

Emerging Regional Plan Water Resources South East

Annex 2 – The solution (overview)

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Table of Contents

1. Our vision.....	2
2. WRSE Regional plan at a glance.....	8
3. Our emerging regional plan for the South East.....	13
4. Efficient use of water and minimal wastage across society.....	15
5. New water sources that provide sustainable and resilient supplies	19
6. A network that can move water around the region.....	24
7. Catchment and nature-based solutions to improve the water sources we rely on	26
8. Drought Orders and Permits.....	27
9. Cost, Alternatives and Carbon	28
10. Beyond 2060	30

Figures

Figure 2.1: Our emerging plan 2025 to 2040 –location of the potential schemes identified in our emerging regional plan..... 9

Figure 2.2: Our emerging regional plan 2040 to 2060 (High Scenario) – location of the potential schemes identified in our emerging regional plan ..10

Figure 2.3: Our emerging regional plan 2040 to 2060 (Central Scenario) – location of the potential schemes identified in our emerging regional plan ..11

Figure 2.4: Our emerging regional plan 2040 to 2060 (Low Scenario) – Location of the potential schemes identified in our emerging regional plan..12

Figure 4.1 Contribution of leakage reduction and demand management schemes15

Figure 4.2: Per Capita Consumption timeline17

Figure 6.1 – strategic transfers within the region24

Figure 9.1 Forecast total expenditure for Situation 128

1. Our vision

Planning for the future

- 1.1. Our regional plan for South East England will look ahead to 2100 and address the planning challenges that we face. Our plan will seek to:
 - Ensure there is enough water for a growing population and to support economic growth
 - Improve the environment by leaving more water in the region's rivers, streams and underground sources
 - Increase the region's resilience to severe drought and other extreme shocks and stresses
 - Address the impacts of climate change on demand for water and how much is available.
- 1.2. Improving how we manage water resources in England is a critical part of achieving the Government's ambition to leave the environment in a better state than when they found it, and improve the nation's resilience to drought. This ambition is shared by water companies and all those involved in the regional groups that have been established across the country.
- 1.3. The South East faces some of the most significant challenges to water resources in the future. Most of the region is already classified as water stressed and its population is set to grow, with major growth corridors planned in some areas.
- 1.4. The impact of climate change will be felt most acutely in the region, bringing changes to the amount and pattern of rainfall which are likely to, in turn, change the types of droughts we face in the future. Consequently, this will reduce how much water is available for us all to use. Furthermore, the region is home to some of the nation's most sensitive habitats including internationally renowned chalk streams, many of which are currently relied

upon by water companies and other abstractors to provide the water needed. As explained in our separate Annexes 1 and 2, the National Framework recognises that the challenges are greatest in the South East region and identified that around 50% of the additional water required nationally by 2050, for public water supply, is needed in this region.

- 1.5. To address these challenges, we need to work together, and in doing so we can also maximise the opportunities to deliver even greater value for people and places. We will use this regional plan to contribute to the bigger picture of environmental improvement by reforming our approach to abstraction through only providing water from sustainable sources, identifying opportunities for environmental net-gain as we deliver new infrastructure, embedding a culture of efficient water use across all users in the region, creating green infrastructure and identifying natural solutions that improve the management of water within river catchments.
- 1.6. Our plan will be adaptive, enabling us to accommodate a range of different futures and uncertainties. We have engaged with customers and stakeholders across the region to understand their priorities and preferences to formulate our regional plan.

Our policies

- 1.7. Our regional plan is informed by policies that we have developed in consultation with water industry regulators, customers and stakeholders. We set out and consulted on our policies in August 2020¹ and responded to the consultation in October 2020². Key concepts that have shaped our plan are set out below.

¹ <https://www.wrse.org.uk/media/navh0vze/wrse-policies-consultation-document-04082020.pdf>

² https://www.wrse.org.uk/media/ljnnyemc/wrse-response-to-policies-consultation_051020.pdf

Policy based on best value

- 1.8. We are adopting a best value approach for our regional plan. In the context of water resources planning, this means seeking solutions that not only secure supplies for customers, but also increases the overall benefit to customers, the wider environment and society as a whole.
- 1.9. This means that the water resource programme that is chosen for the regional plan may not be the cheapest, but delivers additional value as defined through best value criteria.
- 1.10. At this 'emerging regional plan' stage our proposals represent a cost-efficient plan – part way on our journey to a best value plan (a cost efficient plan does not include, in its selection process, other benefits, additional value and/or wider objectives). The (cost efficient) emerging plan will be used as a benchmark to understand cost and value when we are developing our 'best value' plans in the next stage of the process. Further detail on our best value approach, and the work we will complete in summer 2022 on best value ahead of our draft regional plan can be found in our separate Annex 4, and also in our best value planning method statement ([on our website](#)).

Saving water

- 1.11. Saving water and using water more efficiently is a matter of huge importance to deliver environmental improvements and resilience. As water availability becomes increasingly stretched by pressures from climate change, population growth and rising demand, the more customers and businesses can do to reduce their water demands the more sustainable our future will be.
- 1.12. While nationally leakage has fallen by 40 per cent since 1997, a fifth of all drinking water is still lost through leaks in water pipes and there is an expectation of a step change in the future, pushing beyond the average 16% industrywide reduction already pledged in business plans by 2025³.

- 1.13. Personal water use ranges from an average of 127 to 155 litres per person per day in the South East and the majority of customers in the region have already been switched, or are due to be switched, to metered charges over the next five years – a key water company activity to reduce demand.
- 1.14. While water saving interventions may not always be the lowest cost solutions to secure reliable supplies, they are high on the agenda in terms of long-term sustainability. Our ambition is therefore to reduce water use and leakage across all sectors.

Leakage

- 1.15. WRSE and the water companies in the South East are committed to reducing leakage by 50 per cent of the levels seen in 2017/18 by 2050. From 2050 to 2100, the level of leakage reduction in our plan is evidence-based on an assessment of all options to determine which offer the best value. Leakage will still continue to reduce in that period, although the scale of change may not be as great as in the period to 2050.
- 1.16. Water companies in the South East have different levels of leakage and their leakage rates have changed at varying rates over the past few years. We have therefore explored what would be involved in delivering the 50 per cent reduction across all the companies – the cost, how it could be delivered, any additional benefits and risks of not being able to meet the target.
- 1.17. Beyond 2050, we have discussed with our customers and stakeholders whether reducing leakage further for the 50 years to 2100, or providing new resource schemes or water efficiency will offer better value in the future. How stakeholders and customers have informed our plan is explained in more detail in our separate Annex 4.
- 1.18. Funding for leakage will need to be agreed through successive five year water company business plans and WRMP cycles. As this may require significant long-term investment to replace water mains, this policy will need to be regularly reviewed and will require on-going engagement.

³ <https://www.ofwat.gov.uk/households/supply-and-standards/leakage/>

- 1.19. Further details of the role leakage reductions play in our plan can be found in section 4 of this Annex.

Personal water use

- 1.20. Our plan will set out a path to reduce per capita consumption (PCC) based on evidence, best value, local circumstances and engagement with customers and stakeholders.
- 1.21. We have assessed what the regional PCC target would be based on data provided to us by water companies. This takes into account individual water company ambitions and adopts a broader approach, including non-household consumption and an environmental sustainability focus.
- 1.22. There is currently no mandatory national target for PCC. Whilst the Environment Agency has put forward a national average PCC of 110 litres per person per day by 2050, this is based on high level assessment and is reliant upon government interventions that are not yet part of government legislation. Our assessment has included some reductions that depend upon government policy interventions in the different scenarios we have explored in formulating the plan, ensuring that the emerging regional plan contributes towards meeting the national target.
- 1.23. With companies having already achieved important reductions through metering and changes to customer behaviour, in our view, the next big reductions in PCC will be reliant on changes to government policy around labelling of white goods and building regulations.
- 1.24. We would also wish to see universal metering across the region and have modelled such a scenario in our Plan.
- 1.25. We have also considered the introduction of alternative ways to incentivise reductions in water use and are considering the extent to which increased water use evident during the Covid-19 lockdowns may give rise to longer term changes in patterns of water use.

- 1.26. Through our plan we explore a range of demand management scenarios, with and without government intervention, to demonstrate and better understand how far companies can go without external support.
- 1.27. Further details on the reductions in PCC we will be looking to achieve can be found in Section 4 of this Annex.

The environment and future resilience

- 1.28. We face an environment and climate crisis in the South East and we share the ambition of customers, interested groups, regulators and government to protect and improve the environment in our region.
- 1.29. Part of this is to reduce abstraction of water from rivers and groundwater where this causes unacceptable harm to vulnerable environments, particularly during droughts, with a particular focus on internationally significant and rare chalk streams.
- 1.30. We have set out the need to work across 26 catchments, to help reduce the risk from water quality and quantity. From the publication of the company Drainage and Wastewater Management Plans we will look to work with other catchment groups to derive integrated catchment plans that can be delivered by multiple parties and not just water companies.
- 1.31. While many actions have already been identified, the National Framework suggests significantly more changes are needed in the future and we believe it's in the best interests of customers and the environment to start planning for these now. We want to make a step change on protecting both customer supplies and the environment from future shocks and stresses, as outlined in our five policy positions below on the environment, resilience, levels of service, drought orders and permits and supporting private water supplies during drought.

Environmental ambition

- 1.32. Environmental ambition has never been as important as it is now. We're pursuing our strategic and technical work, as well as our engagement with

customers and stakeholders, to understand how we can play our part to identify and deliver a progressive level of environmental protection, enhancement and adaptation for our region. We'll continue to work with regulators and government to discuss how to make this a practical reality, including the best way to secure funding.

- 1.33. Our approach in the plan is to move beyond the traditional approach of limiting environmental needs based on the requirements set out by the Environment Agency in WINEP (Water Industry National Environment Programme). Until now, this has limited WRMPs to consider only these mandatory actions in the next 5 years designed to improve the health of the water environment.
- 1.34. Instead, we are planning for the longer term, adopting the National Framework expectations and modelling the implications of these, and other environmental scenarios for both existing sources of water and future options.
- 1.35. The Water Framework Directive (retained in UK law following Brexit) sets the legislative context for our environmental ambition and forms the basis on which we'll define our investment in environmental sustainability. The scale of future reductions in abstraction under the Water Framework Directive ranges from 450 million litres of water each day to 1,200 million litres each day, so we have needed to consider in our plan whether options geared towards the higher end of this scale are likely to be supported if brought forward earlier on in our plan.
- 1.36. The WRP requires that we properly consider environment and society in our decision-making. This means that we must demonstrate overall positive environmental benefit from our plan. We need to ensure that our solutions will have less impact on the environment than any environmental problems we are trying to solve. The guidelines also specifically require us to consider biodiversity net gain and natural capital assessments.

- 1.37. We have been and will continue to work with the Government and regulators to make sure they support the ambitions of our customers and stakeholders to create a sustainable environment, so we're confident funding can be secured through water company business plans and potentially other sectors.

Resilience

- 1.38. We intend to increase resilience of the region's water resources to drought so the need for emergency drought restrictions, such as rota cuts or standpipes, reduces to no more than once every 500 years on average. This is the resilience level required by the WRP in future WRMPs prepared by water companies. The aim is to achieve this level by the end of 2039 at the latest.
- 1.39. Other aspects of resilience supported by customers and stakeholders have been explored as set out in our resilience framework published in June 2020⁴. This aligns with the National Infrastructure Commission's resilience document – Anticipate, React, Recover published in May 2020⁵.
- 1.40. Through our plan we have developed a wider understanding of the vulnerability of water in the region and how a joined-up approach to resilience planning can offer better value for everyone.

Levels of service

- 1.41. Through this plan, water companies have worked towards a common service level for all customers in the South East for temporary use bans (TUBs) and also looked at the potential for non-essential use bans (NEUBs) in the longer term.
- 1.42. Water companies include the use of TUBs (formerly hosepipe bans) and NEUBs (the next step of restrictions which also extend to businesses) as part of their long-term water resource planning. This balances the need to invest significant amounts in water sources, which otherwise would not be needed very often, but would drive up customers' bills.

⁴ <https://www.wrse.org.uk/media/pqvnbppl/wrse-resilience-framework-technical-report-consultation-document.pdf>

⁵ <https://nic.org.uk/app/uploads//Anticipate-React-Recover-28-May-2020.pdf>

- 1.43. Currently these planned frequencies range across the six companies from once in every 10 years on average to less than once in every 20 years for TUBs; and once in every 20 years on average to less than once in every 80 years for NEU bans.

Drought permits and orders

- 1.44. Our plan aligns with the approach to drought permits and orders set out in the Environment Agency's National Framework. Whilst these have a role to play in improving levels of service and drought resilience to one in 500 years, our plan only proposes to use these where they would not unnecessarily harm the environment.
- 1.45. The water companies have a range of drought permits and orders they can call upon to secure supplies for customers during droughts by taking actions such as temporarily increasing abstractions, lowering minimum flow limits or bringing new abstractions online. The Environment Agency made clear in its National Framework these could be used to deliver increased resilience, but not at the cost of the environment.
- 1.46. However, given the very sensitive nature of the environment in the South East, particularly vulnerable chalk streams and customers' and stakeholders' concern for the environment, we haven't planned to include permits and orders to deliver permanent improvements in resilience unless the Environment Agency is satisfied that they pass suitable sustainability tests.
- 1.47. We recognise that drought orders and permits may still be required, as tactical options in the interim, where more sustainable, strategic options may take decades to deliver. Keeping some permits and orders in reserve allows us to further avoid the use of extreme restrictions like rota cuts and standpipes, something customers have repeatedly said they would find unacceptable.
- 1.48. Details of how drought permits and orders form part of our plan can be found in section 8 of this Annex.

Private water supplies during drought

- 1.49. Our plan supports some private water supplies where public health or the welfare of animals could be at risk in a severe drought. During a severe drought, private water supplies which support agriculture, animal farming and private homes can become unreliable or unavailable. Technical work we have undertaken in preparing our emerging regional plan is showing that between 2-3% of private water supplies could become unreliable under 1:500 drought scenarios. Water companies may, and often do, step in to share supplies under public health and animal welfare legislation.
- 1.50. Our plan makes provision for these resources, so they do not place additional pressure on resources and the environment at a time when they are already severely stretched. Agriculture currently makes up about a third of non-public water supplies in the South East.

Pathway to net zero carbon

- 1.51. The UK became the first major world economy to set a target for achieving net zero on greenhouse gas emissions into law – committing to net zero operating emissions by 2050. As one of the more energy-intensive sectors in the UK and a major contributor to emissions, the water industry has set itself a stretching target to achieve this by 2030. WRSE has a key role to play to be part of the solution.
- 1.52. WRSE will follow national best practice to reach net zero operating carbon emissions by 2030 for operational carbon, ahead of the government's aspirations for 2050. Beyond 2030, we will develop an approach for embodied and operational carbon, following national best practice and industry guidance as it develops.
- 1.53. Our policy is aligned with the water industry's commitment to work together to reach net zero operating carbon emissions by 2030, one of five challenging goals outlined in the Water UK Public Interest Commitments and supported by all South East water companies. In November 2020, Water UK

published its Net Zero 2030 Routemap⁶ which sets out that to achieve net zero by 2030 that water companies will need to:

- Reduce current operational greenhouse gas emissions as much as possible through the use of efficiency interventions and alternative technologies
- Use renewable energy generation and bioresources, exporting energy and fuels such as biomethane into the wider UK system
- Remove any residual emissions through contributing to the UK's natural sequestration efforts, especially through interventions such as peatland and grassland restoration and tree planting.
- To ensure net zero is achieved by addressing residual emissions through offsets.

and environmental ambition. For example, we wouldn't want to degrade the environment in another region just to provide water to the South East.

- 1.54. This should follow the best practice guidance developed by the sector research body, UKWIR, as it focuses on how the sector can remove more carbon than it emits by 2050⁷.

Ethical buying, social equity and public value

- 1.55. WRSE is preparing one of five regional plans being developed in England and Wales to secure resilient water resources for the future. As expectation grows for increased collaboration to create a strategic network across water company boundaries, it's important to consider how these will be evaluated in our multi-sector, regional resilience plan.
- 1.56. We believe water transfers or shared infrastructure with other regions should meet the same principles and standards which form the basis of our plan. Our draft regional plan will therefore include social and public value in our approach.
- 1.57. By ethical buying we mean applying the same standards to others as we do to ourselves. In order to meet the policies outlined in this document, we will apply the same standards to options and interventions which are reliant on other regional plans. In particular, this includes our positions on resilience

⁶ <https://www.water.org.uk/routemap2030/>

⁷ <https://ukwir.org/quantifying-and-reducing-direct-greenhouse-gas-emissions-from-waste-and-water-treatment-processes-1>

2. WRSE Regional plan at a glance

- 2.1. The plans on the following pages (figures 2.1 to 2.4) show the emerging regional plan proposals for the periods 2025-2040, and 2040-2060. The subsequent sections of this Annex then explain the proposals in more detail.
- 2.2. We have focused on these periods, consistent with the information presented in our consultation document. Our separate Annex 3 then provides additional technical information and data on the proposals, both for the 2025-2040 and 2040-2060 periods, and on the period 2060-75.
- 2.3. As explained in the consultation document, we will be extending the regional plan to the period to 2100 for the draft regional plan later in 2022.

Figure 2.1: Our emerging plan 2025 to 2040 –location of the potential schemes identified in our emerging regional plan



Figure 2.2: Our emerging regional plan 2040 to 2060 (High Scenario) – location of the potential schemes identified in our emerging regional plan



Figure 2.3: Our emerging regional plan 2040 to 2060 (Central Scenario) – location of the potential schemes identified in our emerging regional plan



Figure 2.4: Our emerging regional plan 2040 to 2060 (Low Scenario) – Location of the potential schemes identified in our emerging regional plan



3. Our emerging regional plan for the South East

Key drivers for the strategy

- 3.1. As has been explained in the preceding sections, there are a series of policy and other drivers for the emerging regional plan, including environmental policy, population growth and climate change. Of all the regions, the South East faces some of the most significant future challenges to water resources, amounting to forecast deficits of between 1,100 MI/d (least challenging future) and 2,600MI/d (most challenging future) by 2060. There is considerable variability in the scale and spatial distribution of the challenges across the region.
- 3.2. Our emerging plan is driven by
- **Policies:** the policies for leakage reduction; drought resilience, water efficiency, bulk supplies and preparation for the final decision on the regional environmental destination drive the choices in the first 15 years of the plan.
 - **Choices:** the choice of how much and how fast the implementation of the environmental ambition is delivered is key to selecting which branch of the regional plan is followed after 2040
 - **Uncertainties:** from 2060 onwards, the plan is being driven by the longer-term forecasts following the different policies being implemented in the previous 35 years.
- 3.3. The emerging plan gives early sight of the big issues and emerging solutions to gain initial feedback from stakeholders. It is a step in an ongoing process of plan development, and not yet a formal preferred plan. We are publishing an explanation of the processes that we have followed to date in preparing the plan, setting out the emerging regional plan proposals and our assessments of them, together with the further technical work that WRSE will be undertaking on the emerging plan ahead of publication of the draft regional plan in summer/autumn 2022.

- 3.4. Looking ahead, and addressing the planning challenges that we face, our emerging plan seeks to:
- Ensure there is enough water for a growing population and to support economic growth
 - Improve the environment by leaving more water in the region’s rivers, streams and underground sources
 - Increase the region’s resilience to severe drought and other extreme shocks and stresses
 - Address the impacts of climate change on demand for water and how much is available.
- 3.5. Our regional plan will be adaptive, ensuring that choices and decisions we take in the initial years of the planning period enable us to accommodate the full range of different futures and uncertainties that we may experience in the future.

The regional plan priorities

- 3.6. Our emerging regional plan is the product of the regional investment modelling carried out to date. It provides an early look at the selection of options that represent a cost-efficient adaptive way of addressing the region’s future water needs and will provide a benchmark against which our ‘best value’ options will be judged as we further develop our regional plan.
- 3.7. It puts reducing demand for water by tackling leakage and helping people use less at the forefront of activity. Using water in a more efficient way will put our water supplies in a more resilient and sustainable position for the long term and help reduce our reliance on sensitive water sources where abstraction needs to be reduced.
- 3.8. However, the combined challenge of leaving more water in the environment, population growth and climate change means that we will also need to develop new water sources so there is enough for everyone, including during droughts and other events that can affect our water supplies.

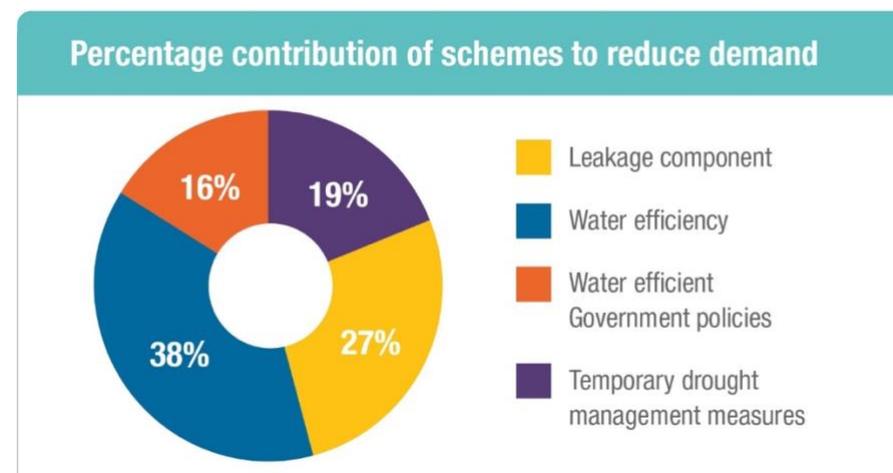
- 3.9. Our emerging plan for the South East includes four priorities that will safeguard the region's water supplies for the future:
- Efficient use of water and minimal wastage across society
 - New water sources that provide sustainable and resilient supplies
 - A network that can move water around the region
 - Catchment and nature-based solutions that improve the water environment we rely upon.
- 3.10. In this consultation on our emerging plan we've presented the shortlist of schemes as they have currently been evaluated using our adaptive planning approach. This has identified the most cost-efficient solutions, along with an early indication of the dates that the chosen options are likely to be needed. Those in the first 15 years of the plan are required across all future scenarios. After 2040, which options are needed will depend on the future scenario we face and are based on the three pathways within our adaptive plan – high, central and low.
- 3.11. In the high scenario where we project higher population growth and more extensive reductions to existing abstractions so more water remains in the environment, more new sources of water will need to be developed to replace these supplies. In the central and low future scenario, ongoing demand management will continue to provide most of the water needed but some new supply options are required to provide water in parts of the region where abstraction reduction is required or where existing local sources are more impacted by climate change.
- 3.12. The timing and scale of the options will be further evaluated through our ongoing work to identify the 'best value' plan that will undertake over the coming months. See our separate Annex 4 for more detail.
- 3.13. The total cost of our emerging plan, which includes the cost to build and operate new infrastructure, deliver leakage and water efficiency activity and develop the nature-based schemes in our catchments is £8 billion between 2025 and 2040 and could range from £15.1 billion to £17.6 billion by 2060 depending on the future scenario. The investment modelling we undertake for our draft best value plan will cover the period from 2025 to 2100.
- 3.14. The following sections of the Annex present information on the different elements of the emerging plan, focusing on the larger options selected. Further technical data on the options and emerging plan is provided in our separate Annex 3.

4. Efficient use of water and minimal wastage across society

- 4.1. Reducing water use is as an essential part of tackling the climate and environmental emergency we are facing both nationally and internationally. It will help mitigate the impact of climate change by helping people use water more efficiently, particularly as the population grows, while at the same time cutting the carbon emissions produced by abstracting, treating, moving, and heating water.
- 4.2. The emerging regional plan promotes the need, between 2025 and 2040, for £5.1 billion of investment across the South East to reduce how much water is used and wasted. Temporary measures that reduce discretionary water use during droughts are also included in the plan. In addition, it identifies the need for the Government to introduce new policies that will deliver long-term reductions in water use across society.
- 4.3. This does not include the leakage reductions water companies have already committed to between 2020 and 2025.
- 4.4. More than half of the total water needed in the first 15-years of the emerging plan will come from reducing how much is used and what is wasted through leakage. This action is required under all the adaptive planning pathways and plays an important role in securing water supplies across the planning period. This level is at the upper end of what we think can be delivered across the majority of the region.
- 4.5. The levels of leakage and usage reductions in this plan are ambitious but our analysis shows this increased level of activity, beyond what was committed to by most of the companies in their previous WRMPs, is required if more significant reductions to abstractions are needed to protect the environment in the long-term. Delivering them will rely on new approaches and technologies that are yet to be tried and tested, as well as changes to customer behaviour and government policy. Therefore, progress against the

plan will need to be monitored closely as if it is not achieved, we risk not having enough water to supply the people of the region and we could need to develop alternative water sources instead. Alternatively, we could develop more new sources of water earlier in the planning period to reduce our reliance on demand management measures.

Figure 4.1 Contribution of leakage reduction and demand management schemes



Understanding the region’s water use today

- 4.6. Water companies measure how much water they put into supply each day using a measure called distribution input (DI). Over the last 20 years, DI has fallen by 21 million litres per day despite the region’s population growing by 3.6 million, so there has been no net increase in the amount of water being taken from the environment. This is primarily due to the reduction in leakage, coupled with water efficiency activity and metering, which companies have successfully delivered since privatisation.
- 4.7. Household customers in the South East use, on average, 145 litres per person per day, which is higher than any other region. Around 18% of water

supplied is used by businesses. The region is warmer and drier than most other areas of the country with varying demographics, housing stock and metering levels, all of which have an impact on how much water people use.

- 4.8. The roll out of water meters across large parts of the region means that water companies have a better understanding of their customers' water use and are helping people make savings. Meters also help to detect leaks on customers' pipes, which makes up around a quarter of the water lost each day through leakage.

Water use during the pandemic

Water use can be affected by external factors that influence how much water is used and where. During the Covid-19 pandemic, household demand increased by around 10% while non-household demand fell by around 25% due to lockdowns and more people working at home. In London, the total amount of water being supplied fell by around 3% and remains lower than before the pandemic. This highlights the uncertainty relating to customer behaviour and reinforces the need for Government to introduce policies that will promote sustained water efficient behaviour across society.

How we will deliver reductions in demand for water

- 4.9. The emerging plan sets out how much total demand must reduce across the region and in each water company area, but it gives water companies the flexibility to deliver leakage and water efficiency programmes that best meet the needs of their customers, address the specific challenges of their local areas, and use new technologies as they develop.

Leakage reduction

- 4.10. More than 300 million litres of water that was previously lost through leaks will be made available by 2060. This will see all six South East water companies reduce leakage by 50% from 2017/18 levels by 2050, a commitment made in 2019. Activities to reduce leakage could include the following:

- Finding and fixing leaks faster and more efficiently across their networks using new methods and technology
- Replacing old water mains so there are fewer leaks and bursts and fewer interruptions to service
- Managing the pressure inside water pipes so less water is lost
- Working with customers to identify and repair leaks on their own water pipes.

- 4.11. Halving leakage by 2050 is a major challenge, but the water industry is committed to delivering it and is developing a roadmap that sets out how it will get there. This includes working to develop innovative solutions to reduce leakage as alternatives to large scale and costly mains replacement programmes.

- 4.12. In the longer-term, reducing leakage beyond 50% will become increasingly difficult and less cost efficient. Our regional plan promotes an ongoing reduction in leakage beyond 2050 but at a slower rate because of uncertainties around how this will be done, how much it will cost and its value for money.

- 4.13. Future versions of our regional plan will continue to balance leakage reduction and uncertainty, particularly as technological advancements are made, and we better understand the costs.

Water company water efficiency activity

- 4.14. The emerging regional plan identifies the need for water companies to do more to help their customers use water more efficiently at home and work. This could save around 445 million litres of water per day by 2060 and could include:

- Rolling out meters, including smart devices, to more customers to help them understand and reduce their water use. This includes a universal metering programme in Portsmouth Water's area
- Targeting activity and communications to customers about their water use

- Delivering more in-home water saving visits and fitting products to help save water
- Running public information campaigns to promote water efficiency
- Testing how different tariffs can encourage water efficient behaviour
- Helping customers and business to reduce wastage from poor plumbing.

Case study

Thames Water began installing smart meters in 2015 and 620,000 households and businesses now have one. Data from smart meters installed on previously unmeasured households, shows that over a quarter of people currently use more than 500 litres per day. The company has been targeting these customers and is providing a comprehensive home visit service that includes installing water efficient products and detecting leaks and plumbing losses. This is helping these households save an average of 74 litres per property per day. The data that smart meters produce provides insight into how customers use water so water companies can tailor the support they provide to help them use less. Thames Water will be rolling out a further 600,000 smart meters by April 2025, so more than 48% of their customers will be smart metered by the start of the period covered by this regional plan.

Water efficient Government policies

- 4.15. Our emerging plan has identified the implementation of new government policies as being the most cost-effective to support long-term sustainable reductions in how much water is used across society and to secure water supplies. This includes:
- Mandatory water labelling of water-using products to help consumers make more informed choices about the products they buy and use in their home by 2024
 - Minimum standards for products that use water to remove inefficient products from the market by 2045
 - Amendments to the Building Regulations for new homes and retrofits, to deliver more water efficient housing, by 2060.

- 4.16. The Government has already committed to introducing mandatory water labelling by 2024. These additional policies must be introduced so that a more sustainable level of water use is reached. These policies could deliver a further 190 million litres per day of water savings by 2060, if implemented based on the timings above, and offset around £3 billion of investment in new water sources. Implementing them sooner could also deliver more savings in the early years of the plan and help reduce the impact on customer bills.
- 4.17. This action by government will be an important part of how society invests in its future environment and protects it for future generations. It will also share the cost of delivering sustained reductions in water use beyond just water company customers.
- 4.18. The Government has promoted a national target for per capita consumption (PCC) to fall to 110 litres per person per day by 2050. Achieving this in the South East region will require water company activity combined with Government interventions. However, this approach doesn't take account of how much water is used by non-household customers or other sectors.

Figure 4.2: Per Capita Consumption timeline



- 4.19. Sectors that rely heavily on water are facing the same long-term pressures on their supplies. We have established a group that brings together representatives from the sectors that use the most water within the region to work more collaboratively to secure supplies. The group has identified examples of how other users are innovating to reduce their water use and

manage water more efficiently such as harvesting rainwater from the roofs of glasshouses and storing the water in new on-site reservoirs.

Reducing water use – a national issue

The Government is considering a national target focussed on reducing water use, which will require water companies, customers and businesses to all take action. We support this approach and the use of a representative measure that captures all aspects of society's water use.

Reduce water use during droughts

- 4.20. When droughts occur, water companies take emergency action to reduce the demand for water as part of their Drought Management Plans. This includes introducing Temporary Use Bans (TUBs) on domestic customers and Drought Orders for Non-Essential Use Bans (NEUBs) on business customers, both of which temporarily restrict certain discretionary water-using activities, to help preserve water supplies. For example, washing cars and watering gardens with a hosepipe.
- 4.21. Around 220 million litres of water savings can be made through these temporary drought management measures, and they are included as options within our plan. They are in addition to the total amount of water that will be saved as part of the day-to-day water efficiency activity, although they would only be used when needed, and in-line with the level of service each water company has set out in their individual Drought Management Plan.

More information

- 4.22. Section 4 of our separate Annex 3 includes more technical data on our demand management and leakage reduction proposals.

5. New water sources that provide sustainable and resilient supplies

- 5.1. Our emerging regional plan includes a number of potential schemes that could provide new water supplies for the future. This is based on our assessment of the feasible options which have been included in our regional investment modelling to identify the most cost-efficient, adaptive solution.
- 5.2. The section below provides an explanation of the proposals in our emerging plan. Our separate Annex 3 contains diagrams at regional and company level to show the options currently being selected under the different branches of our adaptive plan. Some key schemes have been described in detail in the following sections to give an example of the locations and types of schemes in our emerging plan.

Water recycling

- 5.3. Water recycling is where highly treated wastewater is returned to the environment and used to supplement our natural water supplies. Our emerging regional plan has identified that water recycling will need to form an important part of the solution, with variations in the schemes needed depending on the future scenarios we face. The modelling carried out to date to identify the most cost-efficient set of options for our adaptive plan indicates that recycling will be needed in the early years of the plan to achieve the higher level of drought resilience required by 2040 and the ambitions associated with reducing abstraction.
- 5.4. The first schemes that are likely to be needed are at Littlehampton in West Sussex, Beckton in London, Havant in Hampshire, Peacehaven in East Sussex and Aylesford in Kent. Currently, Beckton is selected to support London and the Affinity Central region in the investment model as there are uncertainties associated with potentially cost-efficient alternative re-use schemes, which may substitute for Beckton in the draft regional plan once those uncertainties have been resolved. These alternatives and the associated uncertainties are described below.

- 5.5. The investment modelling indicates that further recycling is required for the north of the region later in the planning period, once reservoir and inter-regional transfer schemes have been developed in the 2040s.
- 5.6. The options identified in our plan are typically in areas where treated wastewater is currently released into the sea, or an estuary, and there is a suitable location in the catchment where it could be released instead so it can be used again. They involve adding an extra stage of treatment at the wastewater treatment works and transferring the highly treated water to a point on a nearby river, or to a lake or reservoir, where it mixes with other water in the environment. Water is then re-abstracted, treated again to drinking water standard and supplied to customers.
- 5.7. Consideration needs to be given to the environmental impact on the watercourse or waterbody that receives the additional treated water so that it does not affect its ecology. In some areas, using an environmental buffer, such as a reservoir to store the treated water – mixed with river or spring water – instead of releasing it directly into the environment provides a more suitable alternative and our plan includes these options.
- 5.8. The recycling schemes identified in our plan range from producing an extra 5 to 300 million litres per day (Ml/d) and the new treatment facilities can be added in stages to the existing treatment works so they can be made bigger in the future if needed.

Havant water recycling scheme

- 5.9. A scheme that uses highly treated wastewater to supplement the water stored in the new Havant Thicket reservoir has been identified in our emerging plan. Treated wastewater from the Budds Farm wastewater treatment works would receive additional treatment at a new recycling facility in Havant before being pumped to the reservoir where it would be stored and supplement the spring water supply. The water would then be further treated at a water supply works before being supplied to people in the local area or transferred through new pipelines to supply other areas in both Hampshire and West Sussex.

Peacehaven Recycling Scheme

- 5.10. The Peacehaven water recycling option is able to provide a yield of 25 MI/d as a shared benefit to both South East Water and Southern Water. This option comprises a new effluent treatment plant at Southern Water's Peacehaven WwTW, the treated effluent would then be transferred inland for release into the River Ouse, or a bankside storage reservoir for abstraction at an existing Water Treatment Works.

Water recycling in London and the north of the region

- 5.11. Our emerging plan identifies that a water recycling scheme at Beckton Wastewater Treatment Works in London is likely to be required before 2040, there are however two other schemes that could represent alternative solutions, which we will continue to explore as we develop our best value draft regional plan.
- 5.12. Under the current infrastructure configurations, the Beckton re-use scheme is selected in the modelling as the most cost-effective adaptive solution for the 2025 to 2040 period and would provide up to 130 MI/d. Although this scheme is relatively expensive, it is selected before the SESRO reservoir and Severn to Thames Transfer SRO schemes because the additional water is needed to enable an increase in drought resilience and to support environmental abstraction reductions before those larger schemes can be delivered. Under this scheme, some of the water from the Beckton site would be diverted and receive additional treatment at a new recycling plant within the existing site. The highly treated water would then be pumped to the River Lee flood channel, upstream of the Lee Valley reservoirs, to supplement the existing raw water supply, before being stored in the reservoirs. It would then be treated to drinking water standard before being put into public water supply, supplying Thames Water in east London and Affinity Water via the eastern Thames to Affinity Transfer SRO scheme. Further phases could be developed at the site to provide additional water if required in the future.
- 5.13. There are two potentially cost-efficient re-use schemes under consideration that could be developed within the 2030 to 2040 period instead of Beckton. These are the Grand Union Canal Transfer and Teddington Direct River

Abstraction. The Grand Union Canal could be used to transfer up to 100 MI/d of highly treated wastewater from Minworth Wastewater Treatment Works in Birmingham to Hertfordshire. The Teddington Direct River Abstraction would use highly treated wastewater from Mogden Wastewater Treatment Works to compensate flows taken from a new abstraction on the River Thames, upstream of Teddington Weir. This could deliver up to 75 MI/d of water that could be used to supplement the supplies in the Lee Valley reservoirs.

- 5.14. These schemes are not selected in the 2025-2040 period at the emerging plan stage due to uncertainties in the infrastructure required to transfer water from Affinity Water to Thames Water (which would be required under the Grand Union Canal scheme) and the available size and timing of the Teddington Direct River Abstraction scheme. Currently Beckton is selected as the most cost-efficient scheme, but ongoing work that will be completed in parallel to the best value assessments in the next stage of the planning process may conclude that these alternative schemes are in fact more cost-efficient solutions for the 2030-2040 period in the north of the region. The final choice of option, incorporating both the updated cost efficiency analysis and best value considerations, will be made at the draft regional plan stage in summer 2022. It is noted that current sensitivity testing has confirmed that the actual choice of re-use scheme in the 2030-2040 period does not affect the next stage of the plan – i.e. the SESRO reservoir option and Severn Thames Transfer remain the most cost-efficient options for addressing future needs.

Reservoirs

- 5.15. Reservoirs store water when it is available, typically pumping water from a river or spring when water levels are high (usually during the winter) when it would otherwise flow out to the marine environment. The water is then stored until it is needed, when water in the natural environment is low. There are a limited number of locations across the South East where reservoirs can be built due to water availability, geology, and social and environmental factors, and we have considered all of these in the development of our plan.

5.16. Our emerging plan has identified that two new reservoirs, one in Hampshire and one in West Sussex would be the most cost-efficient options to develop to address the short-term water needs in the south of the region. This would be followed by the development of a major strategic reservoir in Oxfordshire (SESRO – see below), which is required to support the change to a one in 500-year level of drought resilience and enable more water to be returned to the environment through abstraction reduction. Together these new sources could provide around 325 MI/d of water.

5.17. Beyond 2040, increasing the size of Bewl Water in Kent is identified in all future pathways. A new reservoir is identified near Broad Oak in Kent as well as using an existing Canal and Rivers Trust reservoir in Brent, London, to provide additional public water supplies in the high and central future pathways, with two smaller schemes identified in East Sussex and Bedfordshire in the high pathway.

Havant Thicket and Blackstone reservoirs

5.18. Our emerging plan includes these two smaller reservoirs in Havant in Hampshire and near Henfield in West Sussex. Havant Thicket reservoir is a WRMP19 scheme which now has planning permission and preparatory work for its construction is underway. It will be able to provide an average of 21 MI/d and more if recycled wastewater from the Havant recycling scheme provides additional water. It will provide a strategic solution to drought resilience in the Hampshire area by addressing the water supply shortfall from changes in abstraction licences. Blackstone reservoir could provide up to 20 MI/d and would store water from the River Adur that would then be supplied to Brighton and parts of West Sussex.

South East Strategic Reservoir Option (SESRO)

5.19. Our emerging plan has identified the South East Strategic Reservoir Option (SESRO) near Abingdon, Oxfordshire as a cost-efficient solution to meet the region’s additional water requirements by around 2040. Water would be pumped from the River Thames during periods of high flow, stored in the reservoir and released during low flows for abstraction downstream. The water from the reservoir will be used to supply London and the Thames

Valley and could be transferred east and south through a network of new pipelines.

5.20. The regional plan has identified that SESRO forms part of the cost-efficient solution in all future scenarios, providing up to 280 MI/d by 2040 in the high future scenario. Detailed technical assessments and studies are currently underway and a decision on whether it is built needs to be made by 2025 because it will take 15 years to plan, build and fill with water.

Broad Oak Reservoir

5.21. Our emerging plan includes the development of a (5,126 MI capacity) reservoir at Broad Oak, near Canterbury, in Kent with an intake on the Great Stour, yielding 19.6 MI/d. The scheme would allow groundwater and surface water sources to be operated conjunctively to maximise benefits to the wider environment, i.e. resting chalk sources when groundwater levels are low, and by capturing flood flow and storing in the reservoir so that it can be used during summer/dry periods.

5.22. The inclusion of the Broad Oak Reservoir is a longstanding option for which South East Water own the necessary land and have completed extensive work over a number of years to carefully develop and assess the impact and potential benefits of a new reservoir.

Transfers from other regions

5.23. As part of the planning for our emerging regional plan we have carried out a process of reconciliation with the other regional groups to identify opportunities to share water between regions and provide a more joined up national solution to the country’s future water needs. This has shown that there are two potentially viable transfers from the Water Resources West region into the south east using the existing river and canal network. Other regions have indicated that they are unlikely to be able to provide additional water, beyond what is required to meet their region’s needs, so have been discounted at this stage. Further regional reconciliation will take place before the regional plans are finalised in summer 2022.

Severn Thames Transfer (STT)

- 5.24. This transfer would involve moving water from the north west and the Midlands, via the River Severn to the south east. The River Severn would transfer water to Gloucestershire and from there it would be pumped into the River Thames via the restored Cotswold Canals or a new pipeline. This option could transfer up to 500 Ml/d.
- 5.25. There are a number of possible sources of water that could be moved using this transfer. Which STT transfers are needed and when will depend on the future scenario we face. They include taking water directly from the River Severn, using recycled wastewater to supplement flows, and taking water from an existing reservoir and moving it to the south east via a transfer. Further work will be needed to understand how much water will be available from these sources through ongoing reconciliation with Water Resources West.
- 5.26. Our emerging plan shows that construction work on this transfer would need to run in parallel with SESRO, as it is required under a number of future scenarios, with water starting to be transferred in around 2040 under the high future scenario.

Grand Union Canal

- 5.27. The Grand Union Canal scheme, as described in the water recycling options section, provides a transfer of water between Severn Trent and Affinity Water, so crosses between the Water Resources West and WRSE regions.

Enhancing groundwater and aquifer use

- 5.28. Much of the region’s water supplies come from groundwater which is stored within the underground aquifers across the South East. They provide a direct supply of water and are the source of the region’s many chalk rivers and streams. Our plan will deliver a net reduction in abstraction from our existing sources but also looks to improve how we store water underground, without impacting on the environment.

Groundwater schemes

- 5.29. In the first 15 years, our emerging regional plan has identified seven schemes that could improve the way groundwater sources are currently configured so they can be used more efficiently and produce more water. They range from producing 2 to 5 Ml/d and together could provide an additional 28 million litres of water to the region. From 2040, further opportunities to improve groundwater sources are identified, depending on which future scenario we face.
- 5.30. Much of the infrastructure is already in place to abstract groundwater when it is needed. However, it is important that any developments to groundwater sources and the amount to water taken from them does not damage the environment, particularly where they feed chalk rivers and streams.

Managed Aquifer Recharge and Aquifer Storage and Recovery

- 5.31. Aquifers are underground layers of rock which naturally store water. These schemes involve injecting an additional fresh water from other parts of the aquifer, or from rivers, into a confined area within the aquifer. It can then be stored and pumped back to the surface and treated when needed. There are several examples of existing Managed Aquifer Recharge schemes in the South East including Thames Water’s North London Artificial Recharge Scheme and SES Water’s North Croydon peak management scheme.
- 5.32. There are a limited number of locations in the South East where this is possible because of the geology of the region, and the technology used is still being developed. Thames Water is already planning an ASR scheme in its area and the regional plan has identified two schemes in Hampshire and the outskirts of London where this could be used to provide additional storage after 2040.

Desalination

- 5.33. Desalination turns seawater and brackish water into drinking water by removing the salt, providing a reliable source of water, including during droughts. There is one existing large desalination plant in London, and it is a technology that is used extensively in other parts of the world such as the

Middle East, where there is a shortfall in available water throughout the whole of the year.

- 5.34. Producing drinking water in this way uses a lot of energy and the salt that is removed must be safely disposed of to avoid damaging the environment. Our research shows that customers have concerns about desalination plants, and they are seen as an option of last resort if alternative sources of water are not available.
- 5.35. Our emerging regional plan identifies the need for a desalination plant in the Shoreham area of the West Sussex coast by 2040 as part of the cost-efficient adaptive plan, to meet the scale of deficits within that part of the region in the early part of the plan period.
- 5.36. Further plants may then be needed in other coastal and estuarine locations across Kent and East Sussex, to adapt to more challenging future scenarios.
- 5.37. The modelling indicates that desalination is the least preferred option for WRSE on a cost-efficient economic basis. It tends to be identified as the preferred option where the need in an area is so high that there are no other local sources of water to meet it, or where the alternative is a long-distance transfer to move water from another part of the region, which typically have high economic and carbon costs associated with them. The wider environmental impacts of these schemes will be investigated further as part of our best value assessment.
- 5.38. The decisions on whether to build these desalination plants do not need to be made now and much will depend on how much water needs to be left in the environment and where, and the level of housing growth we see in future. New technology could also make desalination cheaper and less energy intensive. We will also need to monitor whether the other options in the plan are delivered, including the demand management reductions, as if they are not desalination may be needed sooner and in more locations. Alternatively, new options may be identified that could be used instead of desalination, so our plan will adapt in the future based on the latest evidence available.

Sussex Coast desalination scheme

- 5.39. This scheme would involve building a desalination plant in the Shoreham area on the West Sussex coast. It could produce up to 40 MI/d to supply to parts of West and East Sussex. Investigations are continuing by Southern Water to assess sites and delivery of this option.

More information

- 5.40. Our separate Annex 3 includes more information on the resource options selected in each part of our emerging plan period, 2025-2040, 2040-2060 and 2060-2075.

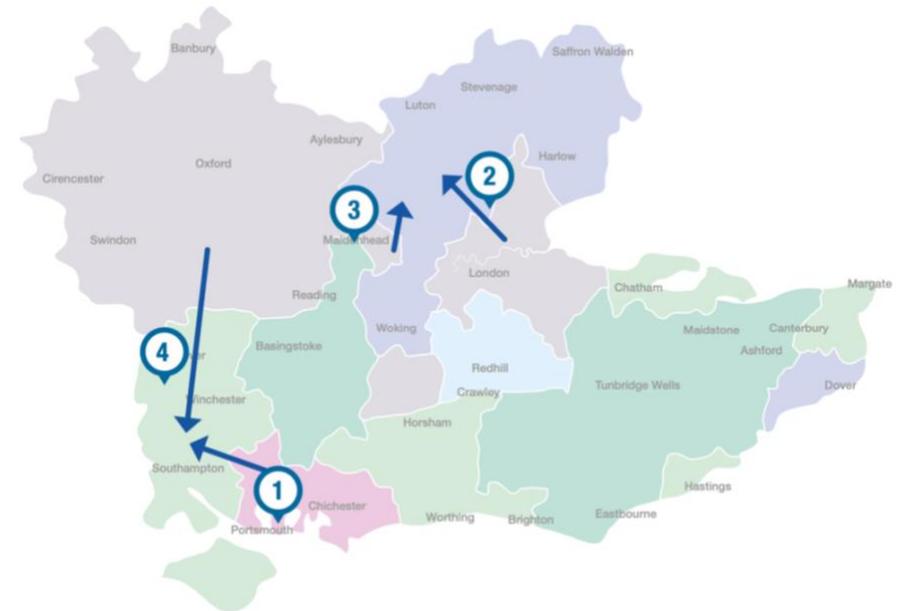
6. A network that can move water around the region

- 6.1. Alongside the options needed to make more water available, the emerging regional plan has identified between £2.4 billion and £3.4 billion of investment in new transfers to move water around the South East more easily by 2060, depending on the future scenario we face.
- 6.2. This could see more transfers between different parts of the six water companies' supply areas and between different water companies, increasing the connectivity of the region. These transfers don't produce any extra water, but they do move water from areas where more is available to those where there is less; and they will help make supplies to homes and businesses more resilient as water companies will have more sources to rely upon.
- 6.3. Nearly 400 Ml/d can currently be moved around the south east. This could rise to more than 1.1 billion litres per day by 2060 in the most challenging future scenario. This will include transfers between multiple companies which means current trading arrangements may need to be reviewed.
- 6.4. The emerging plan has identified that some new strategic transfers which will enable water produced by the major schemes to other areas, as part of its cost-efficient assessment. These include:
 - **1. Havant Thicket to Southampton** - A pipeline that would move water from Havant Thicket reservoir, in conjunction with the Havant water recycling scheme, to deliver the required quantity of water supply to Southern Water's customers in the Hampshire area.
 - **2. Thames to Affinity Transfer** - A transfer that would move water produced by the Beckton recycling scheme to a new water treatment works near St Albans, to provide water to Affinity Water's customers in Hertfordshire. This scheme would be replaced by the relevant alternative if a different re-use scheme is selected.

- **3. Thames to Affinity Transfer** - A transfer would move water from the River Thames to a water treatment works in Iver to supply Affinity Water's customers in that part of Buckinghamshire. It transfers water from both SESRO and the Severn Thames Transfer.
- **4. Thames to Southern** –A transfer that would move water from the River Thames to a water treatment works near Southampton, from where it would be used to supply Southern Water's customers in Hampshire. Water could be transferred raw (as currently selected in the emerging regional plan), or treated prior to transfer. The companies are exploring both options through their SRO work. It would transfer water from both SESRO and the Severn Thames Transfer.

6.5. All these schemes are being investigated through RAPID's gated process. The schemes are illustrated in Figure 6.1 below.

Figure 6.1 – strategic transfers within the region



More information

- 6.6. Our separate Annex 3 contains diagrams at regional and company level to show the options currently being selected under the different branches of our adaptive plan.

7. Catchment and nature-based solutions to improve the water sources we rely on

- 7.1. The South East water companies abstract water from 28 river catchments across the region along with other users who have their own licences to abstract the water they need. Improving these catchments is a priority for the regional plan to ensure the ongoing quality and quantity of our water supplies, and to deliver wider environmental benefits that help achieve the targets set in the Government's 25-year plan for the environment. They will help make the environment more resilient and better able to adapt to climate change.
- 7.2. The emerging plan has identified more than 200 catchment and nature-based solutions across 25 of the South East's catchments requiring approximately £350 million of investment by 2040. The majority of these schemes do not form part of our cost-efficient solution and may only produce a limited amount of water, but they could help the environment become more resilient to climate change and other pressures, while enabling abstraction to continue at a sustainable level. It promotes using the early years of the planning period to progress these nature-based solutions, so we can test different types of schemes and the benefits they deliver. This could influence how much we need to reduce our current abstraction levels by and how this could work in combination with other nature-based activities to deliver wider benefits to the environment in a more cost-effective way.
- 7.3. Some of these options will help catchments to function more naturally, and to allow groundwater catchments to function so that rainwater stays on the land longer and replenishes groundwater stocks (which in turn support the flows in rivers). We also want to work with other land and water users to reduce their water demand and reduce the impact of their own activities on raw water quality (which will mean that water is easier to treat, using less chemicals, carbon, waste) and provide a long-term biodiversity benefit.

- 7.4. The South East water companies will investigate these options further in partnership with local catchment groups and other water users to identify which should be progressed and funded through their business plans. They will also align schemes with those identified in the Drainage and Wastewater Managements Plans being developed by Southern Water and Thames Water, so we maximise benefits.

- 7.5. The nature-based schemes in our emerging plan include the following activities:

- River restoration
- Nutrient and sediment reduction
- Integrated catchment management
- Working with farmers to improve land management practices
- Water retention measures such as natural flood management and wetland creation
- The creation and management of terrestrial habitats
- Sustainable Drainage Systems (SuDS) schemes.

More information

- 7.6. Section 7 of our separate Annex 3 lists the catchment management portfolios available for selection as part of our investment modelling.

8. Drought Orders and Permits

- 8.1. During droughts, water companies can apply for temporary drought orders and drought permits on certain water sources that allow them to temporarily abstract more water, or abstract at a different time of year, to help them supply customers if the drought becomes more severe.
- 8.2. The South East water companies and the Environment Agency reviewed the impact of the 78 drought permits and orders available to them and have excluded 53 from the regional plan because of the potential impact they would have on the environment.
- 8.3. The remaining 12 drought orders and 13 drought permits will continue to be used as options in the early years of the plan until the region reaches one in 500-year drought resilience in 2040. The most significant of the drought permits and orders in the emerging plan are those in the Test and Itchen catchments in Hampshire, where Southern Water has already reduced its abstractions during a drought by more than 180 million litres per day. There are options being developed to replace this water but, in the meantime, they will need to be used should a drought occur.
- 8.4. After 2040, drought orders and drought permits will only be used in our plan if we experience a drought more serious than a 1:500 year event with monitoring and mitigation measures agreed with the Environment Agency and Natural England to help protect the environment. They have not been included as options after 2040 in our emerging plan, as the increased drought resilience that will have been achieved means that we will not need to rely on them.

More information

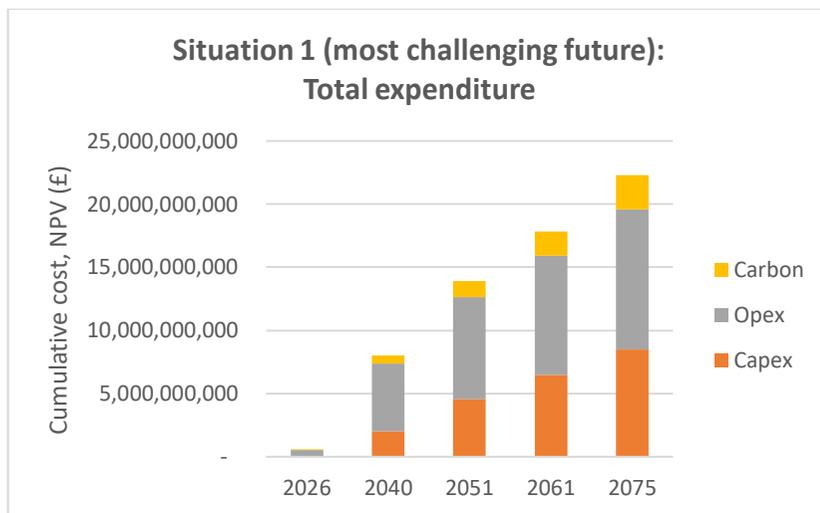
- 8.5. Our separate Annex 3 contains diagrams at regional and company level to show the options currently being selected under the different branches of our adaptive plan. It also contains (in section 8 of Annex 3) a list of drought permits and orders selected as part of our emerging plan investment modelling.

9. Cost, Alternatives and Carbon

How much will it cost?

- 9.1. The total cost of our plan, which includes the cost to build and operate new infrastructure, deliver leakage reduction and water efficiency activities and develop the nature-based schemes in our catchments will range between £18.3 billion and £22.9 billion by 2075 depending on the future scenario.
- 9.2. Figure 9.1 below shows the forecast timing of expenditure for the most challenging future (Situation 1) for our 1:500 Dry Year Annual Average scenario.

Figure 9.1 Forecast total expenditure for Situation 1



- 9.3. The figures are expressed as Totex. Totex combines the operational, capital and carbon costs of these options. The totex will be spread across the planning period.

- 9.4. Much of this investment will need to be paid for through water bills and we will provide an indication of the bill impact in the draft regional plan later this year.

Alternatives and implications

- 9.5. The emerging plan presented for consultation represents a cost-efficient adaptive way of addressing the region’s future water needs. Some of the need early in the planning horizon will be largely addressed by the significant demand management activities we are proposing, and the identified water recycling schemes. It will be difficult to replace these without lowering the ambition to return more water to the environment through reductions to existing abstraction.
- 9.6. In all scenarios by 2040, the SESRO option is required to assist in achieving the 1:500 year level of drought resilience for London. For the mid to late parts of the planning period, without the development of the large-scale options identified, the water companies cannot fulfil their statutory duties under more challenging future scenarios, without reliance on options that are currently assessed as having potential adverse environmental impacts. These options are not selected until after 2045, and further detailed work on the options and innovative solutions to mitigate impacts or generate new alternative options will be undertaken, to avoid or minimise those impacts on the environment.
- 9.7. It could be possible to replace one or two of the strategic options, such as SESRO and/or the Severn Thames Transfer, but only under the least challenging future scenario. Doing so increases the cost of the plan by between £1 billion and £2 billion and it will require more water recycling and desalination options to be progressed. This will also have a more significant impact on the environment, in terms of both the quality of our waters in the case of recycling and the significant additional carbon impact associated with these more carbon intensive options. This will be examined further through our best value assessment and sensitivity testing during the next stage of the regional plan’s development.

Carbon

- 9.8. Water companies have committed to reaching net zero operational carbon emissions by 2030, 20 years before the Government target of 2050. The water efficiency activity within the plan will help to reduce carbon emissions, however, many of the options in our regional plan will add to the companies' carbon emissions once they are operational. Therefore, implementing the regional plan will make it harder for companies to maintain net zero in the long-term.
- 9.9. Furthermore, the construction of some of the schemes within our plan will create additional carbon emissions. Companies will need to identify ways to mitigate these carbon emissions through the use of renewable energy, carbon offset schemes, and by using alternative materials and construction methods.
- 9.10. We estimate that the additional operational activities driven by the plan, combined with the carbon associated with new infrastructure, could produce 14 mtCO₂e (million tonnes of CO₂ equivalent) carbon emissions over the next 50 years. In the next phase of our work we will:
- Optimise carbon as a best value metric which may bring forward low carbon options
 - Complete an assessment on how emerging technology and innovation may reduce the carbon budget in the future
 - Work with companies, regulators and others on how any additional carbon from the regional plan will be managed in the PR24 process.

More information

- 9.11. Our separate Annex 3 contains more technical data on our emerging plan proposals. Our separate Annex 4 provides information on risks and uncertainties relating to the emerging plan.

10. Beyond 2060

- 10.1. Our regional plan has looked at the options needed beyond 2060 under nine different future scenarios. For the emerging plan consultation we have selected options to 2075. This will be extended to 2100 for the draft regional plan in summer 2022.
- 10.2. The majority of the options selected for development in our emerging plan are selected in the 2025-2040 period, or 2040-2060, enabling us to achieve increased drought resilience and our environmental ambition.
- 10.3. Beyond 2060 If we experience a scenario with high rates of population growth and the impact of climate change becomes greater, we expect to need to develop more water recycling schemes and increase the size of the schemes developed in the early years. More desalination plants may also be needed and there may be a need to move more water to the region if surplus is available without causing detriment to water supplies or the environment in the Water Resources West region. Under less challenging futures, the scale of new resource developments we will need to implement beyond 2060 will be less. Much will depend on the future scenario we face and what options are delivered in earlier years of the plan.
- 10.4. Our separate Annex 3 contains diagrams at regional and company level to show the options currently being selected in the period 2060-2075 under the different branches of our adaptive plan.