

Section 9 : Our Preferred Plan

In this section we set out our preferred plan to address the shortfall in water available



Introduction

9.1 The guidelines state that a water company must select a preferred plan that sets out how it proposes to manage the water resources within its area. Included with that plan should be a clear explanation of the decision making process to arrive at the solution proposed.

9.2 We explained our approach to developing our preferred WRMP14 in Section 8, including how we have tested our plan to confirm that the measures we are proposing offer resilience and are appropriate for our customers, the environment and our own needs. We also explain how we have managed risk and uncertainty.

9.3 This section sets out our preferred plan for the period 2015 to 2040 and how this delivers against the objectives and guiding principles we set at the beginning of the WRMP14 preparation process. From the WRSE modelling and our own

least cost solutions we have developed a best value preferred plan by means of scenario testing, SEA, customer preferences and risk assessment.

9.4 Our preferred plan for the period 2015 to 2040 includes a mix of demand management initiatives (leakage and water efficiency) throughout the planning horizon, which deliver an additional 6 MI/d above the assumptions already made in our baseline activities. Of particular note is that, in addition to leakage savings currently being achieved, we are planning to reduce our own leakage to 10% by the end of the planning period. Similarly, we will be delivering enhanced water efficiency programmes, above and beyond our baseline activities, to drive customers' water use down to 148 litres per person per day in a dry year.

9.5 On their own, these types of initiatives will simply not be enough to meet the shortfall as set out in the supply demand balance and therefore

our preferred plan includes the following new water supply options as shown on Figure 9.1:

- Additional yield from changes to the RMS licence which provide an extra 1.6 MI/d in 2016;
- Developing five groundwater sources at Forest Row, Coggins Mill and Cowbeech in East Sussex, Maytham Farm in Kent and Boxall's Lane (Aldershot) in Hampshire during 2015 to 2020 (11.5 MI/d);
- Developing six water transfer schemes to share water with Thames Water, Southern Water, Sutton and East Surrey Water, Portsmouth Water and Affinity Water between 2020 to 2040 (33 MI/d);
- Developing and improving two existing water treatment works, one in Berkshire and the other in East Sussex by 2020 (31 MI/d);
- Developing two water re-use schemes at Aylesford in Kent, and Peacehaven, East Sussex between 2020 and 2030 (37.5 MI/d);
- Building a new reservoir at Broad Oak, Kent, by 2030 to 2035 (13.5 MI/d);
- Extending our existing Arlington Reservoir, East Sussex, by 2035 to 2040 (22.1 MI/d), and

9.6 We will also look to develop additional water transfers between our WRZs based on the total water which will be available during the planning period. Our preferred plan includes three

Table 9.1 Preferred WRMPI4 supply demand balance 2015 to 2040 (Summer Peak Period MI/d)

Option types	2015 MI/d	2020 MI/d	2025 MI/d	2030 MI/d	2035 MI/d	2040 MI/d
Leakage	0.3	2.1	0.4	0.0	2.0	0.1
Water Efficiency	1.0	0.0	0.0	0.0	0.0	0.0
Groundwater	1.7	9.8	0.0	0.0	0.0	0.0
Surface water	0.0	1.6	0.0	0.0	13.5	22.1
Regional Transfers	0.0	5.0	8.0	10.0	0.0	10.0
WTW	0.0	31.0	0.0	0.0	0.0	0.0
Water re-use	0.0	0.0	12.5	25.0	0.0	0.0
Total new yield (cumulative)	3.0	52.5	73.4	108.4	123.9	156.0
Baseline supply demand balance	22.1	-8.2	-37.2	-69.1	-103.7	-137.3
Revised supply demand balance	25.1	44.3	36.2	39.3	20.2	18.8

new intra-company transfers for the period 2020 to 2025 between:

- Kippings to Pembury;
- Aylesford to Blackhurst; and
- Best Beech to Blackhurst.

9.7 Alongside our preferred options we identified a range of alternative options that are available over the same 25 year period, and which could also meet the shortfall in water. These were included for wider comment as part of our dWRMPI4 consultation. They are included as alternative options in our WRMPI4 and are explained later in this section.

9.8 Table 9.1 demonstrates how the options selected meet the forecast supply demand balance deficits across the whole 2015 to 2040 planning period.

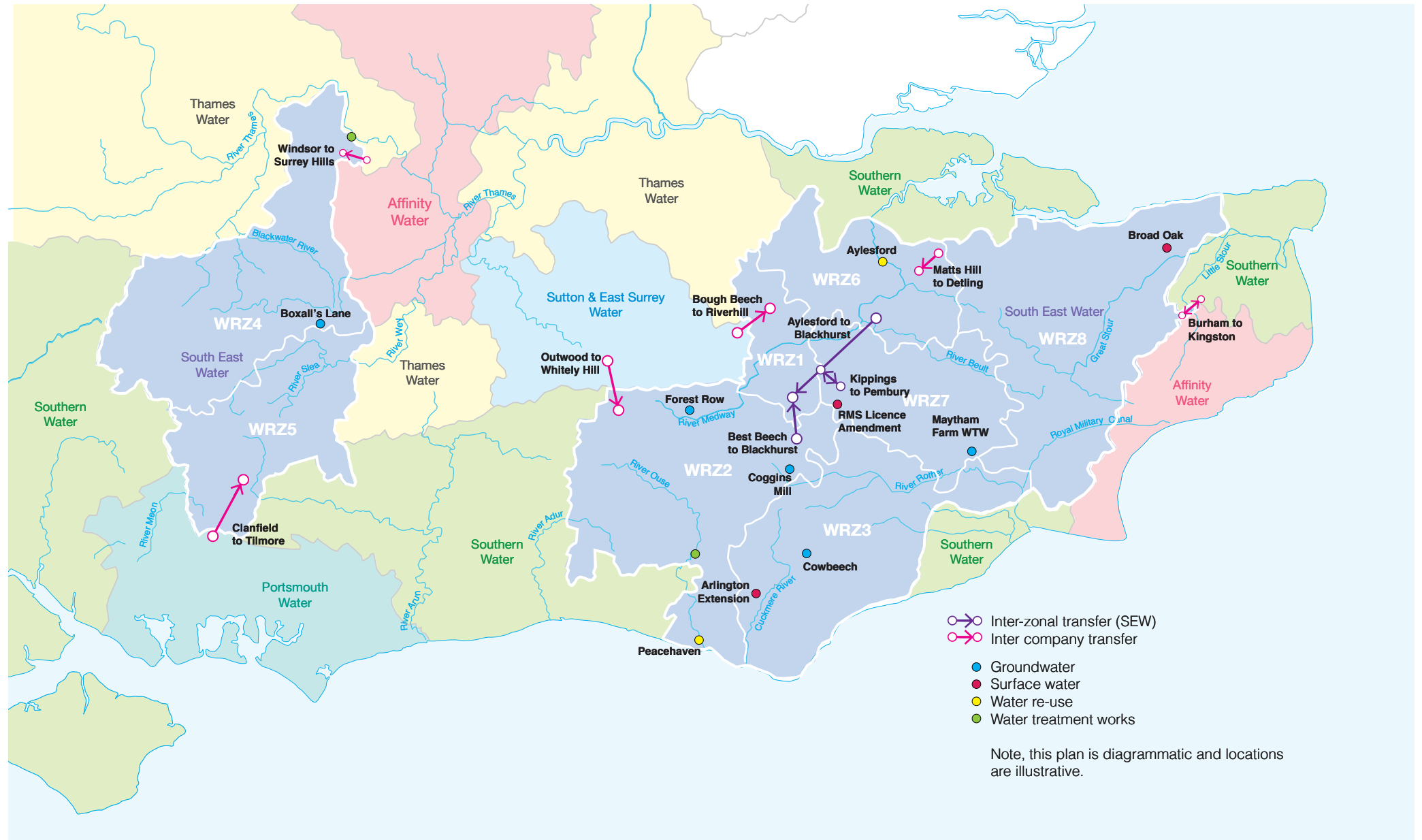
Components of our preferred plan

9.9 This section considers the components of our preferred plan by each of the option types.

Leakage

9.10 Our customers indicated that of all the options available, they would be most willing to pay for leakage reduction. The preferred plan includes

Figure 9.1 : WRMPI4 Preferred Supply Options



2-3 MI/d of further leakage savings beyond the baseline reductions during the first five years through improved District Metered Area (DMA) monitoring and configuration; prioritisation of active leakage control resourcing demand management measures; and pressure management schemes.

9.11 We intend to extend improvements in system management in our WRZs to allow pressures to be reduced, early detection, and subsequent repair of leaks, from customers' properties and from our own infrastructure.

9.12 These further leakage reductions to 2020 are above and beyond the forecast reductions already assumed to be delivered by 2020 as a result of the continuation of our customer metering programme, which we remain fully committed to, and which we forecast will reduce leakage to 90.6 MI/d. By 2040 total leakage reduces to 85.7 M/d and results in an overall leakage level (inclusive of customer side leakage) of approximately 14% of distribution input. Excluding customer side leakage, our company leakage figure would reduce to 10.7%, by 2040. Total leakage in terms of losses per property per day, a better measure of leakage level, reduces from 107 l/prop/day in the Base Year to 78 l/prop/day by the end of the period. Table 9.2 summarises our final leakage numbers delivered by our preferred plan.

Table 9.2 WRMPI 4 final leakage

	2012	2015	2020	2025	2030	2035	2040
Total leakage (MI/d)	94.5	93.1	88.1	87.7	87.7	85.7	85.7
As percentage of demand	16.2%	16.3%	15.5%	15.4%	15.2%	14.6%	14.3%
Leakage as l/property/day	106.5	102.7	92.6	88.6	85.4	80.5	77.5
Company side leakage (MI/d)	71.3	70.8	69.0	68.3	67.0	64.9	64.1
As percentage of demand	12.2%	12.4%	12.1%	12.0%	11.6%	11.1%	10.7%

Water Efficiency

9.13 We already plan for a large reduction in PCC included in the baseline demand forecast, supported by a wide range of activities included in our water efficiency strategy, as described in Appendix 4. The water efficiency strategy results in our customers' PCC reducing by approximately 25 l/h/d over the period of our plan. We operate an extensive education and water efficiency programme aimed at changing customers' behaviour to water use, but to be effective these measures have to be supported and implemented by our customers. In our preferred plan we have included further water efficiency measures that are expected to yield an additional 1 MI/d during the first five years of the period. This is over and above the savings included in our baseline forecast.

9.14 Since August 2011 we have been implementing our customer metering programme,

which incorporates extensive customer engagement to promote and implement a range of water efficiency activities.

9.15 We consider that as our customer metering programme is extended during 2015 to 2020, this will allow increased understanding of customer behaviour, water usage and the deliverability of our water efficiency measures. We intend to incorporate this increased understanding into a future review of the WRMP.

9.16 Our customer research has told us that customers are supportive of water efficiency measures with the most popular measures in priority order being cistern displacement devices, water butts, shower timers and tap and shower inserts. A number of water efficiency measures were considered as part of the WRSE Group, and our own, modelling exercise including retrofit dual or variable flush toilets, repair of leaking toilets and

Table 9.3 Preferred WRMP14 groundwater options

Option	River catchment	Summer Peak Capacity MI/d	Yield start
Boxall's Lane (WRZ4)	Loddon	1.7	2015
Cowbeech (WRZ3)	Cuckmere and Pevensy Levels	1.5	2017
Forest Row (WRZ2)	Medway	2.4	2018
Coggins Mill (WRZ2)	Rother	1.6	2019
Maytham Farm (WRZ7)	Rother	4.3	2019

water efficient white good discount vouchers, and grey water / rain water recycling systems, with a good number of these being selected in our preferred plan.

Groundwater

9.17 Our preferred plan includes five groundwater schemes delivering 11.5 MI/d of new groundwater sources during 2015 to 2020 as shown in Table 9.3.

9.18 Using our experience of the most recent drought and susceptibility of groundwater to three years of little recharge, our aim has been to develop a WRMP14 that includes more resilience and therefore less dependency on groundwater. Given the Environment Agency's concerns over future groundwater development options that it believes are risky on deliverability and sustainability

grounds many have not been included. Our preferred plan includes five groundwater options: at Boxall's Lane in WRZ4 and Cowbeech in WRZ3 with negligible environmental impacts, along with two schemes which we believe can be delivered without significant environmental impact - Coggins Mill in WRZ2 and Forest Row in WRZ2, both of which have been studied in the past as drought options. We have also brought forward Maytham Farm in WRZ7 as a groundwater preferred option, which comprises the replacement of the existing non-operational works with a new treatment works.

Regional Transfers

9.19 Our preferred plan includes six additional regional transfer schemes delivering 35 MI/d transfer capacity by the end of the planning period, although only 33 MI/d net additional water

availability to us. These are shown in Table 9.4. This is in addition to the continuation of existing agreements with Affinity Water and Southern Water, as set out in Section 3.

9.20 This represents an increased number of regional inter-company transfers from WRMP09. Initial discussions have taken place with our neighbouring water companies to reach a level of understanding about the availability of these transfers during the planning period of the plan and copies of this correspondence can be found in Appendix 8. We recognise that there is a degree of flexibility about the precise route of these transfer options and further work is required to ensure environmental impacts are avoided or minimised; and ensure that these schemes are deliverable to meet the objectives of both water companies. These transfers will also be subject to the provisions of the Water Supply Regulations and the drinking water safety plan requirements.

9.21 A number of these transfers are dependent on other demand management options or resource development options in the donor company. This interdependency increases the risk to our plan.

9.22 Discussions between Southern Water and South East Water have explored transfers in Sussex between the two companies. Work has shown that in AMP6 (period 2015 to 2020) no new

Table 9.4 Preferred WRMP14 regional transfer options

Company	To	Source of Supply	Summer Peak Deployable Output (MI/d)	Yield starts
Affinity	Affinity Barham Reservoir Bi-directional	Kingston WTW	2.0	2021
Sutton and East Surrey Water	Whitley Hill service reservoir (WRZ2)	Outwood service reservoir	5.0	2020
Southern Water (Medway Zone)	Detling service reservoir (WRZ6)	Matt's Hill service reservoir	5.0	2022
Sutton and East Surrey Water	Riverhill (Tunbridge Wells) (WRZ1)	Bough Beech service reservoir	5.0	2023
Thames Water (Windsor Zone)	Surrey Hills (Bracknell) (WRZ4)	Potential range of sources	6.9	2031
			10.0	2036
Portsmouth Water	Tilmore service reservoir (WRZ5)	Clanfield service reservoir	10.0	2040

Table 9.5 Preferred WRMP14 reservoir options

Option	River catchment	Summer Peak Capacity MI/d	Yield start
RMS Licence (WRZ6)	Medway	1.6	2016
Broad Oak (WRZ8)	Stour	13.5	2030 to 2035
Arlington Extension (WRZ3)	Ouse and Cuckmere	22.1	2036

transfers are required, but both companies are committed to reviewing these options during AMP7 through the WRSE group or jointly as part of on-going studies. We note that these options

were included in the WRSE work, and rarely selected, but will we work with Southern Water to review the potential for them in the future.

Reservoirs

9.23 During AMP5 (period 2010 to 2015) Southern Water has progressed a licence variation to the River Medway Scheme that will increase the yield of the scheme by 5 MI/d in 2016. Following agreement of our financial contribution to the scheme South East Water will be entitled to 25% of the additional yield i.e. 1.25 MI/d on average and 1.6 MI/d during summer peak periods. This additional yield has been included in our WRMP14.

9.24 Our preferred plan includes two reservoirs towards the end of the planning period. The first new scheme is the development of a reservoir at Broad Oak, near Canterbury, with an intake on the Great Stour, yielding 13.5 MI/d by 2033. The second scheme is an extension to our existing reservoir at Arlington, East Sussex yielding 22.1 MI/d by 2036. These are shown in Table 9.5.

9.25 The inclusion of the Broad Oak reservoir in our preferred plan is a long standing option for which we own the necessary land. This WRMP14 includes a reduced size reservoir than previously proposed in WRMP09; 2,815 MI capacity compared to 5,126 MI in WRMP09. We recognise that further work needs to be undertaken to carefully assess the extent of any new reservoir including the need to avoid any inundation of the SSSI and areas of adjacent ancient woodland, the presence of protected species and visual impact.

However, the opportunity exists to create a new open water habitat and compatible recreational facilities. There is considerable potential for enhancement of the biodiversity of the area through advanced habitat creation on land owned by us outside the area required for a reservoir.

9.26 We are also keen to promote an investigation during 2015 to 2020 of the main strategic options in East Kent with Southern Water and Affinity Water. We can see considerable potential for overlap between the companies' plans in the East Kent area over the 25 year planning period. We believe this further investigation is necessary to explore what we see as potential opportunities to conjunctively develop and operate a range of options together e.g. Broad Oak, Plucks Gutter, Weatherlees water re-use, brackish water desalination and inter-company transfers, in order to maximise yield potential in the region, and minimise environmental impacts and costs.

9.27 We consider that the preferred option to extend our existing reservoir at Arlington through the creation of a bunded reservoir north of the existing site is a more acceptable option than other options considered. It is supported by our customers' preferences in the willingness to pay survey work we have done, and we feel confident it could be delivered within the required time horizon. We consider that there could be significant benefits associated with this reservoir

option to create new habitats and recreational opportunities building on the experience and local knowledge gained from managing our existing reservoir which has been designated a SSSI since its construction. Further work is required to ensure we have comprehensive understanding of the issues involved with this scheme including reducing impact on the designated sites nearby, the presence of protected species and the need to move overhead power lines.

9.28 Given the long lead in time for the development of reservoir options, we consider that the opportunity to undertake surveys and assessment work for both these options to fully understand additional (and as yet unknown) constraints, should be undertaken during the 2015 to 2020 period.

Water Treatment Works

9.29 Our preferred plan includes improvements to two of our existing water treatment works as shown in Table 9.6.

9.30 The option for one of our WTW in our WRZ 2 involves the recovery of process losses and returning them to the inlet of the treatment works rather than discharging them as waste.

9.31 The option for one of our WTW in our WRZ 4 involves plant improvements that will allow an increase in abstraction from the River Thames up to the present available peak abstraction licence rate during summer periods.

Water Re-use

9.32 Our preferred plan for WRMPI 4 includes two water re-use schemes (using treated effluent) during the period 2020 to 2030. These are at Aylesford in WRZ6 and Peacehaven in WRZ2.

9.33 We consulted with Southern Water and agreed Southern Water will investigate the development of the Aylesford water re-use scheme during 2015 to 2020. This investigation will include an outline design for the proposed scheme, and

Table 9.6 Preferred WRMPI 4 Water Treatment Works options

Option	Location	Summer Peak Capacity MI/d	Yield start
Existing treatment works WRZ2	East Sussex	2.0	2016
Existing treatment works WRZ4	Berkshire	29.0	2020

will be worked on by both companies, with Southern Water taking the lead role.

9.34 In our WRMP14 we included a jointly developed and utilised scheme with Southern Water, to take the tertiary treated water from the Aylesford wastewater treatment works and treat for potable supply. We require a yield from the scheme of 12.5 Ml/d in 2023.

9.35 The key elements of the joint scheme are: constructing a new pipeline and pumping facility to take tertiary treated water away from Aylesford wastewater treatment work to discharge on the River Medway at a point upstream of the existing Southern Water Springfield river abstraction point; re-abstracting the water at Springfield; treating the water to potable supply standard using existing treatment capacity at the Southern Water Burham works; and, input of potable water to South East Water's water supply distribution system. At this stage we have not ruled out the potential need for further reverse osmosis treatment after tertiary treatment, and this has been factored into our scheme costs.

9.36 Southern Water is still undecided about when it requires the Aylesford water re-use scheme, and is considering a potential alternative licence trading scheme that could come forward in its plans ahead of the Aylesford water re-use scheme.

9.37 Southern Water has advised us to assume any tertiary treated water it receives as part of the Aylesford scheme will be provided under a raw water bulk supply type agreement.

9.38 We have agreed with Southern Water during AMP6 (2015 to 2020) to continue with feasibility studies and planning to develop the Aylesford wastewater treatment works option, with each company paying a contribution to the joint elements of the final scheme dependent on utilisation rates. If Southern Water decides not to promote the Aylesford water re-use scheme in the future, in preference to alternative options, we might consider developing the joint elements of the Aylesford water re-use scheme independently of Southern Water.

9.39 The Peacehaven preferred water re-use option comprises a transfer pipeline from Southern Water's Peacehaven WwTW, expected to be operational during 2013, to Newhaven WwTW, where a new tertiary treatment plant would be required. The combined treated effluent would then be transferred inland for release into the River Ouse and abstraction at or near to our water treatment works in WRZ 2. Southern Water has confirmed it supports our proposals for the treatment of effluent supplied from Peacehaven Wastewater Treatment Works and that it has no plans to utilise this water at Peacehaven. We have

agreed to work with Southern Water in AMP6 (2015 to 2020) to complete further feasibility studies.

9.40 The scheme as proposed at this stage will deliver up to 25 Ml/d, and is required by 2027.

9.41 Results of our customer surveys carried out in 2012 and the willingness to pay work showed a good level of support for water re-use schemes from our customers.

Inter-zonal Transfers

9.42 We will also look to develop additional water transfers between our WRZs based on the total water which will be available for use during the planning period. Our preferred strategy includes three intra-zonal transfers between 2020 and 2025 as shown in Table 9.7.

9.43 As with the preferred regional transfer options, the precise route of these inter-zonal transfers requires further work to take account of environmental constraints.

9.44 These improvements significantly augment the existing inter-zonal transfer capacity within our supply area, supplementing our water grid by increasing the capability to transfer large quantities of water when required. This provides significant

Table 9.7 Preferred WRMPI4 Inter-Zonal options

From	To	Summer Peak Capacity MI/d	Yield start
Kippings service reservoir (WRZ7)	Pembury WTW (WRZ1) (bi-directional)	8.0	2024
Aylesford service reservoir (WRZ6)	Blackhurst service reservoir (WRZ1)	4.0	2025
Best Beech service reservoir (WRZ2)	Blackhurst service reservoir (WRZ1)	10.0	2025

benefits to our customers and improves the resilience of our supply network.

Final supply demand balance

9.45 Table 9.8 summarises the final supply demand once the preferred plan options are included which demonstrates how the preferred plan maintains a balance between forecast demand and planned supplies over the 25 year planning period.

An estimate of costs

9.46 In line with the guidelines we have made an estimate of the costs attached to our preferred plan. This is presented below in our 5 yearly business plan cycle periods, as shown in Table 9.9. Over the 25 year planning period we estimate that the total capital cost will be approximately £406m

with a total fixed operating cost of £51m and a total variable operating cost of £47m. Table 9.10 shows the preferred plan with costs.

9.47 Over the 25 year planning period the net present value of our preferred plan is £205m.

9.48 The estimate of cost of our preferred plan above does not include the cost associated with the continuation of our customer metering programme. The capital cost of this programme of work in 2015 to 2020 is estimated at approximately £45m.

Table 9.8 WRMPI4 Final supply demand balance

	Dry Year Annual Average (MI/d)				Summer Peak Period (MI/d)			
	2015	2020	2030	2040	2015	2020	2030	2040
Deployable Output	622.7	624.7	646.6	667.2	727.2	762.4	789.6	823.1
Bulk Supplies	56.4	61.4	79.4	89.4	57.3	62.3	80.3	90.3
Process Losses	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3
Outage	27.4	27.4	27.4	27.4	36.7	36.7	36.7	36.7
Total (WAFU)	639.3	646.4	686.2	716.8	735.5	775.7	820.9	864.3
Demand	573.1	568.8	578.2	598.3	696.2	698.0	726.9	769.9
Target Headroom	13.7	26.8	42.1	58.9	15.9	33.4	54.7	75.7
Demand + Headroom	586.8	595.6	620.3	657.2	712.1	731.4	781.6	845.6
Supply Demand Balance	52.5	50.8	65.9	59.6	23.4	44.3	39.3	18.8
WRMP09 Supply Demand Balance	50.2	57.5	60.3		23.1	33.0	52.2	
Change	2.3	-6.7	5.6		0.3	11.3	-12.9	

Table 9.9 WRMP14 Preferred plan cost profile (2012-2013 prices)

CAPEX, FOPEX & VOPEX	2015-20	2020-25	2025-30	2030-35	2035-40	Total
	£m	£m	£m	£m	£m	£m
Capital Investment	£57.1	£96.7	£74.6	£146.6	£31.0	£406.0
Fixed Operating Costs	£8.4	£5.6	£9.9	£12.3	£15.0	£51.2
Variable Operating Costs	£0.0	£2.2	£12.4	£19.4	£12.7	£46.7
Total	£65.6	£104.5	£96.9	£178.3	£58.8	£503.8

Comparison of the preferred plan options to WRMP09

9.49 For the period up to 2020, the current WRMP09 comprises the existing customer metering programme delivered with water efficiency and further leakage reductions; improved connectivity and sharing of resources between the Company's water resource zones; and a number of further groundwater developments, some of which have since been brought forward into the 2010 to 2015 period to minimise risk and ensure agreed levels of service to our customers are met.

9.50 Post 2020, through to 2035, the current WRMP09 includes further groundwater development across most resource zones; a desalination plant at Newhaven; a reservoir in the Ouse catchment (Clay Hill); raising of Bewl reservoir; a water re-use scheme at Aylesford, and a reservoir at Broad Oak.

9.51 The WRMP09 includes a commitment to complete a full review of the range of options available post 2020, and makes particular reference to further exploration of inter-company transfer options and water re-use options. We consider we have achieved this in preparing the WRMP14 and Section 7 and Appendix 7 explains how we have undertaken an extensive options appraisal exercise.

9.52 There are some key differences in WRMP14 compared to the WRMP09 including a reduced number of new groundwater options; an increased number of inter-company transfers and further leakage reduction. Whilst different in terms of volumes and in some cases schemes, a similar set of solutions of water re-use schemes and new storage reservoirs are included towards the end of the planning period.

Does the preferred plan meet our objectives?

9.53 As explained in Section 1 'Introduction', we set eight high level objectives at the start of preparing the WRMP14. In this section we consider how the preferred plan meets these objectives.

1. Improvements in the mix of supply sources operated by us in the medium to longer term, reducing the reliance on groundwater and improving resilience to drought and climate change.

9.54 Earlier sections of this WRMP14 illustrated the scale of challenges and uncertainties we face to meet increasing demand for water from a growing population placing additional pressures on our water supply network. We explained how we propose to best manage and maintain our existing supply network to improve resilience, while keeping within abstraction licence limits and maintaining our high environmental standards.

9.55 Across the planning period the preferred plan includes options to develop new water and an improved mix of sources of supply. Table 9.11 shows the improvement in source mix by 2040. Our preferred plan will offer improved drought resilience, extend our range and mix of options so we are not over reliant on one type of source of supply and generally meet the objectives of the SEA.

Table 9.10 WRMPI4 Preferred plan with costs

Option type	Option name	Source Company	Summer Peak Capacity Ml/d	Yield start	Capex £m	Fixed Opex £m	Variable Opex £m
Leakage	Various options		4.9	2015	6.7	4.3	0.0
	Total		4.9		6.7	4.3	0.0
Water Efficiency	Various options		1.0	2015	0.0	6.8	0.0
	Total		1.0		0.0	6.8	0.0
Groundwater	Boxalls Lane		1.7	2016	2.6	0.1	0.0
	Cowbeech		1.5	2017	4.6	1.5	0.2
	Forest Row		2.4	2018	4.8	1.3	0.5
	Coggins Mill		1.6	2019	5.9	1.0	0.7
	Maytham Farm		4.3	2019	3.3	3.0	0.0
	Total		11.5		21.2	6.9	1.4
Reservoirs	RMS Licence		1.6	2016	0.0	0.0	0.0
	Broad Oak		13.5	2033	77.3	2.7	0.1
	Arlington		22.1	2036	127.2	1.8	1.1
	Total		37.2		204.5	4.5	1.2
Regional Transfers	Bough Beech to Riverhill	SESW	5.0	2023	8.2	0.5	0.5
	Clanfield to Tilmore	PRT	10.0	2040	1.1	0.1	0.0
	Outwood to Whitely Hill	SESW	5.0	2020	8.1	0.5	1.8
	Kingston to Affinity	AFF	-2.0	2021	0.0	0.0	0.0
	Matts Hill to Detling	SWS	5.0	2022	0.9	0.0	1.7
	Windsor to Surrey Hills	TWU	10.0	2031	3.9	0.1	0.2
	Total		33.0		22.2	1.2	4.2
Water Re-use	Aylesford		12.5	2023	34.5	7.7	21.7
	Peacehaven		25.0	2027	64.5	9.9	17.7
	Total		37.5		99.0	17.6	39.4
Water treatment works	Existing works in WRZ2		2.0	2016	1.7	0.0	0.4
	Existing works in WRZ4		29.0	2020	23.7	8.6	0.1
	Total		31.0		25.4	8.6	0.5
Total new water			156.1		379.0	49.9	46.7
Intra-Company transfer	Kippings to Pembury		4.0	2024	2.3	0.1	0.0
	Aylesford to Blackhurst		4.0	2025	14.6	0.8	0.0
	Best Beech to Blackhurst		10.0	2025	10.1	0.4	0.0
	Total		18.0		27.0	1.3	0.0
Total Plan			174.1		406.0	51.2	46.7

2. Supports bulk supplies and sharing of resources where they improve the resilience to drought, are cost effective and are supported with the right terms and contracts.

9.56 We only removed bulk supply options that were deemed high risk or no longer available following more discussion with donor companies. As a result, although the preferred WRMPI4 includes significantly higher levels of new bulk supplies overall, it is less than suggested in some of the WRSE work. The bulk supplies that are included at this stage are based upon 'in principle' agreements which have been reached with our neighbouring water companies.

9.57 In preparing this WRMPI4 we have assumed that our existing transfer contracts with Southern Water will continue to operate, with their acceptance, under the same operating agreements (i.e. costs and yields). Our modelling work to date has highlighted the opportunity to explore joint schemes selected with Southern Water, such as the Aylesford water re-use option, on an equal ownership basis. Further work has progressed in time to include in WRMPI4 with regard to the security and resilience of bulk supplies.

3. Meets the political agenda to include more ambitious demand management leading to reduced levels of per capita consumption, but to an extent that is technically and

Table 9.11 WRMPI4 Source mix (taking account of climate change)

Summer Peak Period Deployable Output	Base Year 2015		Preferred WRMPI4 2040	
	MI/d	%	MI/d	%
Groundwater	571.5	73%	573.7	63%
Surface Water	155.7	20%	211.9	23%
Bulk Imports	57.3	7%	92.3	10%
Bulk Exports	0	0%	-2.0	0%
Water (Effluent) Re-use	0	0%	37.5	4%
Total	784.5	100%	913.4	100%

economically justified and includes a suitable level of provision for associated uncertainties and risks.

9.58 A more ambitious demand forecast has been included in the supply demand balance, as outlined in Sections 4 and 6 of this WRMPI4. The associated uncertainties and risks have been accounted for in target headroom, also outlined in Section 5 and Appendix 5.

4. Improves the robustness of the existing supply forecast to take account of operational experience including the most recent drought.

9.59 The existing supply forecast has been thoroughly reviewed and a more robust forecast has been included in the supply demand balance, as outlined in Section 3.

5. Supports the outcomes from WRSE where this can be demonstrated not to leave customers or the Company in a worse position in terms of cost to deliver the planned levels of risk.

9.60 The guideline requires water companies to provide a clear audit trail between the outcomes of the WRSE regional modelling and their individual WRMPs. Differences are expected and acceptable, but these must be explained and justified.

9.61 Large parts of the South East of England are defined as areas of water stress; there is only a finite amount of water available, not only to our customers, but to our neighbouring water companies too without increasing supplies in the future. We have participated extensively in the WRSE Group modelling exercise to explore the options for sharing water through additional water transfers; and where these have proved to be right

for our customers we have commenced discussions with our neighbouring water companies to ensure these solutions will provide the resilient bulk supplies we are seeking. We have retained these WRSE transfers in our preferred set of options for WRMPI4.

9.62 In developing our preferred WRMPI4 we have compared the set of options proposed against the list of core and alternative strategic options, and also against the base case scenarios. Appendix 8 provides a view on how each of the options and plans compare.

9.63 The WRSE Phase 3 modelling completed during September and October 2013 has validated our WRMP and confirmed it to be broadly consistent with the WRSE model results.

9.64 The modelling has demonstrated that the overall cost of the options in our WRMPI4 is consistent with that of the other WRSE scenarios modelled.

6. Enables the Company to meet customer expectations regarding levels of service.

9.65 We have consulted with our customers on the levels of service they wish us to plan for. This is determined through testing with customers their acceptance of current planned levels of service

compared with alternatives, e.g. more frequent (1 in 5 year restrictions) and reduced cost to customers; less frequent (1 in 20 year restrictions) but higher cost to customers.

9.66 Work undertaken to inform the new plan confirmed that customers support the retention of our existing levels of service for WRMP14. Our preferred plan continues to be based upon meeting 1 in 10 year levels of demand in the future.

7. Is cost effective, environmentally sustainable and affordable.

9.67 The preferred plan has been developed in a cost effective way. The cost of the preferred plan is shown in Table 9.9 and further work to the estimated cost to customers is calculated through our PR14 financial modelling. The willingness to pay research leads us to conclude that our customers are supportive of the preferred set of options presented in WRMP14. The preferred plan meets with the requirements of our SEA on environmental grounds. The consultation will offer a further opportunity for our customers, both household and non-households to give feedback on the preferred set of options.

9.68 In summer 2014 we submit our Business Plan for the period 2015 to 2020 to Ofwat. It takes account of the expenditure required to deliver the

WRMP14 during that period, as well as investment requirements in other areas e.g. to maintain existing sources, existing operating costs etc.

9.69 The level of investment to deliver WRMP14 during 2015 to 2020 is similar to the level of investment that was required and is being implemented during the period 2010 to 2015. The Business Plan is likely to confirm that in the round, the total investment package required for the 2015 to 2020 is not likely to require increases in bills, net of inflation, and further consideration is likely to be given to whether reductions in bills might be appropriate.

9.70 The cost of delivering the WRMP14 during the period 2015 to 2020 adds £10 to the average householder bill by 2020. However, we expect this increase to be at least offset by efficiencies, reduced cost of borrowing and lower returns to shareholders so that average bills remain broadly flat across the 2015 to 2020 period.

9.71 The service and the cost of the WRMP14 has been tested with customers and this showed a high level of support with over 80% of households declaring the plan to be acceptable.

8. Ensure transparency has been achieved in as fully inclusive manner as possible, so that the Plan can enjoy the support of our regulators, stakeholders and customers.

9.72 Throughout the development of the new plan a culture of transparency has been key and the engagement strategy has been designed to achieve this, as outlined in Section 2 and Appendix 2. The decision making to arrive at the preferred plan and alternative options to that plan is clear and understandable to our stakeholders, our customers and regulators.

Alternative options

9.73 Although the guideline requires water companies to present a preferred plan, companies are also able to consult on alternative plans. We therefore decided, as part of the consultation process on our dWRMP14, to include alternative options to the preferred plan. This gave us more flexibility to ensure that the WRMP14 meets our requirements in the light of new information that may come to light and also allowed our customers to have the opportunity to comment on the alternative options available.

9.74 Our extensive modelling exercise, including our work with the WRSE Group, has resulted in more constrained options for WRMP14. This includes fewer regional transfer options than we originally expected to be available with a number of options being removed by the donor water company, or which we have decided not to proceed with due to a high degree of uncertainty and therefore risk about the availability of those bulk supplies. Our preferred plan also includes

fewer groundwater options while those included on the Environment Agency’s ‘red list’ and deemed high risk in terms of deliverability and /or sustainability have not been included in WRMPI4.

9.75 Whilst the idea of identifying and presenting the alternative options to our preferred plan for WRMPI4 has been to demonstrate there is some flexibility, in reality all future options post 2020, included in the preferred plan and the alternative options, require the development of key supply infrastructure with long lead times.

9.76 The alternative options we consider to be available are included in Table 9.12.

9.77 In Appendix 9 we set out how and when alternative options included in Table 9.12 would be triggered and replace preferred schemes for strategic long lead options – to demonstrate the flexibility and robustness of our preferred plan to changing circumstances.

Next steps: our work for the period 2015 to 2020

9.78 Section 3 explains how we have built resilience into our supply forecast, ahead of the consideration of our options appraisal work to meet the supply demand deficit. These improvements in the supply forecast have contributed in part to the deficits in the supply

Table 9.12 WRMPI4 Alternative options

Period	Preferred Plan	Alternative Options
2015 to 2020	Leakage	Retain
	Water Efficiency	Retain
	Groundwater	Enhance leakage reduction and transfer more water from WRZ7 to WRZ2
	Transfers (Sutton and East Surrey Water)	Bring in additional groundwater.
	WTW in WRZ 2	Retain
	WTW in WRZ 4	Bring forward transfer from Thames Water or Portsmouth Water
2021 to 2030	Leakage	Retain
	Transfer (Sutton and East Surrey Water)	Aylesford Water Re-use/Medway Desalination
	Transfer (Southern Water)	Transfer from RZ8 to be considered as part of East Kent Strategy / Medway Desalination
	Aylesford Water Reuse	Transfer from RZ8 to be considered as part of East Kent Strategy / Medway Desalination / Additional leakage reduction could also contribute
	Peacehaven Water Reuse	Extension to Arlington Reservoir
2031 to 2040	Leakage	Retain
	Broad Oak Reservoir	North Kent Desalination, Plucks Gutter and/ or Transfer (with Southern Water/ Affinity Water) and/ or Weatherlees Water re-use.
	Extension to Arlington Reservoir	Bunded Reservoir on the River Ouse
	Transfer (Thames)	Transfer (Portsmouth) or Aquifer Storage recovery / Additional leakage reduction could also contribute
	Transfer (Portsmouth)	Transfer (Thames) or Aquifer Storage Recovery

demand balance during the 2015 to 2020 period at summer peak, and we have brought forward new schemes to bridge the gap (and therefore improve overall resilience). We have set out our intentions for the period 2015 to 2020, which has implications for our Business Plan for 2015 to 2020.

9.79 The preferred plan has a robust supply and demand forecast in the early years and the options we plan to deliver have a good level of certainty that they are deliverable. We have a robust target headroom calculation, which is representative of the levels of uncertainties we need to manage, but we consider that our preferred plan allows for these. Uncertainty around climate change has been tackled with the establishment of a better mix of sources, whilst further sustainability reductions which may imposed on us are considered a low risk for the first five years of WRMP14.

9.80 For the planning period 2015 to 2020 we propose to continue to develop our leakage and water efficiency options further across all the WRZs. Table 9.13 shows how our preferred plan proposes to develop all five of our groundwater preferred options; two regional transfer options and improvements to both WTWs.

9.81 Between 2015 and 2017 and prior to WRMP19, we propose to undertake a range of further studies to enhance our longer term plans.

These studies are supported by representations we received on our dWRMP14. They are listed below:

1. Review the assumptions behind our outage assessment and methodology and complete assessment to evaluate further options to reduce outage at our sites where outage is highest;
2. Update our Sustainable Economic Level of Leakage (SELL) analysis to take full account of the latest (October 2012) SELL industry guidance;
3. Complete further work with industry experts on the impacts of climate change on supply and demand;
4. Continue to review the benefits of the customer metering programme (CMP) and review of options to increase meter penetration to 100% beyond 2020 for consideration in our next WRMP in 2019;
5. Continue the on-going review of water efficiency measures and supply options for consideration in our next WRMP in 2019;
6. Complete investigation of an East Kent Strategy with Affinity Water, Southern Water and other key stakeholders in Kent to inform our next WRMP in 2019;
7. Complete joint investigations with Southern Water on the Aylesford water re-use scheme, to planning application stage at the end of AMP6 (period 2015 to 2020) as appropriate;
8. Complete further studies on long lead time strategic schemes and transfers, which will involve a range of stakeholders, (including the Drinking Water Inspectorate, Environment Agency, Natural England, other water companies and local planning authorities), to ensure that these complex schemes can be delivered with minimum impact on the environment and local communities;
9. Review Water Framework Directive assessments for the AMP6 (period 2015 to 2020) groundwater schemes and impact assessments for transfers, including variations to pipeline routes and/or service reservoirs;
10. Implement AMP6 (period 2015 to 2020) supply and demand schemes in line with our preferred plan;
11. Deliver our NEP for AMP6 (period 2015 to 2020), that will include a number of catchment management studies; and,
12. Complete investigations of the alternative options to our preferred plan options. Work to refine the triggers and monitoring programmes included for alternative schemes is discussed in Appendix 9.
13. Complete a review of process losses at our treatment works and options to reduce these.

Further information on components of this programme of work is provided in Appendix 9.

Table 9.13 WRMPI4 preferred plan by WRZ

	2015-2020	2020-2030	2030-2040
WRZ1	Leakage reductions Water efficiency strategy Inter-zonal transfers	Leakage reductions Water efficiency strategy Bough Beech to Riverhill regional transfer scheme Inter-zonal transfers	Leakage reductions Water efficiency strategy Inter-zonal transfers
WRZ2	Leakage reductions Water efficiency strategy Forest Row and Coggins Mill groundwater schemes Improvements to existing treatment works Outwood to Whitely Hill regional transfer scheme Inter-zonal transfers	Leakage reductions Water efficiency strategy Peacehaven water (effluent) re-use scheme Inter-zonal transfers	Leakage reductions Water efficiency strategy Inter-zonal transfers
WRZ3	Leakage reductions Water efficiency strategy Cowbeech groundwater scheme	Leakage reductions Water efficiency strategy	Leakage reductions Water efficiency strategy Arlington (extension to existing reservoir)
WRZ4	Leakage reductions Water efficiency strategy Boxall's Lane groundwater scheme	Leakage reductions Water efficiency strategy Improvements to existing treatment works	Leakage reductions Water efficiency strategy Windsor to Surrey Hills regional transfer scheme
WRZ5	Leakage reductions Water efficiency strategy	Leakage reductions Water efficiency strategy	Leakage reductions Water efficiency strategy Clanfield to Tilmore regional transfer scheme
WRZ6	Leakage reductions Water efficiency strategy Inter-zonal transfers	Leakage reductions Water efficiency strategy Matts Hill to Detling regional transfer scheme Aylesford water re-use scheme Inter-zonal transfers	Leakage reductions Water efficiency strategy Inter-zonal transfers
WRZ7	Leakage reductions Water efficiency strategy Maytham Farm groundwater scheme Inter-zonal transfers	Leakage reductions Water efficiency strategy Inter-zonal transfers	Leakage reductions Water efficiency strategy Inter-zonal transfers
WRZ8	Leakage reductions Water efficiency strategy.	Leakage reductions Water efficiency strategy Barham to Kingston bi-directional regional transfer scheme	Leakage reductions Water efficiency strategy Broad Oak reservoir

Overall conclusions

9.82 We consider that the overall process and decisions taken in preparing the preferred plan are transparent and understandable to stakeholders and our customers. Our preferred plan takes account of the WRSE Group regional modelling work and provides clear explanation for the decisions we have taken in formulating the preferred set of options for consultation with our customers, our stakeholders and our regulators.

9.83 As outlined in Section 8, when developing the preferred plan we have carried out a risk assessment of the options included. We have carried out further work to refine and finalise the outcomes of the risk framework assessment for WRMPI 4 and what is clear is that our preferred plan does include those options that overall represent the lowest risk from the list of options available. Table 9.14 outlines our high level assessment of the overall risk of our preferred plan to our customers, the environment, stakeholders and shareholders.

9.84 A key decision point within WRMPI 4 has been to limit future development of new groundwater. This is justified on the grounds of high uncertainty around the yields that could be achieved and risk around the deliverability of the available options following further scrutiny, combined with regulator concerns surrounding the

Table 9.14 High level assessment of the overall risk

	Risk level	Risks	Mitigated in plan
Customers		<ul style="list-style-type: none"> • Low resilience leads to more interruptions • Low value solutions lead to high bills • Short term options lead to higher future bills more interruptions 	<ul style="list-style-type: none"> • Plan assumptions robust and based on sound process • Best value solution selection in built into process • Mix of long and short term options to reduce inter-generational effect
Environment		<ul style="list-style-type: none"> • Risk that options are damaging in terms of delivery • Risk that options are damaging in terms of abstraction damage 	<ul style="list-style-type: none"> • Full assessment of options list in terms of delivery impact including wide ranging consultation • SEA compounded impact assessed as well as individual options assessed
Stakeholders		<ul style="list-style-type: none"> • Balance of options not acceptable (supply vs demand) • Individual options unacceptable • Need for water overstated 	<ul style="list-style-type: none"> • Balance created through optioneering process • All options shared and consulted upon • Water need generated from guidance and independently audited
Shareholders		<ul style="list-style-type: none"> • Risk that chosen schemes do not deliver and substitutes are required • Reputational risk of service failures • Plan not accepted for approval 	<ul style="list-style-type: none"> • Mitigated in part by regulatory framework • Portfolio of schemes increases resilience • Plan complies with guidance and key stakeholders kept informed throughout

longer term sustainability and resilience of many of the new groundwater developments to more severe drought and climate change scenarios.

9.85 Our WRMPI 4 therefore proposes a better mix of sources to meet customers' demands for water across our supply area but many of the future solutions have long lead in times and are

potentially complex operations with a degree of planning risk. It is important that these long lead in times are carefully managed, not least because the short term solutions we have relied upon in the past, and which historically have served us well, are now dwindling. Looking at the range of options, lead times and permutations, we have been mindful that 2015 to 2020 will be a critical period to undertake investigations on some preferred and alternative options with long lead times.

9.86 We have based our WRMP14 on the WRSE and our own least cost modelling. The WRMP14 has been developed with input from key stakeholders represented on the EFG and CCG, and it takes account of the main findings of the willingness to pay, customer surveys and the SEA process. An assessment of the overall risk of the preferred plan, and alternative options available, gives confidence that the preferred plan offers the best value plan for our customers for the planning period 2015 to 2040.