

DRAFT WATER RESOURCES MANAGEMENT PLAN 2024

Main Narrative



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EXECUTIVE SUMMARY

At Hafren Dyfrdwy we provide clean drinking water to 100,000 homes and businesses. We abstract water from sources in north and mid Wales with two thirds of our water coming from the river Dee and the remaining third from boreholes, streams and reservoirs.

Like all water companies we need to plan for the future. Our Water Resources Management Plan (WRMP) looks at how our water system performs now, and the investments and activities we need to meet the challenges that we may encounter over the coming decades. This is our second WRMP but the first time we have worked with other companies and sectors to consider the wider impacts in cross border catchments.

We have assessed the following challenges that may impact our ability to provide a reliable supply of water to our customers:

- climate change;
- population growth and changing demographics;
- the need for greater resilience to drought, and;
- the impact of our operations on the environment.

Our conclusion is that our existing water resources are sufficient to deal with these challenges. However, we recognise that we need to do more to improve the environment, therefore the main focus of our plan is to:

- Reduce leakage by 10% from 2019/20 levels between 2025 and 2030, and 50% by 2050
- Help customers use water more efficiently
- Deliver environmental improvements at Lake Vyrwy and across our operational sites

We welcome your feedback on this draft WRMP so that we may refine our priorities and pace. Our final WRMP will be published in autumn 2023



ABOUT HAFREN DYFRDWY

As one of the 11 regulated water and sewerage companies in England and Wales, Hafren Dyfrdwy provides Mid and North-East Wales with world-class water services at the most affordable price in Wales and England. We are proud to serve our customers with this vital resource. As a local company, our customers and the environment in which they live and work are at the heart of our operations and our long term plans.

Before we get into the detail of our draft Water Resources Management Plan (dWRMP), here's some key facts about Hafren Dyfrdwy.

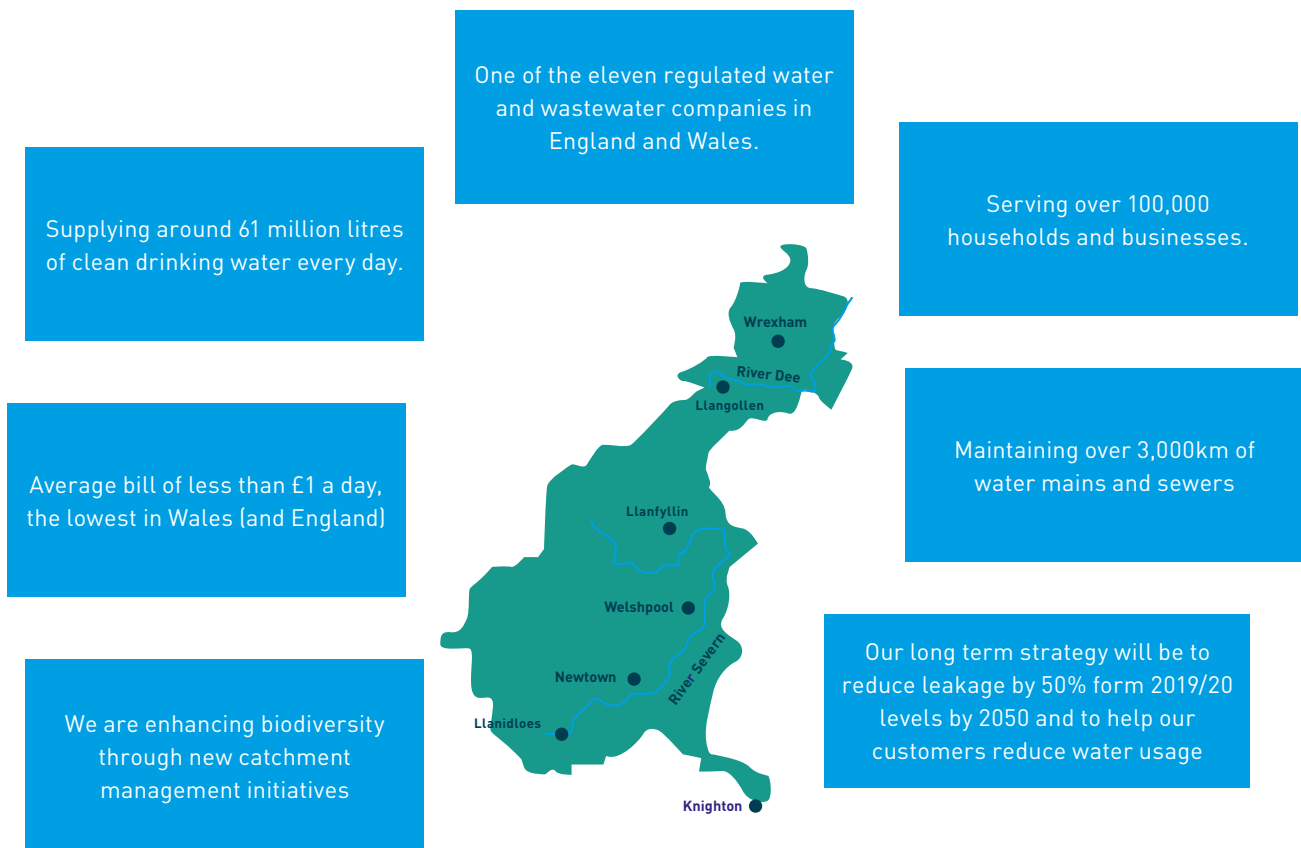


Figure 2.0: About Us

Typically, around 61% of our raw (untreated) water comes from the River Dee, 5% from a series of impounding reservoirs, 30% from boreholes and the remaining 4% comes from a spring source. We treat our water at five treatment works and then supply it to our customers through a network of approximately 2,600 km of water mains, 100 pumping stations and 85 clean water storage reservoirs.

We also own and operate two large dams, at Clywedog Reservoir and Lake Vyrnwy, which are used to supply large areas of northern England and the Midlands. Although the water from these reservoirs does not supply customers in our area, we are looking at ways we could use these sources to provide additional resilience to our customers in the long term and how we can enhance the environment around them, whilst also improving the visitor experience. More detail about this can be found in Section 7.1.

ABOUT THIS DRAFT WATER RESOURCES MANAGEMENT PLAN

This is Hafren Dyfrdwy's second Water Resources Management Plan (WRMP). We published our first in 2019 soon after the company was launched. It is a statutory requirement that water companies produce and publish a WRMP every five years.

The Water Industry Act 1991 sets out the basis under which all water and wastewater companies (referred to as 'undertakers' in the Act) in England and Wales must operate. The most fundamental of our duties is to develop and maintain a safe, efficient and economical system of water supply within our area of operation. As part of this process we produce a WRMP which sets out how we will manage and develop water resources to ensure that we can continue to meet our fundamental water supply duty.

This draft WRMP provides an update to WRMP19. It sets out our long-term strategy for the next 25 years and looks ahead to 2085 to help us understand and prepare for potential risks to our supply due to extreme drought, climate change and changes in population and industry.

About our regulators

The water industry is closely regulated to make sure that companies are being operated in a financially and environmentally sensitive way.



The **Welsh Government** sets the overarching directions for water companies in Wales. These are laid out in the "Guiding Principles for Water Resources Planning in Wales" document. Welsh Government also sets the legislation that we have to comply with in our operations.



Natural Resources Wales (NRW) ensures that water companies in Wales operate in a way that does not harm the environment. They published joint Water Resources Planning Guidelines (2022) with the Environment Agency (which is the environmental regulator in England) and Ofwat. We have used this guidance as the basis for building our dWRMP.



Ofwat is the water industry economic regulator. They ensure that customer bills are fair and that any bill increases are fully justified.



The **Drinking Water Inspectorate (DWI)** ensure that our water is of the highest quality.



The **Consumer Council for Water (CCW)** is the consumer body who represent our customers.

WATER RESOURCES PLANNING IN WALES

As a water company, our long-term plans and activities are expected to complement the Welsh Government's vision for the well-being of the people of Wales and ensure we comply with all relevant environmental legislation. These principles are central to our dWRMP and our other long-term strategies, including our company business plan.

In 2022, we reached an important milestone and issued our first-ever Strategic Direction Statement (SDS). The SDS outlines our long-term ambitions and the key trends, challenges and opportunities we face as a business over the next 30 years. Our SDS was produced in conjunction with our dWRMP, our PR24 business. Together these three documents will shape our Long Term Delivery Strategy.

We have explored the key issues in Wales, including the climate and nature emergencies, as well as the impacts of changes in the economy and wider demographic shifts. These changes will create a range of longer-term challenges to our business as we continue to provide an affordable, resilient service in the face of a challenging economic backdrop and the future investment required to support our response to climate change. We have also considered the key regulatory and policy drivers in Wales, such as the Water Strategy for Wales (2015),

Well-being of Future Generations (Wales) Act (2015) and the Environment (Wales) Act (2016) (which are explained in more detail in Section 4.1).

We have identified **seven** future priorities. These are our **long-term ambitions** and **key strategic aims** for our business over the next **30 years**.

Our priorities are:

1. Ensure we can continue to be able to source and deliver water to guarantee future water supplies.
2. Help our customers to be more water conscious to ensure water is used more wisely.
3. Deliver a high quality, affordable service and support our most vulnerable customers.
4. Improve the resilience of our network to lower the risk of flooding and pollution.
5. Adopt more sustainable practices to protect and enhance our environment.
6. Work with communities to make a positive social difference.
7. Invest in our high performing culture to maintain a safe, inclusive and fair workplace.

In delivering these priorities, we recognise the importance of working collaboratively across the sector and with our communities, regulators and policy-makers across Wales to bring our plans to life. Our future priorities are set not just so that we can be a leading, community focused water and wastewater company, but also so we can make a meaningful and positive environmental and social difference, not only to our area, but to Wales as a whole.

4.1 Welsh Government legislation and regulatory requirements

Whilst preparing our dWRMP we have considered a number of pieces of Welsh Government legislation, guidance and other key documents that link to our dWRMP. These are outlined in Tables 4.1.

Table 4.1: Summary of key regulatory documents and other relevant plans

Document	How it links to our dWRMP
Welsh Government Guiding Principles for Developing Water Resources Management Plans (2022)	Provides key policy priorities the Government expects WRMPs to address, including the nature and climate emergencies, reducing greenhouse gas emissions, consideration of water transfers and setting our environmental destination.
Welsh Government Programme for Government (2021-2026)	Sets out the Government's 10 well-being objectives that it will use to meet Wales' seven well-being goals (as described in the Well-being for Future Generations Act) and the steps it will take. The key objectives include ensuring the nature and climate emergency are a focus of all public service and private sector businesses.
Environment (Wales) Act 2016	The Act aims to provide significant economic, social and environmental benefits for Wales. It was carefully designed to support and complement the Welsh Government's work to help secure long-term well-being, so that current and future generations benefit from a prosperous economy, a healthy and resilient environment and vibrant, cohesive communities. Section 6 of the Act introduced a duty on public authorities operating in Wales to "maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions". The definition of public authority in this instance includes water and wastewater companies.
Water Strategy for Wales (2015)	Sets out how the Government expects water resources in Wales to be managed to support communities, nature and business over the next 25 years and beyond. The strategy is underpinned by the Well-being for Future Generations Act (2015) seven well-being goals. Water companies are expected to help public bodies such as NRW meet their statutory requirements under that Act.
Well-being for Future Generations (Wales) Act 2015	Focussing on improving the social, economic, environmental and cultural well-being of Wales. It is intended to make public bodies working in Wales think more about the long-term, work better with people, communities and each other, look to prevent problems and take a more joined-up approach. Our SDS and dWRMP have been developed with the aim of contributing to the seven well-being goals set out with this Act.
Natural Resources Policy (2018)	Focussing on improving the way that Wales' natural resources are managed. It sets out three national priorities – delivering nature-based solutions; increasing renewable energy and resource efficiency; and, taking a place-based approach. Our SDS sets out clear ambitions in relation to improving ecosystem resilience, achieving net zero and continued commitments to our local communities which will contribute to delivering the NRP.
Nature recovery action plan (Wales)	Under Section 6 of the Environment (Wales) Act 2016, we have a statutory duty to report to Welsh Government on what we have done to comply with the biodiversity duty ("...to seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems"). In December 2019, we submitted our first report and set out our compliance in terms with meeting the objectives of the Nature Recovery Action Plan (NRAP) for Wales. We will continue to use these objectives as the basis of our compliance with the duty and for future reporting.

Document	How it links to our dWRMP
Area Statement for Mid Wales	Mid Wales is an area of diverse and historic landscape, encompassing a large proportion of the Brecon Beacons National Park, the Berwyn uplands and the Cambrian Mountains. Key themes in this Area Statement are improving biodiversity; sustainable land, air and water; reconnecting people and places. All of these resonate with our long term ambitions as set out in our SDS as well as our environmental destination.
Area Statement for North East Wales	North East Wales encompasses the three separate counties of Denbighshire, Flintshire and Wrexham and features large urban communities, industry, several of the country's major transport arteries and some stunning scenery. Key themes in this Area Statement are developing and improving urban and rural green infrastructure; increasing woodlands; promoting the resilience of ecosystems in maintaining and enhancing biodiversity. All of these resonate with our long-term ambitions as set out in our SDS as well as our environmental destination.
Water Resources Planning Guidelines, 2021 (and supplementary guidance)	Guidelines jointly published by the Environment Agency, Natural Resources Wales and Ofwat for how water companies in England and Wales should prepare their WRMPs and regional plans. We have developed our dWRMP to meet the requirements of these planning guidelines.
Water Framework Directive River Basin Management Plans (RBMPs)	Our supply area sits within two RBMP areas – Dee and Severn. Neither of these RBMP propose a need for abstraction licence reductions to address concerns around changes to natural flow and levels of water. However, both focus on multi-sector demand reduction projects and flood risk management activities. Within the Severn catchment, we will consider our impact on Heavily Modified Water Bodies (Clywedog and Vyrnwy) through the AMP8 NEP.
Welsh Report of the UK Climate Change Risk Assessment (CCRA3)	Provides a national summary of climate change impacts and potential risks and opportunities in Wales when assessing climate resilience. We have referred to this assessment when preparing our dWRMP.
PR24 Business Plan	Our business plan is the mechanism through which we set out our investment needs for the next AMP. This investment will be used to deliver the outcomes specified in our WRMP. This dWRMP has been developed in close conjunction with our PR24 planning process, including the use of long-term adaptive planning across all water and wastewater activities, planning for common reference scenarios, linking new plans to delivery of previous ones, and using robust and consistent cost estimates.
Drought Plan	Our drought plan sets out the short-term operational steps we will take if we face a drought in the next 5 years. It describes how we would enhance available supplies, manage customer demand and minimise environmental impacts as the drought progresses. Appendix A details how our WRMP and Drought Plan link.
Water Resources West draft regional plan	There is direct alignment between our dWRMP and the Water Resources West Plan which has been published at the same time
Drainage and Wastewater Management Plan	In June 22 we published our first DWMP, which covers our Powys supply area. We have worked closely to align assumptions, including growth forecasts and climate change scenarios used to develop our plans. Wastewater services in Wrexham are provided by Dŵr Cymru Welsh Water.
Drinking Water Safety Plans	These plans provide a means of identifying hazards and hazardous events that could arise in our catchment areas, from the source up to the customer's tap.
Local Authority plans	Our WRMP reflects local growth ambitions and plans to meet the additional needs of new businesses and households.

4.2 Climate emergency

In 2019 the Welsh Government declared a climate emergency in Wales, becoming the first country in the world to do so. This was in response to mounting evidence that temperatures are rising on both a national and global scale and without urgent action to reduce (or stop) climate change, potentially irreversible environmental damage may occur around the world. The UK committed to the Paris Agreement in 2015, aiming to limit global warming to 1.5-2°C, compared to pre-industrial levels (1850 to 1900), by achieving climate neutrality ("net zero" emissions) by the middle of the 21st century.

Recent trends, as described in the Welsh Report of the UK Climate Change Risk Assessment (CCRA3), have shown that in Wales:

- Annual average temperatures have increased 0.9°C from the mid-1970s to mid-2010s, with more hot summer maximums occurring (e.g. during the 2022 heatwave peak temperatures reached 37.1°C in Flintshire, which was 6°C hotter than the maximum temperature experienced during the 2019 heatwave in Wales)
- Annual mean rainfall has increased by 2% from 1402mm in the mid-1970s to 1430mm in the mid-2010s
- Sunshine hours have increased by 6.1% between the mid-1970s and the mid-2010s.

The latest climate change projections, based on the UKCP18 probabilistic projections indicate that further changes could be seen in terms of both temperature and rainfall (shown in Table 4.2).

Changing climate variable	2050s RCP6.0 (50th percentile)	2080s RCP6.0 (50th percentile)
Annual Temperature (°C)	+1.1	+2.3
Summer Rainfall (%)	-15	-26
Winter Rainfall (%)	+5	+13

Table 4.2: UKCP18 probabilistic projections central (median) estimate of 30-year average change from a 1981-2000 baseline [table adapted from Welsh Report of the UK CCRA3]

The climate change projections are showing a trend towards hotter, drier summers and warmer, wetter winters, which may lead to more periods of water scarcity in the future. This could impact on public water supply, private water supplies, agriculture and industry. In preparing this dWRMP we have carried out extensive climate change modelling to understand the risks of these changing trends on our water supply network (more detail can be found in Section 5.3). We have also considered how we could support people in our area who use private supplies in times of prolonged dry weather/drought. This is discussed in Section 5.8.

Our long-term plans have been designed with climate resilience at the forefront.

Our approach to Net Zero (greenhouse gas emissions)

We are part of the Severn Trent Plc family, alongside Severn Trent Water, which is a water and wastewater company based in the English Midlands, and Severn Trent Business Services. It is our ambition to be a net-zero company by 2030.

We are committed to our Triple Carbon Pledge, which we made in 2019:

- To achieve net zero operational carbon emissions by 2030
- To generate or procure 100% renewable electricity
- To move our fleet to 100% electric vehicles by 2030.

We have signed up to the global Science Based Target initiative (SBTi), which provides companies with clearly-defined pathways to reduce their emissions in line with the Paris Agreement goals and we are encouraging our supply chain partners to do the same. We have a scope 3 target for 70% of our supply chain (by emissions) to have set a Science Based Target by 2026. We have also set Science Based Targets to reduce Scope 1 and 2 emissions by 46% by 2031 in line with a 1.5°C pathway (how much we need to reduce our emissions to help keep the global warming stays below 1.5°C).

As the majority of our operational, location-based, carbon emissions are driven by our use of energy, managing carbon also means managing costs. We therefore aim to reduce carbon emissions and increase our generation of renewable energy. To reduce our operational emissions further we will continue to focus on improving our energy efficiency

to offset the additional demands of more stringent treatment quality requirements and increase the amount of renewable-backed energy we buy. We will also continue to decarbonise our fleet (as part of our triple carbon pledge to move our fleet to 100% electric vehicles by 2030) and encourage employees to convert to low-carbon electric cars to reduce scope 1 emissions when doing business mileage. Pursuing these measures will continue to reduce our key sources of emissions, reduce our reliance on the electricity grid and bring financial benefits for our customers and investors.

Our total net emissions continue to fall year on year due to increased generation of renewable energy and a reduction in the emissions intensity of UK grid electricity, including from our 100% renewable-backed electricity procured in our contract supply. Table 4.3 shows our gross emissions total in 2021-22 based on the 'location-based' accounting methodology for grid emissions and the 'market-based' accounting method in parallel.

Table 4.3: Our carbon footprint kt CO₂e for 2021/22

Operational Greenhouse Gas Emissions (Tonnes CO ₂ e)	Location Based	Market Based
Scope 1 Emissions (Combustion of fossil fuel on site)	25	25
Scope 1 Emissions (Process emissions)	216	216
Scope 1 Emissions (Transport Fleet)	486	486
Scope 2 Emissions (Electricity Purchased for own use)	4,500	0
Scope 3 Emissions (Electricity Transmission and Distribution)	398	0
Total Annual Gross Operations Emissions	5,624	726
Benefit of exported renewable electricity	-640	-640
Total Annual Net Operational Emissions	4,984	86

4.3 Nature emergency

In June 2021, the Welsh Senedd declared a nature emergency, calling on Welsh Government to recognise the need for a parity between actions taken to tackle climate change and those taken to tackle biodiversity loss. Our supply area straddles four counties - Powys, Denbighshire, Flintshire and Wrexham - all with their own unique landscapes, communities and natural value. We serve a comparatively small area of Wales but 60% of that area is on land that is protected as either Sites of Special Scientific Interest (SSSI) or Special Areas of Conservation (SAC), including the Clwyd Range and Dee Valley Area of Outstanding Natural Beauty (AONB) and the Berwyn SSSI. We recognise how important our natural environment is to the well-being of our employees and customers and are fully committed to playing our part in the vision to create a better future for Wales, through environmental leadership and embracing the Sustainable Management of Natural Resources (SMNR) approach.

We have a duty under section 6 of the Environment (Wales) Act 2016, which requires us to maintain and enhance biodiversity in the "exercise of our functions", and in so doing, promote the resilience of ecosystems. In our current business plan, we have made clear commitments to improving biodiversity across our supply area with a target of 450 hectares of land improved by 2025. We have already exceeded this target with 80 hectares of peatland restored and 410 hectares of other habitat improved across our estate at Lake Vyrnwy (in partnership with RSPB Cymru), as well as 65 hectares of nature reserve land improved near Wrexham - in partnership with North Wales Wildlife Trust. In addition, we have undertaken biodiversity surveys at several key operational sites; the outcome of these surveys will inform our Biodiversity Strategy and help identify basic biodiversity improvements that can be introduced across the operational estate.

We understand the vital role that healthy rivers have, not only to our business but as important ecosystems for the Welsh environment. In March 2022 alongside Severn Trent Water and Anglian Water we created our river pledges to enable us to Get River Positive by 2030. We formally published these in July 2022 alongside a Storm Overflows Roadmap action plan that had been co-created with Dŵr Cymru Welsh Water, NRW, Welsh Government and Ofwat (in consultation with Afonydd Cymru and Consumer Council for Water) via the Better River Quality Taskforce.



Figure 4.1: Our Get River Positive river pledges

We recognise the importance of adopting the principles of SMNR, in particular working with key stakeholders within each area to identify priorities that we can help address. With our supply area covering parts of Mid and North East Wales, we have engaged with the relevant Area Statement discussions to identify how we can contribute to delivering against the key themes, shown in Tables 4.4 and 4.5 respectively.

Table 4.4: Mid Wales Area statement themes

Theme	How we can contribute
Improving biodiversity	<ul style="list-style-type: none"> Continue with biodiversity improvement works at Lake Vyrnwy, focusing on habitat restoration for key section 7 species such as the curlew and black grouse Work with Montgomeryshire Wildlife Trust to deliver their Pathway to Pearls project around Welshpool, creating wildlife corridors for the Pearl Fritillary butterfly and other pollinator Use biodiversity survey reports to identify habitat improvement opportunities across our operational estate
Sustainable land, water and air	<ul style="list-style-type: none"> Continue with the programme of peatland restoration across the Vyrnwy estate. Provides water quality, natural flood management and carbon sequestration benefits Deliver on our River Pledges to improve wastewater assets that are adversely impacting on river quality
Reconnecting people and places	<ul style="list-style-type: none"> Expand our Visitor Experience offerings at Lake Vyrnwy and Clywedog Reservoir, improving walking trails and providing educational opportunities Work with Open Newtown and Montgomeryshire Wildlife Trust to improve and promote the walking route between Newtown and Pwll Penarth Nature Reserve
Forestry resources	<ul style="list-style-type: none"> Review our Forestry Management Plan for the Vyrnwy estate commercial forest to include a greater variety of conifer species, increased numbers of native broadleaf and sections of ffridd

Table 4.5: North East Wales Area statement themes

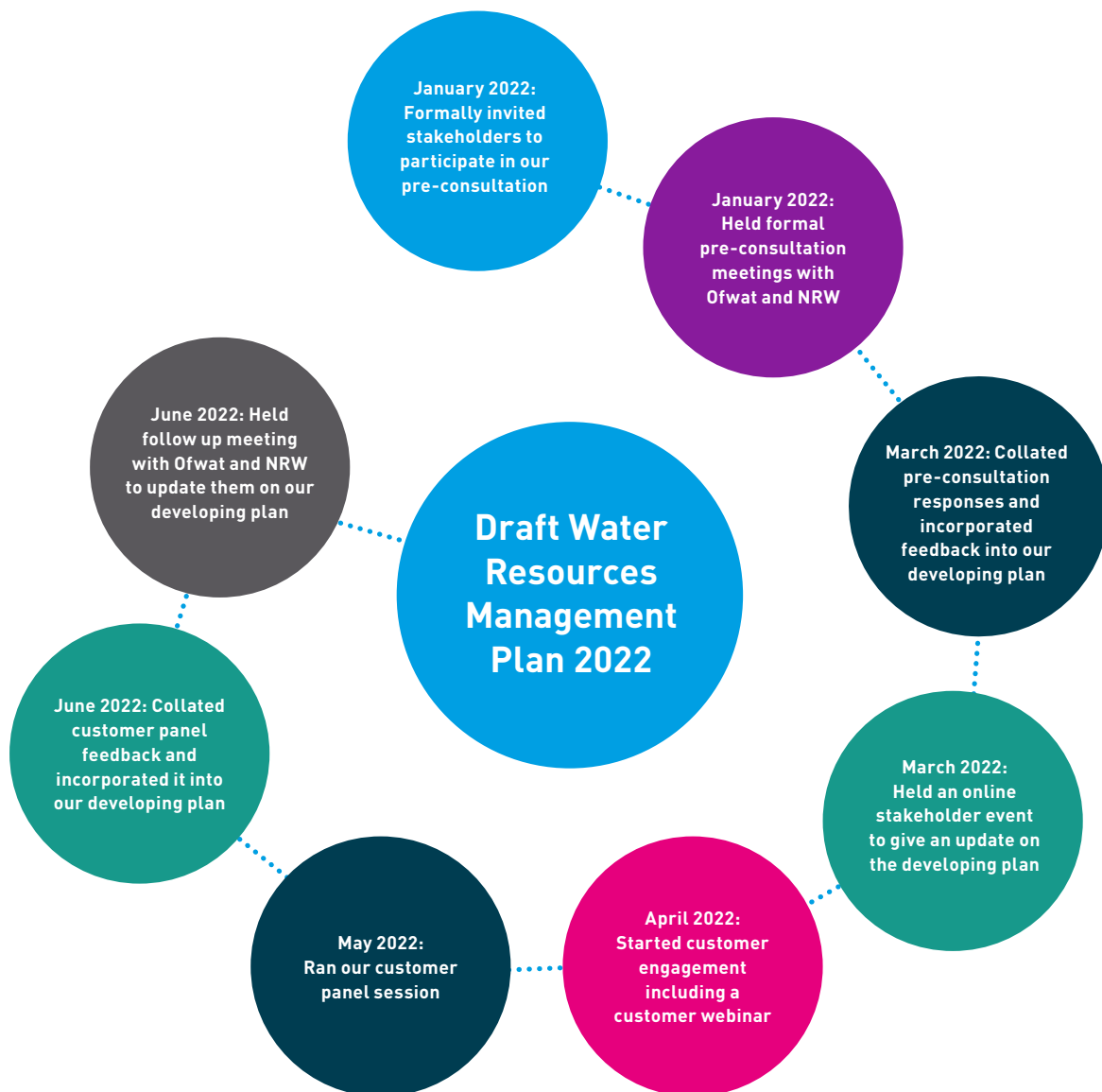
Theme	How we can contribute
Develop and improve urban and rural green infrastructure	<ul style="list-style-type: none"> Work with North Wales Wildlife Trust and the Clywd Range and Dee Valley AONB to identify joint projects for improving urban and rural green infrastructure, for example the Living Landscape project on Wrexham Industrial Estate Working with NRW on construction of fish pass at Horseshoe Falls (a UNESCO World Heritage Site) near Llangollen
Increasing woodlands	<ul style="list-style-type: none"> Working with our rural estates, visitor experience teams and external partners to identify possible tree planting sites, for example we included this requirement when we built a new service reservoir at Llangollen
Promoting the resilience of ecosystems in maintaining and enhancing biodiversity	<ul style="list-style-type: none"> Use biodiversity survey reports to identify habitat improvement opportunities across our operational estate Work with Clywd Range and Dee Valley AONB to develop scope for peatland restoration / habitat improvement project across catchment for our impoundment reservoirs (Pendinas, Cyfynwy, Nant y Ffrith and Penycae)
Farming and sustainable land management	<ul style="list-style-type: none"> Work with the Dee Catchment Protection group to identify opportunities for promoting sustainable land management practices across the Dee catchment, with particular focus on reducing use of pesticides and improving nutrient management

UNDERSTANDING STAKEHOLDER AND CUSTOMER VIEWS

We believe that the views of our customers and stakeholders are vital to our dWRMP. We have shaped our long-term strategy based on feedback from our customer panel and a range of stakeholders who responded to our pre-consultation. We sought to engage with as many stakeholders as possible, including regulators, neighbouring water companies, non-governmental organisations (NGOs) such as wildlife trusts and

representative bodies such as farmer’s unions, to understand the issues they believe to be important. We have also actively participated in regional planning meetings as part of Water Resources West (more detail on this can be found in Section 6.2).

The steps we have taken to engage with our stakeholders and customers are summarised in Figure 5.1, with more detailed descriptions in Sections 5.1 and 5.2 respectively.



Ongoing: Regular meetings with NRW, Welsh technical forums, Water Resources West, Dee Consultative Committee, Dŵr Cymru Welsh Water, United Utilities, Severn Trent, River Severn Working Group and Modelling group

Figure 5.1: Our customer and stakeholder engagement

5.1 Stakeholder engagement

As part of the dWRMP process we are required to carry out 'pre-consultation' with certain statutory stakeholders, such as NRW, Ofwat, Cadw and any licensed water supplier that supplies water to premises in our area through our supply system. We prepared a detailed pre-consultation, which we shared with our statutory consultees. We also met with NRW and Ofwat to review the pre-consultation information in depth. This included:

- what has changed since WRMP19 and why
- updated baseline supply demand balance forecasts
- drought resilience assessments
- initial views of what we might need to do if we were to have any deficits (demand becomes higher than supply) in future
- our initial environmental destination ambitions.

To gather as much feedback as possible we also shared this pre-consultation information with 45 different groups and organisations in and around our area, inviting them to give their views on topics that could influence the development of our dWRMP. We also ran an online stakeholder session, providing an overview of our approach for developing the dWRMP and some elements of our PR24 business plan and encouraging an open discussion about a number of topics (including our environmental destination ambitions and options for providing resilience to people on private water supplies). We collated the feedback and combined it with the written responses we received through the formal pre-consultation process. Some common themes emerged:



Stakeholder Feedback: Our stakeholders welcomed early sight of the supply and demand forecasts but some wanted to know more about how the forecasts were derived.

Our response: These comments were received as part of the formal written pre-consultation response. We held an online stakeholder event to give an opportunity to talk our stakeholders through the methods, data and assumptions used to build the initial draft plan. We have been keeping NRW and Ofwat (two of the key respondents who asked for more information) updated on our progress. More detail on our methods and assumptions can be found in the technical appendices.

Stakeholder Feedback: Our stakeholders wanted to know more about our proposed leakage and water efficiency strategy.

Our response: We have given careful consideration to the pace and ambition of both our leakage and water efficiency strategies. Our plan has been influenced by the views of our customers, balancing both cost impacts on customer bills and the speed at which our customers want us to act. More detail on our strategies can be found in Section 7.2 and 7.3.

Stakeholders Feedback: “To provide more focus for Wales, where there is cross border interests in regional planning, we think you should consider becoming a full member of Water Resources West (WRW). This would allow the areas of Upper Severn and River Dee to be fully considered as part of WRW and provide clarity when engaging with stakeholders in the area.”

Our response: Since Water Resources West formed we have been actively involved as associate members to ensure that the interests of the Upper Severn and Dee are represented. We have worked closely with the core members, aligning our methods and approaches where appropriate and sharing data sets, knowledge and information. Although there is no requirement for regional planning in Wales, we have listened to our stakeholder feedback. We have now become core members of Water Resources West, fully integrating into the regional plan and helping to increase the focus on Wales’ needs (more detail on Water Resources West can be found in Section 6.2).

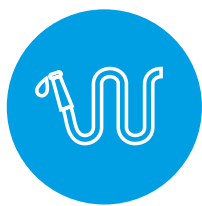
Stakeholder Feedback: “You should ensure the WRMP includes ambitious environmental targets as set out in the Welsh Environmental Destination guidance for both existing and future operations. This could include catchment based solutions, wider than just reducing abstraction.”

Our response: Our environmental destination approach will be focused on catchment level investigations and practical biodiversity improvements at sites that we own. We are working with a range of partners on a variety of different projects, including peatland restoration at the Vyrnwy estate, grassland and woodland habitat improvements, habitat creation, leat repair and maintenance, invasive species management and catchment management opportunities. More details on our approach can be found in Sections 7.1 and 7.4. We will develop specific targets in conjunction with NRW and other partners and report them in our final plan.

5.2 Customer engagement

We have carried out qualitative research with the help of a group of our customers on the specific parts of the dWRMP where they have most direct influence on our plans. Our water resources modelling tells us that whilst climate change will affect some of our sources of water, changes in growth and demand are likely to mean that our long-term supply demand balance remains in surplus - we will be able to supply more water than demand requires. As a result, we are not considering any 'supply-side options' (i.e. new sources of water). Instead, we focussed our research on gauging customer response to the topics shown in Figure 5.2.

Our research targeted a group of 35 customers from a range of customer types: four future customers, ten customers who live in the Powys area, ten customers who live in the Wrexham area and six non-household customers. As our research was internet based, using an online webinar and online community panel, we also included five customers without internet access, who we spoke to on the telephone. An overview of the process we followed is shown in Figure 5.3.



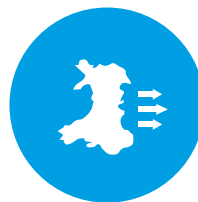
Proposed level of service (use of water restrictions)



Plans to meet the new leakage targets



Proposed ways to reduce demand



Consideration of potential water transfers



Proposed use of smart metering



Plans to support private supply households

Figure 5.2: Core customer research topics

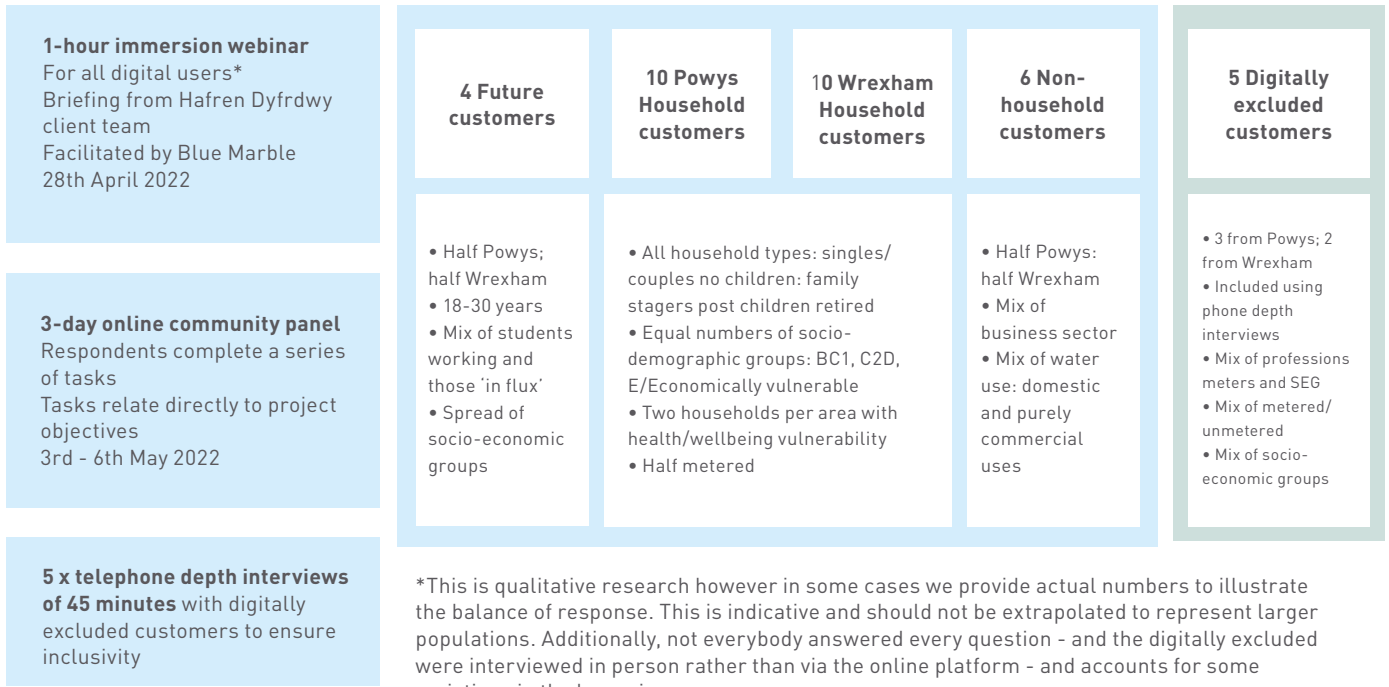


Figure 5.3: Overview of our customer research process and the targeted customer groupings

During the webinar we shared information with our customers on the six specific topics shown in Figure 5.2. We then posed a series of questions. Below is a summary of the questions posed, what our customers told us and how we have used their responses to shape our plans.



On levels of service

We asked: “Currently the way water is managed by Hafren Dyfrdwy means hosepipe (temporary use) bans are expected once every 40 years. How do you feel about the expected frequency?”



Our customers told us: The majority of our customers said they were either happy with the current 1 in 40-year level of service temporary use bans or would not mind if they occurred more frequently than this.

Our response: We will continue to plan for this level of service.

On leakage reduction

We asked: “Currently 22% of the water Hafren Dyfrdwy puts into the network is lost through leakage – often because the mains are old and their condition deteriorating...the regulator has set a target for water companies to halve their leaks by 2050. How do you feel about the timeframe for reducing leaks?”

Our customers told us:

<p>0 said the target is too soon</p>	<p>5 said 2050 is about right</p> <ul style="list-style-type: none"> ● Fair time frame ● Balancing the disruption to homes, businesses and the environment ● Realistic given the likely age of pipework 	<p>23 said 2050 is not ambitious enough</p> <ul style="list-style-type: none"> ● Shocked and disappointed at the level of leakage: should be a priority for Hafren to address ● 2050-taking 28 years feels too long ● Perceive this will become more expensive to fix with time, so Hafren shouldn't delay ● Question when water and cost savings would be seen on customer's bills: suggest savings could be used to invest in reducing leakage more quickly or to a greater extent ● Some suggest profits should be invested into this area
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NB: no costs for reducing leakage were shown

We asked: “Reducing water leaks is a cost to Hafren Dyfrdwy as leaks need to be detected and pipes repaired. On the positive side, by repairing leaks, Hafren Dyfrdwy saves water, resources and money by reducing the amount that needs treating. Which statement best describes how you feel about reducing leakage?”

Our customers told us:

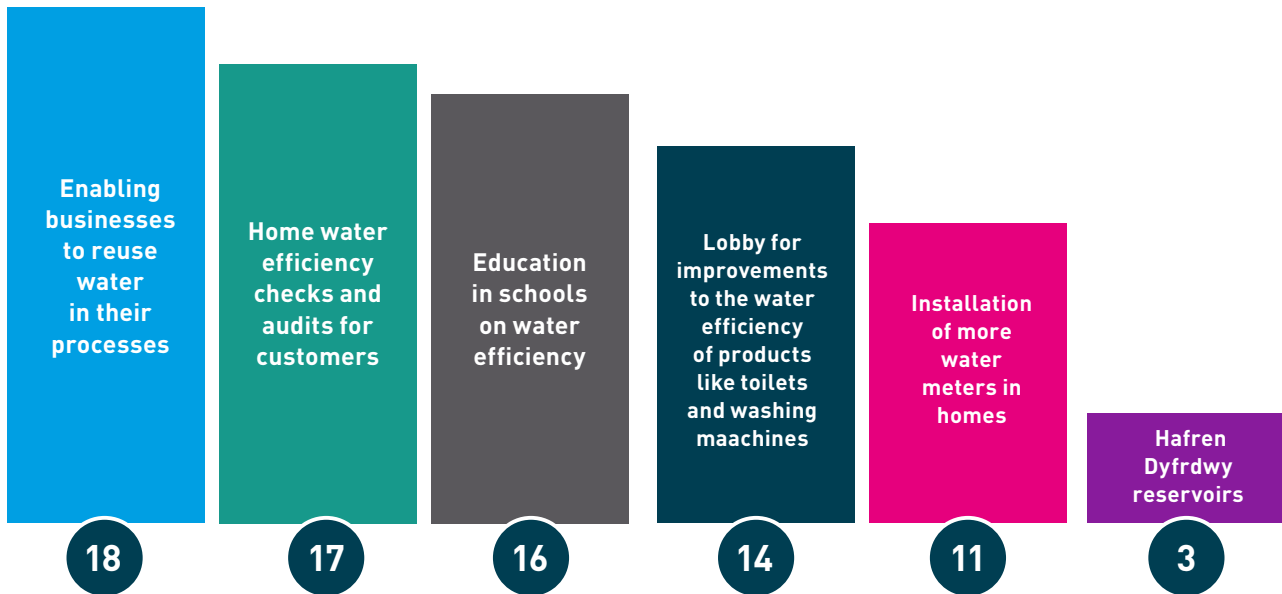


Our response: The majority of customers want us to continue to drive down leakage so that we reach the target of a 50% reduction from 2019/20 levels by 2050, even if it costs more money than it saves. With all our zones in surplus we have no supply demand balance driver and so need to balance our level of ambition against the impact of additional costs needed to reduce leakage that will flow through onto customer bills. We analysed the costs of reducing leakage at faster and slower rates and decided that we should retain our ambition (a 50% reduction from 2019/20 levels by 2050), with a 10% reduction between 2025 to 2030. We believe this strikes the right balance between customer bill pressure, at a time when utility bills are challenging and making environmental gains by taking less water from the environment.

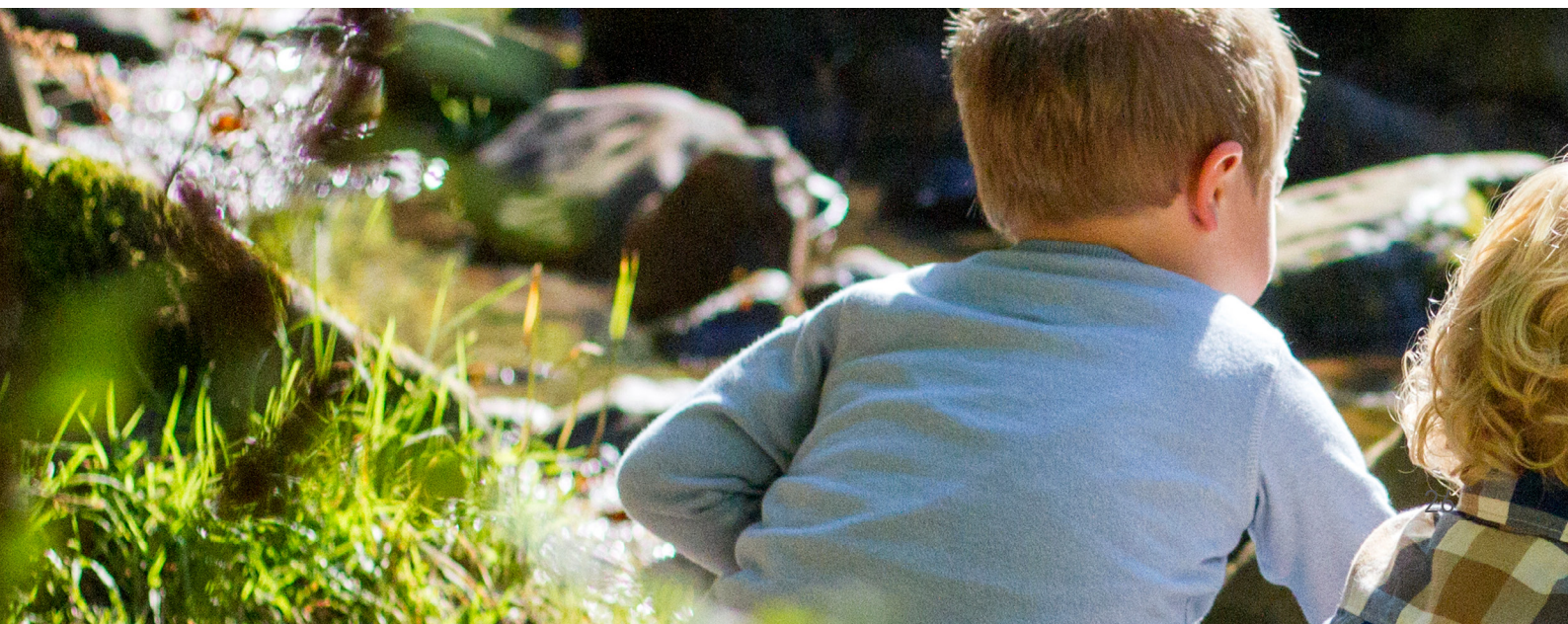
On water efficiency

We asked: “Which of the following should we focus on in the future?”

Our customers told us:



Our response: We believe that reducing the overall demand for water is really important, both from an environmental perspective and financial perspective as more water could be left in the environment, less chemicals would need to be used to treat the water and less energy would be needed to pump and treat the water. In this dWRMP we are committing to help our customers reduce the amount of water they use in their homes and in their businesses. We have set ourselves a stretching target to get the per capita consumption (the amount of water each person in the household uses) down to 118 litres per head per day by 2050. In order to do this we will need investment during the next business plan period (2025-2030) to implement more water efficiency measures such as those our customers highlighted as their priorities. We will also need innovation to find new and better ways to save water in homes and businesses. If our plans are approved we will seek to work with local businesses, Welsh companies and Welsh academic institutions to drive this innovation forward.



On smart metering

We asked: “Currently almost 6 in 10 homes in the region have a water meter. Smart meters use wireless technology so readings are taken remotely, unlike current water meters that are read manually. Smart meters provide water use data continually so customers can see exactly how much they are using. If you had to have a smart meter installed, how would you feel about it?”

Our customers told us:

Concerns & barriers

- It won't be cheaper
- Don't want fear of using water (anxious about enough in the world at the moment, don't want to be chastised for yet another behaviour!)
- Don't understand the benefit: education alone should work
- Don't see benefit versus a regular water meter
- Don't trust the readings

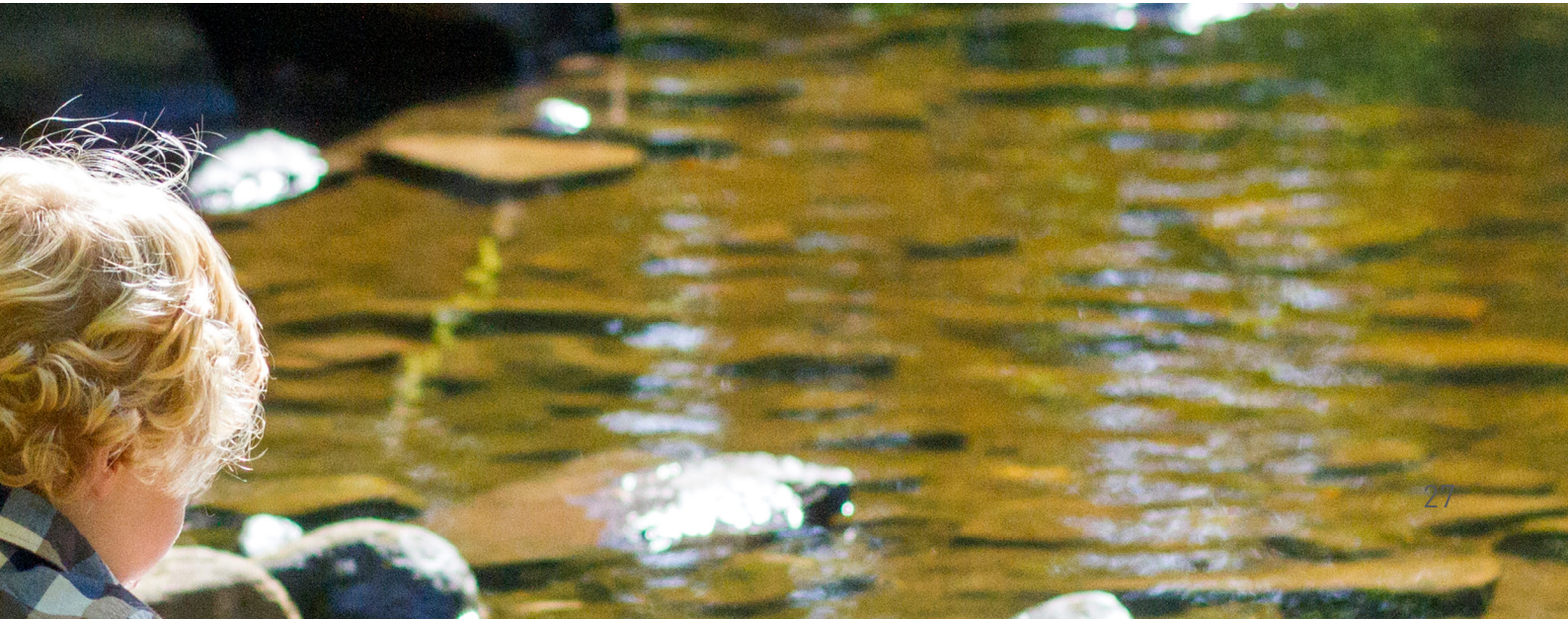
Some are simply unsure

- Daunting to pay for what you use with increasing price rises
- Unsure about reliability
- Question impact of poor mobile signal on monitoring usage
- Doubt the point
 - Already careful with water
 - Have Smart energy meter and haven't changed usage
- Feel resentful at the prospect of having to have one

Smart meters have appeal

- Want to know how to use water: seeing what you use will help 'good' behaviours (Including for children)
- Paying for what you use should encourage monitoring usage
- Positive experience of energy smart meter
- Like the idea of leak detection
- Expect it would save money

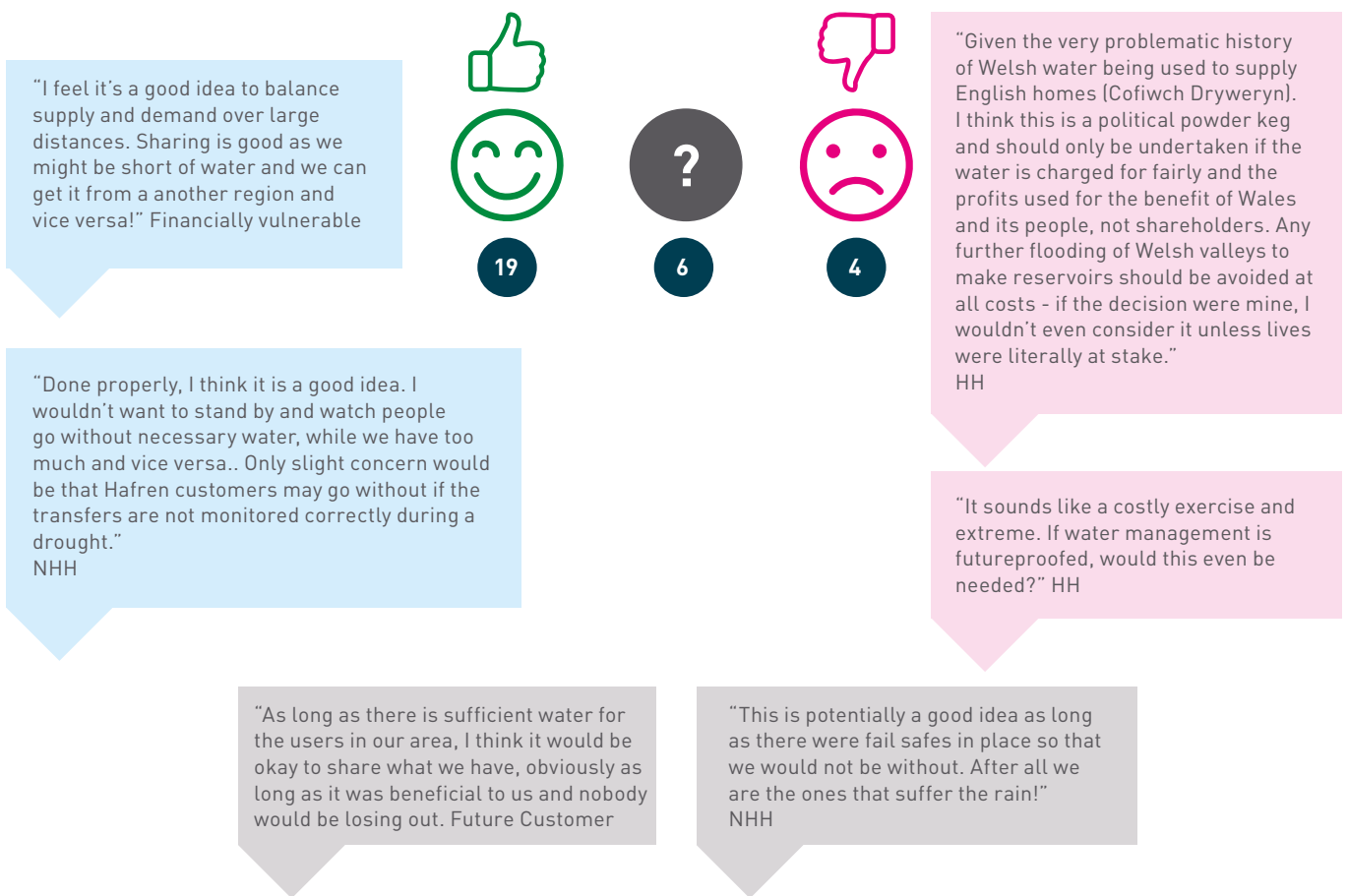
Our response: Our customers expressed mixed views on smart metering. Whilst some customers felt having a smart meter could help them monitor their usage and potentially save money on their bills by helping them eliminate high usage activities, others were unsure of the benefits or reliability of this relatively new technology. As we are not a water stressed area, we do not need, nor do we have the power to carry out compulsory metering. We have carried out analysis on the potential costs of changing our existing metered customers to smart meters. In the current challenging economic climate we believe that the costs would be too high for our customers, particularly our vulnerable customers. The high costs are partly due to the technology itself and partly due to the challenges of the geography of our area and remoteness of some of our communities. We will continue to investigate smart metering technology and will work with Severn Trent to understand the benefits achieved through the smart metering they have recently installed as part of their Green Recovery programme.



On water transfers

We asked: “Do you feel water sharing between regions is a good idea / bad idea / needs further investigation?”

Our customers told us:

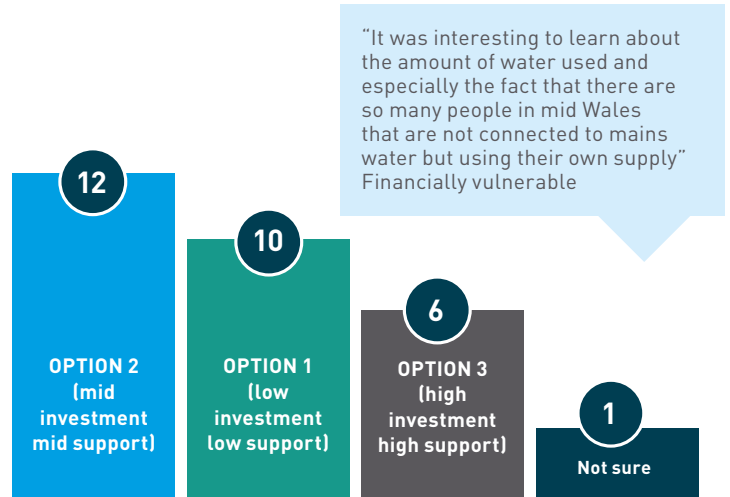
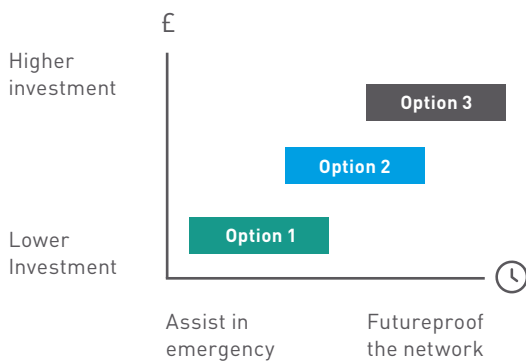


Our response: The majority of our customers felt there could be benefits from transferring water out of our area if we have water available that could be used elsewhere. We are aware of the sensitivity around the history of transferring water out of Wales, to benefit different parts of England. We would not agree to any schemes or proposals that would be detrimental to our customers or our communities. One of the reasons for becoming a core member of the regional planning group Water Resources West (see section 5.1) was to ensure that the range of our customer opinions is fully represented within the regional planning process and to give them the opportunity to be involved in any consultation process. More detail on the potential transfers that are being investigated can be found in Section 6.7.

On Private Water Supplies

We asked: “We know there are 15,000 properties in rural Powys with private water supplies. There are three levels of support we are considering...which do you think we should choose?”

Our customers told us:



Our response: Our customers showed an overwhelming preference towards the mid to low investment options. We have used this as the basis of our proposed approach for supporting people and communities on private water supplies, which is discussed in Section 6.8.

As a final question, we asked our customers what they believe we should prioritise in our plan. Their views are shown in Figure 5.4.

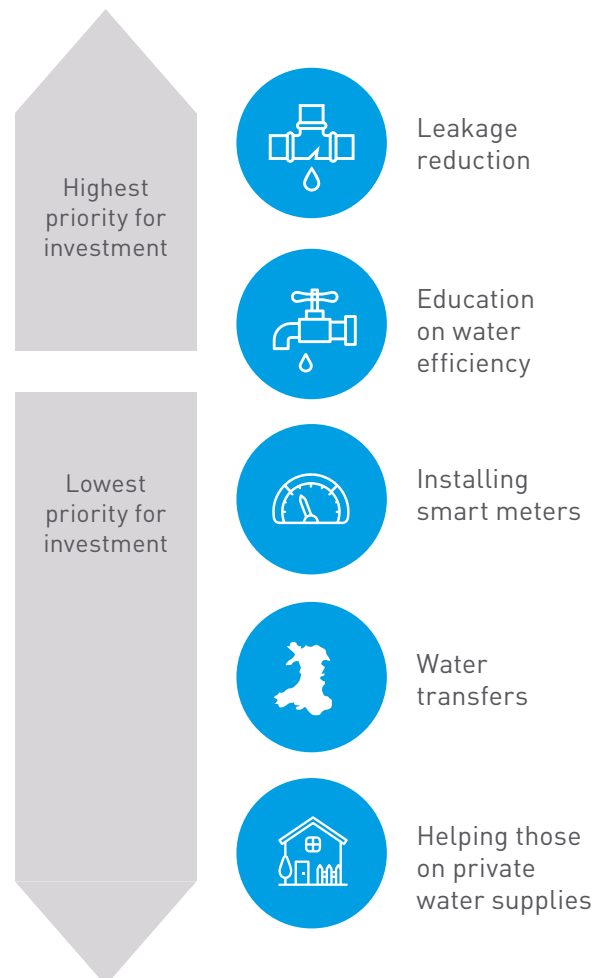


Figure 5.4: Customer prioritisation of our potential areas of investment

OUR APPROACH TO WATER RESOURCES PLANNING

We have built this dWRMP using a collaborative approach, working through the regulatory requirements and then speaking regularly to our stakeholders to understand their views on the direction we have taken. We have considered several different elements including:

- What has changed since WRMP19?
- How can we work with other sectors and other water companies to better understand their water needs?
- What is our resilience to extreme drought and how would climate change affect our supplies under an extreme drought scenario?
- What are the lasting impacts of covid-19 on our customer working patterns?
- How can we improve biodiversity in our area and enhance ecosystems?
- How can we create the best value plan for our customers?
- What can we do to support people on private water supplies in our area during times of drought or prolonged dry weather?

These questions are explored and answered in the following sections. Detailed descriptions of the approach we have taken can be found in the technical appendices.

6.1 Changes since WRMP19

We published our first WRMP in 2019 as the newly formed Hafren Dyfrdwy. The plan combined the Wrexham area (Dee Valley) and the Powys area (Severn Trent). At WRMP19 we created four new water resource zones (WRZs) to cover our supply area - a WRZ is defined as the largest area in which all customers experience the same level of risk of loss of supply. We are continuing to use these WRZs in this dWRMP. The WRZs are:

- Wrexham
- Saltney
- Llandinam and Llanwrin
- Llanfyllin

Our four water resource zones were forecast to be in surplus throughout the planning period. Table 6.1 summarises the supply demand balance position for each WRZ at the start and end of WRMP19.

Water Resource Zone	Major Source of Water	Supply Demand Balance Ml/day (% of water available for use)	
		2020	2045
Wrexham	Llwyn Onn (river Dee)	+ 4.8 (10%)	+ 10.5 (21%)
Saltney	Import from Severn Trent Chester	+ 0.6 (17%)	+ 1.1 (31%)
Llandinam and Llanwrin	Local boreholes	+ 5.6 (28%)	+ 8.8 (44%)
Llanfyllin	Import from Severn Trent Shelton	+ 1.3 (19%)	+ 2.5 (37%)

Table 6.1: Summary of WRMP19 water resource zones

As all of our WRZs were in surplus throughout the 2020 to 2045 planning period, no supply options were proposed. Our strategy was based on leakage reduction and demand management, with a focus on reducing household per capita consumption. We report progress against our WRMP19 on an annual basis to NRW and Ofwat. We are continuing to make progress in these areas:

- Leakage: In 2020/21 we reported a 6.6% reduction in our three-year average and are on target to achieve 15% by 2025. We have secured Ofwat Innovation Funding to explore the use of fibre networks to detect leaks in partnership with Dŵr Cymru Welsh Water and Portsmouth Water.
- Per Capita Consumption: In 2020/21 we reported a 4.5% increase on the three-year average for PCC reflecting COVID-19 pandemic impacts (more detail on this can be found in Section 6.4). This year has seen a continued shift in water usage from non-household customers to household customers.

A number of elements of the Water Resources Planning Guidelines have been changed since our last WRMP was produced. Key changes include:

- Best Value Plan – previously companies were expected to create their plans at the least cost for their customers. However, companies are now expected to build a plan that is best value, taking into consideration a number of different criteria including environmental, economic and wellbeing costs as well as financial costs, including natural accounting principles.
- Drought Resilience and climate change – companies in England are now expected to plan for resilience to a 1 in 500-year drought. For companies in Wales, this requirement only applies for any water resource zones affected by potential new water transfers. However, as water from the River Dee catchment is used by United Utilities, Severn Trent and Dŵr Cymru Welsh Water, we were given guidance by NRW to test our resilience to 1 in 500-year droughts in the Wrexham zone to ensure a consistent assessment was carried out by all companies across the catchment. We are also required to assess a range of climate change scenarios to test the robustness of our water supply system.
- Improving the Environment – companies are expected to include an ambitious environmental destination target. In Wales, our environmental ‘destination’ must look beyond water resources, meaning the focus is not on reducing abstraction licences as these have already been reviewed and revised. Instead, we must support the ambition of the Welsh Government’s guiding principles and help embed the Environment (Wales) Act by improving and enhancing ecosystems and biodiversity.
- Longer planning period – the minimum statutory planning period remains 25 years, however, companies are now expected to look ahead further into the future. At a regional plan level companies are looking ahead to 2085. We have aligned our dWRMP tables to cover this period.
- Regional Planning – although there is no requirement for companies in Wales to carry out regional planning, this is now a key part of the water resources planning process for England. As we share resources with companies in England we have worked closely with the Water Resources West planning group in the development of the draft regional plan.

Figure 6.1 outlines some of the planning decisions we have made in response to these changes in the water resources planning guidance.

Water Resource Zones (WRZs)	Planning Period	Level of Service
Our four WRZS are unchanged from WRMP19 and remain in surplus throughout the planning period.	Consistent with other companies in Water Resources West we are presenting data to 2085 in the WRMP tables	In our baseline scenario we have a 1 in 500-year drought resilience throughout the 60 year planning period
Saltney and Llanfyllin WRZS are supplied by bulk imports from Severn Trent.	We have looked ahead to 2100 to understand potential future risks to supply and demand	We have assessed the 1 in 500 year drought resilience standard under the most severe (RCP8.5) climate change scenario
Llondinam & Llanwrin WRZ is highly resilient to drought and climate change scenarios.	We have adapted our target headroom glidepath to reflect the increasing model and data uncertainty over time	We are resilient to a 1 in 500 year drought with climate change
Wrexham WRZ is impacted by climate change under the 1 In 500 scenario. However, it remains in surplus under RCP8.5		We have asked our customers their opinions on the level of service. They are happy with the current 1 in 40-year level of service temporary use bans

Figure 6.1: Summary of planning decisions

6.2 Local and regional planning

Our water supply area and all of our customers are located within Wales. We have followed NRW and Welsh Government guidance in developing our plan. Some of the requirements for Wales differ to those in England, for example, the Environment Agency's National Framework for Water Resources and the requirement for regional planning cover only water resource zones in England. The English approach to environmental destination is also very different, focussing primarily on reductions in abstraction, whereas the Welsh approach is more holistic, looking for opportunities to improve ecosystems and catchment-level biodiversity on the ground.

Around 60% of our raw water comes from the River Dee. We are a member of the Dee Consultative Committee (DCC) – chaired by NRW - alongside the other major abstractors and stakeholders within the catchment. The River Dee is operated using rules prepared with the DCC's advice. The special conditions for operation in severe droughts must be approved and adopted by all members of the Committee. We have worked with the other members of the DCC to ensure our water resources and climate change modelling approaches are aligned.

We are also core members of the River Severn Working Group and River Severn Modelling Group. These groups include other water companies (United Utilities, Severn Trent, South Staffordshire Water, Bristol Water, Thames Water), regulators including the Environment Agency, NRW, Ofwat, Natural England, and

other stakeholders including the River Severn Partnership and the Canal and River Trust. The Working Group is a useful knowledge sharing forum, with information about work programmes (such as the Severn to Thames Transfer proposal, drought monitoring and drought plan updates, River Severn Enterprise scheme) being discussed on a regular basis. The River Severn Modelling Group carried out a model parameter and assumptions alignment project to ensure that all companies are using the same assumptions for shared resources, like reservoir operational rules, River Severn regulation rules and abstraction assumptions.

Although regional planning is not a requirement in Wales, because we share resources, such as in the River Dee and Severn catchments, and own major reservoirs (Lake Vyrnwy and Clywedog reservoir) which are used by companies in England, we have been an active associate member of Water Resources West (WRW). Since Water Resources West was formed, we have worked closely with the core members, aligning methods and approaches where appropriate and sharing data, information and knowledge. During the pre-consultation process we received feedback from our stakeholders asking us to become core members of Water Resources West. We listened to and acted on that feedback, becoming core members in May 2022. We believe that this will help give a

better representation of the Upper Severn and Dee catchments in the regional plan.

United Utilities own the abstraction licence for use of water from Lake Vyrnwy and are investigating using it as a potential Strategic Resource Option. This means that water that normally supplies the north-west of England would be released into the River Severn for use by water users in the Midlands or the Thames Water area. This was another reason for us becoming a core member of WRW, as it is important that we, and our customers, are properly involved in any regional discussions about its potential use and ensure our customers are represented within any proposals made.

Water Resources West

Water Resources West (WRW) is the regional water resources planning group covering catchment areas in the north-west of England, the Midlands and the cross-border catchments with Wales. As a group WRW aims to build a long-term, multi-sector adaptive plan that reflects the needs and characteristics of our diverse region. The plan covers the period from 2025 to 2085, ensuring the right long-term focus.

Some facts about WRW are shown in Figure 6.2.



Figure 6.2: Water Resources West key facts

Alongside the core members, WRW also has associate members who provide input into the development of these plans. These are:

- Canal and River Trust
- Energy UK
- National Farmers Union
- Confederation of Paper Industries
- Wessex Water
- Bristol Water
- Affinity Water
- Thames Water

NRW, Welsh Government, Natural England, DEFRA, Ofwat and RAPID (Regulators Alliance for Progressing Infrastructure Development) also provide advisory support to WRW.

WRW's draft regional plan is being published alongside the individual water company dWRMPs. With the help of the core and associate members and our regulators, we have been able to understand more about the current and future water needs of neighbouring water companies and other sectors. Whilst our own supply area remains in surplus throughout the planning period, projections show that by 2050, the WRW region will

need an additional 285 ML/d to meet public water supply needs and 96 ML/d to meet the needs of other sectors.

We are working on a collaborative project as part of WRW to develop a more detailed understanding of how much water other sectors are using in our area. We will present more details on this assessment in our final WRMP.

The draft regional plan outlines the regional strategy for ensuring long term sustainable water supplies. The key elements of this strategy are shown in Figure 6.3.

WRW's strategy for sustainable water supplies



Figure 6.3: Summary of Water Resources West's long-term strategy [Water Resources West Draft Regional Plan, 2022]

Divergences from the Water Resources West draft regional plan

To meet the future water needs of the region, an ambitious regional strategy for securing sustainable supplies for the future has been developed. The English environmental destination methodology involves reducing abstraction to improve conditions within catchments. As a result, many of our neighbouring water companies are likely to need to find alternative sources of supply or implement challenging demand management strategies in order to achieve the abstraction reductions. WRW has committed to reducing leakage by 50% by 2050 and in combination with UK and Welsh Government led initiatives, to supporting households to reduce their per capita consumption (PCC) to 110 litres per head per day. As discussed in Section 5.2, we, Hafren Dyfrdwy, are also committed to reducing our leakage by 50% by 2050.

In preparing this dWRMP we have reviewed and analysed our household consumption data. We have taken into account the Welsh Government’s new “Smarter working: remote working strategy” which aims to achieve 30% of the Welsh workforce working at or near home in this Senedd term, and the long-lasting impacts of changes in hygiene practices. Given the long term uncertainties and assumptions we have built into our projections to account for these, we believe 118 litres per head per day is a more realistic, yet still very ambitious target.

Our dWRMP is based on the high climate change scenario using RCP8.5. We have also assessed the impacts of the medium impact scenario using RCP6, which indicates that we will have a larger surplus. The draft WRW regional plan is based on RCP6, with RCP8.5 used as part of the adaptive pathway approach. We have provided both climate change scenarios to be used within the WRW regional planning process. Our long-term plan for leakage reduction of 50% from 2019/20 levels by 2050 and a per capita consumption target of 118 litres per head per day by 2050 is the same under both the climate change scenarios.

Wrexham industrial estate potential future growth

We have discussed the potential growth of the major industrial site in our region with Wrexham Council. As part of the North Wales Growth deal, a large expansion project is planned at the Western Gateway, Wrexham. The new development plan has zoned land for expansion of the Industrial Estate by a third of its existing size. Although at the planning stage, development is expected to start within the next three to five years and continue until around 2035. The quantity of water required by this new development is uncertain as the type of commercial development is unknown.

We have tested a one third increase in demand for water (i.e. assuming the same mix of industries that are currently established) as a scenario in our supply demand balance. As can be seen in Figure 6.4, we have sufficient surplus to cater for this potential additional supply requirement. We will monitor the progress of the development and include an updated assessment into our next WRMP in 2029.

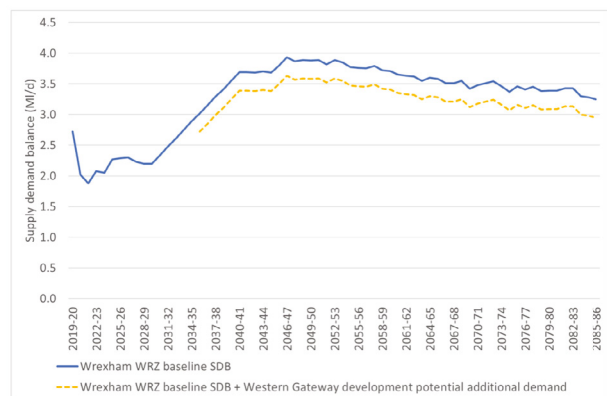


Figure 6.4: Supply demand balance with and without additional Western Gateway development demand

6.3 Our drought resilience in the face of climate change

Our climate change analysis for WRMP19 showed that our 4 water resource zones have a low vulnerability to climate change. Whilst this is still the case, we have carried out a more sophisticated analysis of climate change for this dWRMP, in line with the Water Resources Planning Guidelines (2021) and the accompanying climate change supplementary guidance. We have utilised the most recent climate change projections, the United Kingdom Climate Projections 2018 (UKCP18). For the Wrexham and Llandinam and Llanwrin WRZs we have carried out fully risk based assessments based on probability analysis of drought events, using 19,200 years of stochastically generated rainfall, potential evaporation and river flow series (400 scenarios of 48 years).

Wrexham WRZ

The Water Resources Planning Guidelines (2021) and accompanying climate change supplementary guidance outline how we can use UKCP18 to estimate impacts of climate change on our deployable output. Deployable output is the maximum amount of water that can be output from a supply source or a group of supply sources, depending on abstraction licences, pump sizes, pipe capacities and treatment capacities.

The supplementary guidance indicated that multiple sources of climate change evidence should be used, including UKCP18 Met Office climate models and probabilistic data. The UKCP18 projections provide Global Climate Models (60km), Regional Climate Models (RCM) (12km), a high-resolution RCM (2.2/5km) and probabilistic data (25km) for the most severe climate change scenario, Representative Concentration Pathway (RCP) 8.5. Probabilistic data are also provided for scenarios RCP2.6, RCP4.5, RCP6.0 and A1B Medium Emissions. The UKCP18 probabilistic projections were generated based on the use of multiple variations of a specific climate model to simulate a wide range of different climate outcomes and are considered suitable to understand uncertainties in future risk assessment. Figure 6.5 shows a comparison of different climate model data for England and Wales in the 2070s.

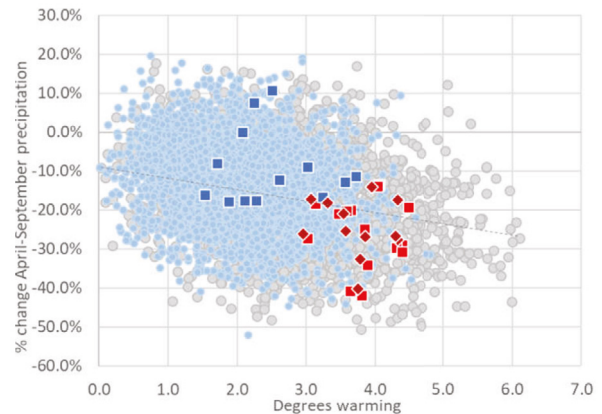


Figure 6.5: Comparison of different climate model data for England and Wales in the 2070s. (UKCP probabilistic A1B blue circles; RCP8.5 grey circles; CMIP5 blue squares; HadGEM red squares and RCM red diamonds) Source: Atkins climate change scaling report (2021)

All water companies in WRW have adopted common methodologies to ensure that a consistent climate change approach has been used across the region, particularly for the assessment of strategic resource schemes. As agreed across WRW, we have used the RCMs and the probabilistic projection datasets in our climate change analysis. RCMs are considered to provide comparable climate change outputs across regions due to their better representation of spatial coherence of climate change. The median of the RCM scenarios have been used to inform central estimate climate change impacts. The probabilistic scenarios are used to assess and represent the uncertainty range of climate change impacts in target headroom. The RCM RCP8.5 data indicate warming of around 4°C (3.1 –4.3 °C) above the 1981-2000 baseline in England and Wales, with wetter winters and drier summers. The climate change guidance does not specify which emission scenario to use in WRMP24 or for regional planning. However, the Addendum on UKCP18 scenarios for use in WRMP24 (Wales) issued by NRW states that the use of projections based on both the RCP 8.5 and RCP 6.0 emission scenarios are required for high or medium vulnerability climate change zones, which will likely require an adaptive plan. Although the Wrexham zone is a low vulnerability zone, consistent with the other water companies who

also abstract from the River Dee catchment, we carried out all climate change rainfall-runoff and water resources systems modelling using RCP8.5 scenarios with a view to include RCM scenarios (that are only available as RCP8.5 scenarios) in our climate change analysis. The use of RCP8.5 2070s scenarios in our analysis has also helped to understand the “business as usual” type scenario – what could happen if greenhouse gas emissions remain unchecked – that demonstrates the impact of climate change most clearly, over and above natural variability and model uncertainties.

Water companies in England are required to assess the resilience of their systems to droughts with a return period of 1 in 200-years and 1 in 500-years. The new 1 in 500-year resilience standard makes sure that exceptional demand restrictions, such as Emergency Drought Orders are not required due to drought more than once every 500 years on average (i.e. systems should be resilient with a 0.2% annual chance of stand pipes and rota cut implementation). As a minimum, the requirement for Wales is for companies to assess a design drought – the worst drought on record for their company area. As the River Dee catchment crosses into both England and Wales and is used as a source of water by English and Welsh companies, modelling work was carried out by NRW with a view to identify how the operation of the River Dee system may have to change to accommodate the 1 in 500-year drought resilience target and adapt to the likely impacts of UKCP18 climate change projections. The steer from the Dee Consultative Committee, as with previous climate change work, was also to identify the likely scale of change to available supply whilst retaining the current levels of service. Outputs from the UKCP18 RCM RCP 8.5 for the 2060-2079 period were used to estimate the likely impact on the Dee System. Modelling has shown that climate change is likely to cause a reduction in the amount of water available for abstraction from the Dee System. NRW has stated that water companies should plan for a net reduction in their River Dee allocations of 26% by the 2070s, based on historic inflow data with UKCP18 RCM outputs applied. This reduction in net River Dee allocations is not driven by the new 1 in 500-year resilience target, instead failures were caused by the existing Dee levels of service criteria

(which have shorter return periods). NRW has proposed to investigate this before the next round of planning as the model outputs showed the need to review control rule curves and target storage reserves.

We have modelled the impact of climate change on the Wrexham WRZ using our existing Aquator model by applying the 26% net cutback on safe yield abstraction from the River Dee and using climate change impacted inflows for the Wrexham upland reservoirs. Modelling of each climate change scenario provided us with estimates of potential impacts of climate change on zonal deployable output for the year 2070 for RCP8.5. The WRW draft regional plan uses RCP6.0 in the planning tables. As agreed with NRW, modelled climate change impacts based on RCP8.5 scenario were scaled down to impacts that reflect RCP6.0 scenario. Full details of the climate change modelling can be found in Appendix A.

Companies in Wales do not have a time constraint on when 1 in 500-year drought resilience is achieved, however, for companies in England the guidance states that the expected level of 1 in 500-year resilience should be achieved as early as possible, or by 2039 at the latest. Our assessments show that the water resources system in the Wrexham zone meet the 1 in 500-year resilience from the start of the planning period (from 2025). Our level of service for temporary use bans and non-essential use bans (1 in 40 years) is also maintained. As per WRMP19 we do not expect we would need to impose non-essential use bans.

Llandinam and Llanwrin WRZ

In preparation for this dWRMP we have completed a review and update of the constraints on source deployable output (DO) for the two groundwater sources in the Llandinam and Llanwrin WRZ. We have also determined the DO of both sources under a 1 in 500-year drought severity to establish the DO baseline and then considered the impact of various UKCP18 climate change scenarios on this baseline.

Table 6.2: Overview of groundwater DO and climate change methodology applied for Llandinam and Llanwrin groundwater sources

Groundwater source	Method applied
Llandinam	<p>This source could potentially be affected by low groundwater levels and therefore be affected by the impacts of climate change. We took the following steps to assess these potential impacts:</p> <ol style="list-style-type: none"> 1. Analysis of climate data: Stochastic rainfall and potential evapotranspiration (PE) datasets were scaled to be representative at the source under consideration. 2. Estimation of minimum groundwater levels and flows: Factored climatic data were applied to a 'GR2' spreadsheet (lumped parameter spreadsheet model) and frequency analysis conducted on the output to estimate the 1 in 500-year annual minimum groundwater level. 3. Revised DO assessment: The 1 in 500-year annual groundwater level was then used to recalculate the Source Performance Diagram curves and determine the source DO under these revised conditions. 4. Climate change impact: The impact of climate change on DO was assessed using the 1 in 500-year DO as the baseline and a suite of UKCP18 scenarios.
Llanwrin	<p>This source is not considered to be constrained by groundwater levels. We have assessed the potential impact of a 1 in 500-year event and climate change on this source using the following steps:</p> <ol style="list-style-type: none"> 1. Review of source DO: A GR2 lumped parameter spreadsheet was not available to enable Llanwrin to be assessed in the same way as Llandinam. Therefore, a comparison between the WRMP14 and dWRMP24 source DO value was undertaken to identify how the DO has changed. The DO has decreased since the WRMP14 assessment (from 1.86 to 0.73 MI/d). Based on this and considering the outcomes from the assessment for Llandinam, a high-level consideration has been given first to the likelihood of Llanwrin becoming hydrogeologically constrained, and second to the likely implications on the DO value. 2. Review of source constraint: The decrease in DO is related to a change in the abstraction licence constraint and so water level headroom is likely to have increased rather than decreased. Llanwrin is unlikely to have become level dependent. The DO change is estimated to be zero. This is derived from a simple high-level assessment, applying average impacts observed from the level dependent source to the non-level dependent source; the assessment does not necessarily consider source specific details and is precautionary.

Consistent with the other companies in WRW, we have used the 12 Regional Climate Model (RCM) scenarios and 3000 probabilistic scenarios to carry out our groundwater climate change assessment. The probabilistic scenarios were subsampled to 100 probabilistic scenarios and further subsampled by to generate a suite of 20 scenarios representing the range in climate impacts.

Our analysis has shown that:

- In this WRZ, there is no forecast change in the current combined operational DO for the 1 in 500-year scenario baseline position or when a central estimate of climate change is applied to this baseline. This is also true for the 1 in 200-year scenario. The central estimate deployable output reduction is based on the median of the 12 Regional Climate Models. This is zero for both average and peak deployable output.
- Whilst there is no deficit in the zone, Llandinam is effectively a single source of supply so as part of PR24 we are considering the cost and benefit of options to improve resilience.

Further details on the methods used can be found in Appendix A.

Saltney and Llanfyllin WRZs

The Saltney and Llanfyllin water resource zones are supplied by imports from Severn Trent. We have not carried out analysis of the resilience of these zones to drought and climate change, however, they have been included in Severn Trent's analysis. These imports will be met in accordance with our bulk supply agreement.

6.4 Recent demand trends

The COVID pandemic has affected demand during AMP7 and has potential for longer-term impacts on consumption patterns. In March 2020 people throughout the UK were told they must stay at home and were only allowed to leave their homes for a small number of purposes to control the spread of COVID-19. This was the start of a lengthy period of lockdown through to July 2020, followed by easing of lockdown measures and subsequent phases of lockdowns and restrictions to control COVID spread through the remainder of the year and into 2021.

At the start of the lockdown, we could not have foreseen the impact on water consumption in homes, which when combined with the hot and dry weather resulted in some of the highest peaks in water demand that water companies have ever seen.

In our area, we observed an uplift in household demand because of the COVID-19 pandemic. Factors causing this increase include the health advice on hand washing, more people staying at home as we moved into the lockdown period, home schooling and home working along with periods of hot weather.

Following the easing of lockdown and subsequent return of a degree of normality, household consumption has reduced from the peaks of 2020/21 lockdown levels. However, household consumption remains high which is likely to be due to customers adopting hybrid working arrangements, customers continuing to practice health advice and residual behavioural change impacts from changes during the lockdown periods. Uncertainty remains over what a 'new normal' looks like with regard to COVID impact on water consumption and this presents a challenge for the future. We have developed this plan against this COVID uncertainty.

6.5 Making a best value plan for our customers

One of the main changes in the Water Resources Planning Guidelines (2021) from previous WRMPs is that companies should move away from least cost, no regrets planning to creating plans that deliver the best value to their customers. It is important that we adopt the appropriate but proportionate decision-making approach to develop a best value plan for customers. More complex approaches are needed depending on the significance of the risk to the balance of water supply versus demand in the context of future pressures from growth, climate change and environmental issues.

We used the UKWIR problem characterisation approach to determine the size and complexity of the supply demand situation. The assessment for our last plan showed that we were in surplus across the company and had a Low complexity problem to solve.

Our assessment in January 2022 for the pre-consultation phase considered a range of different scenarios to understand how different potential “futures” could affect our supply and demand. It indicated that, under the most extreme climate change impacted drought scenario, there was a reasonable risk that our Wrexham WRZ would go into deficit by 2085. This increased our problem characterisation size to a ‘small deficit’ with complexity remaining at Low.

Further modelling, improved data, and clarification of how the Dee General Direction rules should be applied under climate change scenarios, indicated that Wrexham WRZ would in fact remain in surplus, thus reducing the complexity back to Low (see Figure 6.6).



Figure 6.6: Our problem characterisation

However, given the expected change in problem characterisation at pre-consultation, we committed to develop an enhanced decision support capability to help us develop a best value plan. Our change in decision making approach is shown in Figure 6.7. Our new decision support tool, WiSDM (Water Infrastructure and Supply Demand Model), allows us to test a wide range of future scenarios (including Ofwat common reference scenarios) and to have an integrated investment plan informed by system wide view of water supply, resilience, and leakage reduction.



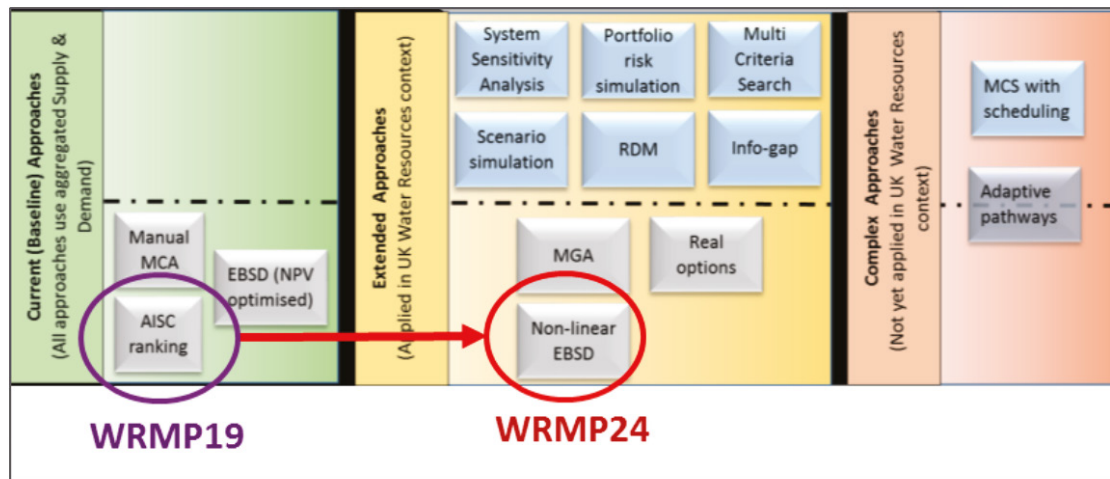


Figure 6.7: Assessment of investment modelling approaches

We believe that an enhanced investment modelling capability is essential over the longer term and therefore continued its development despite further analysis confirming that all zones are in surplus.

Our new WiSDM model (shown in Figure 5.8) allows us to determine the least cost programme, incorporate multi-criteria metrics to align with Water Resources West, and derive a series of best value programmes to enable us to consider possible adaptive pathways.

WiSDM can be used to assess and trade off supply and demand options using a multi-criteria assessment. However, without a supply demand deficit to close, supply options were not loaded into the system (see Section 6.6) and its primary usage for this dWRMP was to find the optimum glidepath to a 50% leakage reduction.



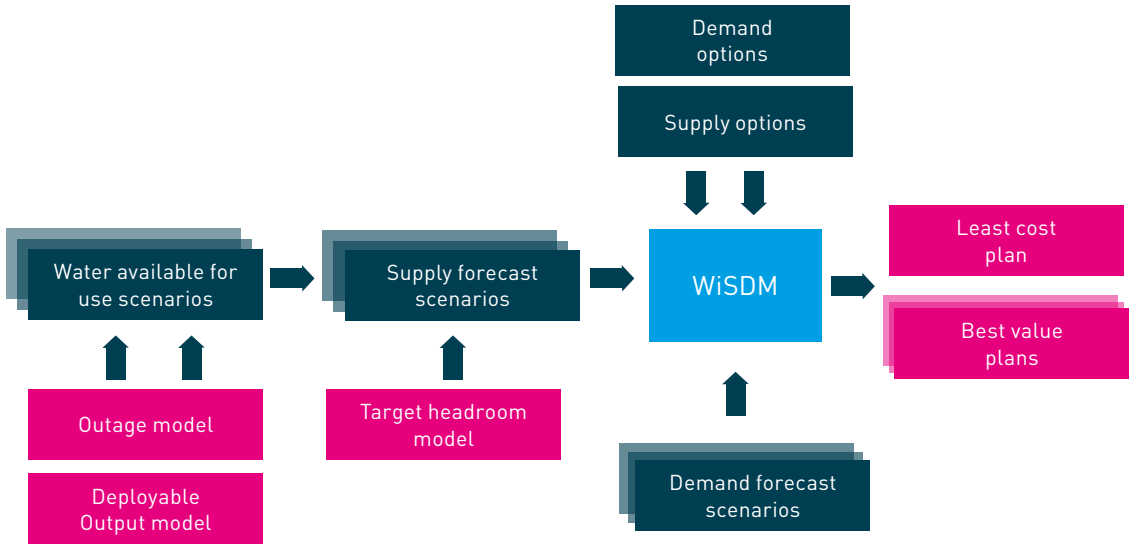


Figure 6.8: Our new WiSDM (Water Infrastructure & Supply Demand Model) system

For this dWRMP, we believe that the least cost, no regrets plan is the best value for our customers. Keeping bills as low as we can will ease pressure on our customers, particularly during the continuing cost of living crisis. We have avoided unnecessary spend on water resource schemes and have opted to concentrate our efforts on leakage reduction, innovation in water efficiency and demand management activities and our environmental destination programme. There are multiple benefits of these activities, as shown in Table 6.3.



Table 6.3: Benefits of our proposed plan

Benefit	Demand side measures		Environmental improvements
	Leakage reduction	Increased water efficiency and demand management	
Takes less water from the environment	✓	✓	
Reduces carbon footprint	✓ ✓	✓ ✓	✓ ✓ ✓
Improves biodiversity			✓ ✓
Creates investment in the Welsh economy		✓ ✓ ✓	✓ ✓
Improves resilience of supplies	✓		✓
Improves water quality within catchments			✓ ✓
Helps meet other wellbeing goals	✓	✓	✓ ✓



6.6 Options development

In our WRMP19 and Dee Valley’s WRMP14 there was a supply surplus across all of the water resources zones and thus no driver for identifying or developing and supply-side options. To increase our preparedness in the event of any potential future supply demand deficits we have developed an approach to supply options development in compliance with the relevant guidance and aligned to that of Water Resources West. An overview of this approach is shown in Figure 6.9.

We paused option development prior to detailed screening once the water resources modelling confirmed that we were in surplus across all water resource zones. However, the initial screening process provided an opportunity to review potential resilience options and highlighted where redevelopment of disused sources would prove too costly but could provide opportunities for environmental improvements.

The long list of options and those rejected during our internal high-level screening are set out in Appendix D.

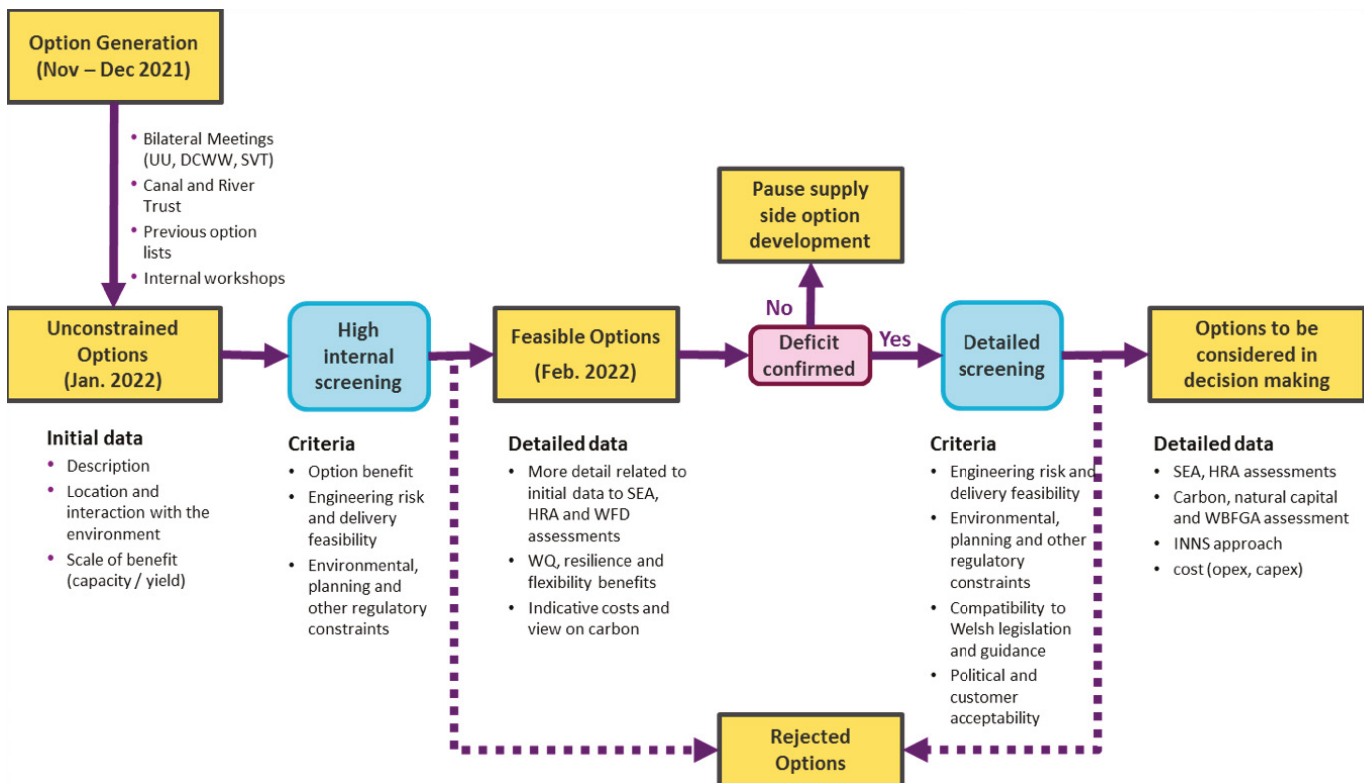


Figure 6.9: Options development and screening process

We have considered whether any of the feasible options would be suitable for neighbouring water companies and have had conversations with Dŵr Cymru Welsh Water, United Utilities and Severn Trent. None of our options were attractive but we will continue discussing potential variation of options between draft and final plans.

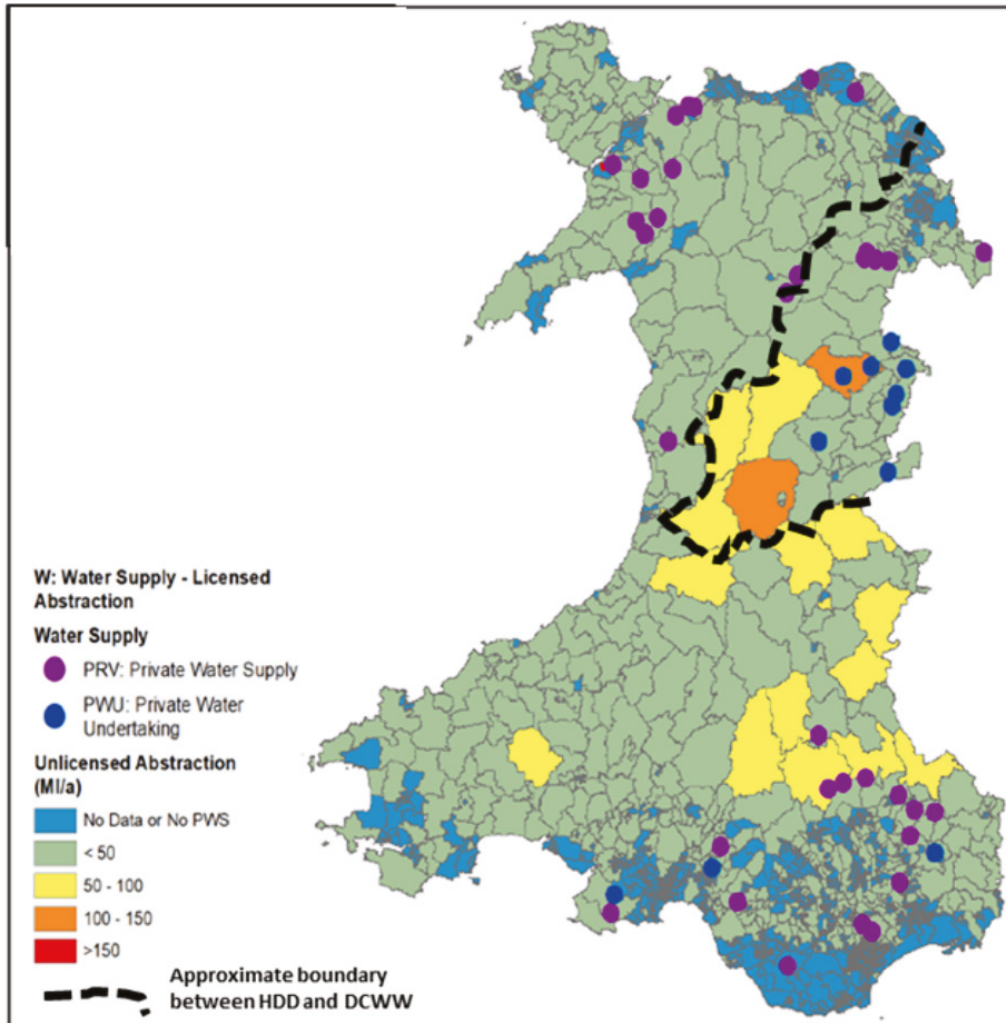


Figure 6.10: Location and estimated volume of private supplies (Arup 2021)

We also have about 700 customers on dual supplies that can either use private boreholes or a mains connection.

Our emerging investment plan will cover:

- Support with alternative supplies – tanks, access to raw water reservoirs for the farming community to use in times of agricultural drought
- More granular analysis using GIS to identify possible low cost opportunities to connect domestic private supplies from 2030 onwards.

We aim to engage with communities relying on private supplies to understand their experiences, aspirations and whether we can learn anything from our water efficiency work.

6.8 Potential water transfers

We have a small supply surplus in all zones under the most extreme climate change scenario. Having discussed the needs of our neighbouring companies (Dŵr Cymru Welsh Water, United Utilities and Severn Trent) these small surpluses are not sufficient to provide a viable water transfer. We will review our position in five years time as part of the water resources management plan cycle.

We also own and operate two large dams at Clywedog reservoir and Lake Vyrnwy, whose abstraction licences are controlled by the Environment Agency and United Utilities respectively to supply large areas of the Midlands and northern England. Lake Vyrnwy is already part of the United Utilities driven Strategic Resource Option. As a key member of the River Severn Working Group, we are helping to ensure that any new releases from the bottom of the dam do not cause any environmental harm.

At Clywedog reservoir, we are investigating whether the dam could be enhanced to provide greater resilience to our customers, help mitigate some local flood issues, provide water for onward transfer, whilst bringing an overall improvement to the environment and local wellbeing. This scoping study may lead to a proposal for more detailed feasibility work if endorsed by regulators and the Welsh Government.

6.9 Long term resilience plans

We have assessed the resilience of our water supply to drought under various potential climate change “future” through this plan. The risk to our supply is low, meaning that investment in supply options is not required.

However to fully understand the resilience of our system we are undertaking a source to tap resilience assessment against all hazards (see Table 6.4.) This integrated approach to assessing the inherent risks and sustainability of our systems and approach to managing our water services, will consider Well-being of Future Generation benefits as well as addressing these specific hazards. The outcome of this analysis will inform our PR24 Business Plan.



Drivers / Hazards		Strategic goal	Adapt and transform
Asset wear and tear	Increasing risk of ingress, process failure, system failure, harm to environment, customer disruption	Ensure our asset base continues to be able to anticipate, resist, absorb and recover from known hazards	Base Plan investment (PR24) • Increase efficiency and effectiveness of maintenance through analytics and innovation
Government policy / legislation	New standards (e.g. Reservoir Act)		Reservoir Safety (PR24)
	Environmental Destination (including Environment Act)	Water always there: Supplies that are resilient to long duration events and new environmental standards	NEP water (PR24)
Support communities with Private water supplies in times of drought	Water Resources Management Plan • Reduce leakage • Reduce customer demand (customer engagement) • Provide support to private supplies		
Demographic and economic change	Population growth, household occupancy Levels of economic activity (respond to and promote)		
Climate change (RCP8.5)	Increased risk of drought from reduced rainfall and increased evaporation	Water always there: Supplies that are resilient to short duration events	Water Resilience (PR24) • Improve system capacity and connectivity • Manage peak demand
	Increased frequency of dry hot periods (customer demand) or freeze – thaw events (leakage)		
	increased intensity and frequency of high rainfall events causing floods		
	Increased severity of storm winds causing power outages	Supplies that continue to be Good to drink	Raw water deterioration (PR24) • Improve treatment or catchment management processes
	Increased frequency and severity of ground movement, landslip and riverbank erosion		
	Increased run-off and temperature affecting treatability of raw water (e.g. chloride spikes, algae)		
New legislation	New water quality standards	Supplies that continue to be Good to drink	Lead Free Wales (PR24)
Human activity	Unintended consequences: land use change, catchment deterioration (pesticide, fertiliser usage) and pollution events		
	Malicious: cyber attacks and security breaches		Cyber Security (PR24) • Keep pace with threats

Our view is that the plans derived through this analysis will help achieve a resilient Wales (by securing secure long term water supplies), a healthier Wales (by ensuring wholesome water and an improved environment, through our environmental destination programme, river pledges etc) and a globally responsible Wales (by seeking to reduce our emissions to net zero).

OUR LONG TERM WATER RESOURCES STRATEGY

Following the guidance from NRW and Welsh Government, we have considered a range of drought resilience, climate change and future demand scenarios. **Even under the most extreme scenarios we expect to maintain a supply surplus over the next 60 years.** This means that the amount of water available under the most severe climate change (using RCP8.5 projections) and drought scenarios will be more than enough to meet the future demand needs of the changing population and growing industry in our area.

Taking into consideration the feedback we have received from our customers and stakeholders we have developed a long term strategy which focuses on reducing leakage, increasing the use of demand management and protecting our sustainable sources of supply. We do not foresee any need to develop new sources of water supply.

When building this dWRMP, we have sought to strike a balance between the economic case for supply and demand investment, meeting the expectations of our customers and stakeholders and protecting and enhancing the environment. From listening to our customers and stakeholders, we know they want us to be more ambitious in our leakage and demand management targets. We believe that going forward we can better meet these expectations in an affordable way by embracing innovations and by aiming to achieve multiple benefits when carrying out our investment activities. We aim to continue to provide fair and affordable water and sewerage services, both for people and businesses.

As already outlined in this plan, we have set ourselves challenging targets for both leakage and demand management:

- Leakage – we are committed to reducing our leakage by 50% (from 2019/20 levels) by 2050.
- Demand management – we are committed to helping our customers to reduce their per capita consumption to 118 litres per head per day by 2050.

In order to meet these targets we will require modest investment between 2025 and 2030. This investment will be needed to drive down leakage, enhance customer education, and provide innovation in demand management techniques to deliver tangible and long lasting impacts on household demand.

There is significant uncertainty in delivering demand side interventions. If we are not successful in our ambitious leakage and demand reductions, then

this will mean that we will have a smaller supply demand surplus than forecast. Rather than create an adaptive pathway for this situation where our water efficiency benefit is delayed until 2030 to 2035 we will monitor the situation and react to it at WRMP29.

A key element of our preferred plan is the continued investment in innovation in leakage, water efficiency and demand management. We have not yet defined the details but will seek to work in collaboration with Dŵr Cymru Welsh Water as we have done in our joint work on fibre to detect leaks. As part of these initiatives we will try as far as possible to work with Welsh academia and Welsh businesses to support the Welsh economy and well-being goals.

A summary of our plans in each water resource zone is set out in Section 7.1, with more detail on our leakage strategy in section 7.2 and our water efficiency and demand management strategy in section 7.3.

7.1 Water Resource Zone summary

As discussed in section 6.1, to manage our water resources effectively we have divided our area into water resource zones (WRZs). These WRZs are the building blocks of our dWRMP. By understanding our supply and demand at WRZ level we are able to create a supply-demand management and investment plan to address specific issues or potential future pressures (such as climate change) affecting those areas.

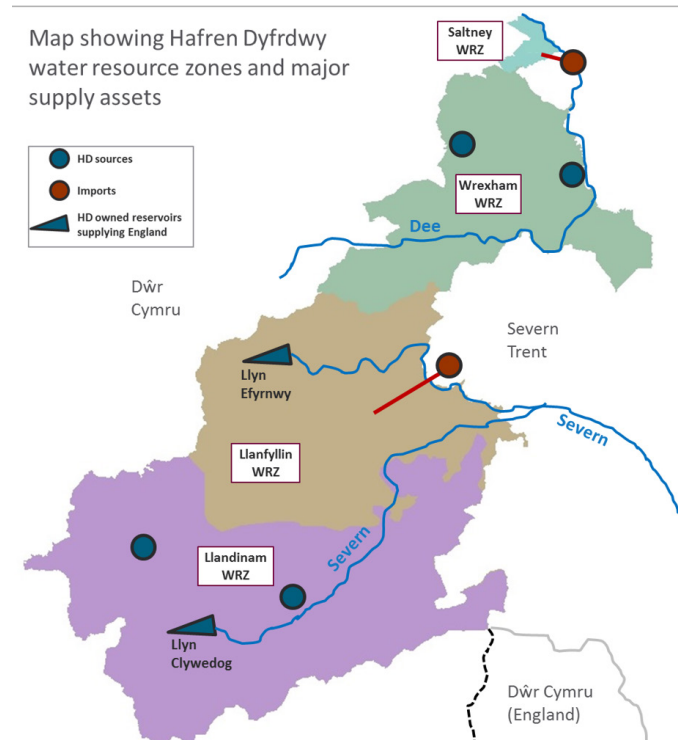


Figure 7.1: Our water resource zones

Saltney Water Resource Zone

Saltney is the smallest of our water resource zones. It spans both sides of the River Dee and includes Saltney and Bretton in the west and Sealand to the northern extent.

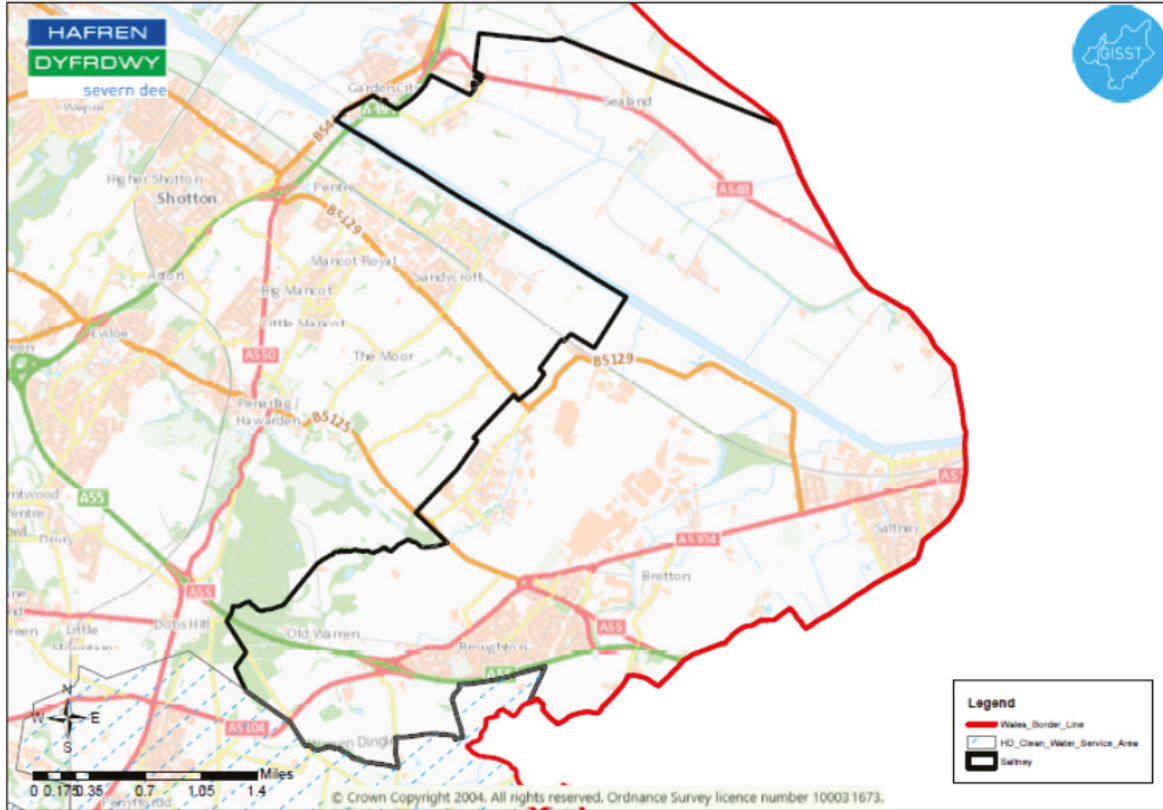


Figure 7.2: Map of Saltney Water Resource Zone

Total population (2025/26)	12,530
Total number of properties (2025/26)	6120
Average Household Per Capita Consumption (2025/26)	110.5 Litres/head/day
Type of Supply	Bulk import from Severn Trent
Vulnerability to climate change	Low
Drought Resilience	1 in 500-year return period
Does the zone go into deficit?	No. It stays in surplus throughout the planning period
Are supply options required?	No
Is there planned demand management activity?	Yes. We are planning to reduce leakage by 50% from 2019/20 levels by 2050, with a 10% reduction in 2025 to 2030, and help our customers to keep their water usage low. At a company level we have set ourselves a target of reducing customer per capita consumption (the amount of water each person uses per day) to 118 litres per head per day by 2050. Our customers in Saltney WRZ have already exceeded this target.

Table 7.2: Saltney Forecast

Forecast	2025/26	2030/31	2040/41	2050/51	2060/61	2070/71
Distribution Input (ML/d)	2.95	2.96	2.91	2.83	2.80	2.71
Water Available for Use (ML/d)	4.73	4.73	4.73	4.73	4.73	4.73
Supply Demand Balance (ML/d)	1.77	1.76	1.82	1.89	1.92	1.96

Planned Environmental Destination work

There are no abstraction reductions proposed by NRW for our supply area. Our environmental destination approach will, therefore, be focused on catchment level investigations and biodiversity improvements which will bring water quality benefits and improve resilience of our water sources. However, we have no environmental destination work specifically planned for this WRZ. Due to the water supply coming from a bulk import from Severn Trent, we have not identified any specific need or actions within this zone. We will continue to work with Severn Trent to identify any opportunities for contributing to environmental improvements relating to their abstraction that benefits our customers.

Wrexham Water Resource Zone

Wrexham is the largest of our water resource zones. The city of Wrexham contains our largest population centre. The zone includes Berwyn to the southern extent and the towns of Y Waun (Chirk) and Llangollen. We provide a small export from the Wrexham zone to Severn Trent, supplying parts of Chester.

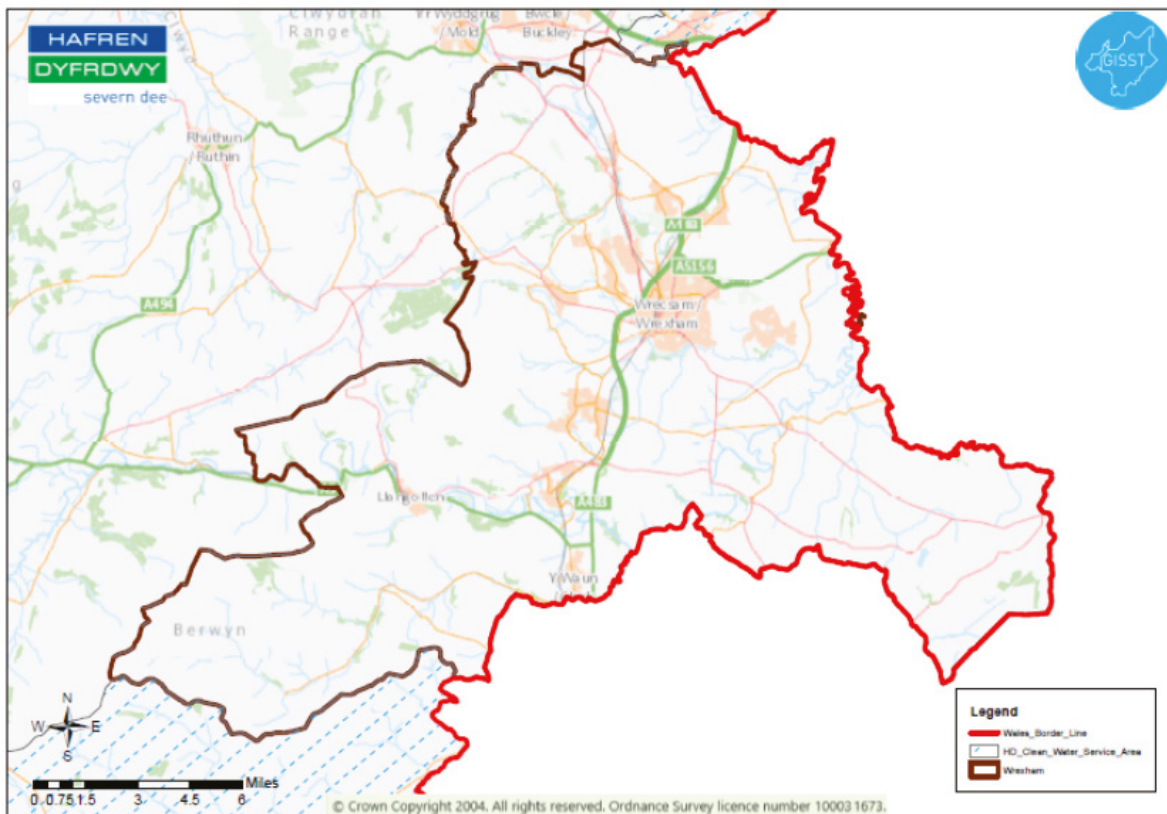
**Figure 7.3: Map of Wrexham Water Resource Zone**

Table 7.3: Wrexham Key Facts

Total population (2025/26)	142,300
Total number of properties (2025/26)	76,220
Average Household Per Capita Consumption (2025/26)	141.2 Litres/head/day
Type of Supply	Conjunctive use – this WRZ is supplied by a combination of river abstraction, raw water reservoirs and a small groundwater abstraction.
Vulnerability to climate change	Low to medium. By 2070, the supply in Wrexham could be reduced by around 20% under the most severe climate change impacted drought scenario
Drought Resilience	1 in 500-year return period
Does the zone go into deficit?	No. It stays in surplus throughout the planning period
Are supply options required?	No
Is there planned demand management activity?	Yes. We are planning to reduce leakage by 50% from 2019/20 levels by 2050, with a 10% reduction in 2025 to 2030, and to help our customers reduce their water usage. At a company level we have set ourselves a target of reducing customer per capita consumption (the amount of water each person uses per day) to 118 litres per head per day by 2050.

Table 7.4: Wrexham Forecast

Forecast	2025/26	2030/31	2040/41	2050/51	2060/61	2070/71
Distribution Input (ML/d)	39.50	38.90	37.22	35.66	34.49	33.18
Total Water Available for Use (ML/d)	44.13	43.46	42.10	40.67	39.21	37.70
Supply Demand Balance (ML/d)	2.29	2.33	3.69	3.89	3.65	3.48

Planned Environmental Destination work

The Dee and its estuary has a high conservation value. It is designated as two Special Areas of Conservation (SAC), and notified as three separate Sites of Special Scientific Interest (SSSIs). Interest features contributing to the SSSI and SAC designations of the freshwater sections of the river include floating water plantain, Atlantic salmon, lamprey, otter, and structural changes in the meandering section of the main river. There are no abstraction reductions proposed by NRW for our supply area. Our environmental destination approach will, therefore, be focused on catchment level investigations and biodiversity improvements which will bring water quality benefits and improve resilience of our water sources.

Heavily regulated for both flow and quality, the Dee flows through a mixture of rural and urban landscapes and is at risk from both agricultural and industrial pollution sources. We therefore propose to work with United Utilities, Dŵr Cymru Welsh Water, Severn Trent, NRW and the EA – through the newly reformed Dee Catchment Protection Group – to identify opportunities for minimising risks from these sources through land management advisory services and practical interventions (e.g. creation of buffer strips alongside the river; improving drainage on farms and industrial units). Several of our impoundment reservoir sources sit within the uplands of Denbighshire and Flintshire,

surrounded by peatland and ex-mining sites; we regularly experience high colour and taste and odour issues at some of these reservoirs, resulting in water that is difficult and expensive to treat. We will work with the Clywd Range and Dee Valley AONB to identify opportunities to restore the upland habitats in these reservoir catchments, with the aim of slowing the flow of water through the catchment and capture minerals and nutrients, reducing run off into our reservoirs. We will also work with the neighbouring landowner at Pendinas reservoir to undertake repairs and maintenance of the leat which feeds the reservoir, thereby improving water capture from the catchment and improving water quality. We will also explore opportunities for forestry and woodland habitat improvements which will have biodiversity and water quality benefits.

Llanfyllin Water Resource Zone

Llanfyllin water resource zone comprises of a number of rural communities in Montgomeryshire. The town of Llanfyllin is located at the centre of the zone. Other towns in the zone include Llanfair Caereinion and Llangadfan towards the south and Llansilin and Llanarmon towards the north.

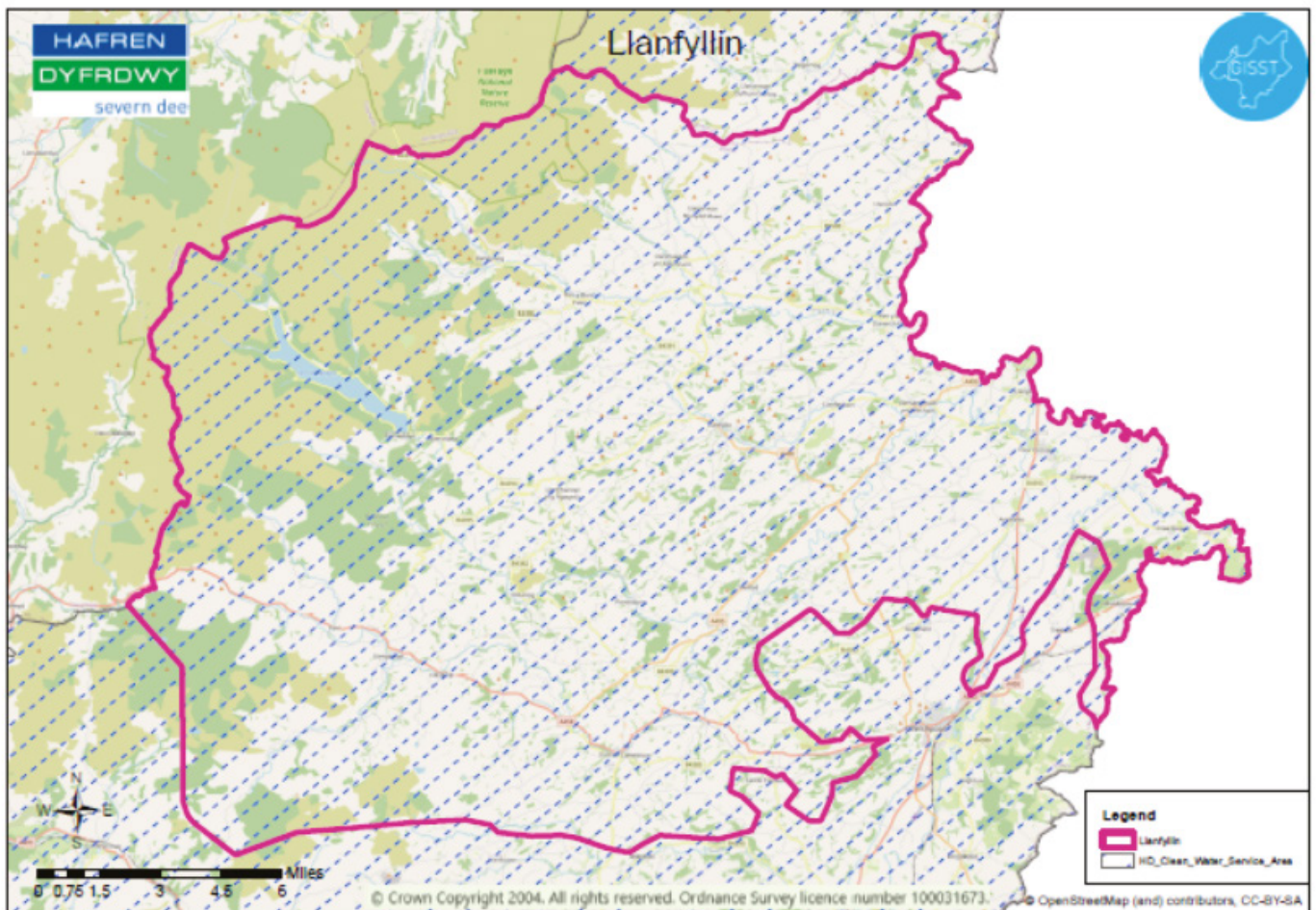


Figure 7.4 Map of Llanfyllin Water Resource Zone

Table 7.5: Llanfyllin Key Facts

Total population (2025/26)	12,080
Total number of properties (2025/26)	7,020
Average Household Per Capita Consumption (2025/26)	150.2 Litres/head/day
Type of Supply	Bulk import from Severn Trent
Vulnerability to climate change	Low
Drought Resilience	1 in 500-year return period
Does the zone go into deficit?	No. It stays in surplus throughout the planning period
Are supply options required?	No
Is there planned demand management activity?	Yes. We are planning to reduce leakage by 50% from 2019/20 levels by 2050, with a 10% reduction in 2025 to 2030, and to help our customers reduce their water usage. At a company level we have set ourselves a target of reducing customer per capita consumption (the amount of water each person uses per day) to 118 litres per head per day by 2050.

Table 7.6: Llanfyllin Forecast

Forecast	2025/26	2030/31	2040/41	2050/51	2060/61	2070/71
Distribution Input (Ml/d)	5.10	5.08	4.98	4.89	4.83	4.76
Total Water Available for Use (Ml/d)	7.11	7.11	7.11	7.11	7.11	7.11
Supply Demand Balance (Ml/d)	2.01	2.03	2.13	2.22	2.28	2.34

Planned Environmental Destination work

There are no abstraction reductions proposed by NRW for this WRZ. Our environmental destination approach will be focused on catchment level investigations and biodiversity improvements which will bring water quality benefits and improve resilience of our water sources. Therefore, our main focus in this catchment / WRZ is biodiversity improvements across the Vyrnwy estate working in partnership with RSPB, NRW and possibly United Utilities.

This includes peatland restoration, grassland and woodland habitat improvements and invasive species management. This will have wide ranging benefits including water quality and carbon sequestration. We will seek to work with our farming tenants and neighbouring landowners to create and improve habitats for key species such as curlew, merlin, peregrine and the welsh clearwing moth.

Our 2020 to 2025 business plan will restore 675Ha of peatland mainly in the Rhiwargor heft (shown in Figure 7.5) which will sequester approximately 14,000tCO₂e and boost biodiversity.

Significant further opportunities exist that we will progress as part of our environmental destination including the land at Penygwely reservoir, a disused source which has potential for biodiversity enhancement works.

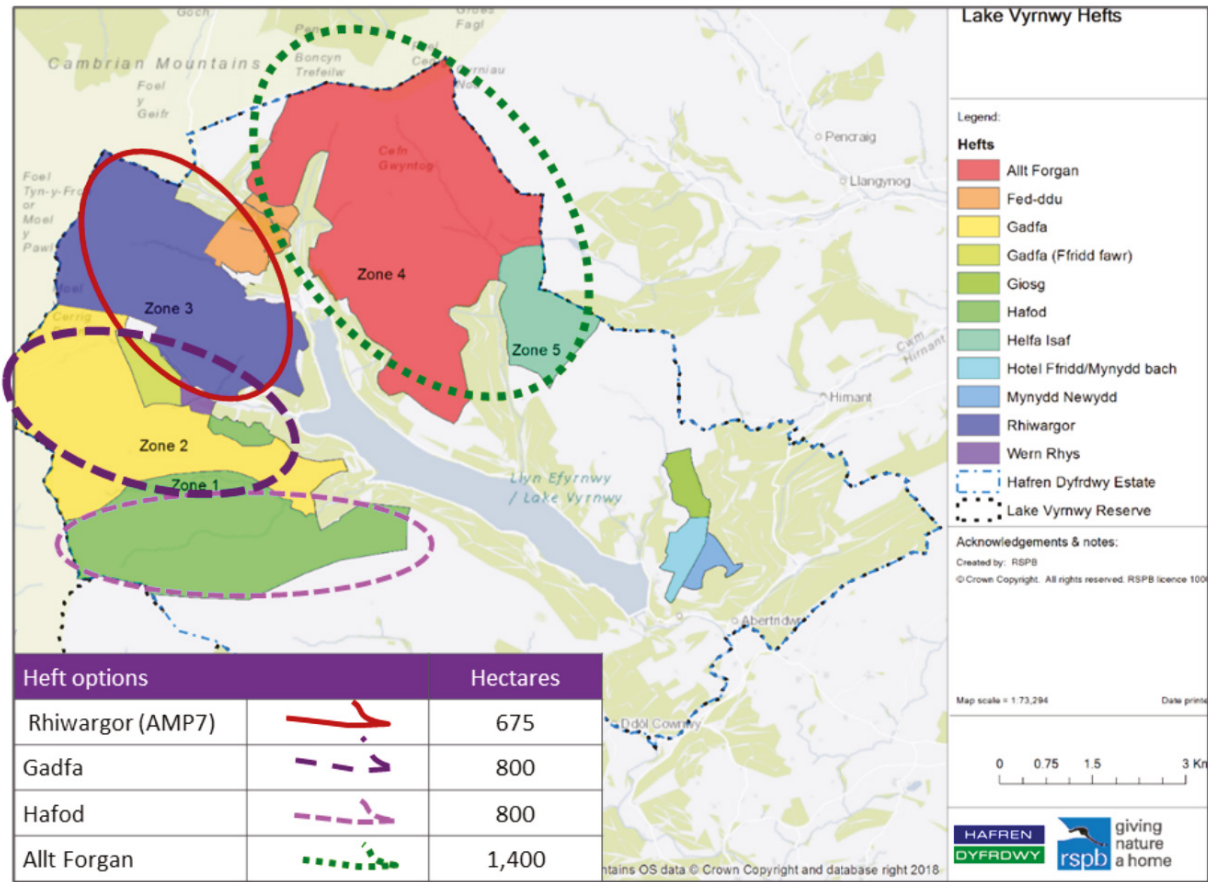


Figure 7.5: ‘Hefts’ of peatland across the Vyrnwy estate that are due to be restored between 2020 and 2025 (Rhiwargor) and those that could form part of our environmental destination (Gadfa, Hafod and Allt Forgan)



Llandinam and Llanwrin Water Resource Zone

Llandinam and Llanwrin is a rural WRZ in Powys. It contains the towns Y Trallwng (Welshpool) to the north, Llanidloes to the south, Machynlleth to the west and Trefaldwyn (Montgomery) to the east. Most of our customers in this area are supplied by our largest groundwater abstraction.

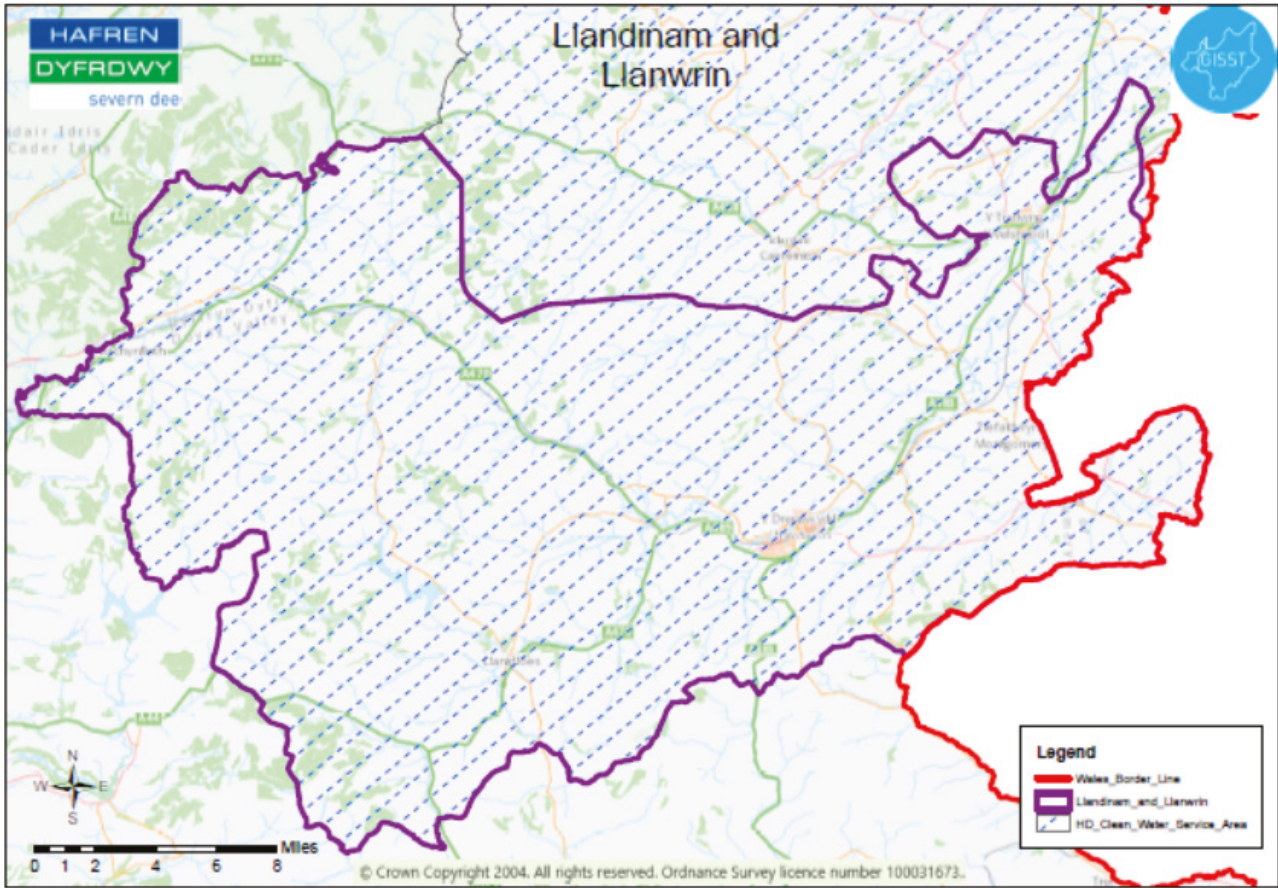


Figure 7.6: Map of Llandinam and Llanwrin Water Resource Zone



Table 7.7: Llandinam and Llanwrin Key Facts

Total population (2025/26)	37,490
Number of Households (2025/26)	22,590
Average Household Per Capita Consumption (2025/26)	178.7 Litres/head/day
Type of Supply	Groundwater abstractions
Vulnerability to climate change	Low
Drought Resilience	1 in 500-year return period
Does the zone go into deficit?	No. It stays in surplus throughout the planning period
Are supply options required?	No
Is there planned demand management activity?	Yes. We are planning to reduce leakage by 50% from 2019/20 levels by 2050, with a 10% reduction in 2025 to 2030, and to help our customers reduce their water usage. At a company level we have set ourselves a target of reducing customer per capita consumption (the amount of water each person uses per day) to 118 litres per head per day by 2050. This zone has the highest per capita consumption so we will need to work closely with our customers to meet our target.

Table 7.8: Llandinam and Llanwrin Forecast

Forecast	2025/26	2030/31	2040/41	2050/51	2060/61	2070/71
Distribution Input (Ml/d)	13.43	13.37	13.11	12.86	12.73	12.58
Total Water Available for Use (Ml/d)	18.13	18.13	18.13	18.13	18.13	18.13
Supply Demand Balance (Ml/d)	3.87	4.08	4.33	4.57	4.69	4.84

Planned Environmental Destination work

There are no abstraction reductions proposed by NRW for this WRZ. Our environmental destination approach will be focused on catchment level investigations and biodiversity improvements which will bring water quality benefits and improve resilience of our water sources. Clywedog reservoir is situated within this WRZ and although we do not use it for public water supply, we do own the dam and areas of land surrounding it, including small areas of woodland which presents opportunities for additional tree planting as well as improving the visitor experience to increase wellbeing benefits. In addition, there is a disused reservoir near Machynlleth – Esgaireira – which already has an improved healthy ecosystem following a sympathetic lowering of the dam. There is evidence of key species on site and we plan to further develop the site into a local nature reserve.

7.2 Reducing leakage on our network

Leakage currently makes up 22% of the total amount of water we put into supply. While there is no supply / demand driven need to reduce leakage, we aim to reduce leakage by 50% by 2050 (from 2019/20 levels) because:

- Our customers told us they think too much water is being lost through leakage;
- Throughout our pre-consultation processes, we have heard that leakage is a key concern and that we should do more to reduce it. At the same time, Ofwat and other key stakeholders have given a clear message to the water industry that they expect to see ambitious and innovative leakage reduction programmes in the next water company business plans in PR24;
- It will help us in achieving our goal of being Net Zero by 2030 as we would need to treat less water to put into supply, reducing our energy use for pumping and through the treatment process and reducing our carbon footprint, and;
- Abstracting less water to treat and put into supply will leave more in the environment, helping to improve the aquatic environment.

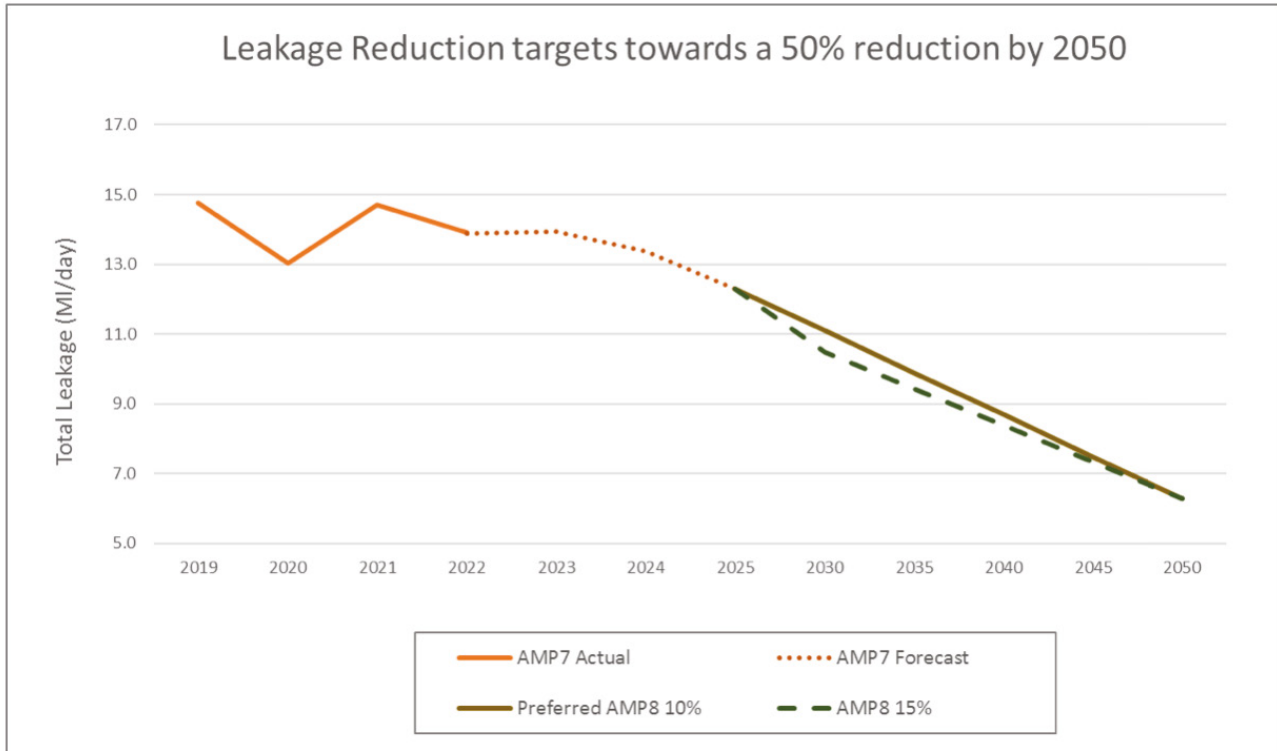
We are committed to achieving our long term ambition of a 50% reduction from 2019/20 levels. However, as we have a supply demand surplus, we have choice over the pace of reduction over the short term (2025 to 2030).

We explored options to reduce leakage by 5%, 10% and 15% by 2030 and concluded that a 10% reduction (shown in Figure 7.7) by 2030 strikes the right balance as:

- All our water resources zones are projected to remain in supply / demand balance surplus during the current water resources planning horizon, even without further leakage reduction;
- Our customers want us to be ambitious and reduce leakage;
- A 10% reduction is stretching and beyond the sustainable economic level of leakage and we have other areas of risk that require investment.



Figure 7.7: Leakage reduction options to a target of 50% reduction from 2019/20 levels by 2050



We have reduced leakage by 6%, or 1 MI/d, between 2019 and 2022 putting us in a good place to achieve our 15% leakage reduction target by 2025.

Our current strategy to drive down leakage through a mix of active leakage control, pressure management and mains renewal will continue. Initial modelling indicates that activity levels will need to step up as we drive leakage lower. We have included costs in our plan to achieve the 10% reduction by 2030.

In the longer term we will need to find a better way to reduce leakage on our customer owned service pipes (which currently accounts for 25% of total leakage). This may mean implementation of smart meters and transfer of ownership so that we may efficiently renew them. We will set out these options as part of our PR24 adaptive planning process.

Table 7.9 shows our proposed glidepath to achieve the 50% leakage reduction from 2019/20 levels by 2050.

Table 7.9: Leakage targets

% leakage reduction in each 5-year period				
2030	2035	2040	2045	2050
10%	12%	12%	14%	15%

7.3 Water efficiency and demand management

Our baseline demand forecast takes account of demographic, social, economic, lifestyle, environmental and such other factors as are likely to influence how household and non-household consumption patterns may change over the next 60 years. Our plan provides a reliable, and wholesome, supply of water to our current and future customers. We forecast a long term declining demand for water in our area driven by falling population predicted in the region over the next 60 years.

Although the Welsh Government has not mandated a per capita consumption target, we intend to adopt a long term target of 118 litres per head per day (l/h/day) as part of our preferred plan. We believe that this is the practical limit that we can achieve working with our customers without universal metering and the use of widespread smart meters and incentivised tariffs. Welsh Government support on water labelling and Building Standards is a pre-requisite to achieve our 118 l/h/day target and is assumed to be in place by 2030.

Our plan focusses on demand management measures including education and enhanced water efficiency support. As all of our water resource zones are in surplus, we lack the necessary authority to install smart meters for all our customers. Our customer research shows limited appetite from our customers to universal metering. We may undertake a limited trial of smart meter technology between 2025 to 2030 to understand what smart metering technology would work in upland rural areas with limited access to power and telecoms.

We will continue to offer our customers the free meter option and will continue with our maintenance strategy to replace old or broken meters reactively.

During 2020 to 2025 we plan to deliver a 4.2% reduction in per capita consumption in our region.

In 2025 to 2030 and beyond we will implement a baseline water efficiency programme in line with our understanding of the requirements of our statutory water efficiency duty (Section 93A of the Water Industry Act) and the expectations of NRW and Welsh Government.



In developing our plan, we have considered the relevant guidance and sought out evidence from other groups, for example:

- Waterwise Evidence Base Reports
- Data and insight from our own water efficiency programmes, also utilising data from Severn Trent
- Evidence from other water industry reports and from third parties.

We have included the following options in our water efficiency programme:

- Provide free and subsidised water saving devices to our customers. We currently offer the same range of devices to our customers in Hafren Dyfrdwy and Severn Trent and expect this approach to continue even as we add to the range of devices available. In the past year we have added:
 - Toothy Timer
 - Garden kits
 - Kitchen Swivel Tap aerator.



- Social housing home water efficiency checks
 - working with housing associations where we will carry out an assessment of current use within a customers' property to include:
 - Engagement on how the customer can reduce their water use through simple changes of behaviour
 - Installation of water saving devices
 - Repair of leaks on internal fittings where it is simple to do so.
- To help educate and persuade customers to use less water we will also develop a community education vehicle.
- Schools Education – as part of our ongoing schools education programme we visit schools across our area to talk to pupils about water and how to use it more wisely. We offer in person assemblies and classroom sessions which we can also offer these remotely if required. This option was developed during Covid-19 but is still offered if required. We also offer interactive content on our website.
 - General customer education – we continue to engage customers at events and through our regular comms messaging which we intend to increase to understand if this will drive more traffic to our website and increase uptake of water efficiency devices. We propose to introduce a community vehicle to help engage more customers on the services we offer including the availability of water efficiency advice and products.



7.4 Environmental Destination activity

Over the last few years, there has been significant investment by the water industry and other large scale abstractors to protect and improve the environment by reducing the adverse impact of abstractions on ecosystems. However, our ecosystems are facing unprecedented challenges, which is reflected in the declaration of a climate emergency by Welsh Government in addition to the over-whelming evidence for biodiversity decline in Wales. By setting an ambitious strategy for ecosystem resilience we can work with regulators to help enhance biodiversity through our water resources activities whilst ensuring a plentiful supply to customers – this strategy is also known as our environmental destination.

NRW have set out a clear set of principles that we will follow in developing our environmental destination:

- Deliver demonstrable benefit for the environment;
- Consider the appropriate scale (spatial and temporal);
- Consider multiple benefits;
- Use a collaborative approach;
- Take account of all relevant evidence, and;
- Adaptive management.



ASSURANCE AND GOVERNANCE

8.1 Assurance

Throughout the development of this dWRMP, we have engaged with the Hafren Dyfrdwy Executive Team (HDEC), and the Hafren Dyfrdwy Board (the Board). We have used this ongoing engagement to agree the strategic decisions set out in this dWRMP. Our methodologies and data have passed through a robust multi-stage governance and assurance process.

We have used an established three lines of assurance model for our regulatory submissions. We target this model using a risk-based approach which considers areas that we know are of prime importance to our customers and regulators, or may have a significant financial value, alongside the likelihood of reporting issues. Areas that are higher risk receive the full three lines of assurance while other areas may be targeted with first or second line only.

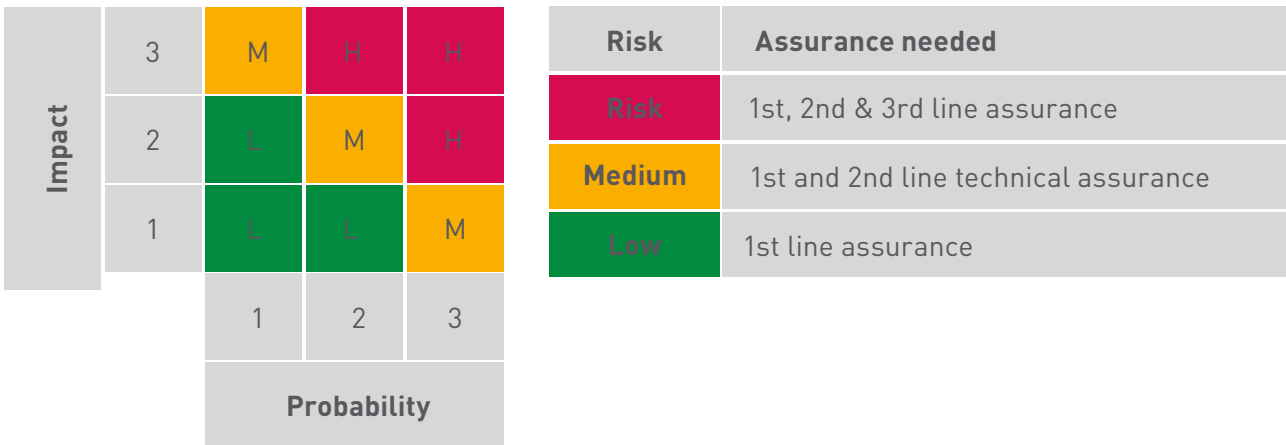


Figure 8.1: Overview of our assurance model

Technical assurance is first undertaken by an expert in the topic, followed by a second assurance review by an independent internal assurer. Jacobs Consulting (Jacobs) is our established independent external technical assessor, who undertakes third line assurance.

The full three levels of assurance have been applied to:

- All data tables;
- The methodologies applied to create the data tables;
- Our approach to Customer and Stakeholder Engagement and its outcomes;
- Our approach to Environmental Destination, and;
- The alignment of our dWRMP with PR24 planning and regional planning.

8.2 Governance

HDEC and the Board have been engaged at appropriate milestones and decision points through the development of this dWRMP. Once fully assured, the submissions have then progressed through a comprehensive governance process and been signed off by the following Committees and Boards:

- Disclosure Committee
- Audit Committee
- Executive Committee and
- Board for final approval to submit.

Table 8.1: Draft WRMP assurance and governance stages and timeline

Milestone	Governance step	Date
Assurance of methodologies and models First draft supply demand balance created		December 2021 January 2022
	HD Disclosure Committee Update HD Executive Committee Update	January 2022
Draft WRMP Pre-consultation Final supply demand balance completed		January 2022
	HD Executive Committee Update HD Board Update	March 2022
Assurance of data inputs and dWRMP Tables		May 2022
	HD Executive Committee Update	June 2022
Draft WRMP Submission	Disclosure Committee Approval Audit Committee Approval HD Executive Committee Approval HD Board Approval	September 2022

Having reviewed the draft WRMP, the supporting assurance and having taken Jacobs' conclusions into account, our Board makes the following statement:

- We have met our obligations in developing our plan
- Our plan reflects the Water Resources West regional plan, which has been developed in accordance with the national framework and relevant guidance and policy, and provides a clear justification for any differences
- The Board is satisfied that management are committed to produce a final WRMP that represents a best value solution for managing and developing water resources in line with our obligations to supply water and protect the environment, that takes into account the interests of customers, local communities and the environment, based on robust evidence and costing processes aligned to the PR24 business plan.

Our Board are supportive of the need to produce a best value plan. A key feature of the WRMP is that there are choices about the ambition and pace of delivery. This is why the production of a draft WRMP is critical – it allows us to understand different views so we can ultimately produce the best value plan for our customers and region. Following the publication of our draft plan we will be undertaking extensive engagement and consultation with our customers and stakeholders. This insight will feed into our processes and robust costing models, aligned with our PR24 plan, to produce a best value plan for the final submission. Jacobs, our external auditors, confirm that this approach is reasonable and appropriate.

As such, in this draft submission, we have provided an alternative Board statement as outlined above, which confirms our commitment to produce a best value plan for customers and stakeholders for the final WRMP.



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