, well above the UK corporate average. We were awarded the UK Government's Cyber Security Essentials+ certification in October 2017 and have continued to build upon the concepts of the certification by beginning the journey to fully align with the Global Information Security Management System Certification ISO27001 the target for alignment is the end of 2018. Moving into 2020-2025 we foresee risks increasing in Cyber Security. To reduce our risk, we are investing further in Artificial Intelligent (AI) Cyber software, tracking activity over the IT estate to determine anomalies and potential threats.

IT infrastructure and cyber resilience.

In 2015-2020, we have upgraded our IT systems and complimented this with an innovative awareness campaign for all our staff to reduce our vulnerability to phishing attacks. This involved issuing fake phishing emails to company staff, monitoring the response and providing feedback to improve awareness. These initiatives have reduced our vulnerability to cyber-attacks through educating our staff as well as improving our IT infrastructure.

We see further growth in AI through Big Data analysis and Machine Learning and Automation. Providing further innovation with regards to real-time operations, reducing Mean Time to Repair both in IT and out in the wider business operations. This analysis and pro-active situational awareness will also provide the basis for reduced interruptions to supply and water resource management. New predictive models for asset care will evolve and mature through quality data processing, improving our planned maintenance.

Our innovation cultural change and management, will start to cultivate ideas and knowledge sharing, supported by our DevOps shift in IT delivery we aim to provide the agility to adapt to unexpected circumstances or exploit opportunities for improvement.

Finally, our Cloud First strategy will mature and start to move up the value chain, shifting from Infrastructure as a Service (IaaS) to Everything as a Service (XaaS). Providing not only better value for money, but improved evergreen resilient IT services, mitigating risks of failure, technical obsolescence and functional capability gaps.

Our IT investments outlined as part of the business plan demonstrate our commitment to maintain this continued trend of stability, simplification and improvement, providing the foundations for betterment of work life balance of our people and improved customer experience.

Key risks and challenges for operational resilience

Our highest operational risk identified consistently through the assessment of shocks and stresses as well as through our risk assessment is **critical asset failure**. We recognise interruptions to supply and low pressure is a key concern for customers hence our ongoing efforts to improve our score. Another highlighted risk is the **population growth** and a challenge involved in an accurate planning for the demand changes. Linked to that is the **supply unavailability**, decreasing supply base due to drought, abstraction reductions and legislation. **Cyber-attack and terrorism** are key concerns from the point of view of our IT infrastructure.

Our key operational resilience risks are listed in the table 6 below.

Table 6: Main operational risks

Topic	Achieved to date	Initiatives for final years of 2015-2020	Activities continuing into 2020-2025	New initiatives for 2020-2025	Minimum standard and measure of success
Critical asset failure	<ul style="list-style-type: none"> - Contingency plans - Emergency Response Plan - Single point of failure 2000+ properties - Main renewal - Pump replacement - Reservoir isolation plan - Standby generators - Emergency exercises - Asset maintenance - Network Service Desk - GIS - CAD drawings - Hydraulic models' platform improvement 	<ul style="list-style-type: none"> - Review contingency plans - Review Emergency Response Plan - Mitigation solution for single point of failure 2000+ properties - Main renewal 2015-2020 Programme - Pump replacement 2015-2020 programme - Standby generators maintenance - Emergency exercises - Asset maintenance 2015-2020 Programme - Network event detection - CAD drawings library improvements - Linking hydraulic models to telemetry and GIS - Asset Information Centre contingency library 	<ul style="list-style-type: none"> - Review contingency plans (OPEX) - Review Emergency Response Plan(OPEX) - Main renewal 2020-2025 programme (CAPEX) - Pump replacement 2020-2025 programme (CAPEX) - Standby generators maintenance (OPEX) - Emergency exercises (OPEX) - Asset maintenance programme (Mix CAPEX and OPEX) - Maintenance of hydraulic models (Mix CAPEX and OPEX) - GIS maintenance (Mix CAPEX and OPEX) - AIC maintenance (Mix CAPEX and OPEX) 	<ul style="list-style-type: none"> - Water always on (Mix CAPEX and OPEX) - Sundon treatment - Dead legs removal (CAPEX) - Trunk main serviceability (CAPEX) - Additional storage (CAPEX) 	<ul style="list-style-type: none"> - Interruption to supply, see Performance Commitments - Maintain current level of serviceability - Water always on
Population growth	<ul style="list-style-type: none"> - Water Saving Programme - Leakage schemes - WRMP long term planning for population growth - Liaised with planning authorities 	<ul style="list-style-type: none"> - Water Saving Programme - Leakage schemes 	<ul style="list-style-type: none"> - Achieved year-on-year leakage and PCC reduction 	<ul style="list-style-type: none"> - Continuing the improvement programmes started in AMP6 	<ul style="list-style-type: none"> - Maintain current level of serviceability - Water always on
Unavailability of supply	<ul style="list-style-type: none"> - Water Saving Programme - Leakage schemes - Raw water monitoring for water quality - Catchment management 	<ul style="list-style-type: none"> - Water Saving Programme - Leakage schemes - Recommissioning out of service sites 		<ul style="list-style-type: none"> - Sundon treatment 	<ul style="list-style-type: none"> Resilience to 1 in 200 drought event
Cyber-attack, terrorism and malicious damage	<ul style="list-style-type: none"> - Sites security upgrades - Move to Cloud computing - Redundancy in infrastructure - Security upgrades of critical sites 	<ul style="list-style-type: none"> - Sites security upgrades - Move to Cloud computing - Security upgrades of our critical sites 	<ul style="list-style-type: none"> - Sites security upgrades - Move to Cloud computing - Security upgrades to our critical sites 	<ul style="list-style-type: none"> - Continuing on the IT security programmes 	<ul style="list-style-type: none"> Zero 3rd party intrusion (physical and digital) Reduced cost of repair

Behavioural nudge, our Improvement Programmes

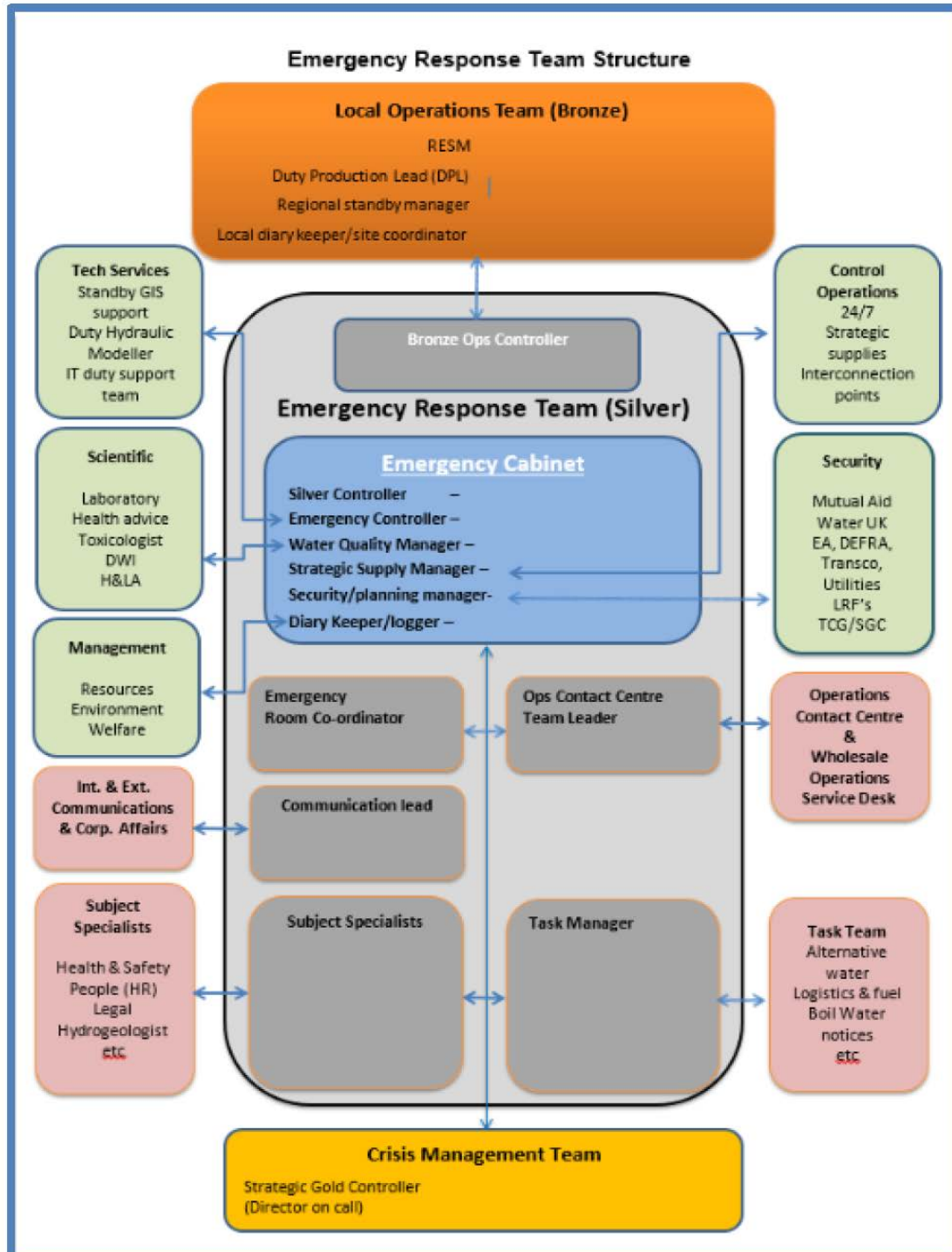


Figure 15: Emergency Response Team Structure

We hold post-incident wash-up meetings, following each event and identify any learning points or actions. This was emphasised by the appointment of a dedicated improvement team in September 2017 set up to deliver five core packages of work.

1. Functional Standby

Failing to make effective and timely decisions during incidents has been cited as a cause of delay during no water events that have impacted the ODI. A significant contributor to this is the incumbent supervisory standby model that is based on geography instead of functional role. A new operating model is being reviewed that will ensure we have the core skills of network repair and network operation always available.

2. Network Control Desk

Our Network Control Desk was formalised in January 2018 and now operates 24/7. The team is responsible for monitoring the network alarms being installed as part of our Network Event Detection (NED) programme. This new Desk will reduce our response times, particularly out of hours, when our customers may not be aware that they have lost their water supply.

3. Contractors meeting ODIs

Our previous sub-contractor frameworks (including repair teams, traffic management, plant and machinery) are based on a 2-hour response. This ensures that our supply chain are only paid for the resources they deploy whereas the previous schedule of rates arrangement meant they could lose money on this basis resulting in cheaper plant and equipment and unskilled labour being used. This was concluded as a primary reason for no water events since 2015.

We intend to maintain this payment approach in the contracts replacing NIMA and will ask the suppliers to price for a 'one hour' response time in AMP 7. This will assist us in responding more quickly to reduce our property minute interruption performance commitment over 3 hours.

4. Equipment and Materials

Investment is being used to fill gaps in our emergency stocks, increase training and competence and to deliver restoration services. A number of large diameter repair clamps (from 541mm up to 1300mm outside diameter) have been procured as they will provide a quicker live repair solution. We have sixteen different sizes each requiring up to 3 repair clamps across the 5 regional hubs (Egham, Rickmansworth, Stevenage, Horsley Cross and Cherry Cross). We have also procured repair clamps with 80mm flange outlets to help with return to service on mains of 200mm up to 1200mm outside diameter.

A new focus on restoring supplies alongside the repair of the burst main is a key strategy. To deliver this we have developed a new team with a dedicated Business Lead, moved 12 DLO Operatives into Restoration Technician roles and two Restoration Managers provide leadership for both on site deployment and pre-deployment planning/dispatch in our Network Control Desk. They will deploy an arsenal of lay flat hoses, pipework, fittings and tanks to restore supplies alongside the repair teams as and when required. They will also be upskilled to line stop and freeze mains to enhance our ability to isolate mains quickly.

We have strengthened our restoration capabilities with pre-chlorinated pipework on preloaded trailers to avoid delay in disinfecting on site which has ruled out restoration options previously. We have procured 3 further fully equipped restoration trailers.

We have adopted MOPVC pipework as our default pipe material for bursts up to 6" (150mm). Each team carries a range of pipe sizes stored within each other in a Russian doll configuration. This innovative way of transporting pipe negates the need to wait for the delivery of heavier pipework.

5. Extended Working Window

Linked to the standby operating model is the review of our team's working hours. Terms and conditions in Wholesale Operations (WO), extending our working window from 39.5hrs to 60hrs a week would reduce the likelihood of an event going on to impact the ODI.

Progress against these five core packages is sustained through a series of focused workshops and weekly steering group meetings that have driven our key enablers to improving our I2S performance. This good and sustained progress has enabled the confidence levels in the delivery of our plan to be increased.

The improvement programme is being delivered alongside other related programmes. By the end of AMP 6 we will have also completed our Trunk Main Mitigation programme which will remove all single points of failure on the network through enhanced network connectivity and resilience. The Control Vision programme is key to ensuring we can reduce the delay experienced during out of hours events. The delivery of the Situational Awareness tool will be the final stage in this programme of works that will bring together all of our network and production telemetry points on one platform to be analysed by our Control Desk teams.

As a result of these initiatives we have not had a significant 'no water' event since September 2017 besides the severe weather event during February/March. Our new approach proved effective during the freeze & thaw, and no customers experienced a supply interruption greater than 13 hours despite neighbouring water companies experiencing loss of supply to many customers for a number of days.




Our performance in year 4 to date is exceeding our ODI quarterly target (4 props vs 80 props target) and also the surrogate measure of property minutes that will be our measure in our plan for 2020-2025.

5 Our Plan for 2020-2025

5.1 Overview of our plan to ensure resilience

In order to improve our resilience in our plan for 2020-2025, a list of recommended initiatives was put in place (Table 7) in order to address our main concerns. Also, investments included in different Work Packages in our portfolio all take into account resilience and this is presented in the Table 8; additionally, we identified two initiatives specific under the Resilience portfolio. Section 4 of our business plan highlights our outcomes and performance commitments. Our plan will enable to deliver these performance commitments.

Resilience risks		Description	2020	Customers support/ Performance Commitments	Highlights from our mitigation plans	2025
	Critical asset failures	Interruptions and low pressure is a key concern for customers Vulnerability of our larger sites Impact of national infrastructure projects and abstraction reductions on the criticality of our assets	A	Customers want to continue to experience uninterrupted supply and expect good water pressure	Water Always On - reducing significantly the length of supply interruptions and low pressures by 2025 (Performance Commitments 5 and 10) Maintaining current level of serviceability through continued infrastructure and non-infrastructure investments (Performance Commitments 4 and 6) Replacing storage cells Supply 2040 : Build additional capacity to cope with critical asset failures	G
	Widespread failure of IT & telemetry	Mitigating external dependencies such as reliability on other service providers	G	Customers support proposals that protect the environment and improve long-term resilience.	Cloud computing (100% by 2021), Software and Infrastructure as a Service (SaaS, IaaS, XaaS)	G
	Terrorism and Cyber-attacks	Physical resistance to terrorism Information security failure	A	Customers accept current service level commitments Performance Commitment 5 -	Cyber-security and SEMD measures	A
	Infiltration	Ensuring water reaching customers' tap is of high quality	G	Customers accept current service level commitments	Continuation of reservoir inspection programme, DWSP, DOMS, network regulation inspections (Performance Commitment 19)	G

Resilience risks		Description	2020	Customers support/ Performance Commitments	Highlights from our mitigation plans	2025
	Supply unavailability (or constrained)	Decreasing supply base due to drought, abstraction reductions and legislation Lack of interconnectivity and water trading in the South East	A	Customers support proposals that protect the environment and improve long-term resilience.	<p>Resilience tested WRMP – We are currently resilient for a 1 in 40 years drought event, with customers support we are planning for 1 in 200 years drought event in our WRMP, development of extreme drought (Performance Commitment 3) scenarios, Leakage and demand reductions (Performance Commitments 1 and 2)</p> <p>Regional collaboration - coordination and cooperation between water companies in the South East through WRSE / WRE</p> <p>Acceleration of regional investment - new resource (UTRD from 2035)</p>	G
	Flooding of our sites	Impact of national infrastructure projects such as HS2 and abstraction reductions on the criticality of our assets	A	Customers accept current service level commitments	<p>We have review our exposure to flooding event in line with the National Flooding resilience review. Our site critical sites are currently protected for 1 in 200 events. We are not planning any change in our plan for 2020-2025. We will continue monitoring to prioritise investment and asset replacement</p> <p>The Completion of Thames relief channel by the Environment Agency <i>in 2025</i> will further support our resilience in the event of flooding event.</p>	G
	Environmental degradation impacting on raw water quality	Managing catchments to ensure the natural environment is more resilient	A	Customers support proposals that protect the environment and improve long-term resilience.	<p>Further support to a resilient ecosystem and biodiversity through a significant increase in size and scope of environmental programmes, Innovative environmental pilot schemes to support PR24 options (Performance Commitments 13 and 16)</p> <p>Developing land management programme to conserve and enhance biodiversity on our sites. Deliver environmental schemes where they have a legal duty such as WISER. This is described in chapter 11- Trust confidence and Assurance.</p>	G






Resilience risks		Description	2020	Customers support/ Performance Commitments	Highlights from our mitigation plans	2025
	Limited finances for the business	Financial stability to protect customers, ability to withstand economic shocks and stresses	G	Customers accept current service level commitments	Continuation of financial modelling, 5-year financial viability statements	G
	Workforce unfit for the future	Ensure we have a digital, agile, flexible and resilient workforce	A	Customers accept current service level commitments	Workforce Plan , horizon scanning, Diversity & Inclusion Strategy , resource plan to secure resource that we need for the future, improving people skills (competency, training, succession planning, mitigation measures) Improving supply chain , ensure that relationships through the supply chain support; effective and timely decision-making process; secure access to workforce to cope with shocks and stresses and ensure 24/7 supply as expected by customers.	G
	Changing governance and regulation	Improve transparency of governance & political influence Assurance of information Processes & systems	G	Customers support proposals that protect the environment and improve long-term resilience.	Improving the quality and assurance of our information (through our Data Strategy), systems (Digital Workplace), processes and governance (Business Management System), corporate stores (Corporate Library, Asset Information Centre)	G
	Disengaged and non-resilient customers & communities	Ensuring bills remain affordable and that customers are in control, supporting communities in their ambitions, enabling them to strive 24/7 response to customer needs	G	Customers support proposals that protect the environment and improve long-term resilience.	Increase in bills by to fund additional supply resilience- Please refer to investment by community chapter. Continuation of our 10-year IWS programme , gives customers more control on their consumption Community involvement - education programme expansion to Brett and Dour. Water Saving Squad , Lee Pilot Project , Customers resilience support during service disruptions	G
	Population growth leading to demand increase	Continued growth in our area, with a number of garden cities and villages, and infill developments	A	Customers support proposals that protect the environment and improve long-term resilience.	Innovative environmental pilot schemes, Smart City and Fast data project Supply 2040 - building additional capacity and flexibility in our strategic network to cope with prolonged and increased peak demand.	A

Table 7: Recommended AM7 initiatives

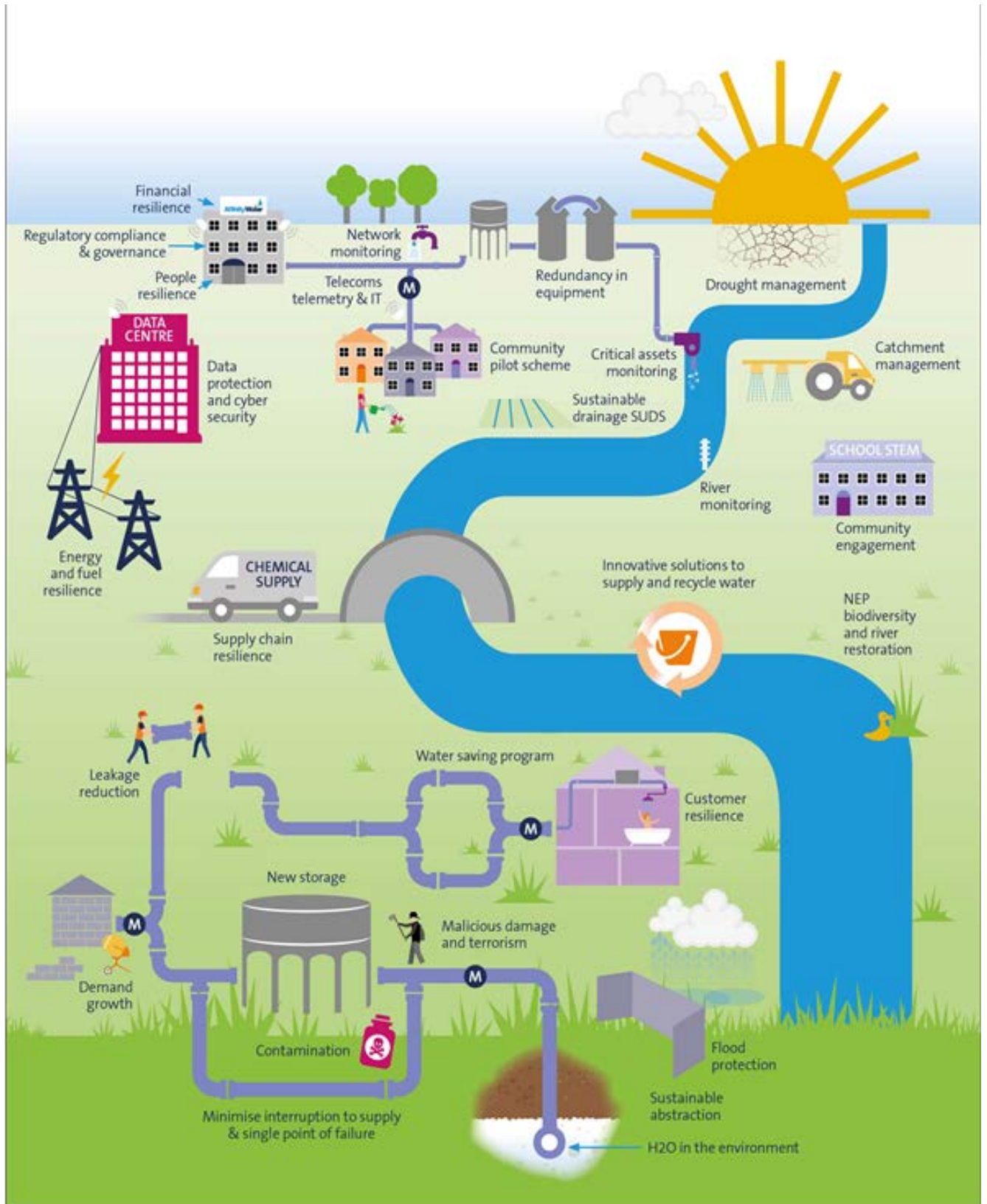


Figure 16: PR19 Resilience Initiatives

5.2 Investment initiatives to improve resilience recommended under the Resilience Work Package

The section below outlays capital investments recommended under the Resilience Work Package is explained in chapters below.

Pilot schemes

Resilience and Environment Community Pilot Schemes propose an innovative way of working in partnership with other organisations (i.e. river groups, Hubbub, councils) and communities on various environmental and community schemes to improve our eco systems, water availability and increase customers' awareness to water related issues. There will be one pilot scheme per community tackling a specific feature for each area, starting from a small-scale proposal with a potential of scaling up in AMP8. Pilot schemes will also enable us to improve the knowledge and collect evidence of water use within our catchments.

Pressure Improvement schemes

Insufficient or irregular pressure at the property boundary (below 15m) can affect service to customers and is one of the most common customer complaints. Low pressure can be caused by an operational incident, high demand or network configuration. We are planning to improve pressure received by customers by reducing the average impact of low pressure from 13 hours per property per year to either 8.7 hours (-33%) or 6.5 hours (-50%). This proposed commitment will prioritise pressure improvement schemes to target those properties which currently receive the most frequent drops in mains pressure.

We propose a development of a bespoke resilience Performance Commitment around this measure to improve low water pressure for customers in our communities.

Single Points of Failure

A Single Point of Failure (SPoF) is defined as an asset failure leading to loss of production/availability where the residual output is insufficient to meet normal requirements. The designed resilience of our systems ensures that the two components (asset failure and subsequent loss of supply) are infrequent. However, a few, low likelihood, high consequence risks associated with asset failure which could lead to significant loss of supply remain.

Typical examples include severe fire affecting electrical infrastructure at large treatment works, failure of trunk mains, asset failures at sites where customer supplies are almost immediately affected and sudden inundation of infrastructure assets within basements.

Our Single Points of Failure investment strategy addresses these risks whilst retaining a proportionate response that is affordable. i.e. we do not propose duplication of all assets to provide complete redundancy rather a range of risk mitigation strategies (Terminate, Treat, Transfer or Tolerate) including investment to ensure the continued availability of existing contingency measures (such as standby power generation, reservoir storage and bulk transfers) and investment to reduce the consequence or likelihood of failure where there is currently no mitigation.

For our 2,500km of large diameter distribution mains we are investing to mitigate the impact of failures where more than 2,000 properties are at risk of being off supply for more than 12 hours. The numbers of properties at risk of above ground asset Single Points of Failure at treatment works are higher than this although the likelihood is less at around 1 risk event per year compared to 12 risk events a year for trunk mains.

An initial study using the Affinity Water Risk Framework as the basis for the evaluation of risk consequence and likelihood indicates that an equivalently sized programme of work will efficiently reduce risk of Single Points of Failure whilst addressing our top Single Point of Failure risks.

Some emerging themes from this study phase include lack of up to date site drawings and other reliable information to assist in emergency situations, lack of fire detection and/or suppression systems in electrical switch rooms, vulnerability of electrical systems to sudden flood because pump motors and MCC panels are housed at low level and vulnerable following a pipe/pump leak or burst, lack of immediate availability of mitigation measures designed to prevent failures becoming single points of failure. Examples include alternative supplies, standby generators and standby pumping stations..

In our plan for 2020-2025 we plan to address our 15 highest ranking SPoF at sites on a priority basis.

Horsley Cross

During our resilience self-assessment, Horsley Cross Water Treatment Works (WTW) came across as a main concern and a critical, single point of failure. The same outcome followed from the most recent DWI audit. Horsley Cross is a main source of treated water for Brett, it is fed by 7 underground sources which provide around 70% of Brett's supply, another 30% comes from Ardleigh WTW. Water produced and treated at Ardleigh is shared with Anglian water. We currently take 30% of the Ardleigh output as a maximum. In case of the Horsley Cross failure, our maximum allowed volume of water from Ardleigh is not able to provide enough water to supply the whole of Brett.

This scheme ensures a failure of the Horsley Cross treatment works is mitigated, recommended enhancement to the site makes it more resistant, ensures a quick response, minimises the duration and the scale of the outage and reduces interruption to our customers. The improvement plan includes the fire protection and suppression, stand by equipment and parts, piping rearrangements at the site (i.e. by passes), a single raw water main to the sand filters and the MCC replacement.

Supply 2040

Our plan for 2020-2025, will deliver the first phase of our Supply 2040 initiative; a strategic vision that will enable us to release and utilise 17Ml+ of water trapped within our Wey community, improve interconnectivity in our Central Region and prepare the network for a 100Ml import of water upon completion of the Upper Thames Reservoir in 2037. The investment is spread across a 20-year period. We recognise that to be successful and deliver best value to customers, we must be flexible. Therefore, our schedule of schemes is adaptive to mitigate against stranded assets. Schemes to be delivered in 2020-2025 are required to maintain the supply demand balance but will have the additional benefit of improving resilience within the Central Region and, in the longer term, throughout the South East. This investment is described in detail in our Supply 2040 Technical report.

5.3 All Investment initiatives to improve resilience

Resilience is embedded in our day to day thinking, although to improve our resilience in our plan for 2020-2025, a list of initiatives made up of innovations, operational improvements and investments was put in place throughout our plan for 2015-2020 to address our main concerns. A significant portion of the investments included in our portfolio will contribute to improve or maintain resilience where already satisfactory. The section below outlays our capital investments recommended and their impact on resilience is explained in the table below. Each business cases described below went through our assessment process described in section 1.4 – Our resilience assessment method, the risks and the business needs were identified and evaluated. A broad range of intervention options including redundancy, reliability, resistance and response and recovery options were considered to ensure that the preferred option was

the best value solution option for customers. This includes best whole life cost, sustainable, in line with our policy and standards, integrated with our existing infrastructure and able to adapt to future needs.

Table 8 : All Investment initiatives to improve resilience

Work Package Name	Business Case Title	How does the investment relate to resilience?	Customers support
Water Resources	1.1.1 Catchment Management: Investigations	These investigations will enable us to develop a greater catchment understanding of the water quality risk to our assets. By identifying source(s) and pathway(s) for pollution, future catchment intervention schemes can be identified to reduce pollution at the source and could lead to a reduction in the need for future treatment and a greater resilience for existing treatment and blending options at these abstractions	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.10 Sustainability Reduction: Digswell	Through investment we are improving resilience of water supply to our customers, whilst considering future growth of local developments which put pressure on our network and capacity.	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.12 Water Resources Feasibility	These schemes will support the long-term resilience of supply for the business (against drought, population growth, sustainability changes).	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.13 Water Resources South East	Developing a regionally co-ordinated approach to water resource planning will increase resilience through greater connectivity of networks, and better access to knowledge and resources through sharing across companies.	Customers suggested a water network like the national oil pipe network, they liked the idea of intercompany collaboration
Water Resources	1.1.14 Sustainability Reduction: Other	Through investment we are improving resilience of water supply to our customers, whilst considering future growth of local developments which put pressure on our network and capacity.	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.15 Sustainability Reduction: East – Desalination Plan	- Through investment we are improving resilience of water supply to our customers, whilst considering future growth of local developments which put pressure on our network and capacity	

Water Resources	1.1.16 Iver river support scheme	The investment will improve our understanding of the Iver river catchment and potentially reduce the need for any future Sustainability Reductions in this river catchment	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.16 Sustainability Reductions: strategic supply transfer schemes	The investment to reinforce strategic transfers and unlock 17Ml/day “trapped” water	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.2 Catchment Management: Drinking Water Quality Plans	By developing a better understanding of the catchments that supply raw water to our assets and the land use that poses a risk to water quality, this project facilitates moving from a reactive approach (treatment, blending and imports) to a proactive approach of identifying and mitigating pollution risks at the source.	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.3 Catchment Management: River Thames Pesticides	A successful, long term reduction in diffuse pesticide pollution affecting raw abstracted water could lead to a reduction in the need for future treatment and a greater resilience for existing treatment and blending options at these abstractions	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.4 Catchment management: Groundwater Pesticides	A successful, long term reduction in diffuse pesticide pollution affecting raw abstracted water could lead to a reduction in the need for future treatment and a greater resilience for existing treatment and blending options at these abstractions. It also allows water transfer across the company's supply area without regulatory restrictions on deterioration of water quality.	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.5 Catchment Management: Nitrate Affected Sources	A successful, long term reduction in diffuse nitrate pollution affecting raw abstracted water will lead to a reduction in the need for future treatment investment and provides resilience that existing treatment and blending options at these abstractions is sufficient	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.6 NEP Investigations and Options Appraisals	The investment would improve our technical understanding of our abstractions and provide robust evidence to support future decisions on Sustainability Reductions.	Customers support proposals that protect the environment and improve long-term resilience.

Water Resources	1.1.7 Morphological Works	The investment will improve our understanding of the river catchments and potentially reduce the need for further Sustainability Reductions in these river catchments. The more natural a river inherently is, the more resilient to climatic extremes and future pressures it will be.	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.8 Biodiversity	This investment will ensure that the company has a better knowledge of the ecology on its assets. This can be used to assess the site for protected species or to avoid any incidents in the future where a habitat or species is illegally destroyed, thus evading a financial penalty. It also gives us the opportunity to enhance landholdings which may have become deteriorated which will reconnect them with the wider landscape.	Customers support proposals that protect the environment and improve long-term resilience.
Water Resources	1.1.9 Sustainability Reduction: St Albans	Through investment we are improving resilience of water supply to our customers, whilst considering future growth of local developments which put pressure on our network and capacity.	Customers support proposals that protect the environment and improve long-term resilience.
Resilience	1.10.12 Resilience and Environment Community Pilot schemes	This project will enable us to improve our operational resilience for the proposed catchment. This investment will improve knowledge with regards to sustainable catchment management options, levels of Service and PCC.	Customers support proposals that protect the environment and improve long-term resilience.
Infra Strategy	1.10.14 Low Pressure	The investment will be used to improve pressure to those areas that receive repeated and longer instances of low pressure.	Customers support proposals that protect the environment and improve long-term resilience.
Infrastructure	1.11.1 Infrastructure contributions	The RTS scheme indirectly improves our resilience to flooding at our River Thames Works. With other schemes, the opportunities are taken to reconfigure our network if needed.	Customers support proposals that protect the environment and improve long-term resilience.
WRMP	1.2.1 Fast data	Resilience to drought is increased by reducing the amount of water wasted and influencing the reduction in use by customers especially through a drought period.	Customers want more communication and information about water saving and restrictions

WRMP	1.2.10 Groundwater chalk resilience options	This investment will enable us to improve our operational resilience for the proposed catchment.	Customers support proposals that protect the environment and improve long-term resilience.
WRMP	1.2.2 Leakage	Resilience to drought is increased by reducing the amount of water wasted and influencing the reduction in use by customers	Customers support proposals that protect the environment and improve long-term resilience.
WRMP	1.2.3 Runley Wood Green Sands	This investment will enable us to improve our operational resilience for the proposed catchment.	Customers support proposals that protect the environment and improve long-term resilience.
WRMP	1.2.4 Bulk Transfers	From the Bulk Transfers, we are improving resilience of water supply to our customers.	Customers support proposals that protect the environment and improve long-term resilience.
WRMP	1.2.8 Additional Grafham costs	From the additional import, we are improving resilience of water supply to our customers, whilst considering future projects which put pressure on our network and capacity.	Customers support proposals that protect the environment and improve long-term resilience.
WRMP	1.2.9 Additional Ardleigh costs	Investment to improve Ardleigh WTW resilience	Customers support proposals that protect the environment and improve long-term resilience.
Water Quality Strategy	1.3.1 Nitrates Management	This solution increases the output of the 4 WTW's which supports our water resources needs. It further reduces our reliance on importing via bulk supplies which is a significant cost to the business	Customers support proposals that protect the environment and improve long-term resilience.
Water Quality Strategy	1.3.2 Other Pollutants - Disinfections Compliance	This investment secures the supply at Crescent Road and Temple End and reduces the risk of a Cryptosporidium detection or outbreak event.	Customers support proposals that protect the

			environment and improve long-term resilience.
Water Quality Strategy	1.3.3 Lead	Whilst this programme itself does not relate to resilience it could help deliver additional benefits to resilience such as enhancing leakage performance with regards to resolving leaks on the customer supply.	Customers want more investment in infrastructure and leakage reduction
Non-Infra Strategy	1.3.5 Egham aluminium management	The solution will address aluminium risks in the network thus enabling us to transfer water without risks to water quality to support water resources.	Customers support proposals that protect the environment and improve long-term resilience.
Water Quality Strategy	1.3.6 Pesticide monitor	The solution supports our water resources needs by supporting catchment management activities upstream in the absence of raw water bankside storage as part of a twin track approach.	Customers support proposals that protect the environment and improve long-term resilience.
Water Quality Strategy	1.3.7 Sundon Reservoir	The solution supports our DWI Undertaking and long-term water resource needs such as Sustainability Reductions and Water Resources Management Plans by providing greater flexibility to water transfers.	Customers support proposals that protect the environment and improve long-term resilience.
Land and Disused Assets	1.4.1 Land and Disused Assets	This work package will form part of a strategic review of our land and disused assets currently under consideration for disposal in the context of our requirement to maintain public water supply. In reviewing sites in conjunction with our WRMP and strategic storage requirements we will ensure we maintain resilience of our assets. Protection of our raw water assets from future development on land parcels identified for disposal, taking in to account needs today and in the future.	Customers support proposals that protect the environment and improve long-term resilience.
Water Saving	1.5.1 Baseline Water Saving	The programme prevents the company falling into water balance deficit, ensuring that customers continue to have access to water. Boundary box replacement replaces ageing company assets and helps identify leakage via the meter.	Customers support proposals that protect the environment and improve long-term resilience.
Infra Strategy	1.7.1 Trunk Main Renewals	Maintaining the asset health of our trunk main network is key to ensuring the "reliability" of supply to customers. Replacing trunk mains in a planned and efficient manner ensures that future generations do not inherit a legacy of under investment.	Customers want more investment in infrastructure

			and leakage reduction
Infra Strategy	1.7.2 Distribution Mains Renewals	Maintaining the asset health of our distribution main network is key to ensuring the "reliability" of supply to customers. Replacing distribution mains is a medium to long term intervention and ensures that future generations do not inherit a legacy of under investment.	Customers want more investment in infrastructure and leakage reduction
Infra Strategy	1.7.3 Trunk main Maintenance and Risk Mitigation	Maintaining the equipment of our trunk main network is key to ensuring the "reliability " of the network is maintained and we can recover quickly ("response") from any incidents. Having the right people available at the right times, with access to the right equipment and supported by the right control team will ensure a robust ability to restore water supplies	Customers want more investment in infrastructure and leakage reduction
Infra Strategy	1.7.4 Leakage Infrastructure and Maintenance	Maintaining our leakage infrastructure provides "reliability" of service by helping to meet leakage levels especially in times of drought. This programme of work also supports our "response" to incidents by providing information on the network flows and pressures to aid decision making.	Customers want more investment in infrastructure and leakage reduction
Infra Strategy	1.7.5 Network Ancillaries	Effective and timely reactive replacement of failing assets on the distribution network u provides adequate "response" to minor incidents and provides "reliability" of service in supporting the control and management of leakage levels.	Customers want more investment in infrastructure and leakage reduction
Infra Strategy	1.7.6 Pressure and DG2	Ensuring pressures above 15-minute threshold during hot spells show "reliability" of the network and pumping infrastructure.	Customers support proposals that protect the environment and improve long-term resilience.
Infra Strategy	1.7.7 Meter Replacement	Contributes to the commercial viability (reliability) of the company to operate.	Customers support proposals that protect the environment and improve long-term resilience.
Infra Strategy	1.7.8 Developer Services	strategic infrastructure is designed to improve the "reliability" of the infrastructure assets.	Customers want more investment in infrastructure and leakage reduction

Non-Infra Strategy	1.8.1 Fleet	It supports the business operation by enabling our gangs to effect R&M, Mains Laying and Reinstatement work where required. This enables us to be resilient and self-reliant.	Customers want more investment in infrastructure and leakage reduction
Non-Infra Strategy	1.8.10 RGF House 1 Refurb. at Chertsey	The investment increases filtration availability and reliability to achieve 90 MLD for a 7-day emergency period along with reducing maintenance and power costs.	Customers support proposals that protect the environment and improve long-term resilience.
Non-Infra Strategy	1.8.11 RGF House Repl. & Refurb. At Walton	The investment increases filtration availability and reliability along with reducing maintenance and power costs.	Customers support proposals that protect the environment and improve long-term resilience.
Non-Infra Strategy	1.8.12 SSF at Walton and Chertsey	The investment relates to site resilience as it ensures that both site`s current filtration capacity will continue to be available in the future. In addition, it brings an opportunity to improve on the site resilience against demand changes in the WRZ 4 by extending the deployable output of each site and the possibility of varying filters.	Customers support proposals that protect the environment and improve long-term resilience.
Non-Infra Strategy	1.8.13 Waste Water Plant at Denge	With waste water now being recovered the ability to produce additional potable water will aid in times of low abstraction levels and other issues.	Customers support proposals that protect the environment and improve long-term resilience.
Non-Infra Strategy	1.8.14 Waste Water Recovery at Clay Lane	The additional waste water treatment will enable more waste water to be recovered which will subsequently result in the site in general being able to operate more comfortably to its maximum capacity.	Customers support proposals that protect the environment and improve long-term resilience.
Non-Infra Strategy	1.8.15 Water Tower Demolition at Denge	The new variable speed boosters will enable greater control of network distribution with redundancy in their configuration. Power generation feeds a separate booster in the event of failure of power failure to the four main boosters.	Customers support proposals that protect the environment and improve long-term resilience.
Non-Infra Strategy	1.8.16 Waste Water Recovery	The investment increases waste water recovery availability and reliability along with reducing operations and maintenance issues.	Customers support proposals that protect the

	System at Walton		environment and improve long-term resilience.
Non-Infra Strategy	1.8.17 Storage	The inspection and maintenance programme for both Storage and Treatment process assets reduces the likelihood of failures that could lead to interruption of supply and level of service reductions. Replacing storage assets at the end of their asset life eliminates the high risk of outage with these assets, maintaining supply resilience.	Customers want more investment in infrastructure and leakage reduction
Non-Infra Strategy	1.8.18 GAC	Proactive maintenance of the GAC reduces the risk of compliance failures enabling treatment to resist pollution incidents and maintain reliability of treatment.	Customers accept current service level commitments
Non-Infra Strategy	1.8.19 Capital Maintenance (Pioneer Output)	A mixture of proactive and reactive maintenance schemes to maintain our Compliance Risk Index and maintain assets health to ensure no deterioration in resilience.	Customers accept current service level commitments
Non-Infra Strategy	1.8.2 Dewatering at Iver	New skips and emergency storage area will enable cake sludge to be removed whenever it is required to be thereby enabling Iver WTW to run without interruption.	Customers accept current service level commitments
Non-Infra Strategy	1.8.20 Iver aluminium management	The solution will address aluminium risks in the network thus enabling us to transfer water without risks to water quality to support water resources.	Customers accept current service level commitments
Non-Infra Strategy	1.8.21 North Mymms Turbidity	Provision of turbidity treatment at North Mymms WTW will reduce the reliance on turning off North Mymms and Essendon sources under low water quality conditions. It has been estimated that the North Mymms source turbidity is too high to be treated for 10% of the year.	Customers accept current service level commitments
IT Infra	1.8.23 IT Infrastructure	IT maintenance primarily focusses on maintaining operational fit-for-purpose systems that have support from their respective vendor. Where IT assets are classified as highly critical, fault tolerant solutions incorporate from design to delivery	Customers want more investment in infrastructure and leakage reduction
Non-Infra Strategy	1.8.24 Ardleigh capex	As well as providing a source of supply Ardleigh is the key back up supply for Horsley Cross.	Customers accept current service level commitments

Non-Infra Strategy	1.8.3 Egham Chertsey Walton Ozone	The investment relates to site resilience as it ensures that the site`s current ozone plants will continue to be available in the future.	Customers accept current service level commitments
Non-Infra Strategy	1.8.4 Egham Waste Water Upgrade	The additional thickener will enable the thickening system to cope with levels of demand and ensure the sludge is treated properly. It will also enable ease of maintenance in the length of time a thickener can be taken out of service.	Customers accept current service level commitments
Non-Infra Strategy	1.8.5 Iver Ozone	The investment relates to site resilience as it ensures that the site`s current ozone plant will continue to be available in the future and ensure there is no loss of output from Iver.	Customers accept current service level commitments
Non-Infra Strategy	1.8.6 Waste Water Recovery at Chertsey	The additional thickeners will enable some of the currently discharged waste water to be recovered thereby adding an additional source of supply.	Customers accept current service level commitments
Non-Infra Strategy	1.8.7 Reservoir Cleaning at Walton	The investment increases resilience of Walton WTWS as the properly maintained and operated settling reservoirs provides a two-day emergency water resource in case of having a pollution incident on the River Thames.	Customers accept current service level commitments
Non-Infra Strategy	1.8.8 Disinfection at Denge	The new UV system will be up to date and more efficient therefore reducing the risk of failure whilst also enabling Denge WTW to comply with AW disinfection policy.	Customers accept current service level commitments
Non-Infra Strategy	1.8.9 Lab Equipment	This proposed investment ensures the resilience of the testing facilities at the laboratory to deliver its services. A well planned and structured equipment replacement strategy ensures that we can continue to provide the service that the business requires in a sustainable, uninterrupted way.	Customers want more investment in infrastructure and leakage reduction
Ongoing Asset Management	2.1.1 SDM Analytics, Reporting & Monitoring	Provides insight to support on understanding of Risk-developing data driven strategies to maintain compliance whilst providing a value for money service to customers.	Customers want more communication and information about water saving and restrictions

Ongoing Asset Management	2.1.2 Asset Health, Risk & Investment	Our ability to understand the condition of our network and production can enable us to form robust contingency planning measures and ensure we meet our resilience objectives. Best use of our maintenance expenditure ensures that service is maintained without sacrificing resilience.	Customers want more investment in infrastructure and leakage reduction
Ongoing Asset Management	2.1.3 Asset Information & Data Modelling Tools	The asset systems are essential to provide the facility to model the network and assure of its capacity to maintain our customer obligations through monitoring and analysis. It is also essential to maintain a system to manage our spatial data, which is used to pinpoint the extent of our assets, the links between those assets, the environment and our customers.	Customers want more investment in infrastructure and leakage reduction
Ongoing Asset Management	2.1.4 Business Plan	The Business Plan ensures that we are resilient in terms of being able to supply water to our customers	Customers accept current service level commitments
Ongoing Asset Management	2.1.5 Water Resources Management Plan	Drought resilience (through reductions in DO); population growth & climate change; reducing abstraction; extended methods (longer term plans); regional collaboration; demand management reductions (e.g. leakage, water use PCC)	Customers accept current service level commitments
Ongoing Asset Management	2.1.6 Drought Management Plan	The Drought Management Plan ensures that we are resilient to the effects of a developing drought, which will have an effect on our available water supplies.	Customers accept current service level commitments
IT Strategy	2.7.1 LIMS	The existing solution operates on aged equipment with little or no redundancy. Moving to a virtualised cloud-based service orientated model will substantially enhance resilience, service recovery and system availability.	Customers want more investment in infrastructure and leakage reduction
IT Strategy	2.7.2 IT Strategy	By undertaking the initiatives set out within the " Secure and Optimise " implementation option, it encompasses several projects that ensure robustness, security and resiliency to both our IT infrastructure/devices as well as business related water assets.	Customers want more investment in infrastructure and leakage reduction

5.4 Operational initiatives to improve resilience

Significant progress has been made in the last 12 months against our five core work packages and other supporting programmes. Our performance against our 2015-2020 target and surrogate measure used by other water companies is markedly improved as a result.

To get to 6 minutes by April 2023, our strategy focuses on making the organisational structure changes required to continue improving out of hours performance in line with in hours performance.

- Further capital investment for trunk main maintenance to remove hotspots and single points of failure
- Further behavioural nudge to achieve consistent performance
 - Additional front line Technician and Operative resources to facilitate a move to 24/7 working
 - Replacement of the new fittings procured during AMP 6 for specialist large main repairs
 - Phase two of the Customer Impact Tool and enhanced alarms linked to the incident clock

A move to 3 minutes would move us further into unknown territory as an industry and therefore the funds required to deliver this level of performance have a lower confidence rating. Our strategy to achieve this would be to deliver a greatly enhanced 'water on' capacity through a fleet of water tankers. The funding requirement is based on the procurement of 5 water tankers to serve across the 5 restoration hubs established during AMP 6. We have taken learning from learning events with other water companies that have adopted this model during AMP 6. The management of such a fleet and restoration strategy is complex and additional resources are included therefore to ensure sufficient drivers, deployment technicians and support staff.

Annexes

Annexe A: Resilience metrics

Given the wide aspect of resilience, measuring it proved to be a challenge for the Resilience WP. Our main focus was on being able to consistently and objectively measure resilience across our communities, which then helped us identifying our risk exposure and gaps.

Prior to being able to measure resilience, a matrix was developed to identify the main risks, link them to the strategic business risks, identify their potential impact, current control measures and categorise them in order to simplify our metrics.

Following that exercise, we identified seven risk categories which were included in our metrics. Having considered how broad resilience is, we found it wasn't possible to use one resilience metric to reliably score all aspects. For that reason, we followed the Cabinet Office 4Rs model to assist us with how metrics were created. Four metrics were used to score the same risk categories, but related to four different issues: Resistance, considered as Likelihood; Reliability considered as Vulnerability; Response & Recovery considered as Duration of impact; Redundancy considered as Scale of impact.

In our metrics, we considered risk exposure to floods and storms, critical asset failure, maintaining water quality, unavailability of supply, but also covered malicious damage and terrorism, IT interruptions and impact on catchment and environment. We took a bottom up risk approach and managed to measure multiple hazards in one metric.

Flood and Storm

The Figure 9 below provides display for our Flood and Storm resilience metrics used to assess risk exposure and robustness of our mitigation plan.

Table 9: Flood and storm resilience metrics

Flood and Storms	Resistance	Reliability	Response and recovery	Redundancy
Score	Is there a flood barrier in place and what is this design to	Has the system be designed or upgraded to be able to continue functioning in the event of a flood(relevant to EA flood zone)	Is there an on-site and regularly reviewed recovery plan and this been embedded?	Assuming your answer provided to [Duration], during this period what is the maximum percentage of properties that would be off supply, taking account contingency measures?
5 - High	not at risk	Yes	ERP (Emergency Response Plan) in place for this hazard and embeded	0%
4 - Major	Barrier design to - at least 1 in 1000/>0.1%		ERP in place for this hazard to best practice	Up to 10%
3 - Medium	Barrier design to - at least 1 in 200/>0.5%		Generic ERP developed	Up to 25%
2 - Minor	Barrier design to - at least 1 in 100/>1%		Local knowlegde	Up to 50%
1 - Low	No Barrier	No	No ERP	50% +
0 - Don't know	Don't know	Don't know	Don't Dnow	Don't know

Environment

The table 10 below provides display for our Catchment and Environment resilience metrics used to assess risk exposure and robustness of our mitigation plan.

Table 10: Environmental resilience metrics.

Catchment / environment	Resistance	Reliability	Response and recovery	Redundancy
Score	Does the organisation manage catchment land/environmental impact?	What systems are in place to ensure the catchment and environment are protected	Is there an on-site and regularly reviewed recovery plan and this been embedded?	Assuming your answer provided to [Duration], during this period what is the maximum percentage of properties that would be off supply, taking account contingency measures?
5 - High		Catchment monitoring in place and embeded	ERP in place for this hazard and embeded	0%
4 - Major	100%	Catchment monitoring in place to best practice	ERP in place for this hazard to best practice	Up to 10%
3 - Medium	Over 75%	Staff on site to carry out regular survey	Generic ERP developed	Up to 25%
2 - Minor	Over 75%		Local knowlegde	Up to 50%
1 - Low	Under 50% controled	Nothing in place	No ERP	50% +
0 - Don't know	Don't know	Don't know	Don't Dnow	Don't know

Maintaining water quality in distribution

The table 11 below provides display for our maintaining water quality in distribution resilience metrics used to assess risk exposure and robustness of our mitigation plan. This includes the storage and network infiltration.

Table 11: Maintaining water quality in distribution resilience metrics

Contamination of water in distribution (Storage and network infiltration)	Resistance	Reliability	Response and recovery	Redundancy
Score	Is there a proactive maintenance and monitoring approach for the system?	Has the system been constructed/maintained in way that it can withstand water intrusion?	Is there an on-site and regularly reviewed recovery plan and this been embedded?	Assuming your answer provided to [Duration], during this period what is the maximum percentage of properties that would be off supply, taking account contingency measures?
5 - High		Yes, pressurised	ERP in place for this hazard and embeded	0%
4 - Major	Yes proactive maintenance and monitoring	Atmospheric pressure or not pressurised and Meet protection requirments	ERP in place for this hazard to best practice	Up to 10%
3 - Medium	Proactive maintenance, no monitoring	Atmospheric pressure or not pressurised and Meet protection requirments partialy	Generic ERP developed	Up to 25%
2 - Minor	Inconsistently applied	Inconsistently applied	Local knowlegde	Up to 50%
1 - Low	No	No	No ERP	50% +
0 - Don't know	Don't know	Don't know	Don't Dnow	Don't know

Availability of supply

The Figure 12 below provides display for our availability of supply resilience metrics used to assess risk exposure and robustness of our mitigation plan. This focuses around long term events like drought, pollution event or exceptional demand.

Table 12: Unavailability of supply resilience metrics.

Unavailability of supply (due to drought, pollution event or exceptional demand)	Resistance	Reliability	Response and recovery	Redundancy
Score	Is there a proactive monitoring of catchment lands and licences?	Are there any raw water controls in place that minimize the service risk supplying water? E.g. Reservoir mixers, mobile PAC plants, etc.	Is there an on-site and regularly reviewed recovery plan and this been embedded?	Assuming your answer provided to [Duration], during this period what is the maximum percentage of properties that would be off supply, taking account contingency measures?
5 - High		Not at risk and headroom to meet demand	DWSP (Drinking Water Safety Pla) in place for this hazard and embeded	0%
4 - Major	100%		DWSP in place for this hazard to best practice	Up to 10%
3 - Medium	Over 75%	Yes, significantly reducing contamination and headroom to meet demand	Generic DWSP developed	Up to 25%
2 - Minor	50-75%	Yes but mix results	Local knowlegde	Up to 50%
1 - Low	Under 50%	Nothing in place	No DWSP	50% +
0 - Don't know	Don't know	Don't know	Don't Dnow	Don't know

Critical asset failure

The Figure 13 below provides display for our Critical assets failure resilience metrics used to assess risk exposure and robustness of our mitigation plan. That includes power failure, fuel shortage, material/chemical shortage as well as skill shortage.

Table 13: Critical asset failure resilience metrics

Critical asset failure (incl. power, fuel, materials or skill shortage)	Resistance	Reliability	Response and recovery	Redundancy
Score	Is there a proactive maintenance and monitoring approach for the critical assets withing the system?	How many critical assets are there within the system? These are single assets that if they fail, would cause the whole system to fail - i.e Single failure modes	Is there an on-site and regularly reviewed recovery plan and this been embedded?	Assuming your answer provided to [Duration], during this period what is the maximum percentage of properties that would be off supply, taking account contingency measures?
5 - High		0	ERP in place for this hazard and embeded	0%
4 - Major	Yes proactive maintenance and monitoring	1	ERP in place for this hazard to best practice	Up to 10%
3 - Medium	Proactive maintenance, no monitoring	2	Generic ERP developed	Up to 25%
2 - Minor	Inconsistently applied	3	Local knowlegde	Up to 50%
1 - Low	No	4 +	No ERP	50% +
0 - Don't know	Don't know	Don't know	Don't Dnow	Don't know

Malicious damage

The Figure 14 below provides display for our Malicious damage and terrorism resilience metrics used to assess risk exposure and robustness of our mitigation plan. It focuses mostly around our land and properties and physical network.

Table 14: Malicious damage and terrorism resilience metrics

Malicious Damage and terrorism	Resistance	Reliability	Response and recovery	Redundancy
Score	Is the system located in a perimeter that is inaccessible to the public?	What security systems are in place to ensure the critical assets are protected from physical attacks?	Is there an on-site and regularly reviewed recovery plan and this been embedded?	Assuming your answer provided to [Duration], during this period what is the maximum percentage of properties that would be off supply, taking account contingency measures?
5 - High	Electric fences/barbed wire and electronics at all sites	Site staffed 24/7	ERP in place for this hazard, embeded, exercice and training	0%
4 - Major	Electric fences/barbed wire around all sites	CCTV installed and monitored	ERP in place for this hazard to best practice and policies	Up to 10%
3 - Medium	High fence around all sites	Security Staff on site	Generic ERP developed	Up to 25%
2 - Minor	Fences or barriers in place but vulnerabilities	Intruder detection system installed	Intruder detection system installed	Up to 50%
1 - Low	No fences or barrier	Nothing in place	No ERP	50% +
0 - Don't know	Don't know	Don't know	Don't Dnow	Don't know

Information Technology

The Figure 15 below provides display for our Telemetry and IT interruptions resilience metrics used to assess risk exposure and robustness of our mitigation plan. That includes interruptions to telecommunication, cyber threat, malicious damage to the IT and telemetry equipment and cyber terrorism.

Table 15: Telemetry, telecoms and IT interruptions resilience metrics

Telemetry, telecoms and IT interruption (incl. cyber threat, malicious damage and terrorism)	Resistance	Reliability	Response and recovery	Redundancy
Score	Is there a proactive maintenance and monitoring approach for the IT and telemetry system?	Is there an alternative/manual arrangement in place to ensure control in the event of a failure?	Is there an on-site and regularly reviewed recovery plan and this been embedded?	Assuming your answer provided to [Duration], during this period what is the maximum percentage of properties that would be off supply, taking account contingency measures?
5 - High		Yes , no impact to service	ERP in place for this hazard and embeded	0%
4 - Major	Yes proactive maintenance and monitoring	Yes but reduced fuunctionalities for a period	ERP in place for this hazard to best practice	Up to 10%
3 - Medium	Proactive maintenance, no monitoring		Generic ERP developed	Up to 25%
2 - Minor	Inconsistently applied		Local knowlegde	Up to 50%
1 - Low	No	No	No ERP	50% +
0 - Don't know	Don't know	Don't know	Don't Dnow	Don't know

Annexe B: Resilience Self- Assessment methodology

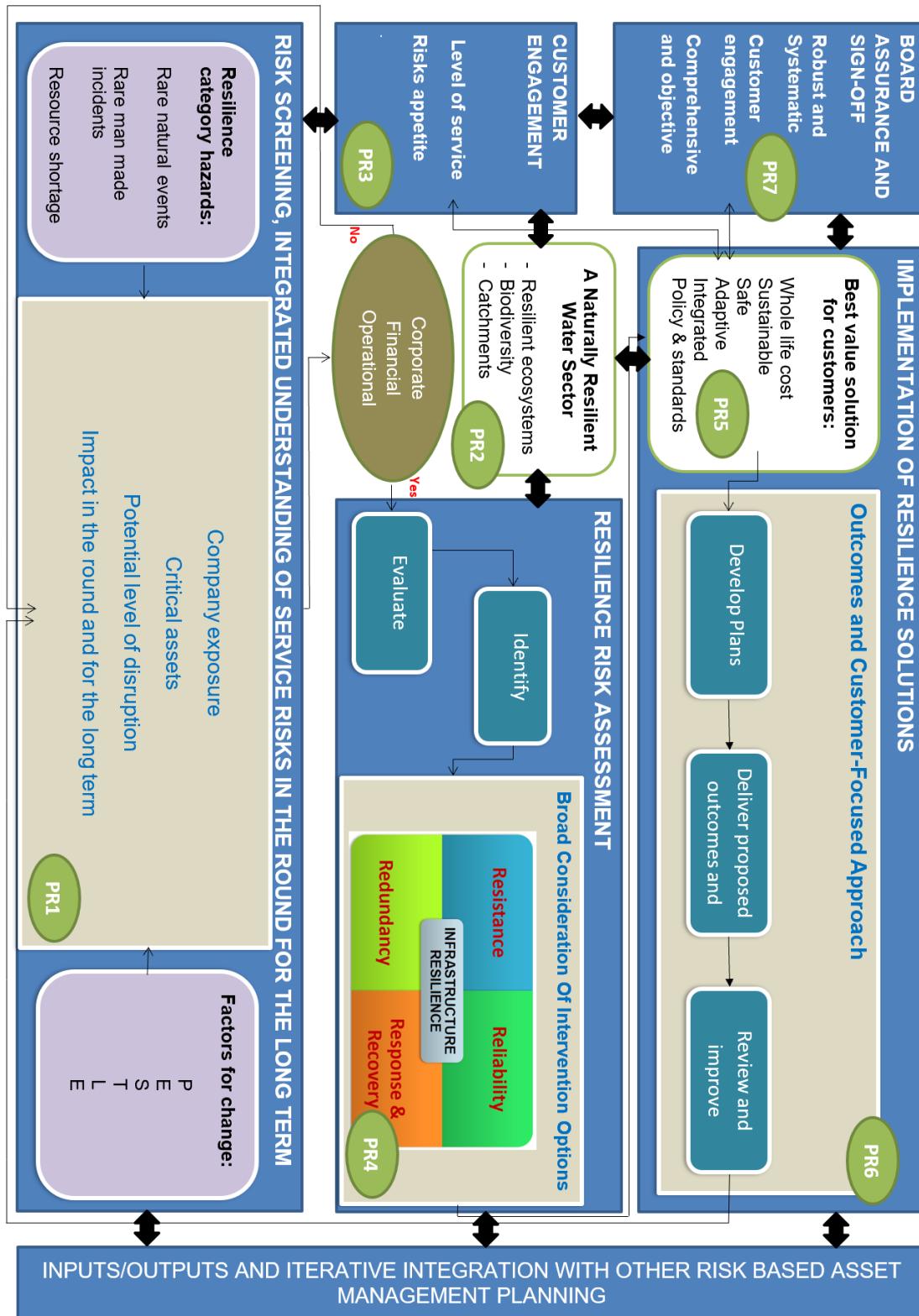


Figure 17: Resilience Self- Assessment methodology

Principle 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.

Principle 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

Principle 3 - Customer engagement:

Assessments of resilience should be informed by engagement with customers to help companies understand their customers' expectations on levels of service. This will also help companies understand their customers' appetite for risk and how customer behaviour might influence approaches to resilience.

Principle 4 - Broad consideration of intervention options

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 border planning).

Principle 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.

Principle 6 - Outcomes and customer-focused 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.

Principle 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

Annex C: Resilience Self- Assessment results

Resilience theme	Risk	End AMP6 (March 2020)	End AMP7 (March 2025)	End AMP8 (March 2030)	End AMP9 (March 2035)
Financial	Limited finances for the business	G	G	G	G
Corporate	Customers and Communities experience and resilience	G	G	G	G
	Workforce fit for the future	A	G	G	G
	Changing governance	G	G	G	G
	Supply Chain	G	G	G	G
Operational	Environmental degradation and impact on raw water quality	A	G	G	G
	Constraints on supply	A	G	G	G
	Flooding of our sites	A	G	G	G
	Ageing water infrastructure leading to critical asset failures	A	G	G	G
	Infiltration	G	G	G	G
	Widespread IT failure, cyber-attacks and data loss/theft	G	G	G	G
	Terrorism & Cyber attacks	A	A	A	A
	3rd party event - large fire, plane crash on our site, nuclear incident, pandemic	A	A	G	G

Risk matrix

R: aware but no mitigation in place **A:** mitigation developed but not yet fully implemented
G: mitigation developed and in use

Annex D: Arup Independent Resilience Maturity Assessment

Affinity Water Ltd.

Independent Resilience Review



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Executive summary

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2. What is resilience and why does it matter?
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5. Our resilience framework and approach
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 - Operational resilience: maturity assessment
 - Corporate resilience: maturity assessment
6. Financial, corporate and operational resilience: summary of findings

Appendix A: Interviewees

Appendix B: Reference documents

Executive summary

Understanding resilience

Our world is rapidly changing, with long-term challenges, or chronic stresses, such as climate change, depleting resources, and changing demographics putting greater demands on infrastructure. This brings increasingly unpredictable risks, which will not only push systems to their tipping points, but also drives uncertainty around the impact of hazards, shocks and disruptions.

In order to create truly resilient organisations in the face of growing uncertainty, risk management will need to be supplemented with a broader consideration of resilient systems.

Ofwat's definition of resilience is: "the ability to cope with, and recover from, disruption and anticipate trends and variability in order to maintain services for people and protect the natural environment now and in the future." (Ofwat, 2017¹). However, for the purposes of this review, we have adapted a definition from 100 Resilient Cities² - *'Resilience is the ability to survive, adapt, and grow no matter what kind of disruption is experienced; and anticipate trends and variability in order to maintain services for people and protect the natural environment, now and in the future.'*

Ofwat splits resilience into three main categories – financial resilience, corporate resilience and operational resilience.

Affinity Water's resilience challenge

Affinity Water has identified a number of unique resilience challenges that it faces as an organisation. Its operational areas are situated in a part of the country that is seeing significant population increase and economic growth, with major new national infrastructure projects such as airport expansions at Heathrow and Luton, construction of the high-speed rail line HS2, and the River Thames Flood Scheme. The company relies heavily on groundwater sources for its supply, but these same waterbodies are critical in supporting unique ecosystems, bringing the challenge of meeting human demand whilst protecting the natural environment. Affinity Water's customers are some of the highest water consumers in the country, and customer insight work has shown that customers are frequently unaware of this. As demand management becomes increasingly necessary to balance potential deficits, communication and co-creation of solutions with customers will play an ever more important role.

Understanding the company's key challenges helps to focus resilience building interventions in the most appropriate areas.

Affinity Water's strengths

Affinity Water has systems in place across a number of corporate, operational and financial resilience themes.

In particular, Affinity Water has established governance and assurance processes, a good approach to risk management, and business continuity planning aligned to ISO22301.

Its collaborative and long-term approach to water resources management planning will be amongst the industry leaders if implemented as intended.

Affinity Water has undertaken robust stress and scenario tests to demonstrate its financial viability.

Affinity Water's opportunities for enhancement

Affinity Water has an excellent opportunity to review its long-term strategic direction, in the face of resilience challenges. Further enhancing its community-focused approach will help to deliver resilience not just for the company, but for customers and the environment too.

Having developed a data strategy, there is a real opportunity to further embed a data driven approach, informing short-term emergency decisions and strategic planning for the longer term. Clearer long-term planning can then feed into investment planning, to make future

investment more resilient to key challenges.

Reference

¹ Ofwat (2017) Delivering Water 2020: Our final methodology for the 2019 price review

² 100 Resilient Cities, 2018

1. Introduction and purpose

Introduction – Affinity Water

Affinity Water is the largest water-only supplier, supplying over 900 million litres of water per day to 3.5 million people. The company's vision is "to be the UK's leading community-focused water company".

Its strategic goals, informed by customer consultation, are to¹:

- Maintain the local environment
- Sustain local communities
- Support local economies

Affinity Water recognises that to improve its understanding of the resilience challenges it faces, it will be crucial to involve and engage with its customers – both to raise awareness of these challenges, and ensure that its plans for building resilience are also going to improve its customers' experience.

From the consultation work carried out previously, four priority customer outcomes were identified:

- Making sure customers and communities have enough water while leaving more water in the environment
- Supplying high quality water you can trust
- Minimising disruption to you and your community

References:

¹Affinity Water – Strategic Direction Statement (2012)

- Providing a great service that you value

This assessment

In July 2018, Arup was commissioned by Affinity Water to carry out a resilience maturity assessment of their current and future programme of activities.

The assessment is based on an established framework, developed by Arup's experts, in the areas of corporate, financial and operational resilience.

The review was undertaken between July and August 2018. A series of interviews were undertaken with key staff within the organisation to explore current strategy, existing processes and future plans. Arup also reviewed several key documents to inform the assessment.

The findings from the interviews and document review were collated and analysed to formulate a view of Affinity Water's current and future status with regard to corporate, financial and operational resilience, and consequently provide scores against established resilience framework principles.

It should be noted that whilst we have endeavoured to build as complete a picture as possible of Affinity Water's resilience, our assessment is limited to the information we have been provided with verbally and in

writing, and our professional evaluation of that evidence at the time of writing.

This report

This document presents a definition for resilience and explains its significance for the water industry. It also provides clarification on what constitutes shocks and stresses and how these are presented within Affinity Water.

The report presents the resilience assessment framework, developed by Arup. In line with Ofwat's definition, the framework focuses on three key themes: financial, corporate and operational and defines how the organisation's resilience is assessed and what a well-functioning system should look like.

The framework is presented at sub-theme level, where each of the three themes is broken down into several essential sub-themes to enable accurate and detailed assessment.

The results are presented as scores from 1 (Unaware) to 5 (Leading) and details of the findings and evidence to support the scores is provided for each theme.

Additionally, the report presents key strengths and opportunities to help the organisation improve alongside highlight

areas of leading practice.

2. What is resilience and why does it matter?

There are several different definitions of resilience. For this review our working definition of resilience has been adapted from the definitions outlined by 100 Resilient Cities¹ and Ofwat²:

'Resilience is the ability to survive, adapt, and grow no matter what kind of disruption is experienced; and anticipate trends and variability in order to maintain services for people and protect the natural environment, now and in the future.'

We live in a fast changing world, with trends such as rising resource consumption and depleting resources, changing demographics and climate change all placing greater demands on infrastructure. Impacts of this are being seen at individual, organisational, city and national levels.

These changes bring increasingly unpredictable risks, push systems to their tipping points and drive uncertainty around the impact of hazards and disruptions. Resilient organisations will be those with the ability to survive and thrive in these conditions. Organisations must also consider how they want to contribute to the resilience of the wider world.

Resilience goes beyond simple risk management approaches where typically individual hazards and mitigations are identified. A resilience approach instead allows an organisation to respond to uncertainty as well as more quantifiable and better understood risks.

A resilient organisation is not just concerned with surviving and coping with challenges, but also thriving and improving on its ability to learn and anticipate changes.

Resilience reflects 'the overall capacity of individuals, communities, institutions, businesses and systems to survive, adapt and thrive no matter what kinds of chronic stresses or acute shocks they experience'³

Ofwat has published guidance on resilience in their PR19 methodology (Ofwat, Delivering Water 2020: Our final methodology). This includes the concept of 'Resilience in the Round' which recommends that customers should be the focus of the business and three themes of resilience should be considered as shown in Figure 1:

Corporate resilience: the ability of an organisation's governance, accountability and assurance processes to help avoid, cope with, and recover from, disruption; and to anticipate trends and variability in its business operations.

Financial resilience: an organisation's ability to avoid, cope with, and recover from, disruption to its finances.

Operational resilience: the ability of an organisation's infrastructure, and the skills to run that infrastructure, to avoid, cope with, and recover from, disruption in its ability to provide critical services to customers.

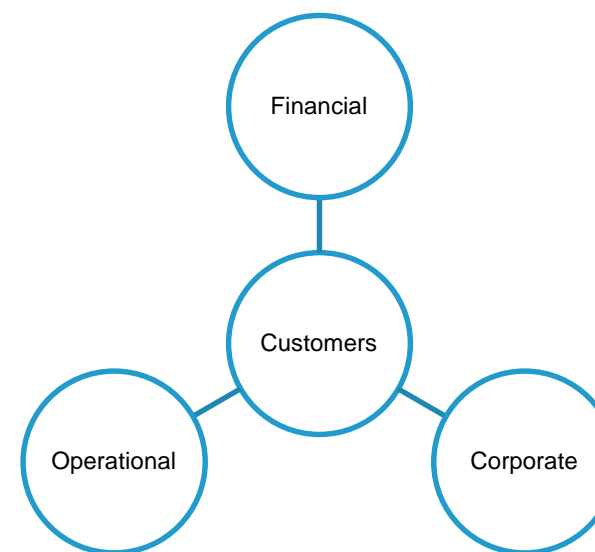


Figure 1: Resilience in the Round from Ofwat²

References:

¹100 Resilient Cities, 2018
²Ofwat (2017) Delivering Water 2020: Our final methodology for the 2019 price review;
³Arup, 2013

2. What is resilience and why does it matter?

Figure 2 illustrates the anticipated improvements in performance and response to disruption from a company that integrates resilience into its standard practice.

It shows that a resilient company is able to return to good service or even a better service than before as quickly as possible (i.e. bounce forward). A resilient system or organisation will not just improve service, but will grow and develop as a result of disruption.

In the report 'Building water infrastructure resilience'¹, the concept of 'Resilience Pathways' is set out, where pathways can improve infrastructure performance during and after a shock or stress has impacted on a network (Figure 3).

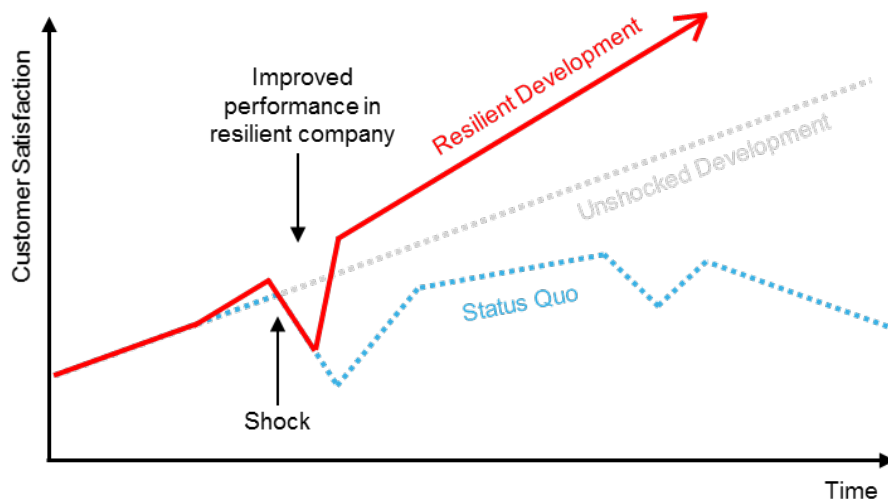


Figure 2: The effect of resilience initiatives on customer satisfaction over time.

References:
¹Lloyd's of London/Arup (2017) Future Cities:
Building water infrastructure resilience.

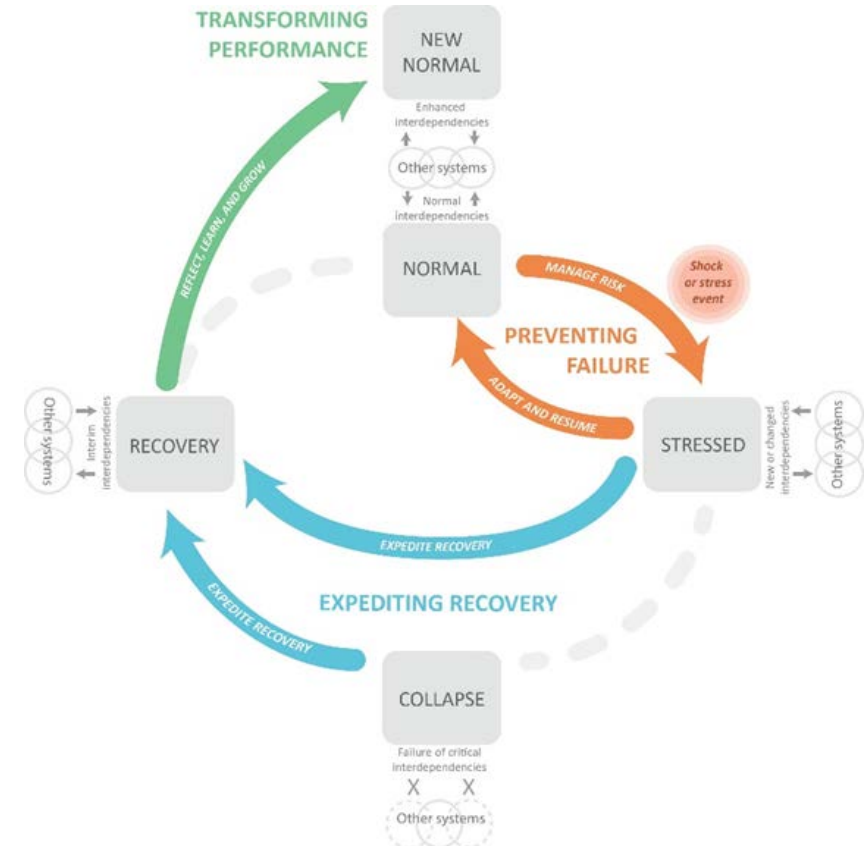


Figure 3: Infrastructure Resilience Pathways © Arup.

The Resilience Pathway

- Preventing failure: *ensuring infrastructure systems can withstand the direct and indirect impacts of events.*
- Expediting recovery: *supporting infrastructure systems to become functional again as soon as possible after stress or collapse.*
- Transforming performance: *working towards a new and improved state, rather than simply reverting to 'business as usual'. This requires reflection on successes and failures.*

3. Shocks and stresses

Ofwat guidance is directing water companies to be resilient to both short-term shocks and long-term stresses. Table 1 sets out a range of shocks and stresses that we have identified that may be relevant to water companies.

Stresses

Ofwat has identified two key stresses; population change, and the impacts of climate change which will be acutely felt in the water sector.

Further stresses, and further detail is set out in international and national documentation, such as the World Economic Forum’s annual Global Risk Report, and the UK Climate Change Risk Assessment 2017.

Shocks

The National Risk Register outlines a range of short-term shocks relevant across industries in the UK. Risks identified are wide-ranging and include potential cyber attacks, legal risks, toxic gas leaks.

Uncertainty

Although organisations can review and assess both short and long-term risks, it is widely accepted that within today’s dynamic and uncertain environment, these shocks and stresses are increasing in frequency and diversity, requiring successful businesses to adapt their operations beyond risk management of likely and understood shocks.

The Ofwat guidance recognises that resilience as well as risk management is needed to overcome short-term disruptive shocks and chronic long-term stresses, especially when these are uncertain and unknown. Therefore, the characteristics of the organisation, as well as the mitigation plans they have in place, are important in developing resilience.

Shocks		Stresses	
Disruptive events, which impact the ability to provide a high quality service. In the water industry, acute shocks include sudden events such as floods, fires or cyber attacks.		Chronic conditions which weaken the function of the organisation or system long-term. Examples highlighted in particular by Ofwat include population growth and climate change. Stresses are also often felt as shocks when they reach a tipping point.	
Terrorist attack	Failure of climate change mitigation and adaptation	Demographic change	Land use change
Civil unrest	Temperature extremes	Urban creep	Coastal erosion
Extreme vandalism	Infectious diseases	Migration	Environmental change inc. invasive species
Hoax calls	Environmental pollution	Skills shortages	Inequality and increasing income disparity
Cyber attacks	Fire events	Unemployment and underemployment	Growth vs recession
Power outages	Nuclear incident	Lifestyle change	Financial crisis
Asset failure	Flooding	Rising chronic and lifestyle diseases	Unmanageable inflation
Telecommunication failure	Severe energy price change	Climate change (inc. drought and sea level rise)	Bad debt
Data fraud/ theft	State collapse or crisis	Macro industry change	Resource scarcity (inc. fuel)
Dam failure	Industrial disputes	Leakage	Increased cost of borrowing
False positive alarms	Supply chain failure	Ageing infrastructure	Structural change
Water supply contamination	Failure of regional, national or global governance and planning	Abstraction licences change	Changing regulation, policy and international governance
		Digital revolution	

Table 1: The shocks and stresses that may impact the UK water sector

4. What is resilience to Affinity Water?

Affinity Water is currently developing its thinking around resilience. This is exemplified by the creation of a resilience strategy and the establishment of a dedicated resilience team in the run up to PR19.

The company's approach to resilience has been greatly enhanced following learning from incidents over the last few years, including a loss of supply at Egham water treatment works in 2015¹, and a major burst near a reservoir in Baldock in 2017². Demonstrating clear improvement, Affinity Water's response to the recent 'Beast from the East' cold snap (March 2018) was praised by Ofwat³.

However the company continues to face a number of significant challenges. As a business, it has identified 12 principal risks to resilience facing the company now and in the future (Table 2).

Specific challenges for the company include the fact that its operating areas support globally important chalk stream habitats, which are dependent upon the same groundwater that Affinity Water relies upon to supply its customers.

Geographically, Affinity Water's central area is sandwiched between two much larger water companies – Thames Water and Anglian Water. This area is also witnessing significant growth - with a projected 20% increase in population by 2045 - meaning that strategic planning and water trading with neighbouring companies will become increasingly important to balance supply-demand deficits.

The business also supplies critical infrastructure sites, including power stations, Heathrow Airport, and major new national infrastructure projects such as HS2.

Affinity Water recognises that the established behaviour and expectations of its customers also represents a challenge; with some of the highest consumption levels in the country. Customers are often unaware of their high consumption. Education, participation and co-creation offer opportunities for Affinity Water to not only develop effective demand management solutions with its customers, but also to increase awareness about the precious water supplies in the region and associated issues.

References:

¹Affinity Water Limited - Annual Report and Financial Statements for the year ended 31st March 2016

²Affinity Water Limited – Unaudited half-yearly financial report for the six month period ended 30 September 2017

³Ofwat – 'Out in the Cold: Water companies' response to the 'Beast from the East'

Affinity Water principal risks to resilience
Critical asset failures
Widespread failure of IT & telemetry
Terrorism and cyber attacks
Infiltration
Supply unavailability (or constrained)
Flooding of our sites
Environmental degradation impacting raw water quality
Limited finances for the business
Workforce unfit for the future
Changing governance and regulation
Disengaged and non-resilient customers and communities
Population growth leading to demand increase

Table 2: Principal risks facing Affinity Water

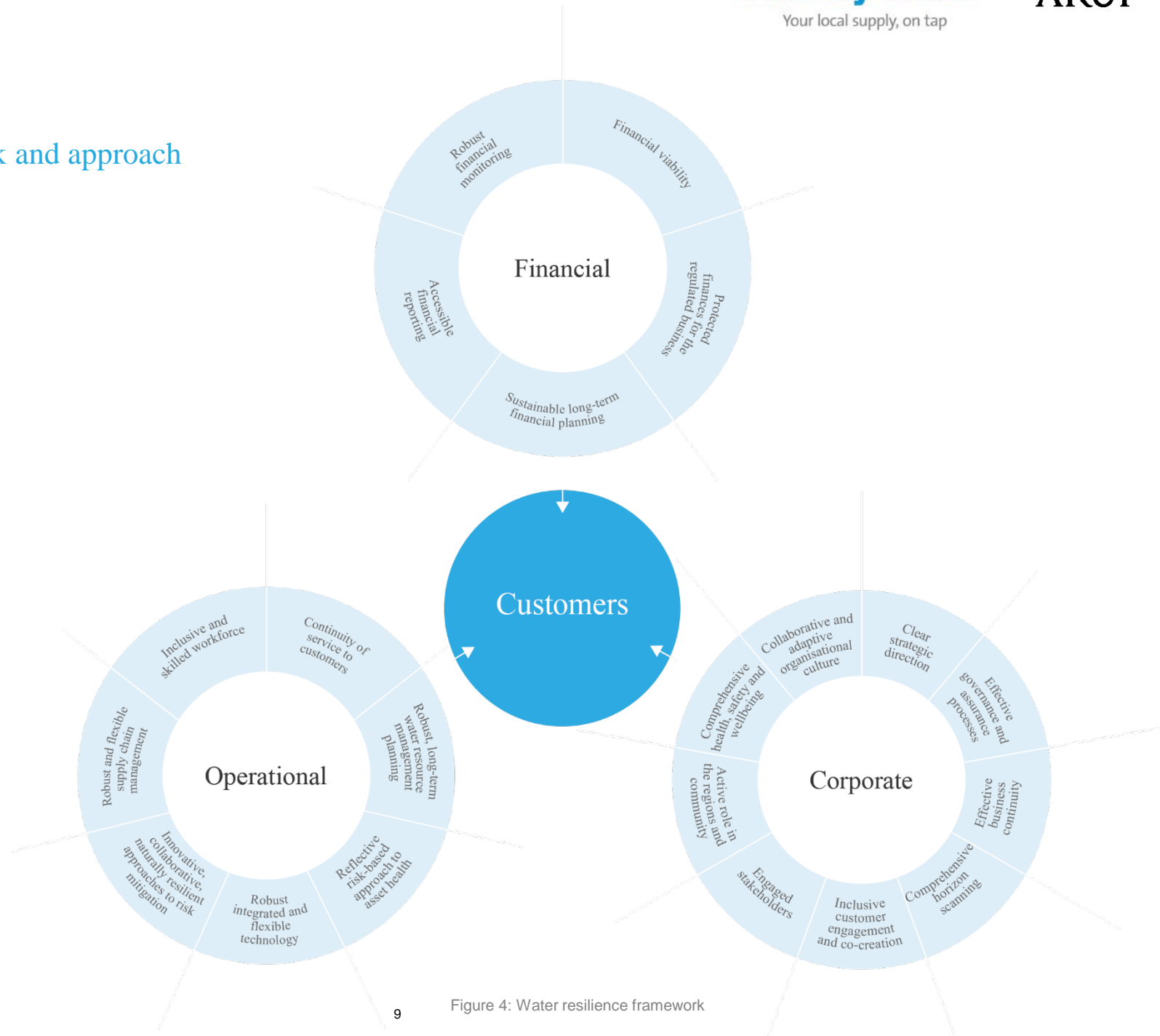
5. Our resilience framework and approach

Resilience framework

With support from financial, corporate and operational resilience experts within Arup, we have developed a holistic resilience framework based on Ofwat's 'Resilience in the Round' concept, with sub-themes to explore activities within the three themes in more detail.

The framework is presented in Figure 4, and a description of the sub-themes is provided in the following sections.

This framework is designed to enable Affinity Water to think about short-term management of risks, alongside longer-term trends and lower likelihood risks, in order to become truly resilient for the benefit of customers and the environment.



5. Our resilience framework and approach

Resilience assessment

The approach to maturity assessment is based on a desk top review of key documents provided by Affinity Water, as well as interviews with internal stakeholders from various departments. The results were presented using scores from 1 to 5 against each sub-theme, as defined in Table 3.

Deliberately we have not attempted to prioritise any of the three resilience groups (financial, corporate and operational resilience) above others, nor weight the individual sub-components of the groups. This helps to recognise the

interdependencies across the components, i.e. failing on one of the sub-components can mean a whole company is not resilient.

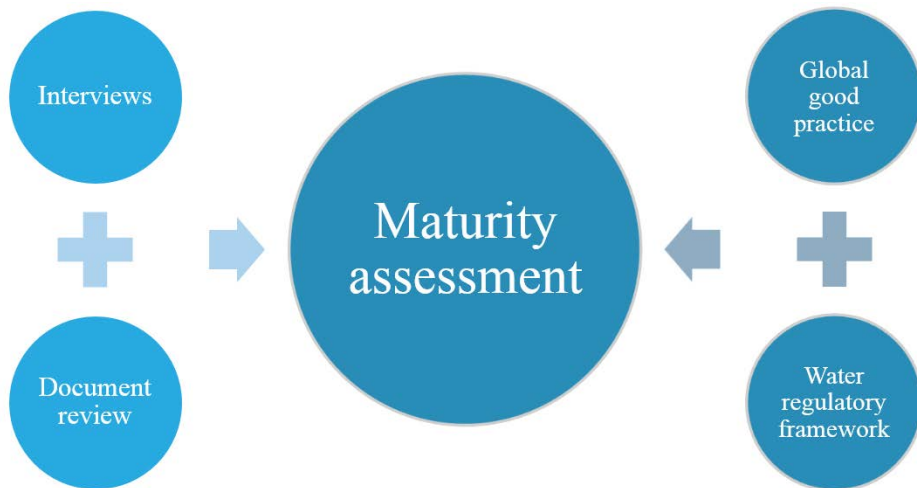


Figure 5: Inputs to the maturity assessment

Level 5: Leading	The company has a best practice approach to this goal with cutting edge actions and responses currently in progress. There is significant horizon scanning for future changes and clear methods to including these within plans and strategies. Regular reviews and updates are part of business as usual.
Level 4: Response actioned	The company has created a response and actions to meet this goal which is being applied in practice across the company. The company is focused on proactive actions to prevent issues before they arise.
Level 3: Response developed	The company set a clear goal around this and has developed a response. This response has yet to be widely actioned, though some pilots may have been undertaken.
Level 2: Aware	The company is aware of the need for this goal but has not yet formally adopted process, plans, strategies and operational activities. There has been very limited response to these gaps. In general the company reacts only to issues that arise, as they arise.
Level 1: Unaware	The company has not determined this as a goal. There are significant gaps in understanding, processes, plans, strategies and operational activities to achieve this goal.

Table 3: Definition of the maturity assessment scoring scale

Our resilience framework

Financial assessment framework

Table 4 spanning two pages presents the financial assessment framework and a description of the financial sub-themes.

What is financial resilience?

Ofwat – “An organisation’s ability to avoid, cope with, and recover from, disruption to its finances.” Therefore, whilst financial viability and the ring-fencing of regulated activities is a component, also important is having proper costed sustainable long-term plans, and having systems and monitoring to appropriately report to investors, Ofwat, stakeholders and the interested consumer.

Sub-theme	Level 1: Unaware	Level 5: Leading
Financial viability	No financial viability assessments beyond the next year.	<p>The Directors review the long-term viability of the company as an extension of their investment planning process, and by their actions retain a strong investment grade rating for the company (ideally Standard & Poor (S&P) equivalent \geq 'BBB+' Stable Outlook). To do this the company:</p> <ul style="list-style-type: none"> • has financial systems to accurately project planned Opex, Maintenance and Capex expenditure in each AMP; • has access to sufficient additional liquidity (cash or access to cash) in the event of unforeseen events or failures; • publicly reports in accounts look-forward rolling financial viability statements for at least five years based on long-term scanning spanning at least two AMPs, regularly stress testing the company to meaningful shocks (e.g. impact of change in inflation, major wastewater event, terrorism/ cybersecurity incident, failure to accurately predict Opex costs and future Capex costs, etc.), including the Ofwat July 2018 stress tests; • to accommodate stress tests and scenario analysis (e.g. the Ofwat July 2018 stress tests) has determined appropriate gearing levels and appropriate use of instruments such as inflation-linked debt; and • has appropriate insurance policies and cover.
Protected finances for the regulated business	The company has not considered ring-fencing finances for regulated activities.	<p>The company has appropriate measures for ring fencing finances for regulated activities to protect the interests of customers. Where the company has non-regulated activities, these are managed appropriately so they do not risk the financing of regulated activities. The company maintains flexibility to finance regulated company activities in the event of shocks to the group finances, evidenced by results from stress tests, spare cash reserves, liquidity, etc.</p>
Sustainable long-term financial planning	The company’s plans are limited to the current AMP. There is also no fixed process for sign off and no plan for regular approval.	<p>The company is looking forward 25+ years, with investment and expenditure plans linked to the strategic direction of the company. These are regularly reviewed and tested. Base operating and maintenance expenditure together with any additional enhancement or replacement expenditure to meet customer and regulatory requirements have been identified on a year-by-year basis in the short to medium term and AMP-by-AMP basis for the longer term. The company has an excellent understanding of the current and future predicted condition and performance of all its assets. All new investment is future proofed.</p>
Accessible financial reporting	The company only reports the minimum financial information that is required by Companies House and Ofwat. The information may be difficult to understand.	<p>Financial reporting is appropriately tailored for the needs of investors, other stakeholders, and interested water customers. The company publicly reports its financial and annual performance (via the annual reports and APRs) using customer focused language. Customer billing information provides sufficient information to enable customers to understand major areas of expenditure and impacts, such as leakage reduction. Corporate, financing and tax structures are transparent and easy to understand.</p>

Table 4: The financial resilience sub-themes within the resilience framework

Financial assessment framework

What is financial resilience?

Ofwat – “An organisation’s ability to avoid, cope with, and recover from, disruption to its finances.”
Therefore, whilst financial viability and the ring-fencing of regulated activities is a component, also important is having proper costed sustainable long-term plans, and having systems and monitoring to appropriately report to investors, Ofwat, stakeholders and the interested consumer.

Sub-theme	Level 1: Unaware	Level 5: Leading
Robust financial monitoring	The company only undertakes basic financial monitoring.	The company has appropriate measures to monitor and confirm the company’s long-term viability, which goes beyond AMP cycles to track trends in maintenance programmes, climate change and demographic changes, etc. These measures are supplemented by regular sensitivity tests and scenario testing. Such information is recorded and reported routinely at Board level, with clear criteria for when material divergences from expected plans need to be discussed and actioned.

Table 4: The financial resilience sub-themes within the resilience framework

Corporate assessment framework

The following table spanning two pages presents the corporate assessment framework and a description of the corporate sub-themes.

What is corporate resilience?

Ofwat – “The ability of an organisation’s governance, accountability and assurance processes to help avoid, cope with, and recover from, disruption; and to anticipate trends and variability in its business operations.”

Sub-theme	Level 1: Unaware	Level 5: Leading
Clear strategic direction	The company has no clear aim or vision. Disparate, multiple company strategies and plans exist.	The company has a clear aim and strategy which is well communicated and is recognised by all, both internally and externally. All plans and decisions are based on how they will work towards this strategy.
Effective governance and assurance processes	There is limited or no company-wide process for assurances, approval and sign-off. Processes, roles, governance and reporting varies across teams.	The company has reliable and well disseminated processes, roles, governance and reporting covering all aspects of the business. There is a clear process for assurance, approval and board sign-off.
Effective business continuity planning	The company has no business continuity plan, no relevant policy in place, and no resource allocated to develop and implement this. There may be informal resilience arrangements within some teams. There are no training nor exercise programmes, and limited or no resilience planning or response plans for critical assets.	The company has a risk-based approach to resilience planning linked to the National Risk Register and the likely impact on service to customers. A set of response plans are in place to prepare for, respond to and recover from potential impacts. Plans are regularly trained and exercised, with everyone in the company knowing their roles and responsibilities. All critical assets have emergency plans and all critical teams will be able to recover to minimise impact on service. Approaches will follow best practice, e.g. ISO 22301 and the Business Continuity Institute Good Practice Guideline 2018.
Comprehensive horizon scanning	No horizon scanning is undertaken for the business.	Plans, strategies and actions are all based on the outcome of comprehensive and robust horizon scanning which takes into account future shocks and stresses that may impact areas of the business. Horizon scanning is regularly reviewed.
Inclusive customer engagement and co-creation	There is limited customer engagement undertaken. Any that is undertaken is one way and only provides the customers with information. There is no or limited consideration of vulnerable customers	The company has a clear two-way dialogue with customers to ensure that customers are included and to improve transparency, cooperation and collaboration on current performance and future direction for the business. Customer policy and practices are established to meet the needs of customers in vulnerable circumstances. The company aims to establish trust, confidence and legitimacy.
Engaged stakeholders	Communication with stakeholders is rare and only occurs when it is required by regulation.	The company plans, manages and undertakes regular and clear communications with stakeholder groups and organisations. Collaboration is determined through multi-agency participation with tangible outputs that improve the resilience to customers and the business.

Table 5: The corporate resilience sub-themes within the resilience framework

Corporate assessment framework

What is corporate resilience?

Ofwat – “The ability of an organisation’s governance, accountability and assurance processes to help avoid, cope with, and recover from, disruption; and to anticipate trends and variability in its business operations.”

Sub-theme	Level 1: Unaware	Level 5: Leading
Active role in the regions and community	The company does not undertake activities to benefit the wider community, and has no plans to do so.	The company undertakes activities which have wider benefits to the communities that are served allowing them to grow and develop through enabling sustainable growth, both at a regional and local level demonstrating corporate citizenship in the process. The company is establishing goals to meet the carbon challenge contributing to their global and local impacts.
Comprehensive health, safety and wellbeing	Limited or no plans for health, safety and wellbeing. Any plans and activities that are undertaken are required by regulation. Limited or no health and safety culture.	The company has reliable and robust plans for health, safety and wellbeing which will make significant and measurable improvements to the lives of the workforce. There is a strong health and safety culture, where behaviours are over and above what is required.
Collaborative and adaptive organisational culture	The organisational culture has no or limited recognition of the importance of collaboration and change in service of customers, community or the environment.	A notable organisational culture that puts collaboration and change at the heart of all they do. This is apparent in the values, policies, plans and working practices of all employees who understand the fundamental roles they play in the service value chain; working together across boundaries in the service of the customer and community. Empowered and engaged staff, with the capability, capacity and mandate to learn and adapt to events and change, is evident in the short, medium and long-term management of the operation; not simply one-off innovations and in response to major ‘events’. The organisational approach to collaboration aligns with ISO044.

Table 5: The corporate resilience sub-themes within the resilience framework

Operational assessment framework

The following table spanning two pages presents the operational assessment framework and a description of the operational sub-themes

What is operational resilience?

Ofwat – “The ability of an organisation’s infrastructure, and the skills to run that infrastructure, to avoid, cope with and recover from, disruption in its performance”.

Sub-theme	Level 1: Unaware	Level 5: Leading
Continuity of service to customers	The company has limited or no understanding of the impacts of outages on services. There is limited or no consideration of vulnerable customers. There is limited or no consideration of dependent critical services.	Company operations focus on providing a continuity of service to customers and avoiding critical service failures, such as supply interruptions and internal sewer flooding. It takes into account the different needs of customers, particularly those who are vulnerable. Service interruptions only occur in the most unforeseeable situations. Asset condition and criticality is understood and all critical aspects of the network have redundancy built in. Mechanisms to regularly review and update all plans are in place.
Robust long-term water resource management planning	The WRMP is limited to a short term approach and does not facilitate sustainable approaches to water management. Planning does not include collaborative projects and stakeholder engagement, and is not aligned across the business.	Water resource management planning and drought planning has been undertaken for the long-term and integrated into business planning to ensure that the company can meet their supply obligations and facilitate sustainable growth. Plans are produced collaboratively with the EA and regional planning groups to ensure best value for customers with respect to cross-company, regional and national supply options. The approach looks at a full range of hazards based on a robust evidence base. Water resource management planning looks beyond the statutory minimum of 25 years into the future, and develops adaptive pathways for delivering in the long-term.
Reflective risk-based approach to asset health	There is a focus on short term high-likelihood risks. The company has limited or no asset health measures in place. Asset management best practise is not followed, and there are no regular updates or reviews of asset management strategy.	The company has undertaken a comprehensive assessment of asset health and asset risk, including long-term low-likelihood risks, having detailed and accurate information on the state of all assets, the way they are configured and the way they are operated. Focus is on criticality, protecting customers and the natural environment from exposure to known risks, and reducing vulnerability to future uncertainties. There is a region wide asset strategy which is adaptive, regularly reviewed and considers changing requirements in the long-term (25 years). They follow best practice for asset management, e.g. ISO 55000.

Table 6: The operational resilience sub-themes within the resilience framework

Operational assessment framework

What is operational resilience?

Ofwat – “The ability of an organisation's infrastructure, and the skills to run that infrastructure, to avoid, cope with and recover from, disruption in its performance.”

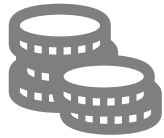
Sub-theme	Level 1: Unaware	Level 5: Leading
Innovative, collaborative, naturally-resilient approaches to risk mitigation	There is limited or no consideration of naturally-resilient approaches to risk mitigation. The company has a short term vision, excluding smart technology, natural solutions or collaborative approaches to risk management, and demonstrates minimal foresight or innovation associated with new challenges. There is limited or no evidence of collaboration with land users, and minimal influence over catchment activities.	There is a robust approach to considering a wide range of options to risk mitigation. Approaches are collaborative, innovative and embrace technological change and the role of the natural environment. A system-wide approach is taken. Collaboration is integrated into business plans, working with customers, other companies, and wider stakeholders to deliver solutions. Approaches considered include encouraging customers behavioural change through smart customer engagement, and use of smart technologies to improve asset performance, customer information, leakage management and water efficiency, natural solutions, such as catchment management to improve raw water quality, and blue-green infrastructure to manage storm water and reduce flooding and pollution incidents. Catchment solutions are considered across the whole catchment, integrating water and wastewater needs.
Robust and flexible supply chain management	The company has not considered the impact of energy, resource and skills supply chains on their operations. There is limited or no consideration of potential shocks and stresses and their affect on supply chains. No alternative source of supply considered.	The company considers the impact of energy, resource and skills supply chains on their operations and ensure diverse and competitive supply chains that deliver the best outcomes for their customers. Supply chain needs are considered in the long-term, based on horizon scanning. Collaborative relationships are developed with the supply chain, to avoid boom and bust cycles. The company also considers the flexibility of their supply chains, particularly during shock events. Internal processes are in place to keep this under review, sharing knowledge and developing solutions with others. The supply chain is considered as a network. The company also considers how they can effectively utilise options beyond their boundaries to mitigate their risks, e.g. use of water trading and bio resource trading markets.
Inclusive and skilled workforce	There is limited or no long-term thinking regarding labour availability. The company has limited or no workforce continuity plans, and has made no attempt to identify skills gaps between their current and future workforce.	Companies need to identify and plan to fulfil the requirements of their future workforce. They should ensure they have workforce continuity plans to identify skills gaps (risks) between their current and future workforce, and ensure that these can be filled through training and development, succession planning increasing diversity and inclusion. Companies should work across the water industry and utility sector to address these skill gaps.
Robust, integrated and flexible technology	Technology is not used intelligently. There is a fragmented network with no system cohesion. The company has a focus on physical security.	Technology is used intelligently to deliver real operational and strategic gains. Data-driven decisions are the norm, using both real-time data to adapt and respond, as well as using data for robust long-term decisions. Systems are integrated, including operational technology and information technology systems. Interoperability and integration with systems in other sectors has been considered. Cyber security is paramount, with redundancy built into systems, and processes in place to continually review and improve this. People are at the centre of how technology is designed and implemented, both customers and staff.

Table 6: The operational resilience sub-themes within the resilience framework

Financial, corporate and operational resilience: maturity assessment

The following pages present details of the findings for the assessment. These were collated through document reviews and interviews with subject matter experts within Affinity Water.

The findings were analysed against the framework sub-themes and a total score is provided for each theme as per the scoring scale presented on page 10.



Financial resilience: maturity assessment

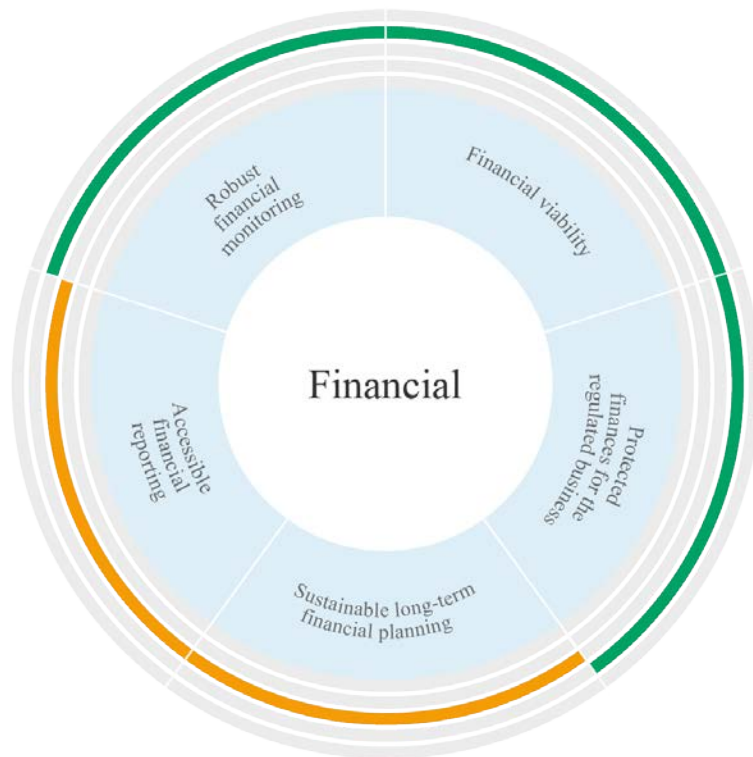


Figure 6: Financial Resilience: Current scores

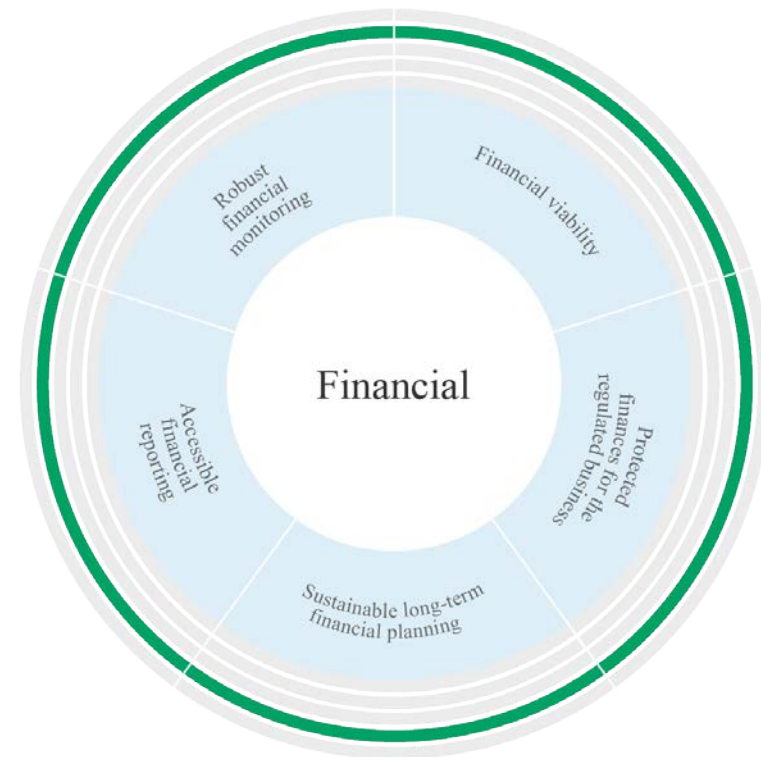


Figure 7: Financial Resilience: Future scores



Financial resilience: maturity assessment

Financial viability

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Level 1: Unaware</p> <p>No long-term financial viability calculations beyond the next year.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>The Directors review the long-term viability of the company as an extension of their investment planning process, and by their actions retain a strong investment grade rating for the company (ideally S&P equivalent >= ‘BBB+’ Stable Outlook). To do this the company:</p> <ul style="list-style-type: none"> has financial systems to accurately project planned Opex, Maintenance and Capex expenditure in each AMP; has access to sufficient additional liquidity (cash or access to cash) in the event of unforeseen events or failures; publicly reports in accounts look-forward rolling financial viability statements for at least five years based on long-term scanning spanning at least two AMPs, regularly stress testing the company to meaningful shocks (e.g. impact of change in inflation, major wastewater event, terrorism/ cybersecurity incident, failure to accurately predict Opex costs and future Capex costs, etc.), including the Ofwat July 2018 stress tests; to accommodate stress tests and scenario analysis (e.g. the Ofwat July 2018 stress tests) has determined appropriate gearing levels and appropriate use of instruments such as inflation-linked debt; and has appropriate insurance policies and cover.
<p>Current and ongoing activities</p> <p>Preliminary Industry Average (3.5)</p>				
<p>Planned for AMP7 and beyond</p> <p>Preliminary Industry Average (3.8)</p>				
<p>Current and Ongoing Activities</p>	<p>As part of the PR19 process, Ofwat requires companies to present Long Term Viability Statements (LTVSs) in their accounts for a minimum period of five years ^A. In its 2017/18 Annual Report, Affinity Water Limited (hereafter Affinity Water) assesses its financial viability over a 5-year look ahead period ^B. However, internally for the PR19 business plan Affinity Water looks out seven years, which includes the remainder of AMP6 to the end of AMP7 ¹. Some water companies are reporting longer viability statements at 10 and 12 years. Affinity Water intends to maintain a rolling 5-year LTVS for its Annual Reports, but has informed us that it can consider a longer period, acknowledging that looking further into the future increases the level of uncertainty, especially when scanning across multiple AMPs.</p> <p>There are a number of factors that credit rating agencies use when assessing companies’ financial outlook, including their gearing rate. Ofwat targets a gearing ratio of 62.5% in AMP6 and 60% in AMP7. Affinity Water’s net debt/Regulatory Capital Value (RCV) ratio increased for the second consecutive year from 76.6% in 2016/17 to 78.6% in 2017/18 ^B, which is at the higher end of the industry ^C. Ofwat is concerned by high levels of gearing in water companies, and the ability of companies with higher gearing ratios to respond to multiple ‘severe but reasonable’ shocks. As part of PR19 it requires companies with gearing levels above 70% to propose “<i>outperformance sharing mechanisms that allow customers to share in the returns equity investors achieve from high gearing</i>” ^{D,E}. Given a less stable regulatory regime and other factors Moody’s, the credit rating agency, in late May 2018 placed four companies with higher gearing rates on negative outlook, rating Affinity Water as ‘Baa1’ Negative Outlook ^F (broadly equivalent to the S&P rating ‘BBB+’ Negative outlook), below a number of companies in the sector, but still above others and the regulatory requirements for the industry (≥ ‘BBB-’).</p>			



Financial resilience: maturity assessment

Financial viability

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

Addressing each of the points for the assessment:

1. As well as having sophisticated systems to project Opex, Maintenance and Capex for the next year, Affinity Water has the necessary financial systems to accurately project planned Opex, Maintenance and Capex expenditure in each AMP ¹. For example, over the last 10 years it has created a database of unit costs for different capital projects which are input into its Pioneer planning tool. Over the last two years it has also built an activity-based costing tool for operating costs.
2. Affinity Water manages liquidity risk by always having sufficient cash reserves and pre-committed bond and bank finance it can draw down. Affinity Water, like many other large water companies, operates a Whole Business Securitisation (WBS) structure. Such a structure imposes many covenants (both positive and negative) on what it can and cannot do ¹. For example, Affinity Water is obligated under the WBS arrangement to have access to the necessary liquidity to cover its financial obligations for at least the next 15 months. Additionally, Affinity Water has an internal requirement to maintain enough liquidity to cover all the operating costs for at least 12 months ahead ¹. Please note that we have not calculated the liquidity ratio independently. On 31 March 2018, the company reported £273million of liquidity, comprising £115million of cash and deposits and £158million of undrawn committed borrowing facilities ^B.
3. It has already been stated that Affinity Water reports a 5-year look forward LTVS. It then runs stress tests over this 5-year period using two main approaches:
 - a) **A bottom-up analysis of key operational, regulatory and financial risks.** The company’s own stress tests and two scenarios (explained overleaf) are run for Affinity Water Limited. For example, the 2017/18 Annual Report ^B lists 15 risks, shown below.

Operational	Regulatory	Financial
a) failure to prevent injuries and accidents to people and the public	h) adverse changes to the regulatory framework	m) failure to secure appropriate financing for business activities
b) failure to meet water supply obligations	i) adverse change in the social and/or political climate	n) macro-economic risk (interest rate and inflation risks)
c) failure to supply high-quality drinking water	j) failure to comply with laws, its Instrument of Appointment and other recognised standards	o) revenue and debtor risk
d) failure to secure appropriate resources (people & materials)	k) failure to deliver Business Plan obligations	
e) information security failure	l) failure to achieve a favourable PR19 outcome	
f) failure to adequately protect personal data		
g) failure to provide adequate levels of customer service		

Against each of the risks, various stress tests are run by ascribing approximate values (£s) to each. For instance, there are water supply issues in areas around the HS2 construction sites and the possible third runway at Heathrow Airport, there is pressure on contractor availability with the building of the Thames Tideway Tunnel, there are cyber security risks of protecting customer data and there are risks of not meeting customer service demands, as demonstrated during the March 2018 Storm Emma supply outage.

The 2017/18 Annual Report states that apart from ‘(b) a failure to meet water supply obligations’ and ‘(c) a failure to supply high-quality drinking water’ (both of which could affect the financial viability of the company if sufficiently major), it is *“reasonable to expect that none of the individual principal risks identified would in isolation compromise the company’s financial viability during the lookout period. Instead these risks could be considered in a number of different severe, plausible and reasonable combinations through stress-testing forecasts using sensitivities set at a level reflecting a realistic assessment of how actual cash flows could vary during the lookout period”*^B.

Current and Ongoing Activities



Financial resilience: maturity assessment

Financial viability

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Current and Ongoing Activities</p>	<p>b) Ofwat top-down analysis of risks. The July 2018 Ofwat individual stress tests were run including a year-on-year Totex underperformance of 10%, an Outcome Delivery Incentive (ODI) penalty (3% of Return on Retained Earnings (RoRE)) in one year, a low inflation scenario (RPI 2% and Consumer Price Index for Houses (CPIH) 1% every year), bad debts 5% higher than current levels, the extra c.£120million of AMP7 debt financed at 2% above the forward projections, and a financial penalty (equivalent to 3% of one year of turnover). In all these individual stress tests WBS covenants can be met with a combination of increasing the permitted gearing rate to closer to the 85% dividend lock up point and reducing money available for dividend distributions ¹. The Ofwat stress tests and the Ofwat combined scenario (explained are run for the Appointed Business which is a subset of Affinity Water, although revenues from Affinity Water’s non-Appointed Business are also included in the calculations.</p> <p>After running individual stress tests, three other scenarios were run, including:</p> <ol style="list-style-type: none"> i. A company assumption of a year-on-year 5% Totex overspend, combined with bad debt 5% higher than current levels and 1% lower inflation ii. The Ofwat July 2018 combined scenario of a Totex overspend of 10% in each year of the price control, an ODI penalty of 1.5% RoRE in each year and a financial penalty equivalent to 1% of Appointed Business’ turnover in one year iii. A company assumption of a one-off exceptional event with a Totex impact of £80million in one year (c.31% of the Totex budget in 2017/18) with a knock on impact of an additional Totex requirement in Year 2 of £10million and £5million in Year 3 ¹. <p>The first scenario can be met without causing a lock up of dividend distributions. The second scenario would result in a dividend lock up as the gearing ratio would rise above the 85% lock up level and one of the interest cover ratios would also breach the lock up level. However, there would be no default. The third scenario would result in a WBS dividend lock-up for the year of the £80million Totex impact, but in the following year all WBS covenants would be met. As mentioned, all these analyses assume that the only levers used are increasing gearing towards the 85% lock up limit and reducing dividends. Other mitigating options include accessing other revenues and reserves that the wider Affinity Group has, claiming on Affinity Water’s insurance policies where possible (see point (5) below), approaching shareholders for additional equity via a rights issue, restructuring debt and moving some planned expenditure to the following year or AMP cycle.</p> <p>Nevertheless, having gearing above the industry average, the company acknowledges that there are some events that could affect its financial viability, most critically a serious drought as the company is reliant on the River Thames during dry periods. The company has performed stress test analysis of a 1 in 200-year drought, where emergency additional operational expenditure (e.g. more pumping of water which increases Affinity Water’s energy costs, customer communications, accelerating replacement maintenance in the run up to the drought and potentially building temporary overland pipes) and capital investment (e.g. bringing back into use dormant water supplies) would be needed. The results of the company’s stress tests of a 1 in 200-year drought are less severe than the Ofwat combined scenario (ii) or the company’s own scenario (iii) ¹.</p> <p>During AMP7 the company will be strengthening its operational resilience to a 1 in 200-year event, e.g. by bringing back into use dormant water supplies mentioned above and investing in key infrastructure assets, so that by the end of AMP7 the company will be resilient to a 1 in 200-year event.</p> <p>To be leading, the company would not only have to meet all the Ofwat stress tests and combined scenarios, but also more challenging scenarios beyond the company’s current assumptions, without the need to resort to the wider gamut of options, such as an additional rights issue or rescheduling investment plans.</p>
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Financial resilience: maturity assessment

Financial viability

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Current and Ongoing Activities</p>	<p>4. As at 30 June 2018, 65% of Affinity Water's debt was fixed rate debt and 35% was index-linked. Whilst being lower than the industry average of c.50% index linked debt the company is comfortable with the allocation. The company has issued a Consumer Price Index (CPI) linked bond, which offers greater protection against the recent regulatory change from Retail Price Index (RPI) to CPIH. Affinity Water has very recently spoken to its shareholders who have agreed to an intention to reduce the gearing in Affinity Water by changing the capital structure at the Group Level.</p> <p>5. To mitigate risks, Affinity Water has a comprehensive range of insurance policies including insurance for (a) property damage and business interruption, (b) terrorism, (c) bodily injuries, (d) employers’ liability, (e) environmental liability, (f) motor vehicles, (g) directors’ and officers’ liability, (h) engineering liabilities and (i) pension trustee liability.</p> <p>6. In November 2017 Ofwat reported that all Water Only Companies (WoCs) have a defined benefit pension surplus ^C. The Affinity Water 2017/18 Annual Report confirms the defined benefit pension fund is in surplus from an accounting perspective. Furthermore, the pension plan is anticipated to be fully funded to a self-sufficiency basis by the end of the year, eight years’ ahead of schedule. Being in such a position helps improve the financial viability of a company to shocks.</p> <p>Overall, a score of (4) is awarded because:</p> <ul style="list-style-type: none"> • The company has robust financial controls, and already has access to committed finance to deliver much of its AMP7 plan. We understand that Affinity Water is in a process of improving its understanding of the assets and their health. • The company has a higher gearing ratio than the industry average, but unlike some other companies in the sector it is more restricted by its gearing ratio thresholds than by its Adjusted Interest Cover Ratio (operating profits less regulatory depreciation / interest payments) threshold giving it the ability to borrow an extra £80million before reaching a WBS lock-up on its gearing levels (85%). • All the July 2018 Ofwat stress and scenarios can be met without the need to approach shareholders, flex expenditure plans or restructure debt. The company is also able to meet other challenging scenarios it has set itself.
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Financial resilience: maturity assessment

Financial viability

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Planned for AMP7 and beyond</p>	<p>Operational and financial resilience were affected during the recent freeze-thaw event in March 2018 which led to additional expenditure to respond to supply interruptions and as a result Affinity Water failed to meet its unplanned interruptions performance commitment. Whilst responding to the storm better than some other water companies, Affinity Water aims to strengthen its operational resilience in this area by establishing a 24-hour Network Control Desk to improve how these events are dealt with, which directly improves financial resilience. Likewise, operationally being able to deal with multiple ‘severe but reasonable’ events increases its financial resilience and reduces the risk of possible Ofwat penalties for breaching ODI thresholds.</p> <p>In July 2018, Ofwat confirmed that it expects all companies with a gearing rate above 70% to propose gearing outperformance targets. There is therefore additional risk to the company. This could put downward pressure on credit ratings, pushing up the costs of debt finance. While the company already has access to committed finance to cover most of the AMP7 plans it is likely that during AMP7 an additional c.£120million of debt (equivalent to 10% of current debt) will be required unless the company uses its working capital (a £100million facility). As two upsides:</p> <ul style="list-style-type: none"> ○ Although the company’s PR19 submission will contain an outperformance ODI metric for gearing at the current rate (c.78.6%), Affinity Water has engaged with its new shareholders and has an intent to lower gearing during the AMP, which amongst other benefits will give the company a larger buffer to deal with ‘severe but reasonable’ events; ○ Affinity Water has historically been profitable, consistently paying dividends which gives some protection. Its newly announced Dividend Policy also contains additional controls on the amount of dividends that can be paid, in effect trapping cash if necessary ¹. <p>Based on Affinity Water’s plans to improve its monitoring and mitigation activities and its intention to reduce gearing a score of (4) is awarded.</p>
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Financial resilience: maturity assessment

Protected finances for the regulated business

Interviews: ¹Stuart Ledger, Chief Financial Officer
Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Level 1: Unaware</p> <p>The company has not considered ring-fencing finances for regulated activities.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>The company has appropriate measures for ring fencing finances for regulated activities to protect the interests of customers. Where the company has non-regulated activities, these are managed appropriately so they do not risk the financing of regulated activities. The company maintains flexibility to finance regulated company activities in the event of shocks to the group finances, evidenced by results from stress tests, spare cash reserves, liquidity, etc.</p>
<p>Current and ongoing activities</p> <p>Preliminary Industry Average (3.8)</p>				
<p>Planned for AMP7 and beyond</p> <p>Preliminary Industry Average (3.8)</p>				
<p>Current and Ongoing Activities</p>	<p>Veolia Water Central, Veolia Water Southeast and Veolia Water East were brought together as the one company Affinity Water in 2012. Following further changes in ownership, Affinity Water was acquired by a consortium of DIF, HICL Infrastructure and Allianz Capital in May 2017 ^B.</p> <p>Affinity Water Ltd (Affinity Water) and its holding company (Affinity Water Holdings Ltd that has injected the equity into Affinity Water) are financially and operationally ring-fenced businesses from the rest of Affinity Water Group by way of a Whole Business Securitisation (WBS), which includes ring fencing provisions for the bondholders in Affinity Water. For example, there is a positive covenant in the WBS that controls the sale of assets above £1million or 0.1% the RCV.</p> <p>As well as the ring-fenced company, Daiwater Investment Limited (the ultimate holding group company in the United Kingdom) also owns the licenced retail business arm (Affinity for Business (Retail) Ltd), Affinity Water Pension Trustees Ltd, Affinity Water Shared Services Ltd, Affinity Water Southeast Ltd and Affinity Water East Ltd ^B.</p> <p>The Group reports that 98.3% of Company’s revenue comes from its Affinity Water regulated activities ¹.</p> <p>Overall, given the dominance of regulated activities it is not considered that other parts of the Group would place an undue burden on the financial position of Affinity Water. Therefore, like many other water companies with a low (<5% of total revenue) level of non-regulated activities a score of (4) is awarded.</p>			
<p>Planned for AMP7 and beyond</p>	<p>With no indication of any material changes to its non-regulated activities Affinity Water, like many other companies, is awarded a score of (4).</p> <p>As most UK water companies now have very few non-regulated activities (or have robust systems and structures to avoid the risk of cross default), a decision has been taken by Arup that a 5 (Leading) score can only be awarded to two or three water companies. For this reason, unless other companies start growing their non-regulated offering, leaving a few with limited non-regulated exposure (like Affinity Water), a leading score of 5 will not be achievable.</p>			



Financial resilience: maturity assessment

Sustainable long-term financial planning

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04;

^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018):

Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody's. Investor Service.

Announcement: Moody's changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Level 1: Unaware</p> <p>The company’s plans are limited to the current AMP period. There is also no fixed process for sign off and no plan for regular approval.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>The company is looking forward 25+ years, with investment and expenditure plans linked to the strategic direction of the company. These are regularly reviewed and tested. Base operating and maintenance expenditure together with any additional enhancement or replacement expenditure to meet customer and regulatory requirements have been identified on a year-by-year basis in the short to medium term and AMP-by-AMP basis for the longer term. The company has an excellent understanding of the current and future predicted condition and performance of all its assets. All new investment is future proofed.</p>
<p>Current and ongoing activities</p> <p>Preliminary Industry Average (2.6)</p>				
<p>Planned for AMP7 and beyond</p> <p>Preliminary Industry Average (3.3)</p>				
<p>Current and Ongoing Activities</p> <p>As part of its maintenance approach, Affinity Water has started to proactively survey and test assets using new technologies and tools. For example, the company has a laboratory where samples of pipes that were installed many years ago can be stress tested using a mix of non-destructive and destructive condition testing. Various tools evaluate asset health, the remaining useful life of pipes and deterioration rates. The results are then used to inform future investments. However, the survey work is still ongoing and it will require some time for Affinity Water to fully utilise the information gathered and reflect it in its maintenance and investment plans. Affinity water has introduced an asset care optimisation programme which looks at the criticality for all above ground assets, and this is being rolled out to include below-ground assets.</p> <p>Affinity Water is also investing money to enable its reactive maintenance to be quicker, for example, in 2016 it purchased 20,000 acoustic loggers to ‘listen’ for the sound of leaks across the 16,600km of pipes it owns ^B.</p> <p>Affinity Water published its Strategic Direction Statement in 2013 that looks forward 25 years ^G. In March 2018, Affinity Water published a draft Water Resources Management Plan (WRMP) that covers the 60-year period between 2020 to 2080 to enable the company to address long term water demand and ensure a resilient and sustainable water supply ^H. It highlights that by 2064 the water balance could be in deficit in seven of the eight water resource zones ^H. The draft WRMP considers the amount of investment that may be required to meet its supply demand balance up to 2080, showing two pathways – one requiring £1billion of investment to 2079 in Net Present Value (NPV) terms and a second requiring £1.8billion. This second pathway will enable the company to be resilient to deal with drought events more severe than 1 in 200-year events. Following comments from the Environment Agency (EA) and Ofwat, we understand that the WRMP is being reviewed given restrictions on the amount of ground water than can be abstracted from wells.</p> <p>Affinity Water scores a 3 (response developed) as it is in the process of understanding its asset health including asset care optimisation and formulating a comprehensive long-term expenditure plan on a year-by-year basis in the short to medium term and on an AMP-by-AMP basis for the longer term. Such information is required for robust financial modelling to ensure that any water bill changes between AMPs are maintained within manageable boundaries, i.e. there are no sudden step shift increases in Totex requests in AMP8, AMP9, AMP10 or AMP11 and asset health is continually maintained or improved from AMP to AMP.</p>				



Financial resilience: maturity assessment Sustainable long-term financial planning

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Planned for AMP7 and beyond</p>	<p>Affinity Water has a process to improve its understanding of asset health and this will strengthen its capability of producing comprehensive long-term plans. By considering future scenarios using horizon scanning to consider what Affinity Water’s area will look like in 2080 (for example, population, demographics, spread of industry, climate change) there is now a need to consolidate the draft WRMP to prepare robust expenditure plans to ensure that any new investments are capable of accommodating the impacts of climate change and planned developments, whilst still allowing sufficient headroom for unplanned outages.</p> <p>As explained in the ‘Financial Viability’ section Affinity Water’s draft WRMP includes interventions to achieve resilience to a severe 1 in 200-year event by the end of AMP7. The company has also been developing scenarios for extreme drought (beyond 1 in 200-year events and toward 1 in 500-year events) and sponsored a week-long intensive workshop in April 2018 that discussed extreme drought planning across the water industry.</p> <p>Going forward, the company needs to ensure that by the end of each AMP the overall health of its assets is improving to avoid step shifts in Totex requests.</p> <p>With this analysis, a better understanding of its asset base and clear investment plans for future AMPs, a level 4 score could be achievable for AMP7 and beyond.</p>
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Financial resilience: maturity assessment

Accessible financial reporting

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

<p>Level 1: Unaware</p> <p>The company only reports the minimum financial information that is required by Companies House and Ofwat. The information may be difficult to understand.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>Financial reporting is appropriately tailored for the needs of investors, other stakeholders, and interested water customers. The company publicly reports its financial and annual performance (via the annual reports and APRs) using customer focused language. Customer billing information provides sufficient information to enable customers to understand major areas of expenditure and impacts, such as leakage reduction. Corporate, financing and tax structures are transparent and easy to understand.</p>
<p>Current and ongoing activities</p> <p>Preliminary Industry Average (3.3)</p>				
<p>Planned for AMP7 and beyond</p> <p>Preliminary Industry Average (3.8)</p>				
<p>Current and Ongoing Activities</p>	<p>As other water companies, Affinity Water reports performance via its Annual Performance Report, its Annual Report and its interim financial statements.</p> <p>Although Affinity Water was one of two ‘Fast track’ companies for the first year of PR14, in 2016 Ofwat changed the company’s status to ‘targeted assurance’ and in 2017 retained this ¹. In Ofwat’s 2017 assessment, out of the nine areas it reviews there was only one area – ‘Financial Monitoring Framework’ - where there were minor concerns over reporting of dividends and the return on equity. These have both since been corrected and additional peer reviews put in place alongside increased communication with Ofwat to seek guidance/clarification going forward. However, there were no areas that ‘exceeded expectations’ ¹. In its 2017 Financial Monitoring Framework Assessment report, Ofwat states that some companies, for example, United Utilities and Dŵr Cymru have exceeded expectations by having ‘<i>more customer friendly ways of communicating performance information to customers and other stakeholders, especially on websites</i>’. Affinity Water is now reviewing the structure of the reports and publications to make them more straightforward for customers, stakeholders and regulators to access specific information. Thought could be given to having meetings with customers to gather their views of the financial structures and performance of the company.</p> <p>To aid communication with customers, Affinity Water provides a breakdown of how each £1 of the customers bill is spent splitting bills into paying for assets, paying suppliers, paying staff, paying tax, paying its bondholders and paying its shareholders.</p> <p>Many of the privately owned water companies have used the WBS bond financing structure, setting up a Cayman Islands financing company. Given press coverage and changes to rules to allow water companies to issue bonds in the UK, most of these companies are now re-domiciling their Cayman investments back to the UK. Affinity Water is actively planning such a move which will make it easier for its consumers to understand its corporate and tax structures.</p> <p>We score Affinity Water a (3) because it has not yet re-domiciled its Cayman finance operations and obtaining evidence from the forthcoming 2018 Ofwat Annual Performance Report review that it is addressing Ofwat’s concerns with its ‘Financial Monitoring Framework’.</p>			
<p>Planned for AMP7 and beyond</p>	<p>We are aware that Affinity Water is in the process of improving the accessibility of its financial reporting to stakeholders through different media, e.g. letters, reports and its website. This combined with the closing down of the Cayman Islands financing company and continuing to strive to the Ofwat ‘self assurance’ status will put the company at a level 4 (response actioned). We are also aware that the company is in the process of applying for the ‘Fair Tax’ Mark, which we understand will make it the first UK water company to gain this accreditation.</p>			



Financial resilience: maturity assessment

Robust financial monitoring

Interviews: ¹Stuart Ledger, Chief Financial Officer

Documents reviewed: ^A Ofwat (2018): Expectations for companies in issuing long-term viability statements. IN 18/04; ^B Affinity Water Ltd (2018): 2017/18 Annual Report; ^C Ofwat (2017): Monitoring financial resilience; ^D Ofwat (2018): Putting the sector back in balance: Consultation on proposals for PR19 business plans, ^E Ofwat (2018): Putting the sector back in balance – summary of Ofwat’s decision on issues for PR19 business plans, ^F Moody’s. Investor Service. Announcement: Moody’s changes outlook to negative on ratings of 4 UK water groups. May 2018; ^G Affinity Water (2013): Investing for your community Spring 2013 - Our Strategic Direction Statement; ^H Affinity Water (2018): Draft Water Resources Management Plan 2020-2080, ^I Ofwat (2017): Company monitoring framework - Affinity Water

Level 1: Unaware The company only undertakes basic financial monitoring	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading The company has appropriate measures to monitor and confirm the company’s long-term viability, which goes beyond AMP cycles to track trends in maintenance programmes, climate change and demographic changes, etc. These measures are supplemented by regular sensitivity tests and scenario testing. Such information is recorded and reported routinely at Board level, with clear criteria for when material divergences from expected plans need to be discussed and actioned.
Current and ongoing activities Preliminary Industry Average (3.8)				
Planned for AMP7 and beyond Preliminary Industry Average (4)				
Current and Ongoing Activities	<p>Affinity Water actively monitors financial metrics, e.g. gearing, interest cover and adjusted cash interest cover, and forecasts these metrics 2-years ahead for its bondholders. Internally it monitors metrics over AMPs. Stress testing and sensitivity analysis is routinely undertaken. Like most other water companies, regular reporting to bond investors adds another level of monitoring and control. For instance, one of Affinity Water’s financial covenants within its WBS documentation is that at least 85% of its outstanding debt is hedged against movements in interest rates.</p> <p>Treasury policies are set in conjunction with the wider Affinity Water Group, with day-to-day compliance being the responsibility of the Treasurer who is in charge of operational compliance, liquidity risk, credit risk, interest rate risk and inflation risk. The Treasury Policy also includes details regarding responsibilities, treasury controls and procedures. A Treasury Report is provided to the Board monthly and policies are set yearly.</p> <p>There are a number of financial committees that report to the Group Board that has overall responsibility for monitoring the Company’s financial systems including:</p> <ul style="list-style-type: none"> • The Regulation & Corporate Affairs team and Audit Committee meet quarterly, who focus primarily on regulatory reporting to Ofwat and ensuring information produced for stakeholders is accurate; and • A Customer Challenge Group (CCG) holds Affinity Water accountable to performing against its AMP commitments. <p>The other committees with financial involvement include the Remuneration committee, the Nomination Committee and the Community Committee.</p> <p>As stated in the ‘Accessible financial reporting’ section, the company has responded to Ofwat’s minor November 2017 concerns over its ‘Financial Monitoring Framework’ and has added additional checks and balances to ensure calculations and monitoring procedures are robust ¹.</p> <p>Based on the above, Affinity Water demonstrates both responsiveness to Ofwat’s concerns and has now put in place a ‘three line of defence’ model to assure information risks monitored and reported are accurate, transparent, reliable, relevant, complete and up-to-date. A level 4 is therefore given to Affinity Water.</p>			
Planned for AMP7 and beyond	<p>There was no indication of planned changes in AMP7 or beyond, hence a level 4 score is retained like most of the industry.</p>			



Corporate resilience: maturity assessment

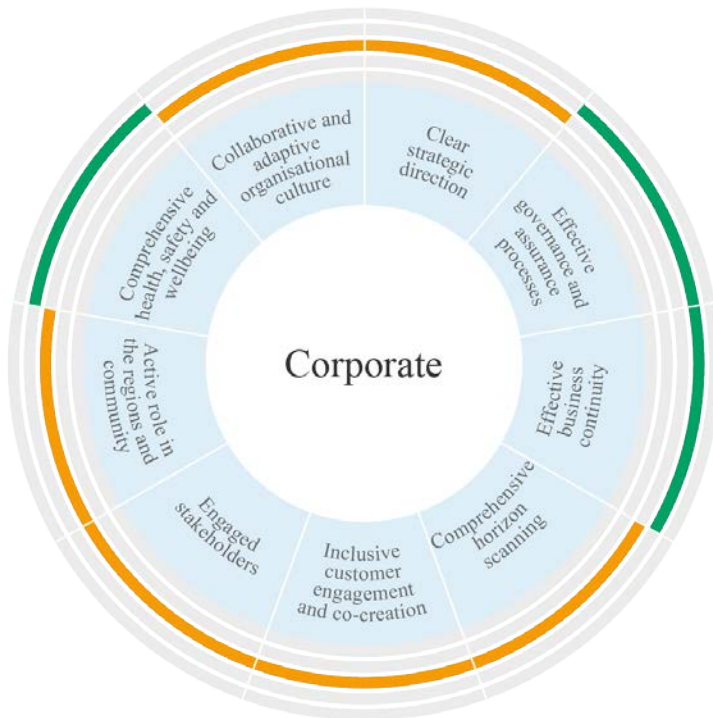


Figure 8: Corporate Resilience: Current scores

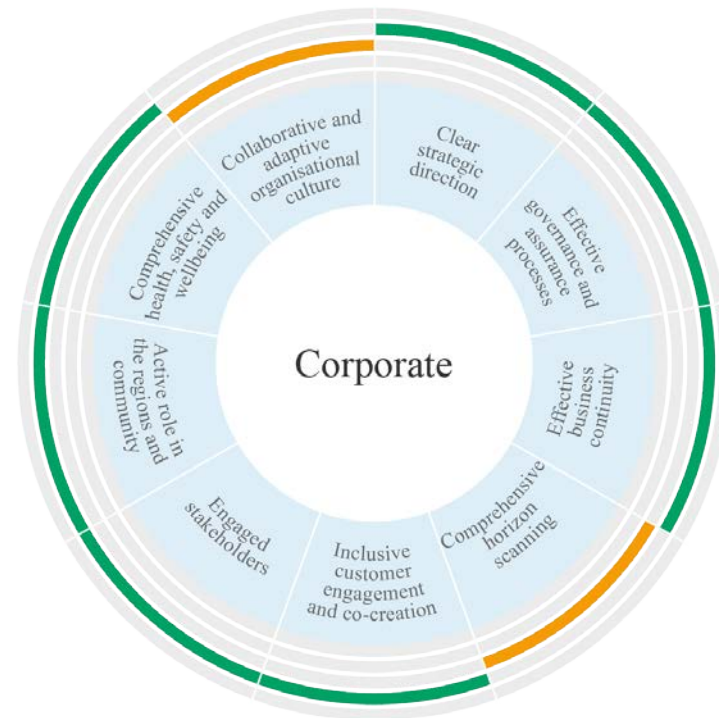


Figure 9: Corporate Resilience: Future scores



Corporate resilience: maturity assessment

Clear strategic direction

Interviews: Chris Offer; Tim Monod; Graham Turk; Kevin Bennett; Amanda Reynolds

Documents reviewed: ^AAffinity Water website, www.affinitywater.co.uk/community-recreation;
^BInvesting for your community: Our Strategic Direction Statement, 2013; ^CDraft Water Resources Management Plan, March 2018; ^DAffinity Water Annual Report and Financial Statements, 2018;
^EAffinity Water jobs website, <https://jobs.affinitywater.co.uk/about-us/our-culture/>; ^FAffinity Water, Resilience Strategy; ^GPeople Survey Results, November 2017

Level 1: Unaware The company has disparate, and multiple strategies and plans. There is no clear aim or vision for the business.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading The company has a clear aim and strategy which is well communicated and is recognised by all, both internally and externally. All plans and decisions are based on how they will work towards this strategy.
Current and ongoing activities Preliminary Industry Average (3.2)				
Planned for AMP7 and beyond Preliminary Industry Average (3.6)				
Current and Ongoing Activities	<p>Affinity Water’s vision is: “to be the UK’s leading community focused water company”^A. In the lead up to PR14, a publicly available 25 year Strategic Direction Statement (SDS) was published^B. This included 25 year plans to ‘Maintain our local environment’, ‘Sustain our local communities’, and ‘Support our local economies’. Currently, there are no plans to update the SDS. However, the business has recently begun to review their strategic direction as part of PR19 planning, which has included a pre-SDS consultation with customers^C. In 2015, Affinity Water also defined their five priorities and implemented reporting metrics for these which are communicated online. The company published performance reports for ODIs and a wholesale defined mission online.</p> <p>The business has set out the ‘Affinity Way’ which is well communicated across the business^E. However, a recent staff survey suggested that a significant number of staff ‘Feel that the vision of Affinity Water does not make their job feel important’^G.</p> <p>The business recently underwent a change in management, with a new Board Chairman and Chief Executive Officer. In 2018, the Board established a ‘Community Committee’, whose inaugural meeting was in March 2018; the aim of this committee is to develop and implement a community strategy that supports the delivery of the company vision to be the UK’s leading community focused water company^D. The 2018 Annual Report summarises the Community Engagement Strategy, which sets out how Affinity Water operates and uses resources in order to create value. This is consistent with what is set out in the Strategic Direction Statement^B. There is evidence in the PR19 business planning in terms of delivering the strategy, particularly Affinity Water’s community approach to delivering resilience to their customers. Leading up to PR19, Affinity Water has also been developing a Resilience Strategy^F, which the business will be seeking Board assurance on before PR19 submission.</p> <p>Affinity Water has a clear 25 year Strategic Direction Statement, including plans for the local environment, communities and economy, there are no current plans to update this statement, however the company is in the process of developing a resilience strategy. Although the company has a clear vision, set out in the ‘Affinity Way’, this isn’t always fully embedded or understood by employees in the context of their roles.</p>			
Planned for AMP7 and beyond	<p>The business is not currently planning to update its SDS, however work is ongoing to potentially develop this in the future.</p> <p>The Resilience Strategy set out in the run up to AMP7 will be implemented and future plans will work towards achieving the aims set out in this. The Community Strategy, supported by the Board’s Community Committee^D, and driven by the new CEO, should also become more established and provide a clear community-led approach. This supports a projected score of 4 for AMP7 and beyond.</p>			



Corporate resilience: maturity assessment

Effective governance and assurance processes

Interviews: Amanda Reynolds; Tim Monod; Chris Offer

Documents reviewed: ^AGovernance Code, ^BAffinity Water Annual Report and Financial Statements – 2017-2018, ^CRisk Management Framework, AW0012, Dec 2015; ^DOfwat Company Monitoring Framework: 2017 assessment, ^EOfwat Company Monitoring Framework: 2017 assessment - Individual Company Report – Affinity Water, ^FGovernance and Assurance, Draft chapter, PR19 Business Plan; ^GConsultation and revised WRMP, 20 June 2018, Affinity Water Limited Board Meeting Paper

Level 1: Unaware There are limited or no company-wide processes for assurance, approval and sign-off. Processes, roles, governance and reporting is different across teams.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading The company has reliable and well disseminated processes, roles, governance and reporting covering all aspects of the business. There is a clear process for assurance, approval and board sign-off.
Current and ongoing activities				
Preliminary Industry Average (3.6)				
Planned for AMP7 and beyond				
Preliminary Industry Average (4)				
Current and Ongoing Activities	<p>Affinity Water has clear and robust processes in place for business governance. Weekly and fortnightly meetings between Directorates are used to review risk¹ which then feed into quarterly meetings held by the Audit Committee². The Audit Committee provides assurance to the board that risks are being managed. Any particularly high risks from the different Directorates are reported to the CEO and Executive Management Team (EMT) through monthly EMT reports. Audit Committee risk meetings are complemented by monthly board meetings to review company performance. The company has a Governance Code^A, which sets out key processes and controls, to which it adheres to. The Governance Code is publicly available on the company's website, and is aligned with the principles set out in Ofwat's 2014 'Board Leadership, transparency and governance' paper^B.</p> <p>The company's Risk Management Framework sets out the responsibilities of the Board, CEO, Senior Management Team, Managers, and Employees. It also provides a clear process flow and framework for how risks are identified, assessed and managed within the company^C. In Ofwat's Company Monitoring Framework assessment in 2017, Affinity Water met expectations for most of the governance categories, but with minor concerns for their financial monitoring framework, the company is categorised as 'Targeted'^{D,E}. There is a well established Incident Review Board to review and learn from incidents; a Zero Harm Strategy Group to monitor performance and provide direction; as well as Safety Leadership Groups to deliberate and cascade information and learning.</p> <p>Affinity Water's Board meets the Ofwat expectation that independent, non-executive directors (INEDs) should make up the largest single representative group. Committee membership is assessed and refreshed periodically to ensure that undue reliance is not placed on any one individual. Affinity Water has set out the principles, responsibilities and actions of the Board and committees clearly within its Annual Report, and this includes a list of the matters considered by the Board over the previous year, a report on attendance of meetings by individual committee members, and reports from the Audit Committee, the Remuneration Committee and the Directors. A complete organisational structure is provided, with ownership and financing clearly set out. Affinity Water has taken effort to ensure the transparency of all of these details. Terms of reference for the Board committees are publicly available through Affinity Water's website, and the Annual Report^B also details particular features of the risk management processes and internal controls that the company has in place to manage strategic business risks and provide reasonable assurance against these risks. While resilience principles are considered through the individual controls and mitigations of risks, there is a lack of broader consideration of resilience across the company. However, the development of a resilience strategy, as part of PR19 planning, will likely help increase the recognition of resilience across the business; this strategy is yet to attain Board assurance.</p>			



Corporate resilience: maturity assessment

Effective governance and assurance processes

Interviews: Amanda Reynolds; Tim Monod; Chris Offer

Documents reviewed: ^AGovernance Code, ^BAffinity Water Annual Report and Financial Statements – 2017-2018, ^CRisk Management Framework, AW0012, Dec 2015; ^DOfwat Company Monitoring Framework: 2017 assessment, ^EOfwat Company Monitoring Framework: 2017 assessment - Individual Company Report – Affinity Water, ^FGovernance and Assurance, Draft chapter, PR19 Business Plan; ^GConsultation and revised WRMP, 20 June 2018, Affinity Water Limited Board Meeting Paper

<p>Current and Ongoing Activities</p>	<p>The Board is engaged in the oversight of the company’s Price Review 2019 (PR19) business planning process, and has also recently been engaged in considering the latest update to the draft WRMP submission to Defra in 2019^G. Affinity Water has obtained external assurance on key matters, and has engaged with its Customer Challenge Group, as well as third parties including, PwC and Atkins on strategic and data table assurance. The company has independent ISO accreditation for quality, health and safety, environmental management and laboratory operations from UKAS accredited certification bodies, follows the requirements of ISO27001 for information security and is implementing ISO22301 for emergency response. Affinity Water also has several dedicated groups and committees focused on health & safety, environment and climate, information security and quality assurance.</p> <p>Affinity Water has a robust response actioned around governance and assurance, providing the company with a score of 4 for their maturity. Affinity Water recognises that it could further improve collaborative thinking across the organisation and develop the consideration of potential impacts on other directorates and parts of the business during decision making. To become leading in this category, Affinity Water would have an independent review of the effectiveness of its Board undertaken, and further develop its governance processes to incorporate more of the principles of resilience alongside the established processes which focus on specific risks.</p>
<p>Planned for AMP7 and beyond</p>	<p>Affinity Water has set out four key governance innovations for the near-term future, which will help to build its resilience in AMP7 and beyond. These include:</p> <ul style="list-style-type: none"> • Aligning all management information reporting with its performance commitments • Embedding investment planning as an ongoing process rather than focusing on it only every five years for the Ofwat Price Review process • Ensuring topics such as innovation, resilience, assurance, trust and confidence are regular agenda items for board meetings^F • Externally facilitated assessments of board effectiveness are also planned, to drive continuous improvement <p>While these plans are encouraging and will enable Affinity Water to continue to have a robust, actioned response, there is not enough information to suggest that the company will move beyond this to become leading in the future, so the score remains a level 4.</p>



Corporate resilience: maturity assessment

Effective business continuity planning

Interviews: Tim Monod;

Documents reviewed: ^AEP010a Emergency Plan (January 2018), ^BEmergency Action – risk assessment, ^CAffinity Water Business Continuity Crisis Plan, ^DERT Module agenda from February 2018, ^EGOLD Controller Cyber Exercise scenario with other parties invite from July 2017, ^FOwat letter to Affinity Water 19th June 2018, ^GSEMD Compliance Statement 2018

<p>Level 1: Unaware</p> <p>The company has no business continuity plans. No resource allocated. No policy in place. There are informal resilience arrangements within some departments/teams. No training or exercise programme is implemented. There are also limited or no resilience planning or response plans for critical assets.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>The company has a risk-based approach to resilience planning linked to the National Risk Register and the likely impact on service to customers. A set of response plans are in place to prepare for, respond to and recover from potential impacts. Plans are regularly trained and exercised, with everyone in the company knowing their roles and responsibilities. All critical assets have emergency plans and all critical teams will be able to recover to minimise impact on service. Approaches will follow best practice, e.g. ISO 22301 and the Business Continuity Institute Good Practice Guideline 2018.</p>
<p>Current and ongoing activities</p> <p>Preliminary Industry Average (3.1)</p>				
<p>Planned for AMP7 and beyond</p> <p>Preliminary Industry Average (4.1)</p>				
<p>Current and Ongoing Activities</p>	<p>Affinity Water has provided evidence of a number of documents that demonstrate the processes in place to manage the business during both planned and unforeseen events. The broadest of these is the 'Emergency Plan' document^A, which is a guidance and reference document for all staff involved in incident management within the organisation. It provides an overview of the company's responsibilities in terms of incident management while also serving to demonstrate its compliance with all obligations relating to emergency planning procedures. This document is at a relatively high level for all elements of incident response, from philosophy and approach, escalation, right through to wash-up and lessons learned. Information on physical provisions is provided (for example emergency room layouts, IT and telephony resources), as well as clear roles and responsibilities for those involved in managing an event, and information on emergency contact lists and standby rosters.</p> <p>From the information provided it is unclear how Affinity Water ensures its response is appropriate for different, wide-ranging incidents that may occur, and whether there are more detailed documents that are available for supporting staff in the planning of and response to specific incidents of varying nature. The 'Emergency Plan' document is supported by an Emergency Action risk assessment template^B, which prompts consideration of risks associated with action to be taken in categories including safety, health, environment, reputation, stakeholder, information and asset. The template uses likelihood and severity scoring to give an overall risk rating, and also includes identification of controls required to mitigate the risks identified.</p> <p>Affinity Water has a dedicated emergency response team and in any incident that is escalated to a strategic level (operational and non-operational), the company has a Business Continuity Crisis Team (BCCT) made up of Directors and senior individuals within the business. This team takes strategic responsibility for incident management, and there is a Business Continuity Crisis Plan^C to support and set out the team's roles and responsibilities, and key processes for responding including a flow diagram of escalation process, typical meeting agenda templates, checklists and both strategic and department level business impact assessment matrices. The final section of this document covers the review and testing procedures for the plans, clearly setting out that the plans are reviewed on an annual basis as well as after any incident. Guidance for testing elements of the plans as well as for larger scale, more holistic tests and full-scale incident training is included.</p>			



Corporate resilience: maturity assessment

Effective business continuity planning

Interviews: Graham Turk; Kevin Bennett;

Documents reviewed: ^AEP010a Emergency Plan (January 2018), ^BEmergency Action – risk assessment, ^CAffinity Water Business Continuity Crisis Plan, ^DERT Module agenda from February 2018, ^EGOLD Controller Cyber Exercise scenario with other parties invite from July 2017, ^FOfwat letter to Affinity Water 19th June 2018, ^GSEMD Compliance Statement 2018

<p>Current and Ongoing Activities</p>	<p>Affinity Water has a dedicated resilience manager, a ‘first alert’ process in place to notify directors of incidents that allows the implementation of the emergency response team and provides regular training for individuals that have incident management roles^D. This was highlighted by Ofwat as a positive point in a recent letter to Affinity Water regarding the company’s response to dealing with the widespread ‘freeze-thaw’ incident in March 2018^F. Ofwat’s assessment of Affinity Water’s response in this particular incident was generally positive, with recognition for its good planning practice that has a particular focus on ensuring capacity and availability as well as flexibility to change or cancel scheduled programmes of maintenance.</p> <p>Affinity Water has been awarded the UK Government’s Cyber Security Essentials + certification. Affinity Water has also begun its journey to fully align with ISO27001, with a target to meet this by the end of 2018. Affinity Water use a third party organisation (MWR) to test their cyber security. In July 2017 the business held a Cyber Exercise with the National Cyber Security Centre. This involved a theoretical desk-based exercise undertaken with members of Affinity Water’s Gold team; Defra, DWI and Ofwat were in attendance as spectators for the duration of the exercise^E. We were not shown evidence of the outcomes and lessons learnt from this assessment. Affinity Water, complies with the Security and Emergency Measures Direction (SEMD), has a dedicated SEMD team, and is externally audited to ensure their processes are in line with this^G.</p> <p>Affinity Water has demonstrated that it has effective processes in place for business continuity planning, and that these plans have been tested in recent events and have proven to be a successful response. In order to become leading, Affinity Water could consider including more advanced technological solutions for monitoring its network, and communicating with its customers proactively, at an earlier stage in the event. The company needs to be mindful of and take into account how the interrelationships between their own systems and other external systems may drive unforeseen impacts, and how these can be identified, prepared for and managed.</p>
<p>Planned for AMP7 and beyond</p>	<p>We have seen no plans that specify changes to Affinity Water’s approach to incident management. However, Ofwat has recently requested that the company publish a response to its assessment outlined in the letter from 19th June 2018, by 28th September 2018^F. This response is likely to be informed by internal reviews of the company’s incident management processes, with potential changes made as a result of this.</p> <p>The score 4 we have given for ‘AMP7 and beyond’ reflects the fact that we have not seen clear evidence of any planned changes to Affinity Water’s business continuity planning arrangements, and therefore their response to this section is expected to remain as actioned.</p>



Corporate resilience: maturity assessment

Comprehensive horizon scanning

Interviews: Tim Monod; Amanda Reynolds; Graham Turk; Kevin Bennett

Documents reviewed: ^ADraft Water Resources Management Plan 2020-2080 (March 2018); ^BInnovation Roadmap; ^CFuture Enablers & Disruptors for the Water Sector Stimuli booklet (Q4 2017); ^DPR19 Stimuli A0 posters; ^EPC103 Procurement Procedure – Risk Management (May 2018); ^FRisk Management Framework, AW0012, Dec 2015; ^GNew Business Models in the Water Sector – a report prepared for Affinity Water by KPMG (December 2016); ^HDraft WRMP

Level 1: Unaware No horizon scanning is undertaken for the business.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading Plans, strategies and actions are all based on the outcome of comprehensive and robust horizon scanning which takes into account future shocks and stresses that may impact areas of the business. Horizon scanning is regularly reviewed.
Current and ongoing activities Preliminary Industry Average (2.9)				
Planned for AMP7 and beyond Preliminary Industry Average (3.2)				
Current and Ongoing Activities	<p>Affinity Water does not currently have established processes or systems in place to ensure that key business-wide decisions and practices are informed by comprehensive horizon scanning. The company's risk management framework discusses a need to consider 'emerging risks' but does not explicitly state a methodology, review period, or future timeframe to consider^F.</p> <p>The business has conducted some specific work to inform longer-term strategies and thinking within particular areas of the business. As part of its PR19 planning, Affinity Water is undertaking a comprehensive analysis of potential shock and stresses that may impact the business. This analysis has been based on guidance from UKWIR and Arup, as well as the Company Risk Register. However, it is not understood whether this process will be regularly reviewed beyond PR19 submission.</p> <p>Typically, consideration of future shocks and stresses are reviewed in a number of operational business areas. For example, the considerations for how water supply and demand may change in the future, as required by the Water Resources Management Plan (WRMP)^H. In its draft WRMP, Affinity Water has gone beyond the statutory 25 year planning period, and has considered up to a 60 year horizon (up to 2080). This choice of horizon was informed by the regional work carried out by Water Resources South East (WRSE), which Affinity Water contributes to. This plan takes into account potential impacts of climate change, population and economic growth in the region, as well as existing programmes of metering and sustainability reductions resulting from the WINEP programme. However, it is not clear how Affinity Water has considered the potential impacts of wider-ranging shocks and stresses, what systems they have in place and how the business has planned for them in order to provide a resilient response should unforeseen circumstances arise.</p> <p>The business's Finance department routinely undertakes horizon scanning by considering various economic indicators and what that means to the company's corporate credit score. Furthermore, horizon scanning is undertaken to assess potential legislative changes, which also provides Affinity Water with an opportunity to influence policies. At the Board level, there is a monthly strategy day to look both forwards and backwards in terms of performance. However, we did not see evidence of topics discussed on Board strategy days. Affinity Water has developed an innovation roadmap that sets out activities that it expects to carry out and what new innovations may be available relevant to these activities over the next 15 years^B. The company has carried out some in-depth thinking around innovations in the digital and technology sector and how these may influence the future of its business^C. Some of the thinking in this exercise demonstrates a wider perspective in considering how advances in technology may be a disrupter or enabler for the business.</p>			



Corporate resilience: maturity assessment

Comprehensive horizon scanning

Interviews: Tim Monod; Amanda Reynolds; Graham Turk; Kevin Bennett

Documents reviewed: ^ADraft Water Resources Management Plan 2020-2080 (March 2018); ^BInnovation Roadmap; ^CFuture Enablers & Disruptors for the Water Sector Stimuli booklet (Q4 2017); ^DPR19 Stimuli A0 posters; ^EPC103 Procurement Procedure – Risk Management (May 2018); ^FRisk Management Framework, AW0012, Dec 2015; ^GNew Business Models in the Water Sector – a report prepared for Affinity Water by KPMG (December 2016); ^HDraft WRMP

<p>Current and ongoing activities</p>	<p>This included questions about workforce and working arrangements, operational aspects of the business and how future technology might affect Affinity Water’s customers. Alongside the booklet developed through this work, Affinity Water also produced a number of posters acting as prompts for thinking about the future during PR19 business planning^D.</p> <p>In its procurement risk management procedure, the company considers risk horizons up to 25 years into the future^E. In 2016, Affinity Water commissioned a piece of work from KPMG which looked at drivers of change, the case for change and enablers of change in the context of possible new business models for the water industry^G. Affinity Water is also a member of the Institute of Customer Services, and attends related events to understand trends in customer-related issues. The company also collaborates with the Water Industry Research Group, participates in Water UK events and engages with local resilience forums, environmental health teams and local councils. Aside from these initiatives, we have not seen any evidence of how Affinity Water undertakes and incorporates horizon scanning into other areas of its business such as workforce planning, technology and innovation and general business as usual considerations.</p> <p>Based on the evidence provided, in some areas the company shows a potentially leading assessment of horizon scanning (e.g. draft WRMP). Moreover, Affinity Water is aware of the importance and breadth of horizon scanning that is required to inform its work in some areas. However, horizon scanning has not been used or adopted widely across the business which has resulted in a current Level 3 ‘Response developed’ score.</p>
<p>Planned for AMP7 and beyond</p>	<p>Affinity Water, and its Board recognises that horizon scanning and future thinking within the business needs to be more comprehensive and joined-up. While we have not seen any specific plans to address this in the future, the commitment to addressing the issue from senior members within the organisation is likely to drive an improvement in score for AMP7 and beyond.</p>



Corporate resilience: maturity assessment

Inclusive customer engagement and co-creation

Interviews: Amanda Reynolds; Chris Offer

Documents reviewed: ^AAffinity Water Strategic Direction Statement – Spring 2013, ^BDraft Water Resources Management Plan research report – May 2018, ^CPre-SDS Consultation Online Survey Findings 2016, ^DPR19 Engagement pre-SDS Focus Groups Research Report – August 2017, ^EAffinity Water Business Plan Acceptability Survey research report – June 2018, ^FAffinity Water Annual Report and Financial Statements – 2017-2018, ^Gpre-SDS Focus Groups Sign Post Trade-offs: Findings and recommendations report – draft v1, ^HPR19 Draft Chapter 4 – Customer & Stakeholder Engagement – July 2018, ^IOfwat Company Monitoring Framework 2017 assessment; ^JOut in the cold: Water companies response to the ‘Beast from the East’, Ofwat, June 2018

<p>Level 1: Unaware</p> <p>There is limited customer engagement undertaken. Any that is undertaken is one way and provides the customers with the information. There is no or limited consideration of vulnerable customers.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>The company has a clear two-way dialogue with customers to ensure that customers are included and to improve transparency, cooperation and collaboration on current performance and future direction for the business. Customer policy and practices are established to meet the needs of customers in vulnerable circumstances. The company aims to establish trust, confidence and legitimacy.</p>
<p>Current and ongoing activities</p> <p>Preliminary Industry Average (3.2)</p>				
<p>Planned for AMP7 and beyond</p> <p>Preliminary Industry Average (4)</p>				
<p>Current and Ongoing Activities</p>	<p>In preparing its business plan for PR19, Affinity Water has undertaken a significant amount of customer engagement work. Affinity Water’s customer engagement has focused on customers both as individuals and members of communities^A. Following a consultation in 2012 on its customers’ expectations, the company set up a programme of engagement including questionnaires, focus groups, online surveys, drop-in sessions and presentations, and used the insights obtained from this programme to inform the company’s ‘Strategic Direction Statement’^A. Affinity Water uses customer segmentation to ensure that it is meeting customers’ specific requirements and understand how these vary across and within its operational area^H. Affinity Water has taken on board customer feedback about how it defines the communities it serves, and now takes a more fluid approach to customer engagement. It does this through identifying communities not only ‘of place’ (i.e. geographical) but also ‘of interest, and recognising that communities can be defined based on shared characteristics, interests or affinities such as life stage, age group, circumstance and employment.</p> <p>The company has recently undertaken a similar programme of customer engagement for the WRMP^B and in the run up to business planning for PR19^H. This has included a preliminary customer consultation to better understand its customer base and their priorities^C, with preliminary focus group sessions that focused on five different topics, across three key themes which considered both short and long-term needs^D. More recently, Affinity Water has conducted a detailed business plan acceptability survey using third party experts Ipsos MORI and Arup^E. This survey included testing three different options for Affinity Water’s PR19 business plan to gauge customer support and preferences, as well as willingness to pay for supporting extensions to social tariffs and environmental pilots, increased leak reduction, reduced chance of severe drought restrictions and reliability of water pressure.</p> <p>The survey for the draft WRMP was designed to obtain insight into customer opinions about the challenges that Affinity Water faces and the possible solutions to these challenges, and associated impact on the customer^{B,F}. Responses were captured through both quantitative and qualitative reporting. The contents of these surveys include specific engagement on some key resilience challenges for the company, and in engaging with customers on resilience issues, Affinity Water has chosen not to use terminology such as ‘resilience’ specifically, but rather relate resilience issues to customer experience and expectations. We regard this to be good practice as it enables the company to engage with the largest percentage of its customer base on resilience issues.</p>			



Corporate resilience: maturity assessment

Inclusive customer engagement and co-creation

Interviews: Amanda Reynolds; Chris Offer

Documents reviewed: ^AAffinity Water Strategic Direction Statement – Spring 2013, ^BDraft Water Resources Management Plan research report – May 2018, ^CPre-SDS Consultation Online Survey Findings 2016, ^DPR19 Engagement pre-SDS Focus Groups Research Report – August 2017, ^EAffinity Water Business Plan Acceptability Survey research report – June 2018, ^FAffinity Water Annual Report and Financial Statements – 2017-2018, ^Gpre-SDS Focus Groups Sign Post Trade-offs: Findings and recommendations report – draft v1, ^HPR19 Draft Chapter 4 – Customer & Stakeholder Engagement – July 2018, ^IOfwat Company Monitoring Framework 2017 assessment; ^JOut in the cold: Water companies response to the ‘Beast from the East’, Ofwat, June 2018

<p>Current and Ongoing Activities</p>	<p>In terms of business as usual customer engagement work, in 2017-18, Affinity Water introduced new channels for customers by providing a self-service online ‘My Account’ solution, and took steps to simplify and streamline customer interaction processes^G. The company also engaged with customers to co-create a redesign of customer bills to make it clearer and simpler to understand, and is personalising the surveys it carries out to maximise the relevance of the information it collects^G. Affinity Water has also undertaken usability testing with customers to ensure that the feedback customers provide informs the company’s work and service improvements.</p> <p>In addition to conducting its own programme of customer engagement, Affinity Water has also collaborated with third parties and environmental charities such as Hubbub and Blue Marble to obtain further insight into customers’ water use habits, and engages on a regular basis with its CCG^H. Affinity Water’s CCG has been recognised by Ofwat as demonstrating best practice by publishing an annual report online including feedback and challenge on outcome performance and stakeholder information.</p> <p>The company has a number of dedicated schemes for vulnerable and priority customers, including accessibility arrangements, a social tariff with fixed monthly payments, and a water direct service in partnership with the Department for Work & Pensions which allows weekly payments to be taken directly from participants’ benefit payments^G. Affinity Water has held various stakeholder workshops with organisations such as Experian and Citizens Advice Bureau to obtain feedback on how to best communicate with vulnerable and priority customers. The company also has plans to engage with the energy utility sector to share information regarding priority services customers – where the energy sector has a higher number of registered priority customers, to ensure it is fully reaching all of its customers’ needs. Affinity Water is also working towards achieving BS18477 accreditation ‘Inclusive Service Provision’, with BSI having conducted the pre-certification assessment and will be returning in October to certify the process and team. In its recent ‘Out in the Cold’ report, Ofwat highlighted Affinity’s Water’s good knowledge of vulnerable customers and how they were impacted by the event^J.</p> <p>Affinity Water’s customer satisfaction measure has improved consistently over the past three years, alongside a 32% reduction in the volume of complaints compared to the previous year^G. The company has won several awards in the last year relating to customer engagement, including ‘Best Customer Transformation’ and ‘Best Corporate Social Responsibility’ at the European Contact Centre and Customer Service Awards, as well as ‘Most Improved Customer Satisfaction’ at the Rant & Rave Awards^G.</p> <p>Affinity Water has a well-developed response to customer engagement scoring a level 3, however they could enhance the integration and joining up of their initiatives to demonstrate a robust, organisation-wide response is actioned.</p>
<p>Planned for AMP7 and beyond</p>	<p>Affinity Water has plans to continue to engage with communities and to use the findings from its targeted research programmes to help shape the ‘communities strategy’ and ‘community model’ that it is developing. The business is also planning a number of projects that will require large investment that have significant resilience drivers, and has plans to consult with customers specifically on these projects and options.</p> <p>Most significantly, Affinity Water recognises that the existing customer communications strategy needs updating and changing, and is already acting on this. There is an opportunity for Affinity Water to bring some of the targeted, in-depth consultation and engagement work that was carried out for the PR19 business planning into the main day-to-day business areas, and to carry this approach through to ensure it continues a two-way dialogue with customers to inform its business-as-usual decision making.</p> <p>Based on these plans, we expect Affinity Water will continue to improve in this area and we would anticipate the company to have achieved a fully actioned response for AMP7 and beyond scoring a level 4.</p>



Corporate resilience: maturity assessment

Engaged stakeholders

Interviews: Amanda Reynolds; Marie Whaley; Mike Pocock

Documents reviewed: ^ADraft Water Resources Management Plan 2020-2080, ^BAffinity Water Annual Report and Financial Statements – 2017-2018, ^C<https://stakeholder.affinitywater.co.uk/>, ^DAffinity Water 'drought Sprint Brief' – April 2018, ^EAffinity Water Board Meeting proposal June 2018, ^FAffinity Water R&D+i presentation slides – Sept 2017.

Level 1: Unaware Communication with stakeholders is rare and only occurs when it is required by regulation.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading The company plans, manages and undertakes regular and clear communications with stakeholder groups and organisations. Collaboration is determined through multi-agency participation with tangible outputs that improve the resilience to customers and the business.
Current and ongoing activities Preliminary Industry Average (3.3)				
Planned for AMP7 and beyond Preliminary Industry Average (3.9)				
Current and Ongoing Activities	<p>Affinity Water clearly understands the importance of engaging and working with its stakeholders. In its draft WRMP, the company has outlined its engagement programme that is designed to reach as many customers and stakeholders as possible. Pre-consultation work identified a number of themes that customers and stakeholders valued in particular, which has informed the development of the draft WRMP^A. In developing its business plan for PR19, Affinity Water has engaged with over 10,000 stakeholders^B, and it has a dedicated website for engaging with its stakeholders in planning for the future^C.</p> <p>Affinity Water has maintained regular engagement with neighbouring water companies on its approach to WRMP development, and the company actively participates in two regional groups; WRSE and Water Resources East (WRE). This regional collaboration is essential for building resilience within and beyond the boundaries of the company's own operational area. More locally, Affinity Water is also engaging with Mutual Aid groups on resource planning, local resilience forums for risks and shared knowledge, and with customers both on service and water saving devices. An example of thinking about collaborative working to achieve regional resilience is the 'Extreme Drought Sprint' held in April 2018, and convened by WRSE CEOs^D. This has kickstarted the development of a regional management approach for extreme droughts in South East England, and the next steps include establishing a regional executive group for this specific purpose. Affinity Water is also working with other water companies to explore the potential to create new cross-border supplies as well as to vary existing water export/import arrangements, recognising that inter-company water trading can represent the best solution for customers in terms of affordability and feasibility. Affinity Water has held dedicated sessions and communications with a number of other key stakeholders including regulators (Ofwat and the EA), the Consumer Council for Water, Natural England, local authorities, the CCG and members of parliament, as well as local interest and environmental groups such as Areas of Outstanding Natural Beauty (AONBs), River Valley Societies and Wildlife Trusts. Affinity Water has identified that a particular area of stakeholder engagement with an opportunity to strengthen work, is with local authorities covering its operational area^{1,2}.</p> <p>Stakeholder responses to the draft WRMP have been presented and discussed at a Board Meeting^E. Affinity Water has adapted to material changes in the regulatory environment such as changes to sustainability reduction targets in the area (from the EA) as well as feedback from stakeholders. Affinity Water will respond to these changes and feedback by amending its draft WRMP and subject the revised draft to a further consultation period, to ensure its robustness. However, this means that Affinity Water will be submitting its PR19 business plan to Ofwat before finalising its draft WRMP. There is therefore a risk of potential inconsistencies between the WRMP and the AMP7 business plan. However, Affinity Water is addressing this by identifying any aspects of the revised WRMP which may require investment and ensuring these are considered in PR19 business planning.</p> <p>Affinity Water has put a significant amount of effort into improving stakeholder engagement in recent times, and this is evident in the response it is beginning to establish. While the company has built good foundations and is moving in the right direction, the current situation could still be described as 'response developed' and scores a level 3.</p>			



Corporate resilience: maturity assessment

Engaged stakeholders

Interviews: Amanda Reynolds; Marie Whaley; Mike Pocock

Documents reviewed: ^ADraft Water Resources Management Plan 2020-2080, ^BAffinity Water Annual Report and Financial Statements – 2017-2018, ^C<https://stakeholder.affinitywater.co.uk/>, ^DAffinity Water 'drought Sprint Brief' – April 2018, ^EAffinity Water Board Meeting proposal June 2018, ^FAffinity Water R&D+i presentation slides – Sept 2017.

<p>Planned for AMP7 and beyond</p>	<p>Affinity Water has identified a number of plans involving stakeholder engagement for AMP7^E. These include working with local catchment partnerships, through eight local community projects, partnership promotion of water efficiency, looking at options for reducing water consumption through best practice in sustainable buildings and looking ahead to opportunities for water reuse for options in PR24.</p> <p>Affinity Water is also considering the potential for collaboration in their Research, Development and Innovation work to increase the leverage of their limited budget for these activities^F. Key partners that have been identified for this are UKWIR, TAGs, Club contractors, universities, other water companies, as well as networks such as Water UK networks, the Cranfield Water Network, National Infrastructure Committee^F.</p> <p>These activities and the company's recent track record of improving in this area mean it is likely that the company will have moved from having a developed response into the response being fully actioned in AMP7 and beyond scoring a level 4.</p>
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Corporate resilience: maturity assessment

Active role in the regions and community

Interviews: Chris Offer; Graham Turk; Marie Whaley; Kevin Bennett; Tim Monod

Documents reviewed: ^AAffinity Water Strategic Direction Statement – Spring 2013; ^BAffinity Water draft business plan (20 July 2018); ^CAffinity Water Annual Report and Financial Statements – 2017-2018; ^D<https://www.affinitywater.co.uk/communityengagement.aspx>; ^E<https://www.affinitywater.co.uk/ricky-road-run.aspx>; ^FSource to tap – community engagement; ^G<https://stakeholder.affinitywater.co.uk/environment-policy.aspx>; ^H<https://stakeholder.affinitywater.co.uk/news/ClimateWeek>

Level 1: Unaware The company does not undertake activities to benefit the wider community or have plans to do so.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading The company undertakes activities which have wider benefits to the communities that are served, allowing them to grow and develop through enabling sustainable growth, both at a regional and local level, demonstrating corporate citizenship in the process. The company is establishing goals to meet the carbon challenge contributing to their global and local impacts.
Current and ongoing activities	Preliminary Industry Average (3)			
Planned for AMP7 and beyond	Preliminary Industry Average (3.6)			
Current and Ongoing Activities	<p>Affinity Water has identified the importance of their customers in terms of whole communities as well as individuals^A. The company has an ambition to be the UK's leading community-focused water company, and as part of this, alongside a local focus, the company has also adopted the 'UN World Water Development group's Vision 2050 for water in a sustainable world' as its vision for a community approach^B. The Board has established a 'Community Committee', whose first meeting was in March 2018^C, which will help to deliver the company's vision.</p> <p>The business has illustrated their community engagement strategy and presence in the regions and communities that they serve^C, as can be seen from their engagement panel, social media presence and water saving programme. The company's production teams have specific targets for 'active community engagement', and there is information on how community engagement is captured and monitored in the production of performance packs for each team. This programme has included activities such as voluntary staff participation in partnership with the River Beane Restoration Association and estate staff from Woodhall Park to rescue native marginal plants from the river channel, which will be replanted once a new bypass channel has been constructed. This has benefited the community, key relationships with Affinity Water's partners and stakeholders, as well as allowing staff to obtain hands-on experience of biodiversity work and expanding their wider knowledge and awareness about the environment that Affinity Water work in.</p> <p>Through Affinity Water's Community Programme, local charities and community groups can apply for funding for specific projects which meet select criteria and contribute towards Affinity Water's core business of supplying water^C. The programme also enables dedicated staff to organise events such as the Ricky Road run which supports charities such as WaterAid and KitAid, as well as a locally based charity each year^E. Affinity Water also has an active role in local and regional groups such as WRSE, various environmental groups, Wildlife Trusts, the Community Investment Trust¹. Each year Affinity Water supports local community groups through their £50,000 Community Engagement Fund, to which local charities can apply for funding. In 2016/17 employees took over 200 'Affinity Days' - a day taken in or outside of work time helping with charitable work or community-based volunteering^F. The company is aware that its employees often attend local community events, and it has just begun to measure this presence to better understand this.</p>			



Corporate resilience: maturity assessment

Active role in the regions and community

Interviews: Chris Offer; Graham Turk; Marie Whaley; Kevin Bennett; Tim Monod

Documents reviewed: ^AAffinity Water Strategic Direction Statement – Spring 2013; ^BAffinity Water draft business plan (20 July 2018); ^CAffinity Water Annual Report and Financial Statements – 2017-2018; ^D<https://www.affinitywater.co.uk/communityengagement.aspx>; ^E<https://www.affinitywater.co.uk/ricky-road-run.aspx>; ^FSource to tap – community engagement; ^G<https://stakeholder.affinitywater.co.uk/environment-policy.aspx>; ^H<https://stakeholder.affinitywater.co.uk/news/ClimateWeek>

<p>Current and Ongoing Activities</p>	<p>Affinity Water has an Education Services Team that works with tens of thousands of young people each year across its operational area in schools as well as at Affinity Water's purpose built Education Centre in Hertfordshire. The Environment and Education Team interacts with more than 15,000 children each year, both at the education centre and in schools ^F. The company has been running STEM related initiatives as well as general awareness-raising of issues affecting water supply in the area and how consumer behaviour change can be driven^B. Affinity Water also has a 'Water Saving Squad', which attends local events ^F.</p> <p>In its Environment Policy^G, Affinity Water makes a number of pledges relevant to its role in the regions and communities. The business has pledged to enhance biodiversity on its landholdings, report annually on its 'conservation, access and recreation performance', and reduce the amount of energy used and waste generated by its operations. It also states that it will set a strategy for carbon accounting across its procurement processes, although there is no target date for this.</p> <p>Affinity Water was an active participant in the national climate change campaign 'Climate Week' in 2014, promoting a number of solutions and initiatives for mitigating greenhouse gas emissions and linking this to the challenges it faces in the future from climate change^H.</p> <p>Affinity Water has spent a significant amount of time and effort in recent months rethinking its approach to its role in the regions and community, especially given its company focus is to be the leading 'community-focused water company' in the UK. We consider that the company has developed a response in this area and scores a level 3.</p>
<p>Planned for AMP7 and beyond</p>	<p>Affinity Water's draft business plan for PR19 contains a specific chapter on its community strategy. This outlines the business's new approach and work carried out to develop this. The company will be testing its new thinking with its customers in the coming months; including, the way that communities are defined by Affinity Water, what it believes leading to be, and the 'Community Model' that is has developed. There are three proposed options for community trials for piloting during the end of AMP6 and then rolling out on a wider basis in AMP7. The company has also identified eight key performance indicators that relate to its community approach, with eight proposed influencing measures identified alongside.</p> <p>Given the significant amount of work that has gone into planning the new approach, we would expect to see a step-change in Affinity Water's resilience and performance as an active part of the region and communities. If these plans are delivered with success, we expect that by the end of AMP7, Affinity Water will have a robust, actioned response to this area of resilience and we project a score of level 4.</p>



Corporate resilience: maturity assessment

Comprehensive health, safety and wellbeing

Interviews: Graham Turk; Kevin Bennett; Chris Offer

Documents reviewed: ^AAffinity Water Health and Safety Policy, March 2018; ^BOur Journey to Zero Harm: A review of Health & Safety 2017; ^CBS OHSAS 18001 Certificate; ^DGreat Days at Work Wellbeing Strategy; ^EZero Harm Wellbeing Safety and Health Review, Year ended 31 March 2015;

Level 1: Unaware There are limited or no plans for health, safety and wellbeing. Any that are undertaken are required by regulation. Limited or no health and safety culture.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading The company has reliable and robust plans for health, safety and wellbeing which will make significant and measurable improvements to the lives of the workforce. There is a strong health and safety culture, where behaviours are over and above what is required.
Current and ongoing activities				
Planned for AMP7 and beyond				
Current and Ongoing Activities	<p>For occupational health and safety, Affinity Water launched their vision and programme of 'Zero harm' in 2015^{A,B}. Since its introduction, Affinity Water has seen a large reduction in the number of lost time injuries and a reduction of the accident frequency rate (AFR) from 1.02 in March 2015 to 0.24 in the first half of 2018. This programme was shortlisted in 2016 in the Health and Safety award category at the Utility Week Star Awards. However, the business recognises that there is more to be done to change behaviours going forward^B. Affinity Water's Health and Safety Management System is assessed by an external company and is certified to the internationally recognised OHSAS18001 standard^{B,C}. In 2016, the business appointed its first Director of Health and Safety.</p> <p>A number of key initiatives as part of the Zero Harm vision include:</p> <ul style="list-style-type: none"> • Introduction of Common Safety Standards for identified higher risk tasks. • Key Safe Behaviours – Monitoring these as one of their leading key performance indicators. • Role based competency assurance against Common Safety Standards. • Leadership safety tours – driving safety culture change from the top down, with Executive Management Team (EMT) members all receiving Institution of Occupational Safety and Health (IOSH) training. • Introduction of Safety Coaches across production teams – responsible for identifying opportunities within the workplace. • Site co-ordinators – driving safety culture change at the operator level. • All employees given access to Rivo – Affinity's system for managing health and safety incidents. Mobile application also allows community employees to report incidents in real-time. • Introduction of a Hazard Reporting initiative has seen numbers of hazards reports increase from 95 per month in March 2015 to over 1,500 in October 2017. <p>The business has also recently reviewed their risk register, prioritising the top five key risks, from which to develop mitigation measures^B.</p>			



Corporate resilience: maturity assessment

Comprehensive health, safety and wellbeing

Interviews: Graham Turk; Kevin Bennett; Chris Offer

Documents reviewed: ^AAffinity Water Health and Safety Policy, March 2018; ^BOur Journey to Zero Harm: A review of Health & Safety 2017; ^CBS OHSAS 18001 Certificate; ^DGreat Days at Work Wellbeing Strategy; ^EZero Harm Wellbeing; ^FThriving at work: The Stevenson/Farmer review of mental health and employers, October 2017; ^GSafety and Health Review, Year ended 31 March 2015;

<p>Current and ongoing activities</p>	<p>In terms of wellbeing, Affinity Water is currently developing its 'Great Days at Work' Wellbeing Strategy^D with a vision for all staff to have 'A great day at work'. This strategy is due to be rolled out by the end of 2018. The business has established a Wellbeing Committee responsible for driving activity in this area, having recognised that currently it has had a 'scattergun' approach to activities and needs a strategy to ensure a consistent approach^D. The business offers the tap4perks employee benefit website that has a specific area providing wellbeing tips, advice and money saving offers^B. The business has analysed the productivity and cost of ill-health to the business by looking at absence data^E.</p> <p>Affinity Water is striving for the Enhanced Wellbeing Standards identified within the Stevenson/Farmer report^F. The business is starting to develop its approach to mental health, and is looking to take the LEARN TO approach, which includes: Lead, Engage, Accredited, Resource, Network, Talk to others, and Own our practices^E. However, we were not shown evidence as to when this would be fully implemented within the business.</p> <p>Affinity Water has made significant progress concerning health, safety and wellbeing over the last years, developing and implementing its successful Zero Harm programme and reviewing and updating its risk register. Affinity Water is currently developing both a wellbeing and a mental health strategy leading to a score of level 4. Affinity Water recognises that there is further room for improvement in several areas.</p>
<p>Planned for AMP7 and beyond</p>	<p>Affinity Water has looked ahead to identify potential issues that they will need to deal with in order to ensure health, safety and wellbeing resilience, including</p> <ul style="list-style-type: none"> • Organisational and technological changes impacting on teams. • Changes to legislation such as the Repeal Bill may potentially change many health and safety regulations. • HS2 and the new maintenance and repair contracts change the dynamics of contractor engagement and the potential level of risks faced. • Further work to be done on improving behaviours. <p>The business will also have rolled out its 'Great day at work' wellbeing plan before the end of AMP6.</p> <p>To become leading, Affinity Water would have to make progress across the board to make sure their areas of good practice in health, safety and particularly wellbeing are embedded within the culture.</p>



Corporate resilience: maturity assessment

Collaborative and adaptive organisational culture

Interviews: Graham Turk; Kevin Bennett; Amanda Reynolds; Chris Offer; Tim Monod; Bill Maynard

Documents reviewed: ^A People Survey Results 2017; ^B People Team Operating Plan; ^C AW Wholesale Ops News brief Issue 26; ^D 20180410 A Brief Introduction to Wholesale Operations; ^E BS11000 Stage 2 Certification

Level 1: Unaware The organisational culture has no or limited recognition of the importance of collaboration and change in service of customers, community or the environment.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading A notable organisational culture that puts collaboration and change at the heart of all that they do. This is apparent in the values, policies, plans and working practices of all employees who understand the fundamental roles they play in the service value chain; working together across boundaries in service of the customer and community. Empowered and engaged staff, with the capability, capacity and mandate to learn and adapt to events and change, is evident in the short, medium and long term management of the operation; not simply one off innovations and in response to major 'events'. Organisational collaboration aligns with ISO44001 standards.
Current and ongoing activities		Preliminary Industry Average (2.6)		
Planned for AMP7 and beyond		Preliminary Industry Average (3.3)		
Current and Ongoing Activities	<p>The People Strategy highlights the importance of employee wellbeing within the business, and the value this provides to customer service and satisfaction. Working with others is an intrinsic part of workplace wellbeing, and this is reflected in the desired capabilities within the People Strategy. Affinity Water is partnering with other water companies to improve wellbeing in the industry. This demonstrates a willingness to collaborate across the industry for the benefit of employees and customers, and a value towards collaboration at the highest levels. Although the business' ability to cope with change is effective, it is also reactive. This is symbolised by the existence of a 'Volunteer Army' within the business that mobilises during emergency situations ^B. An example of this collaborative effort during the 'Beast from the East' event in March 2018, with wider parts of the Community Operations team supporting the leakage efforts in core activities of the Operational and Office teams^C. While the emergency 'volunteers' have been trained in the emergency procedures and include contractors, a dedicated change function would enable Affinity Water to take a more proactive approach to adapting to the broader environment.</p> <p>Affinity Water has an aim for at least 50% of its employees to have had more than three roles within the business. This provides a deeper understanding of what is required for customer delivery, and for facilitating potential innovations that could be brought into the business. 30% of executives have held several roles within the organisation before being promoted. Approximately 60% of employees report having opportunities to learn and grow^A, and graduates can rotate throughout the business. Affinity Water has developed, launched and implemented 'Tap4learning' - an app that provides a learning management system for employees. Wholesale Operations has a Head of Business Transformation, whose role is to implement learning and performance improvements ^D.</p> <p>Affinity Water has several feedback mechanisms for employees, and throughout the year, the company holds 'Big Conversations' sessions, which bring together a cross-section of the workforce to discuss certain key issues. Recent examples have included 'Workforce and workplace of 2025' and 'Improving Safety and Wellbeing'. Additionally, these sessions also provide an opportunity to encourage potential innovations across the business. Multiple actions against their Listening Project are outstanding from August 2017. The company also holds 'town-hall' meetings, has dedicated teams for meeting the demand of ODI's and work programmes and holds Safety Leadership meetings with both internal teams and contractors.</p> <p>Affinity Water currently implements BS11000 on collaboration with suppliers, but does not however have third party certification to this standard. Third party certification is planned for AMP6. Affinity Water has assisted collaborators Mace Group with their BS11000 Certification^E.</p>			



Corporate resilience: maturity assessment

Collaborative and adaptive organisational culture

Interviews: Graham Turk; Kevin Bennett; Amanda Reynolds; Chris Offer; Tim Monod; Bill Maynard

Documents reviewed: ^A People Survey Results 2017; ^B People Team Operating Plan; ^C AW Wholesale Ops News brief Issue 26; ^D 20180410 A Brief Introduction to Wholesale Operations; ^E BS11000 Stage 2 Certification

<p>Current and Ongoing Activities</p>	<p>While Affinity Water shows a willingness to collaborate on a high level across the industry and has an effective ability to cope with change, this ability is still reactive and reliant on volunteers from within the company. Affinity Water has made progress concerning inner company collaboration and communication, actively working towards increasing the understanding of the business amongst employees and having several successful feedback mechanisms. Affinity Water scores a level 3 because while it has pockets of good practice, the culture of collaboration and adaptation is not yet embedded in business as usual.</p>
<p>Planned for AMP7 and beyond</p>	<p>The business is introducing workforce planning as a HR function, which will assist in recruiting a future workforce, and use the existing workforce effectively. The business recognises a need to include resilience as part of formal performance reviews, augmenting the current focus on technical performance. However, there is no evidence that this has been implemented. Affinity Water aims to build the leadership capability within the business by offering technical and business leader streams. This approach will facilitate more transformational styles of leadership, which will help with horizon scanning and adapting the business accordingly.</p> <p>Affinity Water has not provided evidence that it has plans to implement anything further across the whole business, so remains at level 3.</p>



Operational resilience: maturity assessment



Figure 10: Operational Resilience: Current scores

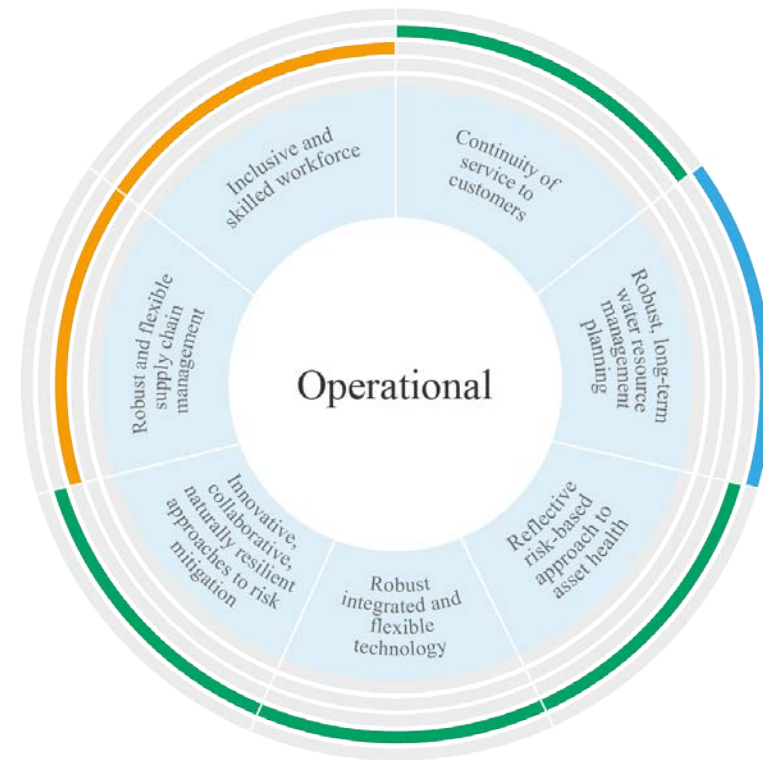


Figure 11: Operational Resilience: Future scores



Operational resilience: maturity assessment

Continuity of service to customers

Interviews: Amanda Reynolds; Chris Offer; Tim Monod; Graham Turk; Kevin Bennett

Documents reviewed: ^AAsset Management Policy, February 2018; ^BStrategic Asset Management Plan, AW005, July 2018; ^CAsset Health Questionnaire response for meeting on 28th February, February 2017; ^DAffinity Water, Annual Report and Financial Statements, 31 March 2018; ^EI2S AMP6 and AMP7; ^FAsset Strategy: Technical Briefing No. AS/TB/2018/04 Criticality Link Analysis, April 2018; ^GControl Vision Program, February 2017; ^HOfwat, Out in the cold – water companies’ response to the ‘Beast from the East’, 19 June 2018; ^IOfwat, Review of water companies response to the ‘Beast from the East’, 19 June 2018, letter addressed to Pauline Walsh from John Russell; ^JAffinity Water Data Strategy

Level 1: Unaware There are no or limited understanding of outage impacts, consideration of vulnerable customers and dependent critical services.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading Company operations focus on providing a continuity of service to customers and avoiding critical service failures, such as supply interruptions. It takes into account the different needs of customers, particularly those who are vulnerable. Service interruptions only occur in the most unforeseeable situations. Asset condition and criticality is understood and all critical aspects of the network have redundancy built in. Mechanisms to regularly review and update all plans are in place.
Current and ongoing activities Preliminary Industry Average (3)				
Planned for AMP7 and beyond Preliminary Industry Average (3.5)				
Current and Ongoing Activities	<p>Affinity Water commits to ensuring consistent and resilient supplies of water for its communities through their Asset Management Policy^A. This is supported by their Strategic Asset Management Plan, which describes the methodology for delivering the Asset Management Policy^B.</p> <p>Affinity Water measures a number of indicators to provide an understanding of service interruptions; these include interruptions at incident level for >12 hours to measure long term interruptions and customer hours to measure the overall impact of failure^C. In the 12 months prior to 31 March 2018, Affinity Water was unable to meet its target for unplanned interruptions to supply >12 hours (7,890 properties were affected)^D. An improvement team was established in September 2017 to deliver an improvement package with the aim of reducing interruptions to supply. This included five work streams to deliver initiatives in the following areas: functional standby, network control desk, contractors meeting ODIs, equipment and materials, and an extended working window. Although this has resulted in improved performance, the team recognises that further investment is required to undertake trunk main maintenance to achieve a consistent performance^E. Affinity Water has introduced a new system (Maximo) to track jobs and manage real time information on works and planned works between the site operatives and offices.</p> <p>The company has undertaken Criticality Link Analysis to simulate and assess the impact of a failure to one or a group of assets. This analysis has also informed Affinity Water’s contingency planning to help improve response and recovery from failures in the distribution network^F. Affinity Water has completed a programme of mitigation measures (including cross connections and other rezone measures) to ensure that no area with more than 2000 houses is without an alternate water supply^C. The company uses Pioneer to develop their capital maintenance programme for assets over a 25 year period. Pioneer is a proactive system for portfolio optimisation which assesses capital investment against cost and service measure benefits. Generally assets with the highest criticality and deterioration are prioritised within investment programmes^B.</p> <p>The Trunk Main Mitigation Programme, which is to be completed by the end of AMP6, is aiming to remove all single points of failure through enhanced network connectivity and resilience. In 2017, a review of RAPID reports over the previous 18 months showed that Affinity Water’s ability to resolve issues more quickly has been hampered by; delayed escalation; on the ground lack of awareness of customer impact; known contingency plans not having been followed (or local responder not aware of)^G. To respond to these issues, the Control Vision programme was set up to help ensure that Affinity Water can reduce the delay experienced during out of hours events by developing real-time network telemetry^G.</p>			



Operational resilience: maturity assessment

Continuity of service to customers

Interviews: Amanda Reynolds; Chris Offer; Tim Monod; Graham Turk; Kevin Bennett

Documents reviewed: ^AAsset Management Policy, February 2018; ^BStrategic Asset Management Plan, AW005, July 2018; ^CAsset Health Questionnaire response for meeting on 28th February, February 2017; ^DAffinity Water, Annual Report and Financial Statements, 31 March 2018; ^EI2S AMP6 and AMP7; ^FAsset Strategy: Technical Briefing No. AS/TB/2018/04 Criticality Link Analysis, April 2018; ^GControl Vision Program, February 2017; ^HOfwat, Out in the cold – water companies’ response to the ‘Beast from the East’, 19 June 2018; ^IOfwat, Review of water companies response to the ‘Beast from the East’, 19 June 2018, letter addressed to Pauline Walsh from John Russell; ^JAffinity Water Data Strategy

	<p>As part of this particular programme, 20,000 new acoustic loggers covering approximately 20% of the network, have been installed to improve leakage detection and pinpointing thereby improving subsequent response times^{E,F}. Moreover, the delivery of the Situational Awareness tool is bringing together all of the business’s network and production telemetry points into one platform which can then be analysed by the Network Control Desk teams. Constant monitoring, management and control of above ground assets is managed from two control rooms in Clay Lane and Folkestone. However, there is no central oversight of network performance and activities. The Network Control Desk provides a robust 24/7 support all year to field teams and provide centralised visibility, governance and control of activities^{E,F}. This team will monitor network alarms installed as part of the Network Event Detection Programme^E. Affinity Water also has an Asset Information Centre available through their Sharepoint site that provides asset schematics, which are also available on mobile devices for emergency scenarios. Further information on Affinity Water’s asset management approach is discussed in the sub-theme, ‘Reflective risk-based approach to asset health’.</p> <p>Around £700k of CAPEX investment is being deployed in AMP6 to fill gaps in emergency stocks, and to increase training and competence for delivering supply restoration services; this was reflected in Ofwat’s letter to Affinity Water stating that training and testing of the business’s emergency response capability is good practice^I. Additionally, the purchasing of clamps is helping to provide a quicker live repair solution. A focus on restoring supplies alongside repairing a burst main is key business strategy^E. To deliver this strategy, Affinity Water has established a new team with a dedicated business lead, moved 12 DLO operatives into Restoration Technician roles and two Restoration Managers provide leadership for both on-site deployment and pre-deployment planning and dispatch in Affinity Water’s Network Control Desk.</p> <p>In Ofwat’s recent ‘Out in the Cold’ report, Affinity Water was explicitly mentioned regarding their understanding of supply interruptions experienced by their vulnerable customers^H. Furthermore, the business provided 24 hour staffing of key water treatment works to ensure a continued supply through the cold period^H. Affinity Water is implementing BS18477 and aiming to achieve certification.</p> <p>Affinity Water is making strong progress to ensure that it provides continuity of service to customers, and improves its performance. The current score of 3 reflects the business having not met its performance commitment on interruptions to supply which is necessary to score any higher in this category.</p>
<p>Planned for AMP7 and beyond</p>	<p>In the run up to PR19, the business has been developing its data strategy, which is yet to be ratified by the Board^J. A fundamental part of this strategy is to improve the company’s data and knowledge management and move towards being a more data-driven business, using data insights (spanning from customer to assets) to better understand asset performance and make more informed and proactive decision making.</p> <p>Affinity Water is establishing partnerships with energy companies in order to share data on how to better understand the location of vulnerable customers and their particular requirement.</p> <p>The Interruptions to Supply Improvement team has identified funding investments that will be required to improve performance in terms of unplanned supply interruptions in AMP7 to 6 or 3 minutes per household cumulatively over a year (compared to over 30 minutes in year three of AMP6)^E. Moreover, the business is looking to move to an extended working window by the end of AMP6, ready for AMP7^E. Affinity Water is looking to ask its supply chain to price for a ‘one hour’ response time^C. However, no evidence was received of the plans to move to this increased response time in AMP7. Affinity Water is also planning further measures so that no area with >900 houses (and then >300 houses) will be without alternate supply of water, to further reduce the number of properties relying on a single supply^C.</p> <p>The completion of activities in the remainder of AMP6, combined with the activities set out for AMP7 and beyond will help the business to ensure that it achieves a level 4 actioned response going forward.</p>



Operational resilience: maturity assessment

Robust long-term water resource management planning

Interviews: Mike Pocock; Mumin Islam

Documents reviewed: ^ADraft Water Resources Management Plan 2020-2080 (March 2018); ^BOfwat response to draft Water Resources Management Plan; ^CEA response to draft Water Resources Management Plan; ^DAffinity Water Board Meeting proposal June 2018; ^EDraft Water Resources Management Plan research report – May 2018; ^FDraft Drought Management Plan (2017)

Level 1: Unaware Water resources management planning is limited to a short term approach and does not facilitate sustainable approaches to water management. Plans are not aligned across the business and do not incorporate collaborative projects and engagement.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading Water resource management planning and drought planning has been undertaken for the long-term and integrated into business planning to ensure that the company can meet their supply obligations and facilitate sustainable growth. Plans are produced collaboratively with the EA and regional planning groups to ensure best value for customers with respect to cross-company, regional and national supply options. The approach looks at a full range of hazards based on a robust evidence base. Water resource management planning looks 80 years into the future and develops adaptive pathways for delivering in the long-term.
Current and ongoing activities Preliminary Industry Average (3.7)				
Planned for AMP7 and beyond Preliminary Industry Average (4.4)				
Current and Ongoing Activities	<p>Affinity Water has recently published their draft WRMP. This WRMP has assessed the water resources challenges for the period 2020-2080^A; a timeframe that is almost double the statutory planning period for a WRMP (25 years), demonstrating a long-term outlook. Ofwat notes that this timeframe aligns with the planning period adopted by Water Resources in the South East (WRSE), which it considers as a favourable aspect due to increased transparency^B.</p> <p>The company has initially outlined both a preferred and an alternative plan. The preferred plan represents what the company believes to be the best value option for customers and the environment, and the alternative plan includes options for features including improved levels of service under severe drought, greater leakage reduction and higher sustainability reductions. Both plans feature demand-side and supply-side options for delivering service and resolving demand-supply deficits, in line with the 'twin track' approach recommended by Ofwat in its methodology for PR19.</p> <p>The technical modelling behind the water supply and demand forecasts appears to be robust. Supply forecasts are generated using statistical approaches and take into account a number of trends and constraints. Demand forecasts take into account Local Authority Plans (spatial growth) as well as more general population forecasts in an updated methodology since WRMP14 using a multiple linear regression model. Supply-demand forecasts indicate deficits in a number of Affinity Water's water resource zones during the planning period, and in its WRMP, Affinity Water presents a number of options available to the company. The plan includes screening of options for feasibility and then further development of feasible options. To scenario-test these options, 163 scenarios were generated, equivalent portfolios identified based on a least-cost optimisation, then shortlisted through multi-criteria analysis based on cost (and uncertainty of cost), environmental impacts (both positive and negative), uncertainty on yield and deliverability. Shortlisted portfolios were subjected to stress-testing using iterative modelling with performance assessed against four resilience metrics relating to reliability, recovery, vulnerability and demand failure. Additional sensitivity analysis was conducted on the final choices, and final schemes for the preferred plan are detailed by water resource zone and delivery year, with a summary of costs and the expected impact on the water balance at a series of points in the future also provided, and the WRMP concludes with a summary breakdown of how the preferred plan delivers Affinity Water's objectives, and a summary of the alternative plan.</p>			



Operational resilience: maturity assessment

Robust long-term water resource management planning

Interviews: Mike Pocock; Mumin Islam

Documents reviewed: ^ADraft Water Resources Management Plan 2020-2080 (March 2018); ^BOfwat response to draft Water Resources Management Plan; ^CEA response to draft Water Resources Management Plan; ^DAffinity Water Board Meeting proposal June 2018; ^EDraft Water Resources Management Plan research report – May 2018; ^FDraft Drought Management Plan (2017)

<p>Current and Ongoing Activities</p>	<p>However, both Ofwat's and the EA's response to Affinity Water's draft WRMP stated that anticipated demand management outcomes fall below the industry average and that the business has an opportunity to be more ambitious^C. Furthermore, Ofwat had concerns related to the transparency and effective communication of the reasons the preferred plan was chosen, the plan development and the consideration of regional solutions, although there are a number of more detailed observations on specific aspects of the plan.</p> <p>Affinity Water has taken responses from key stakeholders such as Ofwat on board, and summarised key points of feedback in a paper to the board^D. Alongside the consultation responses, Affinity Water has also had to adapt to a revised abstraction reduction as a result of EA requirements through Water Industry National Environment Programme (WINEP). This impacts the modelling and decision making that had been undertaken for the draft WRMP, however Affinity Water has engaged proactively with the relevant parties and will be revising its WRMP to reflect the alternative plan that it had prepared in its business planning. Affinity Water has taken the decision based on the material changes required, to open the redrafted plan up for a second consultation period, demonstrating its regard for customer and stakeholder participation. The company is also conscious that the PR19 business plan will need to be completed before the WRMP is finalised, and so is taking measures to ensure that these plans will be consistent with each other and that the necessary investment that will be required by the WRMP is set out in the PR19 business plan. A summary of key elements for inclusion in the business plan was presented to the board for endorsement^D.</p> <p>Affinity Water is aligning its plan with the regional work that has been done by groups it is involved with (WRSE, WRE). Close partnership and engagement with stakeholders on planning for the long term is particularly important for Affinity Water due to the fact that its largest 'central' region is positioned geographically between two large water companies – Anglian Water and Thames Water, and the fact that water trading will become increasingly important in the future to balance supply and demand. Moreover, Affinity Water also faces a significant challenge in developing new strategic sources of water given its relatively small geographical area, alongside the fact it has a dense and rapidly growing population. Participation in the steering group of the Water UK long term water resources plan has also informed the company's approach and facilitated the necessary engagement with stakeholders and regulators. The business will therefore need to rely on collaborative approaches and water trading with its neighbouring companies. The EA has stated that the business has been progressive and engaging, working well with neighbouring companies and themselves to manage prior incidents^C. Affinity Water is also playing a key role in working with Thames Water to bring forward the plan for a new reservoir in the region^D.</p> <p>Affinity Water has considered resilience in a specific chapter in the draft WRMP19, and refers to shocks and stresses, referencing some water-industry specific challenges in the context of resilience, and notes that other shocks and stresses which are less relevant to long term water resource management planning are dealt with in other areas of its business. There is an opportunity for wider consideration of the potential impact of interrelated shocks and stresses. Scenario testing is reported to have been undertaken considering both drought and non-drought hazards however, Ofwat has expressed a need for clarity on the business's approach to non-drought resilience.</p> <p>Affinity Water has undertaken a significant amount of public engagement regarding the plans in its draft WRMP, a summary of which is captured in a research report^E. Different proposals for Affinity Water's future plans were tested through this process, to gauge customer support for reducing leakage, environmental pilots, reducing the chances of severe drought and demand-side solutions (reducing the amount of water used by customers). Both qualitative and quantitative data were collected and summarised to inform Affinity Water's decision making for the draft WRMP as well as the PR19 business planning process. Affinity Water has an opportunity, while revising their draft WRMP, to provide more clarity regarding how customer engagement has informed their plan^D.</p> <p>Affinity Water clearly has robust processes in place to enable long-term water resource management planning, and is looking ahead at an appropriate timeframe, this scores them a level 4.</p>
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Operational resilience: maturity assessment

Robust long-term water resource management planning

Interviews: Mike Pocock; Mumin Islam

Documents reviewed: ^ADraft Water Resources Management Plan 2020-2080 (March 2018); ^BOfwat response to draft Water Resources Management Plan; ^CEA response to draft Water Resources Management Plan; ^DAffinity Water Board Meeting proposal June 2018; ^EDraft Water Resources Management Plan research report – May 2018; ^FDraft Drought Management Plan (2017)

<p>Planned for AMP7 and beyond</p>	<p>Amongst the plans set out by Affinity Water for AMP7 and beyond, stakeholder engagement and partnership feature strongly, as does an increased focus on exploring natural capital value of the environments that it operates within^{A,D}. Future work that will feed into business plans and WRMPs in the future also includes evaluating the effectiveness of behavioural change strategies, identifying opportunities for water reuse that can be included as options for the PR24 business plan, and also looking at the provision of eco-services to local stakeholder groups and communities.</p> <p>Affinity Water supports the staged development of WRSE as an independent regional co-ordinator by April 2020, with a view to achieving a single regional water resources plan by 2021. This demonstrates leading thinking and a commitment to collaborative, regional, multi-stakeholder action.</p> <p>Affinity Water has ambitions for demand management in the medium- and long-term which includes leakage reductions after 2025 to achieve a 50% reduction by 2050^D. The strategy for delivering this will be developed in AMP7. An integrated approach to water saving through the whole company programme alongside smart metering, fast data, and a behavioural change programme will be expanded in AMP7 with the intention of achieving a dry year per capita consumption of 125l/h/day by 2045.</p> <p>We consider it likely that Affinity Water will becoming leading in AMP7 and beyond if it:</p> <ul style="list-style-type: none"> • demonstrates that it will deliver on the new WRMP • continues developing its plans for the future with greater ambition, thinking strategically and long-term as it has already begun too • continues to develop its collaborative, engaged response
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Operational resilience: maturity assessment

Reflective risk-based approach to asset health

Interviews: Graham Turk; Kevin Bennett; Chris Offer; Teddy Belrain

Documents reviewed: ^A Strategic Asset Management Plan, AW005, July 2018; ^B Asset Health Questionnaire response for meeting on 28th February, February 2017; ^C Asset Risk Management Framework; ^D Asset Strategy: Technical Briefing No. AS/TB/2018/04 Criticality Link Analysis, April 2018; ^E Ofwat, September 2017, Targeted review of asset health and resilience in the water industry

Level 1: Unaware There are limited or no asset health measures in place. Focus is on short term, high-likelihood risks. Asset management best practice is not followed. There are no regular updates or reviews of asset management strategy.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading The company has undertaken a comprehensive assessment of asset health and asset risk, including long-term low-likelihood risks, having detailed and accurate information on the state of all assets, the way they are configured and the way they are operated. Focus is on criticality, protecting customers and the natural environment from exposure to known risks, and reducing vulnerability to future uncertainties. There is a region wide asset strategy which is adaptive, regularly reviewed and considers changing requirements in the long-term (25 years). They follow best practice for asset management, e.g. ISO 55000.
Current and ongoing activities Preliminary Industry Average (2.8)				
Planned for AMP7 and beyond Preliminary Industry Average (3.6)				
Current and Ongoing Activities	<p>Affinity Water has developed a Strategic Asset Management Plan, which supports the Asset Management Policy and sets out how it will be delivered. It was published in July 2018 and will be reviewed every 12 months^A. This has also considered potential shocks and long-term stresses and its impacts on assets and service via a PESTLE analysis^A. Currently assets are identified for replacement through a risk assessment, which is informed by both the asset condition and consequence to customer^B. For distribution assets, a validated failure model is used to assess risks, and for production assets a Failure Mode Effect and Criticality Analysis (FMECA) is undertaken. Both of which are validated by appropriate company experts, lessons learnt and local knowledge^B. The company undertakes RAPID assessments on large-impact bursts^B.</p> <p>Affinity Water uses Pioneer to develop a capital maintenance programme for a 25 year period. Asset health data, mainly in the form of burst analysis is being utilised to inform asset renovation strategies. Pioneer is a system for portfolio optimisation which assesses capital investment against cost and service measure benefits. Generally assets with the highest criticality and deterioration are prioritised within investment programmes^A. The Asset Risk Manager sits within Pioneer and captures day-to-day operational risks as they arise on assets. Risks are added and scored by operational users, validated by line managers and challenged by asset strategy engineers at Programme Information Meetings^B. There is a formal process for Asset Risk Management which sets out the steps that are taken by personnel when a risk is identified^C.</p> <p>Criticality Link Analysis has been assessed by the business, and is used to simulate and assess the impact of a failure of one or a group of assets. Simulations systematically analysed the consequence of closing all of the pipes belonging to each cohort (group of assets which share the same impact in the event of a failure) in turn and generated a report of numbers of customers isolated and number of customers receiving a below acceptable pressure^d; the analysis also factors in how long it takes for a customer to be affected, how long it would take to mitigate, population affected and deficit if a site is lost. The Criticality Analysis is used to inform Affinity Water's contingency plan and therefore improve response and recovery from failures in the distribution network^D.</p> <p>Inspection and monitoring is undertaken to track the condition of assets. In their assessment of asset health, Ofwat recognised that Affinity Water was a minority in undertaking physical condition sampling of distribution mains; analysis of approximately 6,000 samples has been undertaken in the company's dedicated pipe laboratory. The results from such analysis are used to inform Affinity Water's burst models and long-term investments. Asset Care Optimisation is based on criticality for all above ground assets, and there is a move to include below-ground assets. Workshops are conducted on a site-by-site basis with local representatives. Each asset is assessed for likelihood of site impact against each of Affinity Water's service areas and criticality. The resultant score dictates the level of care (high, medium or low).</p>			



Operational resilience: maturity assessment

Reflective risk-based approach to asset health

Interviews: Graham Turk; Kevin Bennett; Chris Offer; Teddy Belrain

Documents reviewed: ^A Strategic Asset Management Plan, AW005, July 2018; ^B Asset Health Questionnaire response for meeting on 28th February, February 2017; ^C Asset Risk Management Framework; ^D Asset Strategy: Technical Briefing No. AS/TB/2018/04 Criticality Link Analysis, April 2018; ^E Ofwat, September 2017, Targeted review of asset health and resilience in the water industry

<p>Current and ongoing activities</p>	<p>Affinity Water has an asset improvement programme which undertakes asset lifecycle analysis. They report progress on natural assets and planning in their WRMP.</p> <p>The use of data management systems such as Trace (reporting on outages by site) and Trackdown (reporting on defects by production site and process) have enabled Affinity Water to use operational data and maintenance regimes to inform investment planning^B. A Geographic Information System is used to map and monitor issues and incidents and areas of risk to natural and physical assets.</p> <p>Affinity Water has recognised that asset health within the business is continuing to improve and develop^B. Good steps have been taken to improve knowledge of the company's assets and their ongoing health such as Asset Care Optimisation. Therefore, we have currently awarded a score of Level 3 'Response Developed'.</p>
<p>Planned for AMP7 and beyond</p>	<p>Affinity Water is continuing to develop their asset management system and plans to be compliant with the ISO 55001 Asset Management Standard in 2018. The strategy for maintaining and delivering Affinity Water's assets will be developed in 2019 following the completion of the PR19 business plan. The Strategic Asset Management Plan will be supported by more detailed Asset Management Plans^A.</p> <p>Affinity Water has a number of interrelated processes relating to maintenance and investment in assets – the Strategic Asset Management Plan identifies the need to align the Asset Care Optimisation, Asset Management, Capital Investment Management (using Pioneer) and Asset Performance Monitoring (using Trace) processes^A.</p> <p>Affinity Water is rolling out QR tagging for assets to reduce human error and ensure any work undertaken on assets is recorded accurately and trends in performance can be understood and monitored^B.</p> <p>There is scope for Affinity Water to move to Level 4 'Response actioned' in AMP7 and beyond, particularly if they achieve certification to ISO 55001.</p>

Interviews: Graham Turk; Kevin Bennett

Documents reviewed: ^AAffinity Water, Annual Report and Financial Statement, 2017; ^B<https://stakeholder.affinitywater.co.uk/catchment-management.aspx>; <http://www.colnecan.org.uk/>; ^CDraft WRMP 2020-2080; ^DNEP Water Quality Schemes: Our proposed approach to catchment management, June 2015 v2.0; ^EAsset Strategy: Technical Briefing – Reducing metaldehyde concentrations in the River Thames through catchment management initiatives; ^FAsset Strategy: Technical Briefing - Investigating nitrate in groundwater and how catchment management can help to improve water quality; ^GDraft WRMP 2020-2080; ^H<https://www.hubbub.org.uk/Blog/hubbub-expands-water-saving-partnership-with-affinity-water/>; ^I<https://stakeholder.affinitywater.co.uk/river-gade.aspx>; ^J<https://education.affinitywater.co.uk/about-us/>; ^KI2S AMP6 and AMP7; ^LAsset Strategy: Technical Briefing No. AS/TB/2018/04 Criticality Link Analysis, April 2018; ^MControl Vision Program, February 2017; ^N<https://www.affinitywater.co.uk/water-saving-squad.aspx>; ^O<https://www.savewatersavemoney.co.uk/compare-my-water?showcompare=1>



Operational resilience: maturity assessment

Innovative, collaborative, naturally resilient approaches to risk mitigation

<p>Level 1: Unaware</p> <p>Limited or no consideration of naturally resilient approaches to risk mitigation.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>There is a robust approach to considering a wide range of options to risk mitigation. Approaches are collaborative, innovative and embrace technological change and the role of the natural environment. A system-wide approach is taken. Collaboration is integrated into business plans, working with customers, other companies, and wider stakeholders to deliver solutions. Approaches considered include encouraging customers behavioural change through smart customer engagement, and use of smart technologies to improve asset performance, customer information, leakage management and water efficiency, natural solutions, such as catchment management to improve raw water quality. Catchment solutions are considered across the whole catchment, integrating water and wastewater needs.</p>
<p>Current and ongoing activities</p>	<p>Preliminary Industry Average (3)</p>			
<p>Planned for AMP7 and beyond</p>	<p>Preliminary Industry Average (4)</p>			
<p>Current and Ongoing Activities</p>	<p>Affinity Water's business model recognises that the environment is a key resource to the business, and there is a 25 year plan to 'Maintain our local environment'^A. The company's Catchment Management team work to identify sources of pollution and monitors rivers and groundwater in their communities^B. The business also recognises that not only are engineered solutions required, but that working with the environment using natural methods and working with others can help to build resilience^B.</p> <p>Partnerships include local environmental groups and several catchment partnerships, adopting the Catchment-Based Approach (CaBA) to raise awareness of issues that could affect drinking water quality (e.g. Colne Catchment^B). Collaboration with WRSE and WRE comprising other neighbouring water companies, alongside cross-sector stakeholders such as the EA, Ofwat, Department for Environment, Food & Rural Affairs (Defra), Greater London Authority (GLA), is creating integrated long-term water resource strategies for regional areas for the next 50-60 years and beyond. In 1998, the business established an education centre, which has over 6,000 visitors per year. The principal focus is on educating schoolchildren. The Education team has been accredited with the 'Learning outside the classroom quality badge' and has received eight 'Green Apple' awards. The business also has a 'Water Saving Squad' who regularly attend community events^N.</p> <p>Affinity Water, as part of the National Environment Programme Water Quality Schemes, has a proposed approach to catchment management. This includes various methods for targeting the issue, including stakeholder engagement with farmers including awareness events, 1-2-1 site visits and the company is also exploring a text service to tell farmers when to not apply pesticides and fertilisers through advance warning of rainfall events^D. The business considers innovative ways to reduce pollution at source, by preventing the pathways that could cause pollution to get into untreated water.</p>			



Operational resilience: maturity assessment

Innovative, collaborative, naturally resilient approaches to risk mitigation

Interviews: Graham Turk; Kevin Bennett

Documents reviewed: ^AAffinity Water, Annual Report and Financial Statement, 2017; ^B<https://stakeholder.affinitywater.co.uk/catchment-management.aspx>; <http://www.colnecan.org.uk/>; ^CDraft WRMP 2020-2080; ^DNEP Water Quality Schemes: Our proposed approach to catchment management, June 2015 v2.0; ^EAsset Strategy: Technical Briefing – Reducing metaldehyde concentrations in the River Thames through catchment management initiatives; ^FAsset Strategy: Technical Briefing - Investigating nitrate in groundwater and how catchment management can help to improve water quality; ^GDraft WRMP 2020-2080; ^H<https://www.hubbub.org.uk/Blog/hubbub-expands-water-saving-partnership-with-affinity-water>; ^I<https://stakeholder.affinitywater.co.uk/river-gade.aspx>; ^J<https://education.affinitywater.co.uk/about-us/>; ^KI2S AMP6 and AMP7; ^LAsset Strategy: Technical Briefing No. AS/TB/2018/04 Criticality Link Analysis, April 2018; ^MControl Vision Program, February 2017; ^N<https://www.affinitywater.co.uk/water-saving-squad.aspx>; ^O<https://www.savewatersavemoney.co.uk/compare-my-water?showcompare=1>

<p>Current and ongoing activities</p>	<p>Affinity Water has a dedicated Catchment Management team working in the communities to monitor and record risks to natural assets, this team maintains a catchment risk register and liaises across the business for risk mitigation or control. Affinity Water has certification to ISO14001:2015 to manage their prevention of pollution and impact on the environment, they are implementing ISO44001 to collaborate on risk mitigation with suppliers, contractors and stakeholders.</p> <p>In the past year, the Catchment Management team has given talks and presentations at 12 local, regional, national and international events to promote key messages on protection of water from pollution^B.</p> <p>Affinity Water operates pesticide reduction schemes in 600km² of river catchment upstream of water treatment works (WTW) where the risk is greatest, and which has led to improvements in water quality in these catchments^B. The business also offered a pesticide amnesty to farmers in two of their catchments, offering a free, legal and confidential disposal of unwanted or expired pesticides. The aim of this scheme was to safeguard against chemicals accidentally finding their way into watercourses or ground water. This amnesty collected over two tonnes of chemicals and was positively received by the agricultural community.</p> <p>Affinity Water, in partnership with savewatersavemoney, is offering free or reduced price water saving devices to their customers, as part of the company's Water Saving Programme^O. They have launched a behaviour change programme called #TapChat, with Hubbub, to complement the water efficiency messaging^H.</p> <p>Many globally important chalk streams flow through Affinity Water's supply area, and the company is undertaking river restoration projects to mitigate potential impacts. For example, the Upper Gadebridge Park Restoration Project has helped to restore a section of the River Gade. This was undertaken in partnership with the EA and Dacorum Borough Council^I.</p> <p>There are two specific examples of where Affinity Water has been trialling innovative and naturally resilient catchment management techniques:</p> <ul style="list-style-type: none"> • Collaborating with Thames Water and South East Water to form the Thames Catchment Management Steering Group (TCMSG), Affinity Water shared resources and knowledge to address the metaldehyde problem across the River Thames Basin. Trials are being run in three sub-catchments with high risk of agricultural metaldehyde losses to water, testing: incentivising farmers to reduce metaldehyde pollution via switching slug control products, implementing cultural controls that either reduce slug risk or limit pollution pathways, or payment for ecosystem services^E. • Nitrate leaching has been modelled, with predictions for the likely time period that concentrations will peak for each of Affinity Water's high-nitrate water sources. Reduction measures such as cover cropping were also modelled, this allows Affinity Water to suggest in-catchment measures to improve water quality, such as working with British Geological Society to map swallow holes and preferential pathways for nitrates^F.
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Operational resilience: maturity assessment

Innovative, collaborative, naturally resilient approaches to risk mitigation

Interviews: Graham Turk; Kevin Bennett

Documents reviewed: ^AAffinity Water, Annual Report and Financial Statement, 2017; ^B<https://stakeholder.affinitywater.co.uk/catchment-management.aspx>; <http://www.colnecan.org.uk/>; ^CDraft WRMP 2020-2080; ^DNEP Water Quality Schemes: Our proposed approach to catchment management, June 2015 v2.0; ^EAsset Strategy: Technical Briefing – Reducing metaldehyde concentrations in the River Thames through catchment management initiatives; ^FAsset Strategy: Technical Briefing - Investigating nitrate in groundwater and how catchment management can help to improve water quality; ^GDraft WRMP 2020-2080; ^H<https://www.hubbub.org.uk/Blog/hubbub-expands-water-saving-partnership-with-affinity-water>; ^I<https://stakeholder.affinitywater.co.uk/river-gade.aspx>; ^J<https://education.affinitywater.co.uk/about-us/>; ^KI2S AMP6 and AMP7; ^LAsset Strategy: Technical Briefing No. AS/TB/2018/04 Criticality Link Analysis, April 2018; ^MControl Vision Program, February 2017; ^N<https://www.affinitywater.co.uk/water-saving-squad.aspx>; ^O<https://www.savewatersavemoney.co.uk/compare-my-water?showcompare=1>

<p>Current and ongoing activities</p>	<p>The business has installed 20,000 new acoustic loggers, across approximately 20% of the network, to improve leakage detection and pinpointing, thereby improving subsequent response times^{K,L} this captures leaks early and reduces the amount of water abstracted. The business is trialling new methods to find leakage from satellite images and using conductivity methods. The business has also established a Situational Awareness tool, that is bringing together all of the business's network and production telemetry points into one platform which can then be analysed by the Network Control Desk teams^M. Network telemetry is currently being upgraded and is due to be completed by the end of AMP6^M.</p> <p>Affinity Water is currently scored at level 3 'Response developed'. This is because the business has an awareness of the need for naturally resilient approaches to catchment management, and are currently exploring innovative measures and trialling/piloting different methods. There is an opportunity for Affinity Water to consolidate their understanding by fully developing a response, pulling on the information gathered in their trials and investigations.</p>
<p>Planned for AMP7 and beyond</p>	<p>Affinity Water's draft Data Strategy outlines the company's vision to be a more data-driven business, using data insight to inform decision-making^N. Furthermore, the Data Strategy also states that the company is developing an Innovation Strategy in parallel and will seek to establish an innovation portal. Affinity Water has a draft WRMP plan^G, which includes their innovative approach to demand management called the Fast Data Option. This combines existing network data systems with new fast logging and live network hydraulic models to provide customers with bespoke information about their water use. This will also be used to understand night usage, and therefore areas to target for leakage.</p> <p>The outcomes of the nitrate leaching modelling informs Affinity Water of which sources need targeting for catchment management schemes, and how they need to target their suppliers. It seems likely that the next step for Affinity Water is to develop a full response to put into practice the information already gathered, and to action this. Affinity Water is predicted to reach a level 4 'Response actioned' within AMP7.</p>



Operational resilience: maturity assessment

Robust and flexible supply chain management

Interviews: Katharine Solomon; Tim Monod; Chris Offer; Amanda Reynolds; Graham Turk; Kevin Bennett

Documents reviewed: ^AAffinity Water Procurement Contract / Supplier Risk Assessment Procedure; ^BAffinity Water Risk Management Framework, ^CI2S AMP6 and AMP7

<p>Level 1: Unaware</p> <p>The company has not considered the impact of energy, resource and skills supply chains on their operations. There is limited or no consideration of potential shocks and stresses and their effect on supply chains. No alternative source of supply is considered.</p>	<p>Level 2: Aware</p>	<p>Level 3: Response developed</p>	<p>Level 4: Response actioned</p>	<p>Level 5: Leading</p> <p>The company considers the impact of energy, resource and skills supply chains on their operations and ensure diverse and competitive supply chains that deliver the best outcomes for their customers. Supply chain needs are considered in the long-term, based on horizon scanning. Collaborative relationships are developed with the supply chain, to avoid boom and bust cycles. The company also considers the flexibility of their supply chains, particularly during shock events. Internal processes are in place to keep this under review, sharing knowledge and developing solutions with others. The supply chain is considered as a network. The company also considers how they can effectively utilise options beyond their boundaries to mitigate their risks, e.g. use of water trading and bio resource trading markets.</p>
<p>Current and ongoing activities</p> <p>Preliminary Industry Average (3.1)</p>				
<p>Planned for AMP7 and beyond</p> <p>Preliminary Industry Average (3.4)</p>				
<p>Current and Ongoing Activities</p>	<p>Affinity Water adopts a category management process to its supply chain, with category plans for each area, and associated category managers. Key points to note are:</p> <ul style="list-style-type: none"> All contracts have Contract Plans stating risk in the agreement and how the contracts are to be structured to mitigate the risks Tender processes (all in procedures) to ensure appropriate capability checks are carried out Current supply chain partners were selected according to the principles underlined by BS11000 and Affinity are also working towards ISO44000 and helped Mace achieve BS11000 as a case study. Use of the Achilles UVDB and Verify for on-going tracking of H&S capability and insurances to assess contractors. Credit Assist alerts us to changes in financial standing of companies. Monthly performance meetings, which includes performance against service levels, risks & issues Compliance with ISO55000 Asset Management Standards and with ISO9001, OHSAS18001, ISO14001 Working to the HM Treasury (HMT) alliance best practice documentation, used to help align supply chain and intelligent client behaviours & attitudes Procurement strategy for AMP6 being followed and one developed for AMP7 detailing how the various programmes and portfolios will be sourced and delivered Availability of 'seasonal suppliers' to help mitigate short term shocks and peaks in workload <p>Affinity Water has a draft 'Supplier Risk Assessment Procedure' which is currently being reviewed at time of writing^A. Initial checks are undertaken for all contractors, which includes a credit check where the business appoints Credit Assist to undertake the check. If considered a higher risk, the business asks for ongoing credit checks. The procedure identifies mitigation measurements for procurement risks including a standard pre-qualification questionnaire. It adopts the same approach to likelihood and severity as the business wide risk management process^B. The assessment of severity of risk for 'business resilience / critical supplier' includes consideration of significant regulatory failure, serious financial loss for the company, loss of reputation, and sole reliance on a single or very limited pool of companies.</p>			



Operational resilience: maturity assessment

Robust and flexible supply chain management

Interviews: Katharine Solomon; Tim Monod; Chris Offer; Amanda Reynolds; Graham Turk; Kevin Bennett

Documents reviewed: ^AAffinity Water Procurement Contract / Supplier Risk Assessment Procedure; ^BAffinity Water Risk Management Framework, ^CI2S AMP6 and AMP7

<p>Current and Ongoing Activities</p>	<p>Sub-contractor frameworks include a 2-hour response time as one of six job priorities for teams including repair, traffic management, plant and machinery. Affinity Water has recently moved to a 'cost plus' payment arrangement to ensure the supply chain is only paid for the resources it deploys^C; previous arrangements meant that cheaper plant, equipment and unskilled labour were used. This change has meant no water events since 2015. In order to respond to incidents, emergency callout requirements are written into contracts. Whole-life costs are considered in a particular contract plan, for example energy consumption from running a pump for its whole-life.</p> <p>Regular management discussions are held with suppliers to understand potential pinchpoints. These are not always undertaken by the procurement team, but the person responsible for managing the contract on a particular job or project. Affinity Water uses market advisors to understand market trends, which enables them to forward buy where appropriate to do so. If it is not easy to change supplier, then it is ensured that a dual supply is provided. For example, this is done for chemical supply, and Affinity Water recently experienced an incident where a supplier reduced chemical production. Affinity Water is also looking to move away from oxygen use across sites, to reduce their dependency.</p> <p>Affinity Water integrate contractors into their teams, and share reporting and management systems for collaborative and shared learning. They have received awards for safety in collaboration with their contractors. Their contractors form part of their contingency planning and emergency response. However, overall, Affinity Water recognises that there is more work to do to develop longer-lasting trust-based partnerships with their supply chain. This would enable future trends and challenges to be shared more collaboratively and proactively; developing mechanisms to share risk and resilience reward.</p> <p>The company considers risk horizons up to 25 years into the future in its procurement risk management procedure^B.</p> <p>Affinity Water scores a level 3 because, whilst there are some pockets of good practice, they recognise that there is a need to do more to develop long-term and collaborative relationships with their supply chain.</p>
<p>Planned for AMP7 and beyond</p>	<p>In AMP7, Affinity Water is looking to ask suppliers to price for a 'one hour' response time^C. We understand that the CEO and Financial Director are looking to develop the correct insource/outsource balance. We understand that this will lead to a more comprehensive plan for supply chain relationships and management.</p> <p>The business also recognises the potential impact of schemes such as HS2 and Heathrow expansion, which may lead to resourcing issues.</p> <p>We understand that a more comprehensive plan for supply chain management will be developed at the end of AMP6 or beginning of AMP7, retaining a score of 3 for a plan developed.</p>



Operational resilience: maturity assessment

Inclusive and skilled workforce

Interviews: Bill Maynard; Chris Offer

Documents reviewed: ^A PR19 Business Plan; ^B Affinity Water Annual Report and Financial Statements for 31 March 2018; ^C People Survey Results 2017; ^D Gender pay gap report 2017; ^E People Team Operating Plan

Level 1: Unaware The company has limited or no long-term thinking regarding labour availability. There is limited or no workforce continuity plans or an attempt to identify skills gaps between current and future workforce.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading Companies need to identify and plan to fulfil the requirements of their future workforce. They should ensure they have workforce continuity plans to identify skills gaps (risks) between their current and future workforce, and ensure that these can be filled through training and development, succession planning increasing diversity and inclusion. Companies should work across the water industry and utility sector to address these skill gaps.
Current and ongoing activities	Preliminary Industry Average (2.8)			
Planned for AMP7 and beyond	Preliminary Industry Average (3.6)			
Current and Ongoing Activities	<p>Affinity Water's draft Wellbeing Strategy is to have a 'Great day everyday'. The business has a good local reputation as an employer, with an average employee turnover of 13%, and an average length of service of 10 years^D. Affinity Water is recognised as a 'small big company', which allows people to develop their careers while being small enough to see an impact on customers and the service provided.</p> <p>During AMP6, the business increased the quantity of direct recruiting, which has helped the company to reduce its reliance on third parties. The business has a dedicated talent manager, as well as 'Learning and development' and 'Talent Acquisition' teams whose role is to ensure that the best talent is attracted to, and developed within the company. There are active graduate and apprentice programmes^B, and Affinity Water is working to engage through university partnerships and schools^E. The Talent and Succession workstream^E works to retain talent, and former graduates now hold senior manager roles. Currently, talent and performance is reviewed twice a year, and the company takes a 'future back' approach to talent.</p> <p>Affinity Water is an active participant in relevant industry bodies, including EU Skills, Institute of Water, and HR Forums. The business has been awarded the 'Continuous Professional Development Approved Employer Status' and is recognised as an 'Employer Champion' by the Science Council. Affinity Water has developed, launched and implemented 'Tap4learning' - an app that provides a learning management system for employees. The business' e-learning platform includes a suite of programmes promoting inclusion and skills, including unconscious bias and digital skills, although the extent to which employees engage with this is unclear. Affinity Water has enhanced inductions for new starters covering Affinity Water and policies. Affinity Water also has a leadership training programme (Lane4) for managers. Certification to ISO9001:2015 requires Affinity Water to manage training, awareness and competence. Training is designed to be inclusive and employees/suppliers are trained in EUSR Water hygiene, streetworks and other qualifications.</p>			



Operational resilience: maturity assessment

Inclusive and skilled workforce

Interviews: Bill Maynard; Chris Offer

Documents reviewed: ^A Our People Resilience; ^B PR19 Business Plan; ^C Affinity Water Annual Report and Financial Statements for 31 March 2018; ^D People Survey Results 2017; ^E Gender pay gap report 2017; ^F People Team Operating Plan

<p>Current and Ongoing Activities</p>	<p>In 2017, the business undertook a gender pay gap assessment^D under requirements of the Equality Act 2010. Women comprise 36% of the total workforce, and are under represented in upper quartile pay bands, and overrepresented at lower quartile bands. There is a pay gap between approximately 25-30% in favour of men, which the business attributes to fewer women in senior roles, and in roles where allowances are paid for working patterns. The business is monitoring key trends, and is proposing concrete measures to address gender inequality. Currently, the business does not have a formal diversity and inclusion strategy, although several activities are underway, such as advertising roles on job sites targeting women.</p> <p>Affinity Water scores a level 3 because whilst they have some initiatives underway, these are not yet co-ordinated into a single future workforce plan. Similarly, whilst there are actions underway to improved diversity, these are not developed into a formal diversity and inclusion plan.</p>
<p>Planned for AMP7 and beyond</p>	<p>Some of the initiatives planned in AMP7 include:</p> <ul style="list-style-type: none"> • Addressing gender inequality through flexible working arrangements. • Reverse mentoring for succession planning. • Digital skills platforms and targeted training. • Establishment of an employee forum <p>Affinity Water has not provided evidence that they will be progressing a strategic and integrated response in AMP7, but will continue to develop plans or deliver elements, so they remain at a level 3.</p>



Operational resilience: maturity assessment

Robust, integrated and flexible technology

Interviews: Chris Offer; Tim Monod; David Clifton

Documents reviewed: ^AAffinity Water Data Strategy; ^BWhere will we be tomorrow?; ^CFuture enablers and disruptors for the Water Sector: Stimuli for technological innovations and renovations for the immediate, short term and future vision; ^DControl Vision Program EMT Update, February 2017

Level 1: Unaware The company does not use technology intelligently. Fragmented networks with no system cohesion. Primary focus on physical security.	Level 2: Aware	Level 3: Response developed	Level 4: Response actioned	Level 5: Leading Technology is used intelligently to deliver real operational and strategic gains. Data-driven decisions are the norm, using both real-time data to adapt and respond, as well as using data for robust long-term decisions. Systems are integrated, including operational technology and information technology systems. Interoperability and integration with systems in other sectors has been considered. Cyber security is paramount, with redundancy built into systems, and processes in place to continually review and improve this. People are at the centre of how technology is designed and implemented, both customers and staff.
Current and ongoing activities Preliminary Industry Average (3)				
Planned for AMP7 and beyond Preliminary Industry Average (3.8)				
Current and Ongoing Activities	<p>Affinity Water undertook a data quality assessment in 2017, that assessed the company's alignment with ISO8000-150. This assessment stated that Affinity Water was currently at 'Level 2 – Developing'. Particular shortfalls were identified in the overall Governance of data, quality planning and data measurement. Affinity Water recognises that the business should provide a 'single source of truth' in terms of business-wide data, and that there is currently limited company-wide knowledge management^A. The majority of data management is based on established, but disparate systems. Moreover, a considerable number of records (mainly around assets) are still paper based^A.</p> <p>The company has since responded to the above findings by developing a 'Data Strategy'^A; at the time of writing this strategy is in draft stage and has yet to be given Board assurance. The data strategy sets out business wide plans for the remainder of AMP6 and then into AMP7, with a particular focus on becoming a more data-driven organisation. Within this strategy the business has identified four pillars of data governance, which include: People and organisation (looking to become a more data-centric organisation); Guidelines; Systems; and Measurements. The business has also recently appointed a new Chief Information Officer.</p> <p>Operationally, the integration of Information Technology (IT) and Operational Technology (OT) is still developing and is typically considered separate. Currently, the business has a greater control and understanding of its above ground assets, but during the remainder of AMP6 and into AMP7 it is looking to develop the same approach for its below-ground assets to support the Vision Control Program. In terms of technology, the business as a whole regards itself to be a 'fast follower' rather than a 'pioneer' due to the company's size and 'in-house' capabilities.</p> <p>The teams and contractors are issued with 'toughbooks' for digital interfacing with their systems.</p> <p>Affinity Water has undertaken the following initiatives during AMP6:</p> <ul style="list-style-type: none"> Establishment of a Network Control Desk, which is using the 'Situational Awareness Tool' to bring together live information on network performance, through technology and sensors across the network, to provide speedier and improved decision making to Affinity Water staff in the respective communities^D. 			



Operational resilience: maturity assessment

Robust, integrated and flexible technology

Interviews: Chris Offer; Tim Monod; David Clifton

Documents reviewed: ^AAffinity Water Data Strategy; ^BWhere will we be tomorrow?; ^CFuture enablers and disruptors for the Water Sector: Stimuli for technological innovations and renovations for the immediate, short term and future vision; ^DControl Vision Program EMT Update, February 2017

Current and ongoing activities

- As part of this work on 'Situational Awareness' the business has installed approximately 20,000 pressure loggers on around 20% of the network to provide the company a view on real time issues across their network in order to respond more promptly to incidents, moving away from a reliance on customer-received information.
- The Telemetry Replacement Project is currently ongoing, and is due to be completed by early 2019. This will unify the existing telemetry systems and will feed into the situational awareness tool, while also providing enhancements in cyber security, work management process and asset performance monitoring.
- Affinity Water previously used co-located data centres to store data, however due to previous incidents, the business has moved towards using cloud-based data storage, that has reduced previous risks associated with co-located data centres (e.g. power failure). Approximately 90% storage has moved to Amazon Web Services.
- The Asset Information Centre has provided a means for the business to more readily share information across its communities in order to respond to emergency situations and includes continual updating and future-proofing capabilities. This can also be accessed through mobile devices.
- The company has adopted innovative ways of working and are continuously improving and plan to develop this further in AMP7. A user-centric and agile approach to design and delivery, enhancing cross-functional collaboration and building advanced data and analytics capability are just some examples.
- In preparing for PR19, the business has been considering 'Where will we be tomorrow?', which looks at innovation within the business, and is recognised as a key pillar of PR19.

Moreover, in AMP6, Affinity Water has also implemented a number of initiatives that have focused specifically on customer-based applications, including:

- Community Dashboard.
- Customer experience improvement programme – delivering enhanced and in-depth customer and community level information on billing, usage and near real time community performance. This also included the development of 'My Account', which is enabled on Amazon Alexa (self-serve solution).
- 'In your area' web application – provides customers with information on current works and leaks via a map-based webpage.
- Social media strategy.

In terms of cyber security, Affinity Water has been awarded the UK Government's Cyber Security Essentials + certification. This resulted from the business's 'Data and Information Security Programme' (InSec). Affinity Water has a cyber security policy which is applied and implemented across all teams.

Affinity Water has also begun its journey to fully align with ISO27001, with a target to meet this by the end of 2018. Affinity Water uses a third party organisation (MWR) to test their cyber security. Event management, for example Darktrace and honeypots, is also used to understand whether the business would be affected during a cyber incident, and the company undertakes proactive phishing testing. Multi-factor authentication is also required when accessing Affinity Water's network remotely. By AMP7, the business hopes to have the following measures and outputs in place to increase cyber protection^A:

- Complete traceability of Affinity Water Limited network usage.
- Full monitoring of network attacks and security breaches.
- Data loss prevention on our key working systems and critical Tier 1 structured databases.

Affinity Water recognises that people and their inherent knowledge leaving the company are key risks, and therefore the business is also working with trusted technology partners to deliver particular business needs. This provides resilience to operations by bringing more services back in-house and ensuring its own people are equipped to deliver against their commitments. There is also a heavy focus on ensuring people have access to the training and tools they need to deliver.

We have scored Affinity Water a level 3 'Response developed' as the business has learnt lessons from previous events, and is now working towards improved system integration and real-time assessment of network performance to provide an improved and proactive service to customers. There are also steps to take to better integrate OT and IT technology.



Operational resilience: maturity assessment

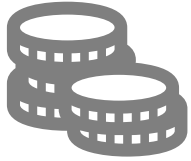
Robust, integrated and flexible technology

Interviews: Chris Offer; Tim Monod; David Clifton

Documents reviewed: ^AAffinity Water Data Strategy; ^BWhere will we be tomorrow?; ^CFuture enablers and disruptors for the Water Sector: Stimuli for technological innovations and renovations for the immediate, short term and future vision; ^DControl Vision Program EMT Update, February 2017

<p>Planned for AMP7 and beyond</p>	<p>Affinity Water has plans in place to advance existing capabilities and in some cases introduce new solutions to further the need to drive innovative ways of working across the organisation. Several examples are detailed below:</p> <ol style="list-style-type: none"> 1) The company is looking to develop an innovation portal, that will allow ideas to be provided, and then developed into trials and if successful integrated into the business more widely. 2) An investment of c.£1million is planned in AMP7 in an advanced segmentation and personalisation solution to take the data and insight capability to the next level. 3) From a cross-functional collaboration perspective, Affinity Water plans to install an online pesticide monitor on the River Thames and partner with housing associations to promote water efficiency to residents. 4) Affinity Water is looking to further drive adoption of user-centered design and agile adoption and have proposed a wide variety of solutions to meet customer needs and meet legal and regulatory requirements. <p>The business is also active in a number of forums (e.g. UKWIR, Water UK, WRc, BIM4Water Owner Operator Group, Cranfield Water Network) and is partnering with relevant organisations or companies^E.</p> <p>Affinity Water realises that people are at the core of driving innovation and technology change and is trying to develop a culture of continuous improvement across the organisation. In the area of adopting technology itself, Affinity Water is looking to be a 'fast follower'. A move towards becoming an early adopter and becoming more risk tolerant will push them ahead in the path to being a leader in this area.</p> <p>Completion of the Telemetry Replacement Project and full rollout of the Situational Awareness Tool contribute to Affinity Water being predicted a level 4 'Response actioned' in AMP7 and beyond. This is likely to be achieved by the end of AMP6 and will be further enhanced as the company moves into AMP7.</p>
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6. Financial, corporate and operational resilience: maturity assessment – summary of findings



Financial Resilience

Key findings

Strengths

- Robust financial monitoring
- Undertaken robust stress and scenario tests to demonstrate financial viability including the July 2018 Ofwat tests
- Access to committed finance to deliver much of its AMP7 plan showing resourcefulness.
- Responsiveness to Ofwat's concerns over its Financial Monitoring framework shows flexibility.

Opportunities

- Strengthening of asset health understanding will aid in producing long-term financial plans.
- Transparency of tax and structure from the imminent closure of the Cayman Islands financing.

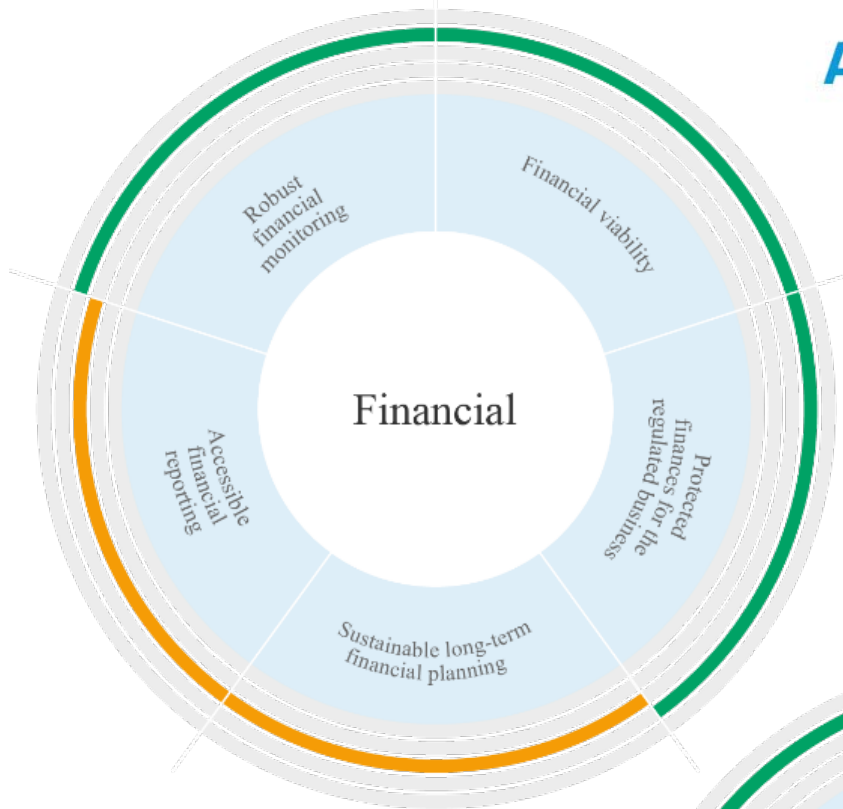


Figure 12: Financial Resilience: Current scores

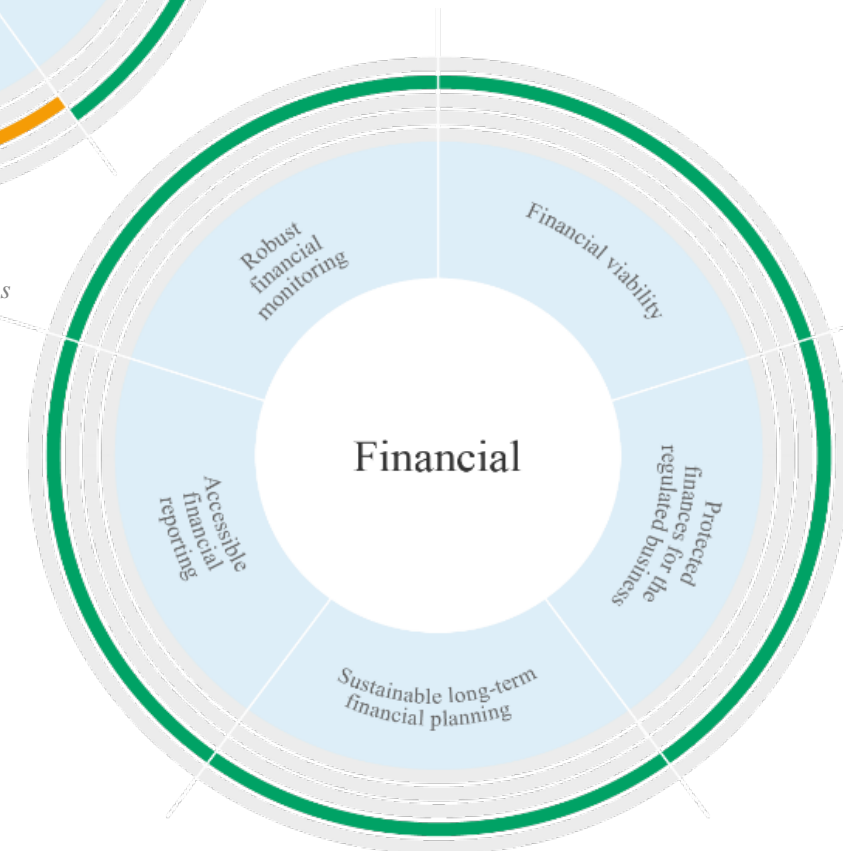


Figure 13: Financial Resilience: Future scores



Corporate Resilience

Key findings

Strengths

- Dedicated resilience manager, team and strategy in progress, prioritisation of resilience.
- Strong risk management and governance which leads to robust processes.
- Business continuity planning and regular training exercises supports flexibility and leads to integration of systems.
- Examples of customer co-creation through e.g. Hubbub and My account, and insight driven approach leading to more inclusion and integration.
- Extensive consideration and planning of community strategy
- Comprehensive health and safety culture and approach

Opportunities

- New CEO and Board Chairman to drive change and community approach
- Update to Affinity Way to engage better with employees.
- Further collaboration, including reviewing Board effectiveness and how to incorporate resilience principles.
- Greater breadth of horizon scanning across the business
- Deployment of community pilots and embedding of community approach
- Delivery of enhanced wellbeing approach to match health and safety
- Further collaboration across the business to deliver resilience value

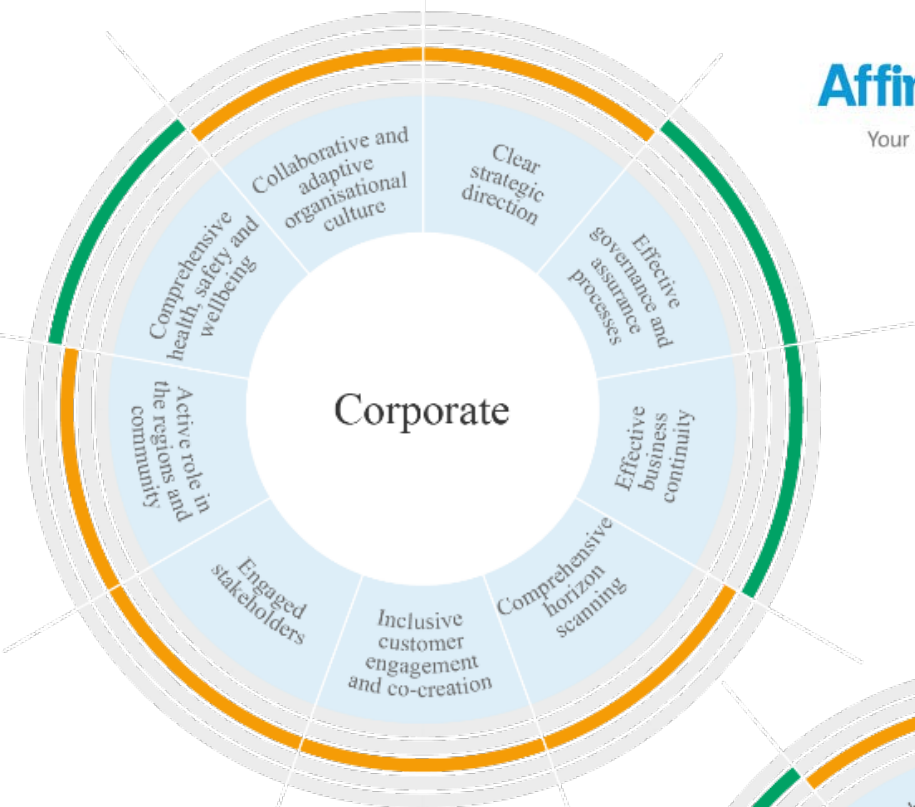


Figure 14: Corporate Resilience: Current scores

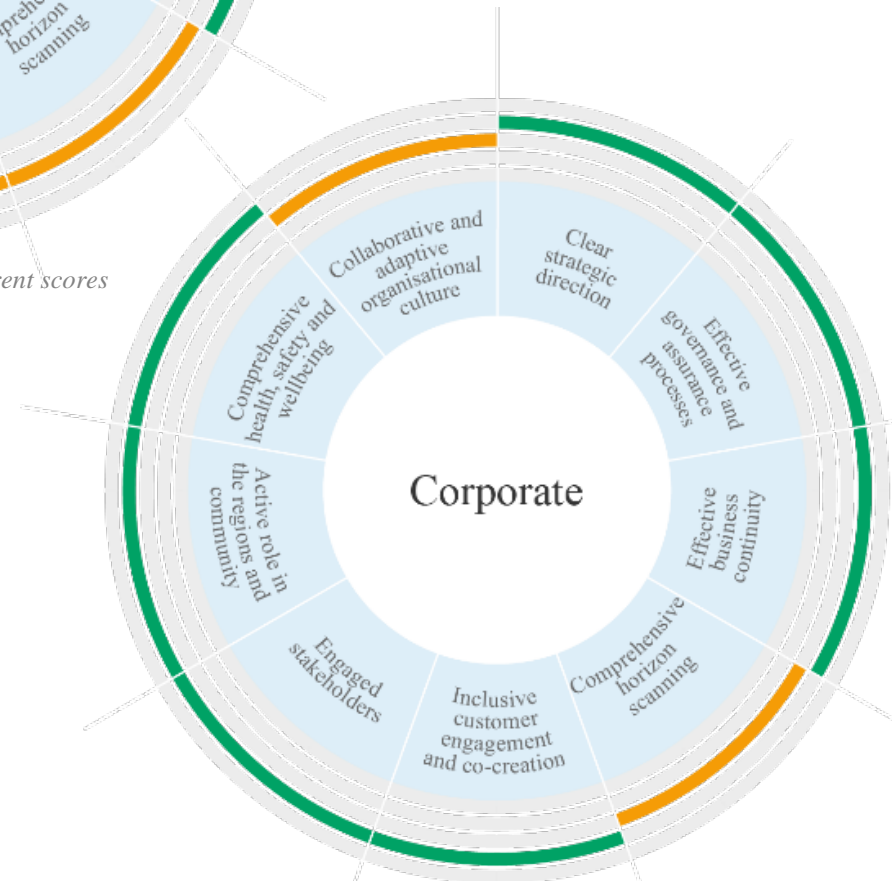
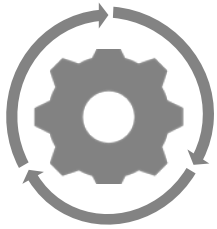


Figure 15: Corporate Resilience: Future scores



Operational Resilience

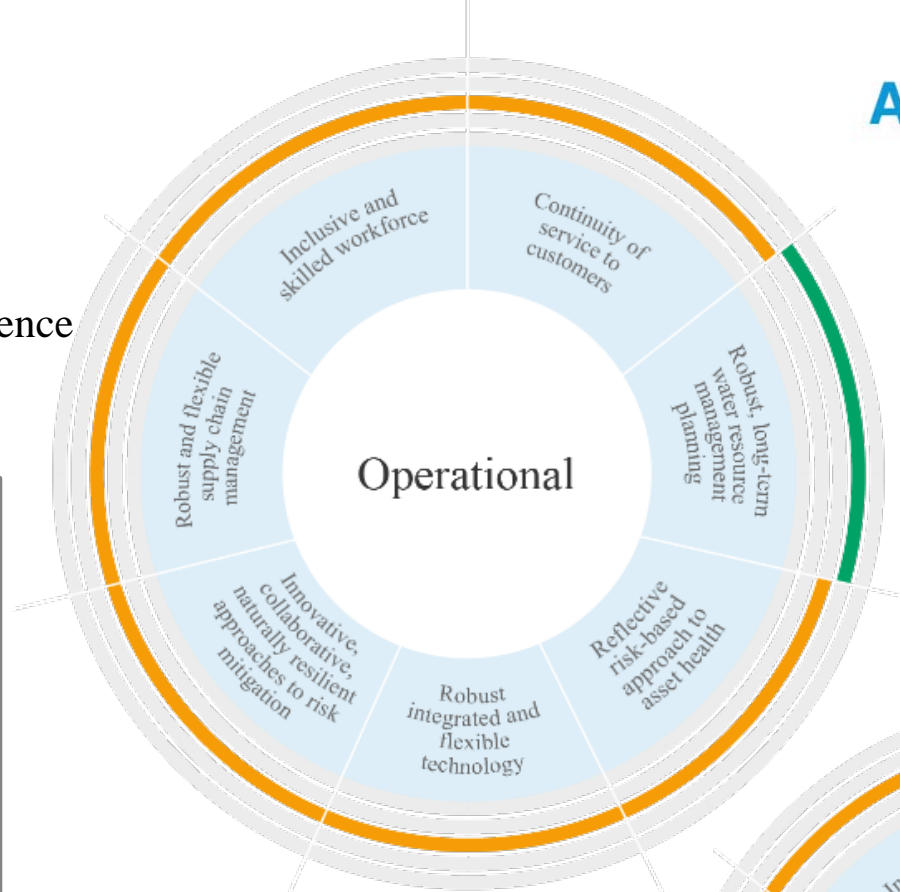


Figure 16: Operational Resilience: Current scores



Figure 17: Operational Resilience: Future scores

Key findings



Strengths

- Collaborative and long-term approach to water resources management planning will be amongst the industry leaders if implemented as intended.
- Implementation of a data driven approach to asset health, with a Strategic Asset Management Plan which will be reviewed every 12 months.
- Innovative pilots undertaken in catchment management.
- Award winning education programmes to educate school children, also delving into behavioural change via #TapChat.



Opportunities

- Embedding a data-driven approach to inform short-term emergency decisions and strategic planning in the longer term.
- Rolling out catchment management pilots on a wider scale and embedding learning outcomes into future plans.
- Role as regional integrator in water resources trading and leading regional and national resilience via reservoir proposal.
- Aligning people plans clearly to the businesses strategic direction and horizon-scanning to inform workforce and capability needs into the future.
- Better integration between OT and IT to support the robustness and flexibility of the systems.

Appendix A

Interviewees

Name	Role/Title
Stuart Ledger	Chief Financial Officer
Peter Rowland	Chief Information Officer
David Clifton	IT Enterprise Solutions Architect
Mark Hunter	Head of Portfolio
Amanda Reynolds	Director of Customer Relations (Household)
Chris Offer	Director of Regulation
Tim Monod	Director of Legal and Assurance and Company Secretary
Graham Turk	Head of Production
Kevin Bennett	Head of Community Operations
Mike Pocock	Director of Asset Strategy
Mumim Islam	Water Resources Planning Manager
Kate Solomon	Head of Operational Procurement
David Watts	Programme Delivery Manager
Bill Maynard	Head of Talent Acquisition
Michael Calabrese	Financial Controller
Grant Wordsworth	Quality Manager
Sara Roden	HSEQ Director

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