Water Resources Management Plan 2019

Annex 7: Summary of Rejected Options

December 2019

Version 1

from Southern Water

Contents

1. Executive summary

This annex covers options that did not make it through to the feasible list of options. Table 1 shows unconstrained options that did not make it through to the constrained list of options. Table 2 shows constrained options that did not make it through to the feasible list of options. The process by which options were screened and filtered is set out in Annex 6. The criteria against which options were assessed are shown in Table 1 and Table 2, along with the results of these assessments for each rejected option. The option groups and categories used in the tables are given below.

Option group	Option group code	Option category	Option category code
Demand management	DM	Leakage management	LM
		Metering/tariffs	MET
		Water efficiency	WEF
Drought options	DO	Demand interventions	DI
		Supply interventions	SI
New water	NW	Desalination	DES
		Canal water abstraction	CWA
		Groundwater abstractions (new)	GWA
		Surface water abstractions	SWA
		New technologies	NT
Storing water	STR	Aquifer storage and recovery	ASR
		Reservoirs	RES
Water reuse	WR	Indirect potable water reuse	PWR
		Industrial water reuse	IWR
		Grey water reuse	GRE
Managing the water environment	ENV	Catchment management	CM
		Conjunctive use	CU
		Licence variation	LV
		Supporting river flows	SRF
Trading water	TW	Bulk supplies	BS
		Bulk export	BE
		Inter-zonal transfers (between Southern Water Water Resource Zoness)	IZT
		Licence trading	LTR
Managing existing assets	ASS	Asset enhancement	AE
		Water treatment works enhancement	WTW
		Borehole rehabilitation	BR

Other abbreviations used in the tables are as follows:

ADO	Average Deployable Output
DO	Deployable Output
EA	Environment Agency
HA	Hants Andover
HK	Hants Kingsclere
HR	Hants Rural
HSE	Hants Southampton East
HSW	Hants Southampton West
HW	Hants Winchester
IOW	Isle of Wight
KME	Kent Medway East
KMW	Kent Medway West
MDO	Minimum Deployable Output
PDO	Peak Deployable Output
SB	Sussex Brighton
SH	Sussex Hastings
SN	Sussex North
SW	Sussex Worthing
WRSE	Water Resources in the South East
WSW	Water Supply Works
WSR	Water Service Reservoir
WTW	Water Treatment Works
WwTW	Wastewater Treatment Works

2. Summary of rejected options

Table 1 Unconstrained options not proceeding to the constrained list of options

Option category code	Option name	Option description	Area	WRZ	Screening criteria: unconstrained to constrained									
					Beneficial environmental outcomes?	Increased resilience?	Phased/Modular implementation?	Technically feasible?	Addresses water resources planning problem?	Meets customer and regulator expectations?	Avoids disproportionate costs and/or delivers appreciable water	Confidence in implementation/output?	Include in constrained option list?	Comments
AE	Develop strategic trunk main in Brighton	Asset enhancement option to develop a strategic trunk main in Brighton, and thus facilitate the transfer of water between Sussex North WRZ and Sussex Worthing and Sussex Brighton WRZs.	Central	SB	No	Yes	No	Yes	No	Yes	Yes	Yes	No	The option for increasing water from Sussex North to Sussex Brighton is considered in the Pulborough Winter transfer option.
AE	Development of the existing Ventnor dewatering schemes for potable supply	The limited and unreliable yield of the de-watering scheme will not provide addition DO, therefore this option has not been progressed.	Western	IOW	No	No	No	Yes	No	Yes	No	Yes	No	The limited and unreliable yield of the de-watering scheme will not provide additional DO and there have been no recent changes to make the scheme viable.
AE	Duplicate trunk main to release locked in DO in Kent Thanet WRZ	This option looks to install approximately 10km of new main (incl. booster pumping station) between the existing main Sandwich WSW and Fleete Manston WSR. The aim of this scheme is to release DO from the groundwater sources in Kent Thanet whose combined DO far exceeds demand by approximately 12Ml/d. Transfer of this excess supply is currently restricted by pressure constraints in the Kent Thanet mains network.	Eastern	KT	No	Yes	No	Yes	No	Yes	No	No	No	AMP5 exclusion remains justified: Limited yield and long term DO benefit is uncertain / likely to reduce with time due to climate change impacts - i.e. The DO drops below the constraint.
AE	Connectivity increased – Pulborough covering Weir Wood	This scheme would increase connectivity within Sussex North WRZ to allow greater flexibility – for instance, with Pulborough able to cover Weir Wood (suggested in EA letter of 18/11/05).	Central	SN	No	Yes	-	No	No	No	No	No	No	Reason for exclusion from AMP4 Phase 1: Option is an asset enhancement scheme already being undertaken by SWS. Issues surrounding the impact of connectivity between Pulborough and Weir Wood would be considered further during Phase 2 and Phase 3, but not as a standalone option. Reasons for exclusion from AMP 5 feasible list: Excluded because it asset enhancement. AMP5 exclusion reason remains valid
AE	Develop new 'leakage sources' to capture groundwater flowing into tidal sites	This option reviews the potential for capturing groundwater flow into tidal sites in both the Kent Medway and Thanet WRZs. This is predominantly considered as an operational efficiency measure, in a similar manner to 'spread load' boreholes in that it would permit key groundwater sources to be rested.	Eastern	KMW, KME and KT	-	-	-	No	No	No	No	No	No	Source enhancement (therefore does not form part of a strategic option).
AE	Transfer to Midhurst	This was deferred under the PR04 options screening process (Nov. 2002 report). Deferment was a result of awaiting the outcome from dredging at Swanbourne Lake and a reduction in the Midhurst licence.	Central	SN	-	-	-	No	No	No	No	No	No	This option is an asset optimisation scheme as opposed to an option that provides an increase in available water. It will be considered as an integral part of the resource modelling process.
AE	East Worthing alternative site and treatment capacity	Scheme to improve DO through additional treatment for East Worthing scheme.	Central	SW	No	-	-	No	No	No	No	No	No	Option replaced by another licence variation option as source is currently licence constrained.
AE	Develop new trunk mains Perry Hill to Tennants Hill	Develop new trunk mains Perry Hill to Tennants Hill	Central	SN	-	-	-	No	No	No	No	No	No	Previous reasons for exclusion remain valid. This option is an asset enhancement option as opposed to providing additional water.
AE	Develop new 'spread load' boreholes to increase DO	This option investigates developing sources in order to spread abstractions across an increased number of boreholes. This will result in making enhancements to a number of boreholes. Work was carried out under the 'Source Optimisation' programme during 2006 to investigate a number of opportunities in this area.	Eastern	KME and KMW	-	-	-	No	No	No	No	No	No	AMP5 exclusion remains valid: Source enhancement (therefore does not form part of a strategic option).
ASR	Hampshire - Bagshot Beds	Hampshire - Bagshot Beds ASR	Western	HS	No	No	No	No	No	No	No	No	No	Tertiary Bagshot Beds are unsuitable for ASR exploitation as the aquifer is semi-confined and the poorly consolidated fine sands are likely to result in clogging problems.
ASR	Hampshire - Chalk	Hampshire - Chalk ASR	Western	HS	No	Yes	No	No	No	No	No	No	No	The Chalk source in central and northern Hampshire is largely unconfined and therefore not appropriate for the application of ASR.
ASR	Pulborough Artificial Recharge	Artificial recharge and increased abstraction from the Pulborough Basin Folkestone Beds aquifer.	Central	SN	No	Yes	No	Yes	Yes	No	Yes	Yes	No	It is not viable to operate this scheme unless the aquifer within the Pulborough Basin is allowed to be derogated by

														abstraction during the summer. The scheme would have to result in increased impacts on the SPA wetlands during summer/autumn conditions compared with the current situation.
ASR	Isle of Wight - Bagshot Beds	Isle of Wight - Bagshot Beds ASR	Western	IOW	No	Yes	No	No	No	No	No	No	No	The aquifer is technically inappropriate for ASR due to the close proximity to the outcrop or the potential hydraulic connectivity with the sea.
ASR	Isle of Wight - Chalk	Isle of Wight - Chalk ASR	Western	IOW	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR (either physically or environmentally).
ASR	Isle of Wight - Bembridge Marls and Limestones	Isle of Wight - Bembridge Marls and Limestones ASR	Western	IOW	No	Yes	Yes	No	No	No	No	No	No	AMP4 exclusion remains valid. The option is not likely to be technically feasible due to insufficient hydraulic conductivities.
ASR	Isle of Wight - Upper Greensand	Isle of Wight - Upper Greensand ASR	Western	IOW	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is not likely to be technically appropriate for ASR (either physically or environmentally).
ASR	Kent Medway Chalk	Kent Medway Chalk ASR	Eastern	KME and KMW	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR.
ASR	Kent Medway - Thanet Sands	Kent Medway - Thanet Sands ASR	Eastern	KME and KMW	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR (either physically or environmentally).
ASR	Kent Thanet - Chalk	Kent Thanet - Chalk ASR	Eastern	KT	No	Yes	Yes	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR.
ASR	Kent Thanet - Jurassic Limestones	Kent Thanet - Jurassic Limestones ASR	Eastern	KT	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR (either physically or environmentally).
ASR	Kent Thanet - Lower Greensand	Kent Thanet - Lower Greensand ASR	Eastern	KT	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is not technically suitable for ASR (either technically or environmentally).
ASR	Kent Thanet - Thanet Sands	Kent Thanet - Thanet Sands ASR	Eastern	KT	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR.
ASR	Kent Thanet - Upper Coal Measures Sandstone Division	Kent Thanet - Upper Coal Measures Sandstone Division ASR	Eastern	KT	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is not technically appropriate for ASR (either technically or environmentally).
ASR	Medway Greensands	Medway Greensands ASR	Eastern	KME and KMW	No	Yes	No	Yes	No	No	No	No	No	AMP4 exclusion remains valid. Investigation concludes that ASR at Kent Medway WRZ is not practically feasible as a strategic resource development option, due to water quality and hydrogeological constraints.
ASR	Sussex Coast - Ashdown Beds	Sussex Coast - Ashdown Beds ASR	Central	SN	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. No information is available for this formation but the depth of the aquifer would make the scheme very expensive.
ASR	Sussex Coast – Chalk	Sussex Coast – Chalk ASR	Central	SW and SB	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR.
ASR	Sussex Coast – Tunbridge Wells Sands	Sussex Coast – Tunbridge Wells Sands ASR	Central	SW and SB	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The option is not likely to be technically feasible due to insufficient hydraulic conductivities.
ASR	Sussex Coast – Upper Greensand	Sussex Coast – Upper Greensand ASR	Central	SW and SB	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The option is not likely to be technically feasible as the Upper Greensand is hydraulically connected with the Chalk.
ASR	Sussex Hastings - Ashdown Beds	Sussex Hastings - Ashdown Beds ASR	Eastern	SH	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR.
ASR	Sussex Hastings - Portland Sandstone	Sussex Hastings - Portland Sandstone ASR	Eastern	SH	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR (either technically or environmentally).
ASR	Sussex Hastings - Tunbridge Wells Sands	Sussex Hastings - Tunbridge Wells Sands ASR	Eastern	SH	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR because the siltation problems and the heterogeneous nature of the material.
ASR	Sussex North – Ashdown Beds	Sussex North Ashdown Beds ASR	Central	SN	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The aquifer is technically inappropriate for ASR (either physically or environmentally).
ASR	Sussex North – 5Ml/d (Hythe Beds)	Sussex North – 5Ml/d (Hythe Beds) ASR	Central	SN	No	Yes	No	Yes	Yes	No	No	No	No	AMP4 exclusion remains valid. ASR is theoretically possible for the area, but the Pulborough basin would be very high risk due to interactions with shallow aquifers and surface waters.
ASR	Sussex North – Portland Sandstone	Sussex North – Portland Sandstone ASR	Central	SN	No	No	No	No	No	No	No	No	No	AMP5 exclusion remains valid. The aquifer is technically inappropriate for ASR (either physically or environmentally).
ASR	Sussex North – Tunbridge Wells Sands	Sussex North – Tunbridge Wells Sands ASR	Central	SN	No	Yes	No	No	No	No	No	No	No	AMP4 exclusion remains valid. The option is not likely to be technically feasible due to

														insufficient hydraulic conductivities.
BE	Transfer from Southern Water Bewl Reservoir to South East Water Bewl Bridge WTW	Selected in WRSE modelling in Jan 2013 and agreed between companies in discussions in Feb/March 2013. Further discussion between Southern Water and South East Water will establish the extent of bulk supplies required.	Eastern	KMW	No	No	No	Yes	No	No	No	No	No	Does not provide a WRMP benefit. Filter out from constrained list. May require investigation pending WRSE modelling and inter-company discussions.
BE	Southern Water Medway (near Rochester Works) to South East Water	14.6Ml/d transfer from near Rochester WSW to South East Water. Not now dependent on Honour Oak transfer.	Eastern	KMW	No	No	-	Yes	No	No	No	No	No	Does not provide a WRMP benefit. Filter out from constrained list. May require investigation pending WRSE modelling and inter-company discussions.
BE	Southern Water Medway (near Rochester Works) to South East Water	(1) 10Ml/d transfer. Not now dependent on Honour Oak transfer. Constrained by near Rochester WTW capacity. Proposed route Southern Water near Rochester to South East Water Blean (via Faversham4–Fleete main). (2) 14.6Ml/d transfer. Not now dependent on Honour Oak transfer. Constrained by near Rochester WTW capacity. Proposed route Southern Water near Rochester to South East Water Blean (via Faversham-–Fleete main).	Eastern	KMW	No	No	-	Yes	No	No	No	No	No	Does not provide a WRMP benefit. Filter out from constrained list. May require investigation pending WRSE modelling and inter-company discussions.
BE	Increase bulk supply from Southern Water Darwell at peak	Increase bulk supply from SWS's Darwell Reservoir to South East Water at peak (reduction in Southern Water DO).	Eastern	SH	No	No	-	Yes	No	No	No	No	No	Does not provide a WRMP benefit.
BE	Extension of Bulk Supply from Southern Water (Deal High)	(1) This option considers increasing the current transfer from Southern Water to Affinity Water, to operate all year round. The new transfer would consist of a 2Ml/d transfer between January and August, with a 4Ml/d transfer between September and December (ADO: 2.67Ml/d.) (2) Transfer from Southern Water to Affinity Water consisted of a 4Ml/d transfer between September and December (ADO 1.33Ml/d), with the agreement expiring at the end of December 2012. This option considers the extension of this contract.	Eastern	SH	No	No	No	Yes	No	No	No	No	No	Does not provide a WRMP benefit.
BE	Bulk supply Southern Water Darwell to from South East Water Eastbourne	8Ml/d Additional bulk supply from Southern Water Darwell to South East Water Eastbourne (RZ3) Folkington Service Reservoir.	Eastern	SH	No	No	-	Yes	No	No	No	No	No	Does not provide a WRMP benefit.
BE	Transfer to South East Water if licence variation for the River Medway Scheme is approved	Transfer to South East Water if licence variation for the River Medway Scheme is approved.	Eastern	KMW	-	-	-	Yes	No	No	No	No	No	Does not provide a WRMP benefit.
BE	Bulk supplies from Southern Water Kent Medway to South East Water	Bulk supplies from Southern Water Kent Medway to South East Water at 3Ml/d. Various routes proposed in WRSE 2012/13. Original proposed route was Southern Water near Rochester to South East Water Aldington or Radfall reservoir (via Faversham4-Fleete main). This was then replaced by transfers from Hartlip (Southern Water KM) to Detling (RZ6) to Blean (RZ8) to Aldington (RZ8).	Eastern	KMW	No	No	No	Yes	No	No	No	No	No	Option reduces Southern Water DO as it is an export. Does not provide a WRMP benefit.
BE	Southern Water Medway (Bewl) to South East Water	(1) 10Ml/d transfer using existing spare capacity at Bewl WTW. (2) An additional 10Ml/d transfer dependent on new capacity at Bewl WTW.	Eastern	KMW	No	No	No	Yes	No	No	No	No	No	Option reduces Southern Water DO as it is an export. Does not provide a WRMP benefit.
BE	A range of capacities for Sussex Brighton to South East Water Mid-Sussex transfer will be costed.	Sussex Brighton to South East Water Mid-Sussex export.	Central	SB	-	-	-	Yes	No	Yes	No	Yes	No	Does not provide a WRMP benefit.
BE	4Ml/d transfer, Southern Water Sussex Brighton to South East Water	Bi-directional transfer between existing South East Water Barcombe WSR and Southern Water Swan WSR.	Central	SB	No	No	No	Yes	No	No	No	No	No	Does not provide a WRMP benefit.
BE	5Ml/d bulk supply from Southern Water Kent Medway to South East Water via Faversham4–Fleete Main	5Ml/d bulk supply from Southern Water Kent Medway to South East Water via Faversham4–Fleete Main. 5Ml/d transfer from South East Water Blean WSR to connect to break pressure tank along the Faversham4–Fleete main/ Bulk supply from Southern Water via the Sheldwich main at Hartlip (Southern Water near Rochester to South East Water Hartlip).	Eastern	KMW	No	No	No	No	No	No	No	No	No	Does not provide a WRMP benefit.

BE	Weir Wood Transfer-additional capacity (>5.4Ml/d) to SEW	An additional transfer option for transfers in excess of 5.4Ml/d. Capex would be required for pipeline reinforcement. Pipeline costs for up to 20Ml/d in increments of 5Ml/d could be developed.	Central	SN	No	No	Yes	Yes	No	No	No	No	No	Does not provide a WRMP benefit.
BE	Southern Water Sussex Hastings to South East Water	Southern Water Sussex Hastings to South East Water. Proposed in WRSE 2012 to possibly involve increased take from Bewl.	Eastern	SH	No	No	No	No	No	No	No	No	No	Does not provide a WRMP benefit.
BR	Re-commissioning of Broadstairs source	This option involves the re-commissioning of unused Broadstairs source in Kent Thanet WRZ. The existing source at Broadstairs has not been used since 1989 when the source was contaminated with cyclohexane. Rehabilitation has occurred for many years but the licence has now been revoked.	Eastern	KT	No	Yes	No	Yes	Yes	Yes	No	No	No	Excluded due to water quality issues.
BS	Increase the connectivity between Bough Beech (SES Water reservoir) and Weir Wood	Transfer of water from Bough Beech reservoir (SES Water) to an outlet into Weir Wood reservoir. The transfer would most likely be of raw untreated water from Bough Beech but it is also possible that water would first be treated at Bough Beech Reservoir Water Treatment Works.	Central	SN	No	Yes	No	Yes	No	Yes	No	No	No	Option is reliant on development of water resources by SES Water. Excluded from AMP 5 because option requires large-scale water resource developments and EA would not support an option that increases abstraction from the Medway catchment. Exclusion remains valid.
BS	Bulk transfer from Craig Goch Reservoir	Bulk transfer from Craig Goch Reservoir. The idea behind the scheme would be to supplement flow in the Severn from Craig Goch, allowing increased abstraction downstream, with a relatively small pipeline transfer from the Severn to the headwaters of the River Thames (probably in the region of 30 miles). Supplementary flow in the Thames could allow greater abstractions downstream, and it would be these additional abstraction volumes that would be used to increase water available to Southern Water.	Southern Water	-	No	Yes	No	Yes	Yes	No	No	No	No	Excluded during Southern Water Western Area Options investigation 2015 on grounds of practicality, technical feasibility, availability of water, costs of the infrastructure required, and the environmental impacts of transferring raw water from one catchment to another. Exclusion remains valid.
BS	Termination of Deal High reservoir supply to Affinity	Terminating the bulk supply from the Southern Water service reservoir at Deal to Affinity Water would mean an additional amount of water for Kent Thanet of 4Ml/d at peak and 3Ml/d at average operating between 1st September to 31st December annually. This may potentially reduce the reliance on the Faversham4–Fleete main.	Eastern	KT	No	No	No	Yes	No	No	No	No	No	Excluded from AMP 5 because the contract was not renewed after the previous end date of 2012/13. Option is therefore already included in the baseline.
BS	Water Grid	Construction of a UK Water Grid using pipelines and canals to transfer water long distances.	Southern Water	-	No	Yes	Yes	Yes	No	No	No	No	No	The feasibility of a Grid was considered by the House of Lords Select Committee (2006), which found "a national water grid is not currently feasible because it would require huge amounts of energy and would cost too much". Due to the great uncertainties involved, the concerns regarding the practicality and reliability of the scheme, and the potential for significant environmental impacts, this option was excluded from AMP 4 Phase 1 and AMP5 unconstrained options. Exclusion remains valid.
BS	Bulk transfer from Kielder Reservoir	Construction of a new bulk transfer network from Kielder reservoir in the far north of England near the border of Scotland (Northumbrian Water) to Thames Water, for transfer onwards to Southern Water.	Southern Water	-	No	Yes	No	Yes	Yes	No	No	No	No	Excluded from AMP 4 Phase 1, Test Surface Water RSA and AMP 5 due to impracticality, costs and technical feasibility associated with the infrastructure required.
BS	Bulk supply from Norway or Iceland (Albion Water)	Shipping of glacial quality water via super tanker from Norway or Iceland through Albion Water. Oil super tankers are extremely large and, if it could be cleaned to a suitable level, then it would be possible to transfer up to 350Ml in a single tanker. Storage would not be needed, as the tanker could act as a floating reservoir, subject to an available and suitable berth being identified. Correspondence with Albion Water in November 2016 suggested delivery locations of Southampton and possibly Thamesport on the Isle of Grain.	Southern Water	-	No	Yes	No	Yes	Yes	No	No	No	No	Excluded from AMP 4, AMP 5 and Southern Water Western Area Options 2015 due to excessive and disproportionate costs, berth availability and limited DO due to limited number of ships. Correspondence with Albion Water in November 2016 confirmed that the option for bulk transfer via Super tanker would still be extremely expensive.
BS	Reduction of bulk import from Portsmouth Water	Southern Water receives a bulk supply from Portsmouth Water of up to 15Ml/d. In the event of a drought, the Company would hold discussions with this donor with regards to the resources position and their supply.	Central	SN	Yes	No	No	Yes	No	No	No	No	No	Reduces Southern Water DO.
BS	Wey and Arun Canal transfer	Transfer using the Wey and Arun canals. The Thames region EA indicated that there was probably insufficient water available in either the River Wey, or in groundwater supplies, to run the canal, let alone	Central	SN	No	Yes	No	No	No	No	No	No	No	Requires development of the Upper Thames reservoir and the refurbishment of the canal. Excluded from AMP 4 Phase 1 and AMP 5 due to technical feasibility, practicality and

		provide additional water to Sussex. Any water would therefore have to be taken via a transfer pipeline from the Thames or existing Thames Water groundwater sources, which will only be available if Thames Water builds the Upper Thames reservoir.												reliability. Exclusion remains valid.
CM	Rother pilot: additional payments for ecosystem services to farmers / landowners	Rother Catchment - pilot using a model to change land management to reduce soil loss and link with HLS/Single farm payments. This needs to have very clear boundaries and has to have the extent, boundaries, what is being paid for regarding the ecosystem clearly defined. Reliant on EU policy to continue and deliver this. No point if the monitoring and analysis is not being done properly, need to check that the farmers are following protocol. Need all farmers in target area to be signed up to the scheme.	Central	SN	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Excluded as replaced by another option.
CM	Pilot: River Rother Restoration instream	River restoration addressing over-widened over-depended river channel. Installing small weir, proper fish/eel passages. Allow reduction in MRF as more water available for abstraction. Providing benefit to Pulborough	Central	SN	No	No	Yes	No	No	Yes	No	No	No	Would have no increase in DO as the changes would not allow for a reduction in MRF. Now superseded by another option.
CM	Western Rother Pilot Scheme- Sediment Traps	Roll out sediment traps for high risk areas across catchment. Subsidies. Additional benefits in pesticide and nutrient reduction. Benefit to Pulborough	Central	SN	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	It is unknown until a pilot study is undertaken as to whether this option is able to provide additional water resource. The adoption into the constrained option list should be dependent on whether there is the opportunity for a pilot study to be undertaken. Now superseded by another option
CU	Increase the connectivity between Ardingly reservoir and Weir Wood	This option is to increase connectivity between Ardingly Reservoir (SEW) and Weir Wood Reservoir to allow transfer of raw water at a capacity of 10 to 20Ml/day. The option to increase the connectivity between the reservoirs does not involve extension of the capacity of either reservoir or the water treatment works. Rather, this option aims to increase the volume of water held at the start of a drought event based on past hydrological experience.	Central	SN	No	Yes	No	Yes	No	Yes	Yes	No	No	AMP5 exclusion remains valid: Option excluded in AMP5 as there was no water resource benefit.
CU	Stourmouth conjunctive use with near Canterbury ground water	Stourmouth conjunctive use with near Canterbury ground water	Eastern	KT	-	-	-	Yes	No	Yes	Yes	No	No	AMP5 exclusion remains valid: Will not form a separate option as the water resource model will ensure that schemes are operated in conjunctive way.
CWA	New abstraction from the Basingstoke Canal	Abstraction from the Basingstoke Canal, owned by Hampshire and Surrey County Councils and managed by the Basingstoke Canal Authority.	Western	HA	No	Yes	No	No	Yes	No	Yes	No	No	Any abstraction from the canal is likely to affect navigation along the watercourse.
DES	Tidal River Adur Desalination	This option proposes a desalination plant abstracting from the Tidal River Adur. Shoreham Harbour has not been included in the search area as it is covered by another option.	Central	SB	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	AMP5 rejection remains valid. Most of the tidal stretch of the river is internationally designated. The Adur runs through the Sussex Downs AONB and is designated as a SSSI on entering Shoreham Harbour. Adur Estuary SSSI site also forms part of an RSPB reserve which supports a large number of wading birds and saltmarsh plants.
DES	River Brede Desalination, on the approach to Rye where it joins the Rother before entering Rye Harbour	This option would include construction of a desalination plant along the tidal River Brede on the approach to the Rye where it joins the Rother. The River Brede is only tidal for 800m and has low density residential dwellings. Any treated water would be used to supply the Sussex Hasting WRZ.	Eastern	SH	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Excluded from AMP 5 because it was stated that a more suitable site is located to the south and considered in another option.
DES	Gosport and Lee-on-the-Solent (outside the company's supply area)	This option is to build a desalination plant along the coast of Gosport and Lee-on-the-Solent (outside the company's supply area). The coastline from Lee-on-the-Solent to Hill Head consists of a shingle beach and does not have any European designations. Residential dwellings and secondary homes cover most of the coast.	Western	HSW	No	Yes	Yes	Yes	Yes	No	Yes	No	No	Excluded from AMP 5 due to inappropriate location and environmental impacts. Construction in a mainly residential area, discharges to environmentally designated area of coast and other options to meet demand in the area mean this option will not be looked at further.
DES	Offshore desalination	Desalination from a ship or platform. Either option would require a pipeline connection into supply from a suitable berth, power connection, delivery and storage of consumables on land or the ship/platform, and purchase or lease of an appropriate vessel along with mooring fees. In addition, recirculation of brine may become an issue at high production rates unless either the offtake or discharge is located at some distance from the ship/platform.	Southern Water	-	No	Yes	Yes	No	Yes	No	No	Yes	No	Excluded as a WRMP option.
DES	Desalination between	The stretch of coastline between Sandwich and Kingsdown on the	Eastern	KT	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Excluded in AMP 5 as site is unsuitable for desalination

	Sandwich and Kingsdown	East Kent coast was investigated for potential locations for a desalination plant. This stretch of coastline has been discounted as it subject to several designations (e.g. SSSI, Ramsar sites, SAC and SPA, Special Landscape area) and is either undeveloped or residential in nature.												proposals due to planning/environmental constraints. These reasons are still valid.
DES	Solar Desalination	(1) The use of solar cells to drive evaporation distillation. (2) Standard desalination powered by photovoltaic solar panels. Both these processes might be more efficient during a drought when in theory there would be more sunlight hours.	Southern Water	-	No	No	Yes	No	Yes	No	No	No	No	Excluded as a specific option type, although, any new build option will give due consideration to the inclusion of renewable power sources during feasibility and design. It may be possible to include solar panels in the design and operation of a desalination plant.
DI	Temporary bans on water use	Drought Option to implement temporary bans on water use: Can be introduced relatively quickly and in a phased manner under powers created by the FWMA 2010 and can be applied on a WRZ basis.	Southern Water	-	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Demand savings from temporary use bans are already taken account of in the deployable output calculations used in the baseline supply demand balance.
DI	Emergency restrictions	Drought Option: Emergency Drought Orders allow water companies to restrict supplies to customers through the imposition of rota cuts and/or the introduction of standpipes. These measures exist to deal with the very remote possibility of a drought much worse than any seen in the last century or more in the UK. Emergency Drought Orders have not been put in place in the UK since 1976. Ministers have made it clear that such measures should be avoided at all costs and introduced only as a last resort. The Company will make full use of all other measures before considering whether the severity of drought conditions mean that Emergency Drought Orders might be required. The full range of measures available under Emergency Drought Order include powers: ● To limit the use of water for such purposes as it considers necessary (i.e. further measures not specified in the Drought Direction 2011); ● To introduce rota cuts; and ● To set up, and supply water by means of, stand-pipes or water tanks. Level of intervention for this option: Unprecedented drought conditions. We intend the need for these to only arise in conditions of civil emergency and as such our emergency plan covers this in more detail.	Southern Water	-	No	No	No	Yes	No	Yes	Yes	Yes	No	This option has not been included in the investment modelling because it is not considered to be a WRMP option: before any consideration of such emergency events, Southern Water considers that there would likely be prior government designation of some form of national or regional emergency.
DP	Rest groundwater sources - Sussex Brighton	Drought Option - Brighton - Use any spare winter/spring water available from the Pulborough river abstraction to supply customers in Worthing and in Brighton via the Rock Road transfer. This allows groundwater to be rested in key 'storage' sources, which can improve drought resilience in those sources during the following summer and autumn, and help provide some protection against saline intrusion in sources down gradient	Central	SB	No	Yes	No	Yes	No	Yes	Yes	Yes	No	Excluded as it would have only a small amount of indirect impact, if any, on Hove, Brighton A and Falmer, that supply the eastern part of Middle Level service.
DP	Rest specific sources during early stages of drought - Kent Thanet.	The overall strategy for the WRZ is to rest groundwater sources and maximise the use of surface water. In this respect, there is the potential to maximise the use of Stourmouth when there is sufficient surface water available. Within this strategy, there are a number of sources which are constrained by hydrogeological constraints such as the source yield or features such as adits. Priority will be given to resting these sources, over and above those that are simply constrained by the abstraction licence or pump capacity. Level of intervention: Impending drought.	Eastern	KT	No	Yes	No	No	Yes	Yes	No	No	No	Excluded from constrained list as option is not considered viable. Stourmouth WSW is not operational.
GRE	Compulsory rainwater capture	Make rainwater capture part of planning/building regime for extensions/refurbishments as well as new build to provide grey water for domestic use	Southern Water	-	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Not a WRMP option. Southern Water could support any changes to planning legislation but are not responsible.
GRE	Dual supply system for households	Different charges for different quality of water. New housing to include soakaway (where applicable) and grey water storage. Individuals can sell stored water like solar energy. Existing housing to soakaway/grey water storage and then reclaim costs. Incentives to householders to stop putting water down drains	Southern Water	-	No	Yes	Yes	Yes	Yes	No	No	No	No	Not a WRMP option. Southern Water could support any changes to planning legislation but are not responsible.

GRE	Enhanced grey water usage - residential or industrial	Promotion of grey water usage to reduce clean water used in homes for non-consumption uses - e.g. gardens, toilet flushing etc. Support inclusion of facilities in 'new builds'- storage tanks, solar pumps. Reed beds for treatment of water-reduce water sent away for waste	Southern Water	-	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Not a WRMP option. Southern Water could support any changes to planning legislation but are not responsible.
GWA	Ashey WSW	Ashey is a disused groundwater source located on the east side of the Isle of Wight near Sandown. The option would involve bringing this source back online. This scheme consists of two sub-options, one which involves marginal treatment onsite and the other is to pump the raw water from Ashey borehole through a new dedicated raw water pipe to Newchurch WSW for treatment.	Western	IOW	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Excluded due to limited additional DO (0.3Ml/d average). Water treatment needed due to high Cryptosporidium risk.
GWA	New borehole at Rye	This source is currently used and has a Deployable Output of 2.26Ml/d (average) and 3.8Ml/d (peak). This option aims to increase the Deployable Output at the site to the licensed value. The current licence is for 2.26Ml/d (average) and 8.73Ml/d (peak). Hence it is only possible to increase the peak licence at this source.	Eastern	SH	No	No	No	No	No	No	Yes	No	No	The site is at its hydrogeological yield and cannot be increased further. The option is not viable as part of a strategic option and is not considered further.
GWA	Offshore freshwater drilling	Drilling rig offshore to abstract from freshwater aquifer with underwater pipeline to Shoreham docks for treatment.	Central	SB	No	Yes	No	Yes	Yes	No	No	No	No	The scheme could produce water quality issues due to saline intrusion and is likely to be prohibitively expensive.
GWA	Midhurst Licence Increase	Increase the licence capacity of the Midhurst abstraction	Central	SN	No	No	Yes	No	No	No	No	No	No	There is little or no scope for additional abstraction in Midhurst.
GWA	Broadstairs	This option involves the reintroduction of groundwater from the Broadstairs borehole. The site contains a 53m deep borehole, a small water treatment works and a covered reservoir. The site is licensed at 5.68Ml/d (MDO and PDO). The current source is out of action due to a water quality incident at the site. The scheme is to refurbish the current borehole, install all necessary pumping infrastructure and new treatment works.	Eastern	KT	No	Yes	No	Yes	Yes	Yes	No	No	No	Excluded due to water quality concerns.
GWA	Optimise the seasonal management of the North Kent chalk aquifer block at two groundwater locations	Optimise the seasonal management of the North Kent chalk aquifer block	Eastern	KME and KMW	No	No	No	No	No	No	No	No	No	First option is discounted as having already been largely investigated and implemented as far as possible. Second source has been removed, therefore is not considered further.
GWA	SPA Flow Augmentation	Use of treated water or effluent to augment flows in Arun Valley SPA ditches and allow further groundwater abstraction in the Pulborough Basin	Central	SN	No	Yes	No	Yes	Yes	No	No	Yes	No	Because of the environmental sensitivity of the site the water quality for the irrigation water would have to be at least as good as an indirect re-use scheme for the River Rother. Given the fact that the indirect re-use scheme would provide a direct benefit to DO and would not require the extensive pipework needed for an irrigation scheme, then there is no real benefit from this option compared with indirect effluent re-use.
GWA	Development of a new groundwater abstraction	Investigation to identify possibility of the development of a new groundwater abstraction	Southern Water	-	No	No	No	No	No	No	Yes	No	No	The CAMS identifies these Chalk aquifers as being under stress from abstractions as they are over licensed. The current licensing strategy is that there is a 'presumption against' the granting of licences for abstraction from the Chalk for consumptive use
GWA	North Worthing Borehole	New Groundwater Source near North Worthing	Central	SW	No	No	No	Yes	No	No	No	No	No	The aquifers within this area are assessed as over-abstracted or 'no water available'.
GWA	Twyford WSW	Increase output.	Western	HSW	No	No	No	No	No	No	No	No	No	As permission for a further abstraction licence is unlikely there cannot be acceptable confidence that this option would be implemented and that there would be any output.
GWA	West Sussex New Groundwater Sources	Develop new groundwater sources in either Sussex North or Sussex Coast areas.	Central	SN	No	No	No	No	No	No	Yes	No	No	The aquifers within this area are assessed as over-abstracted or 'no water available'.
IZT	Transfer from Bewl to Weir Wood	Transfer of 10Ml/d raw water from Bewl to Weir Wood via a pumping station at Bewl with additional treatment and mains at Weir Wood to permit 20Ml/d into supply at peak and maximum drought periods.	Central	SN	No	Yes	No	Yes	Yes	No	No	No	No	AMP5 exclusion remains valid: Would require large scale water resource development at Bewl so that water would be available for the transfer.
IZT	Supply from Darwell	(1) Bulk supply from Darwell (2) Raw water supply from Darwell	Central	SH	No	No	-	Yes	Yes	No	No	Yes	No	AMP 5 exclusion remains valid: For sub-option (1) it was concluded that transfer from Bewl is more cost effective than from Darwell. For sub-option (2) it was concluded that any raw water transfer from the Bewl-Darwell system would be more cost effective

														and reliable coming from Bewl rather than Darwell.
IZT	Hampshire Andover to Hampshire Winchester	Transfer any surplus from Hampshire Andover to Hampshire South	Western	HW	-	-	-	Yes	No	Yes	Yes	Yes	No	Exclude as it is a security of supply option. Not a water resources option
IZT	Hampshire Kingsclere to Hampshire Andover	Transfer any surplus from Hampshire Kingsclere to Hampshire Andover	Western	HA	No	No	No	Yes	No	Yes	No	Yes	No	Exclude as it is a security of supply option. Not a water resources option
IZT	Optimise Medway – Rother transfer	This option is to use the existing Bewl-Darwell transfer main to transfer water from Darwell to Bewl. This would re-use the existing pipeline but would require a new pumping station, together with by-pass valves on the existing main and potentially additional air valves or other infrastructure along the pipeline route.	Eastern	SH	No	Yes	No	Yes	No	No	No	No	No	The system yield of the scheme was considered very low (less than 2Ml/d) and it was not considered a strategic water resource development.
IZT	Itchen WSW to Pulborough transfer	This pipeline option would be operated at critical summer periods and the pipeline would then be drained over the winter when supply from the River Rother was adequate. The proposal was to transfer 20Ml/d (peak and average) from Itchen WSW to Pulborough	Central	SN	No	Yes	Yes	No	No	No	No	No	No	Excluded from AMP 5 feasible list as the Itchen Habitats Directive found significant environmental impacts would remove excess water availability.
IZT	Connect Powdermill and Darwell	This option would see the construction of a new raw water transfer main between Darwell and Powdermill Reservoirs. The proposed transfer route would have a length of approximately 8.2 km. The main would be pumped to a high point of around 80 mAOD north of Sedlescombe from where it would continue under gravity to Powdermill reservoir. The pipeline is designed with a maximum capacity of 10Ml/d.	Eastern	SH	No	Yes	Yes	Yes	No	No	No	Yes	No	Option rejected as it provides very little water.
IZT	Strategic Trunk Mains	Develop a better strategic trunk main system to allow water to be distributed more easily	Central	SN	No	-	No	Yes	No	No	No	No	No	Excluded as it is an asset enhancement option.
IZT	Second stage transfer to/from Sussex Coast	Second stage transfer to/from Sussex Coast	Central	SW	-	-	-	Yes	No	No	No	No	No	AMP5 Water resource modelling showed that there is insufficient spare capacity to justify such a transfer without further resource development. Previous exclusions remain valid.
IZT	10Ml/d Bi-directional transfer between Sussex Worthing and Sussex Brighton	10Ml/d Bi-directional transfer between Sussex Worthing and Sussex Brighton	Central	SW	-	-	-	No	No	No	No	No	No	AMP5 exclusion remains valid: assume that Southern Water continue to supply South East Water through the planning period
IZT	Test Surface Water to Blackfield Booster Station	This option increases the capacity for transfer of water from Test Surface Water WSW in the Hampshire region to the Isle of Wight via the Blackfield booster pumping station. This option also involves the construction of a new high-lift pumping station at Test Surface Water WSW.	Western	IOW	No	No	No	Yes	No	Yes	Yes	Yes	No	Considered within another option.
IZT	Increased capacity of the transfer main to Bewl Water	The River Medway is of a 'flashy' nature, with high flows following rainfall events, even during 'dry' conditions. This proposed option duplicates the existing pipeline, including the construction of a new pumping station and rising main. This would also require a new abstraction licence from the EA, which would be expected to be above the existing MRF plus abstraction capacity (i.e. above 500Ml/d). In summary, the option would require: - New intake and pumping station. - Power supply, surge protection and other works. - New rising main, 1200mm diameter 19.9km long, together with air valves, washouts and thrust blocks. - One railway crossing, and two major rail crossings. - Outfall structure for delivery of water to the reservoir.	Eastern	KM	No	Yes	No	Yes	Yes	No	No	Yes	No	AMP 5 exclusion remains valid: Option was excluded from AMP 5 feasible list because it was concluded that a similar benefit could be achieved by varying the existing licence.
LM	District meter zoning	Review of district meter areas (DMAs) to identify potential re-zoning	Southern Water	-	Yes	No	No	No	No	Yes	Yes	Yes	No	Limited feasibility for further re-zoning with insignificant savings as a result
LV	River Arun Tidal Licence derogation	Application for derogation for the licence on the Tidal abstraction, which is currently attached to a cut-off clause if flow in the Upper Arun is not supported by flow from a sewerage works.	Central	SW	-	-	-	No	No	No	No	No	No	Excluded as no DO benefit.
LV	Arundel Licence Increase	Increase in licence	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	No	No	The option is environmentally unacceptable and the EA specifically said that increased abstraction from sources around Arundel will be unacceptable.
LV	Rookley	Reduce or remove the MRF which controls the abstraction from this source	Western	IOW	No	No	No	Yes	No	No	Yes	No	No	There is an immediate impact on flows in the Sheat stream for a small DO benefit.

LV	Long Furlong A Licence Increase	Increase in licence	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	No	No	This option is environmentally unacceptable and the EA has said that the Chalk and Lower Greensand aquifers are not going to be further exploited.
LV	Darwell licence variation	As part of the license for Darwell Reservoir, the EA maintain 500Ml of storage for use as 'freshet' release during periods of poor water quality in the River Eastern Rother. This option involves temporarily removing the “Freshet condition” applicable to the reservoir, whereby Southern Water is required to reserve 500Mlof water in the reservoir for release to the River Rother. The removal of this requirement would enable an extra 500Ml of water to be made available for public water supply from the reservoir. Although the 500Ml is reserved for use by the EA, it is understood that the volume has not been used and there is no infrastructure in place to allow this to occur. The removal of this storage would increase DO in the WRZ (equivalent to 1Ml/d at MDO and 1.1Ml/d at PDO). Could also be considered as a Drought Option	Eastern	SH	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	It has been confirmed that this environmental condition has been removed from the licence (31/03/18) and Southern Water are no longer required to reserve this 500Ml of storage. Therefore this option is no longer feasible and is removed from the list of options available.
LV	Pulborough Licence Separation	Separation of the Pulborough Surface and GW licences to allow greater flexibility (up to 100Ml/d abstraction) and possible benefits from conjunctive use	Central	SN	-	-	No	Yes	No	No	Yes	No	No	AMP5 exclusion remains valid: Infeasible as a standalone scheme and included in Pulborough option.
LV	Powdermill Compensation flow reduction		Eastern	SH	-	-	-	-	-	-	-	-	No	Excluded as it is considered instead as a Drought Option.
LV	Sandown	Reduce the MRF near Alverstone which controls the abstraction at Sandown	Western	IOW	-	-	-	No	No	No	No	No	No	Not being considered as a separate drought order/permit therefore excluded from constrained list.
MET	Smarter metering of all HH metered customers AMP8 start	Introduction of smarter meter technology which can provide daily meter reading data to customers and Southern Water. Implementation during AMP8.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	0
MET	Smarter metering - longer term programme	Introduction of smarter meter technology which can provide daily meter reading data to customers and Southern Water. Implementation over a longer period of time: during AMP7 and AMP8.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	0
MET	Meter remaining NHH customers	Meter remaining unmetered NHH customers (c.5000), where feasible to do so.	Southern Water	-	Yes	Yes	No	No	No	Yes	Yes	No	No	Under market reforms, NHH demand management measures are the responsibility of retail companies not Southern Water as the wholesale water provider. Demand management will be a key way in which retail companies retain and attract new customers because it will allow them to offer cheaper bills linked to lower consumption. There is an incentive for retail companies to be innovative in this respect and offer various services to help customers reduce their consumption.
MET	Water efficient appliance tariff	Link tariffs to water efficiency of key water using appliances - e.g. toilet cisterns, dishwasher, washing machine, etc. Requires product labelling proof.	Southern Water	-	Yes	Yes	Yes	No	Yes	Yes	No	No	No	The cost to obtain customers' product/appliance information, and keep it up-to-date for all households would be significant. Additionally, it would be difficult to model what the demand savings would actually be as it would all be based on frequency of use. It may also discriminate against people who perhaps cannot afford to install a new washing machine, or do not have a dishwasher. For these reasons, this tariff option is not considered further in this WRMP.
MET	Resource availability tariff	Daily tariff set according to resource availability (i.e. approaching drought - possibly linked to Southern Water's drought trigger levels) and or climatic conditions (e.g. xx number of days below xx mm rainfall). Meter readings would need to be taken and analysed at least daily, requiring a smart or networked-AMR system of meters to be in place	Southern Water	-	Yes	Yes	No	Yes	Yes	No	No	No	No	It is expected that a permanent tariff linked to resource availability may produce bill volatility in excess of that which would be acceptable to customers, the regulator, and Southern Water. Furthermore, customers may lose focus on the reason for the resource availability tariff (i.e. to reduce discretionary consumption during drought events) if it is in place permanently - the message may be stronger if implemented only during times of drought
MET	Carrier bag charge equivalent tariff	Equivalent to the 5p plastic carrier bag charge, but applied to water efficiency.	Southern Water	-	Yes	Yes	No	No	No	No	No	No	No	After having been explored during the options appraisal process, a means of structuring or implementing such a tariff has not become evident. This tariff option is

														therefore not considered further in this WRMP.
MET	Community reward tariff	"Tariff to encourage community to reduce water use, by providing a reward in the form of a Southern Water funded community reward. If the community reduces its combined water use during a defined period of time then they get rewarded with a Southern Water funded community reward. This option has the potential to reduce both average and peak period water consumption, but primarily targeting reduced discretionary use.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Southern Water's trial of this tariff scheme is in the early stages of operation. It is not at this stage possible to estimate the potential savings or costs of this scheme. Therefore it cannot be included as a standalone option for this WRMP, although Southern Water will review the results of the trial with a view for inclusion within option T100.
PWR	Aquifer recharge using treated effluent for ASR	This option is associated with investigations to identify if they are any locations where recharging the aquifer with tertiary treated effluent may offer a water resources benefit as part of an ASR scheme	Southern Water	-	No	Yes	Yes	Yes	Yes	Yes	No	No	No	ASR and ARS type schemes will not be investigated further, specifically that indirect reuse through a river would likely be cheaper and incur less loss during the process. If both effluent reuse and ASR schemes are used more often in the UK, then these types of scheme may become more feasible based on increased knowledge.
PWR	Direct Effluent reuse scheme for Test Lake and into Test Surface Water WSW	Provide tertiary treatment on the backend of Test Estuary WTW to then discharge into Test Lake. This water would then be abstracted by Test Surface Water WSW for further treatment and supply.	Western	HSE	-	-	-	Yes	Yes	No	Yes	No	No	If the scheme was operated in conjunction with other Test Surface Water WSW abstractions then the reuse water could be diluted low enough to be considered an indirect reuse scheme. However, as the water would be required during a period of reduced or no abstraction from the River Test this scheme would be a direct reuse scheme which have been discounted at this stage due to the risk of adverse public reactions. In the future, if the public become more used to indirect reuse schemes in general then this scheme could be reconsidered.
PWR	Small scale catchment natural wastewater recycling	Use of reed beds and other biological methods to provide community based wastewater recycling with lower costs. This would be applicable in rural settings where there is expected to be land available for reed beds.	Southern Water	-	Yes	Yes	No	Yes	No	Yes	No	No	No	Where there are customers who could make use of effluent reuse water, the supply from small waste treatment works will be investigated and the applicability of different treatment types including reed beds. Therefore, schemes of this nature or similar will be investigated as part of another option.
PWR	Wastewater reuse direct into supply system	Investigate acceptability, treatment requirements, legislation and public health risk of direct effluent reuse.	Southern Water	-	No	Yes	Yes	Yes	Yes	No	Yes	No	No	The high risk of public perception issues mean that direct reuse will not be investigated further. It is possible that as the public becomes more used to reuse schemes, direct reuse would be less risky.
RES	Development of new reservoir at Broadoak, inclusive of new treatment works and mains	The scheme is for a new surface water storage reservoir - capacity 15,000Ml - located to the west of the A291, along the valley of the Sarre Penn stream just to the north of the village of Broad Oak in east Kent. The option is being developed by South East Water, but would potentially be a joint scheme, with Southern Water sharing the yield and the development costs. The outline of the scheme is as follows: • Abstraction from the River Stour. • Abstraction works and pumping station. • A new raw water pipeline from the abstraction location to the reservoir and the construction of inlet and offtake towers. • A new impoundment dam across the Sarre Penn valley and all associated works. • A new water supply works to treat water abstracted form the reservoir and all associated underground infrastructure • Various roadworks and landscaping works associated with the reservoir.	Eastern	KT	Yes	Yes	No	Yes	No	No	No	No	No	The scheme has high environmental and planning risks and is likely to have disproportionate costs.
RES	Construction of new reservoir at Burton Mill Pond	Construction of new reservoir at Burton Mill Pond with a capacity of between 1000 and 3000 Ml. (Enlargement of current waterbody)	Central	SN	No	Yes	No	Yes	No	No	No	No	No	Excluded due to environmental impacts, water quality issues and economic feasibility. The scheme would not provide a good enough water resource to justify the environmental impacts and would be unlikely to get planning within an AONB.
RES	Rookley Reservoir	This option involves the construction of an impounding reservoir across the River Medina near Rookley on the Isle of Wight with a capacity of 1500Ml. Water would be treated at a new water	Western	IOW	Yes	Yes	No	Yes	Yes	No	Yes	No	No	The scheme has very significant environmental impacts. These would also make planning difficult to get which would either stop implementation or increase the

		supply works (WSW), which would be constructed just downstream of the proposed site for the dam, and then pumped to the Alvington High Level water service reservoir (WSR) to enter distribution.												costs so they become disproportionate.
RES	New surface water storage site at Colden Common	This option consists of constructing a new surface water storage reservoir in Hampshire South region near Colden common. The reservoir would be largely pump filled from a new abstraction on the River Itchen. A previous study indicated that a maximum storage capacity of approximately 1400Ml would be dependent on a 10m high embankment as well as two small impoundments on the upstream side of the reservoir to prevent flooding of roads and housing. However, the impoundments would not be feasible as they would block the rivers from entering the reservoirs and so the capacity of the reservoir is reduced to 700Ml. The reservoir does also have a catchment of approximately 28km^2. The reservoir would be used as storage to supply additional water for treatment at Itchen WSW, approximately 3km away.	Western	HSW	Yes	Yes	No	Yes	No	No	No	No	No	Very significant environmental and planning impacts and limited yield with high costs.
RES	Community scale small surface water reservoirs	Small scale reservoirs that take surplus run off and rainfall in small scale catchment - could be linked to rainwater harvesting	Southern Water	-	Yes	Yes	Yes	Yes	Yes	No	No	No	No	This option was excluded due to practicality, reliability and deliverability but may form part of a Catchment Management option.
RES	Construction of new reservoir at Coneyhurst	Construction of new reservoir at Coneyhurst. Involving an embankment dam across the River Adur. The capacity of the reservoir would be 1500Ml	Central	SN	Yes	Yes	No	Yes	Yes	No	No	No	No	Although the scheme is technically feasible, the impoundment required may not be acceptable to the EA. It was excluded in AMP4 due to practicability and reliability issues and in AMP5 due to it being environmentally unacceptable.
RES	Construction of new reservoir at Cornerhouse	Construction of new embankment dam reservoir at Cornerhouse with a capacity of 2000 Ml	Central	SN	Yes	Yes	No	Yes	Yes	No	No	No	No	Although the scheme is technically feasible, the impoundment required may not be acceptable to the EA. It was excluded in AMP4 due to practicability and reliability issues and in AMP5 due to it being environmentally unacceptable.
RES	Enlargement of Darwell Reservoir	This option involves raising the embankment of Darwell Reservoir. The proposal is to raise the embankment by up to 10m to provide increased storage, and therefore increase supplies. The additional capacity would be 14,000 Ml. Darwell reservoir falls within an AONB and there are also various environmental designations: parts of Darwell wood are designated as SSSI and the majority of the reservoir and surrounding area is designated as a Site of Nature Conservation Importance (the Darwell Reservoir Complex SNCI).	Eastern	SH	No	Yes	Yes	Yes	Yes	No	No	No	No	This scheme is unlikely to be given permission. It also has a high AISC and low DO and so would not avoid disproportionate costs or deliver an appreciable water resource.
RES	Construction of new reservoir at Dunsfold	Construction of new reservoir at Dunsfold with a capacity of 5000Ml.	Central	SN	Yes	Yes	No	Yes	No	No	No	No	No	The scheme is not considered for further investigations due to limited refill capacity and high costs of infrastructure.
RES	Construction of new reservoir at Goose Green	Construction of new bankside storage reservoir at Goose Green with a capacity of 4500Ml.	Central	SN	Yes	Yes	No	Yes	No	No	No	No	No	There is low refill potential and so a probable low DO and disproportionate costs.
RES	Construction of new reservoir at Habin	Construction of new embankment dam reservoir at Habin with a capacity of between 1000 and 3000Ml.	Central	SN	Yes	Yes	No	Yes	Yes	No	Yes	No	No	The scheme has adverse environmental impacts including to a Trout Fishery, it is also unlikely to be given permission unless it can be proved to be an exceptional circumstance.
RES	Construction of new reservoir at Hammer Pond	Construction of new reservoir at Hammer Pond with a capacity of between 1000 and 3000 Ml. (Enlargement of existing waterbody)	Central	SN	No	Yes	No	Yes	No	No	No	No	No	Due to environmental impacts, water quality issues and economic feasibility. The scheme would not provide a good enough water resource to justify the environmental impacts and would be unlikely to get planning within an AONB.
RES	Construction of new reservoir at Hawkins Pond	Construction of new reservoir at Hawkins Pond with a capacity of between 1000 and 3000 Ml. (Enlargement of existing waterbody)	Central	SN	No	Yes	No	Yes	No	No	No	No	No	Due to environmental impacts, water quality issues and economic feasibility. The scheme would not provide a good enough water resource to justify the environmental impacts and would be unlikely to get planning within an AONB.
RES	Construction of new reservoir at Horsfold	Construction of new reservoir at Horsfold with a capacity of 2000Ml	Central	SN	Yes	Yes	No	No	Yes	No	No	No	No	The environmental impacts are likely to be high, it is not technically feasible without high costs and engineering works and permission is unlikely to be given.
RES	Construction of new reservoir at	Construction of new embankment dam reservoir at Ingrams Green with a capacity of between 1000 and 3000Ml.	Central	SN	Yes	Yes	No	Yes	No	No	No	No	No	Due to environmental impacts, water quality issues and economic feasibility. The scheme would not provide a

	Ingrams Green													good enough water resource to justify the environmental impacts and would be unlikely to get planning within an AONB/National Park.
RES	Construction of new reservoir at Kirdford	Construction of new embankment dam reservoir at Kirdford between 1000 and 3000Ml.	Central	SN	Yes	Yes	No	Yes	No	No	No	No	No	This scheme is not considered for further investigation due to environmental, water quality and economic feasibility issues.
RES	Construction of new reservoir at Kneppmill Pond	Construction of new reservoir at Kneppmill Pond with a capacity of between 1000 and 3000 Ml. (Enlargement of current waterbody)	Central	SN	No	Yes	No	Yes	No	No	No	No	No	Due to environmental impacts, water quality issues and economic feasibility. The scheme would not provide a good enough water resource to justify the environmental impacts and would be unlikely to get planning within an AONB.
RES	Leigh Barrier flood storage reservoir	The Leigh Barrier is an impounding flood storage reservoir, which is used to attenuate peak flows in the Upper Medway catchment and hence reduce the risk of flooding downstream. The barrier is currently 6m high and has a storage capacity of approximately 5,500Mlalthough the EA may be increasing the capacity.	Eastern	KMW	No	No	No	No	No	No	No	No	No	Analysis has revealed that water would not be available at the barrier for the years when Bewl Water Reservoir fails to fill.
RES	Construction of new reservoir at Mill Pond	Construction of new reservoir at Mill Pond with a capacity of between 1000 and 3000 Ml. (Enlargement of existing waterbody)	Central	SN	No	Yes	No	Yes	No	No	No	No	No	Due to environmental impacts, water quality issues and economic feasibility. The scheme would not provide a good enough water resource to justify the environmental impacts and would be unlikely to get planning within an AONB.
RES	Mine working storage	This option represents the storage of raw water in disused mine workings. Involves abstracting the water from existing licences during winter periods and then storing it in the mines for re-abstraction during dry periods.	Southern Water	-	No	No	Yes	No	No	No	No	No	No	This option is rejected due to practicability and water quality as in AMP4 and AMP5.
RES	Construction of new reservoir at New Pond	Enlargement of an existing online reservoir at New Pond to a capacity of between 1000 and 3000Ml.	Central	SN	Yes	Yes	No	Yes	Yes	No	No	No	No	Due to it being unlikely that planning permission will be given. The environmental impacts, impacts on the tourism and economic feasibility.
RES	Construction of new reservoir at Nyewood	Construction of new bankside storage reservoir at Nyewood with a capacity of between 1000 and 3000Ml.	Central	SN	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	There would be high environmental impacts by either option. Also, it is unlikely that development within an AONB/National Park will be given permission. Therefore, there cannot be acceptable confidence in the implementation.
RES	Construction of new reservoir at Petersfield	Construction of new bankside storage reservoir at Petersfield with a capacity of between 1000 and 3000Ml	Central	SN	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	There would be high environmental impacts by either option. Also, it is unlikely that development within an AONB/National Park will be given permission. Therefore, there cannot be acceptable confidence in the implementation.
RES	Enlarge Powdermill Reservoir and increase abstraction from the Eastern Rother to refill during winter period	This option involves raising the embankment of Powdermill Reservoir by up to 13m to provide increased storage and subsequently increase supplies to Southern Water. The scheme would consist of the following: • Raising the reservoir embankment by 13m; • Increasing the storage from 856Ml to 7200Ml; and • Improvements to a 5km road section of the A21 in order to improve access to the reservoir site.	Eastern	SH	No	Yes	Yes	Yes	No	No	No	No	No	This scheme is unlikely to be given permission. It also has a high AISC and low DO and so would not avoid disproportionate costs or deliver an appreciable water resource.
RES	Construction of new reservoir at Pulborough	Construction of new bankside storage reservoir at Pulborough with a capacity of 4000Ml	Central	SN	Yes	Yes	No	No	Yes	No	No	No	No	This option is not considered for further evaluation due to it not being technically feasible, having disproportionate costs and environmental impacts.
RES	Construction of new reservoir at Rotherbridge	Construction of new reservoir at Rotherbridge with a capacity of 1000Ml to 3000Ml.	Central	SN	Yes	Yes	No	Yes	Yes	No	No	No	No	AMP5 exclusion remains valid. This scheme is not investigated further mainly due to planning issues
RES	Construction of new reservoir at Slinfold	Construction of new embankment dam reservoir at Slinfold with a capacity of 2500Ml.	Central	SN	No	Yes	No	Yes	No	No	No	No	No	Due to environmental impacts, water quality issues and economic feasibility. The scheme would not provide a good enough water resource to justify the environmental impacts and would be unlikely to get planning within an AONB.
RES	Construction of new reservoir at Small Dole	Construction of new bankside storage reservoir at Small Dole with a capacity of 4500Ml	Central	SN	Yes	Yes	No	No	Yes	No	No	Yes	No	AMP5 exclusion remains valid. There would be high levels of cost with the excavation of the alluvial material and disposal as well as with the compensatory storage.
RES	Storage reservoir network	Winter storage reservoir network across Southern Water supply areas to provide direct benefit to agriculture and indirect benefit to environment and abstractors.	Southern Water	-	-	-	-	No	No	No	No	No	No	Duplication of other suggested options and may form part of a Catchment Management option.

		Potential to help to maintain MRFs in river systems over local stretches, enabling more downstream river abstraction												
RES	Storrington Sand Pits	Develop Storage in Storrington Sand Pits	Central	SN	Yes	No	No	No	No	No	No	No	No	AMP5 exclusion remains valid. The option is now being used as a construction waste landfill and so is not available for use as a reservoir
RES	Support / grants to farmers for local reservoirs	Help farmers to secure water supplies on farms (i.e. reducing demand/water use so more available for others) by developing relatively small reservoirs on site. Potential to capitalise on natural ponds/seasonal dips in land (i.e. soft rather than hard engineering)	Southern Water	-	-	-	-	No	No	No	No	No	No	Duplication of other suggested options and may form part of a Catchment Management option.
RES	Construction of new reservoir at Trotton	Construction of new embankment dam reservoir at Trotton with a capacity of between 1000 and 3000Ml/d	Central	SN	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	The scheme has adverse environmental impacts including to a Trout Fishery, it is also unlikely to be given permission unless it can be proved to be an exceptional circumstance.
RES	Construction of new reservoir at Vachery Pond	Construction of new reservoir at Vachery Pond with a capacity of 2000Ml. (Enlargement of an existing structure.)	Central	SN	No	Yes	No	No	No	No	No	No	No	Due to environmental impacts and economic feasibility. The scheme would not provide a good enough water resource to justify the environmental impacts.
RES	Build New Reservoir on Coast (Woodgate)	The option would involve the construction of an earth embankment reservoir and associated treatment works that would allow up to 10Ml/d of treated water to enter the distribution mains and supply the Sussex Coastal block. The reservoir would be filled with water pumped from the river Arun at Houghton, which could only realistically be pumped during low tides and may be constrained to periods of relatively low flow during the winter because of turbidity constraints during higher flows. Because of this, the treatment works has been sized at a relatively low capacity (10Ml/d). Approximate reservoir storage would be around 3,500 Ml.	Central	SW	Yes	Yes	No	Yes	No	No	No	No	No	This option has not been considered further due to significant cost associated with the option and the significant local opposition.
RES	Construction of bankside storage near Maidstone	This option proposes bankside storage of 250Ml capacity near Maidstone, which would capture and store water from the River Medway at high flow events. At times of need, this would allow the existing pipeline to Bewl pipeline, which only abstracts during high flow events, to transfer water over an extended time period i.e. when river levels have fallen below the normal cut off level.	Eastern	KMW	Yes	Yes	No	Yes	Yes	No	No	No	No	The costs would be too high and not proportional to the DO provided. There are also issues with environmental risks.
SI	Targeted abstraction licence trading	Option to purchase abstraction licences upstream of Southern Water abstraction sites. Level of intervention: Severe drought conditions.	Central	SN	No	Yes	No	Yes	Yes	Yes	No	No	No	This Drought Plan option is not appropriate for inclusion in the WRMP due to the lack of specific schemes having been identified.
SI	Tankering	Tankering water from adjacent WRZs or other water companies would be considered in severe droughts. Can be applied on a WRZ basis.	Southern Water	-	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Drought Plan option, not easily scalable to WRZ-wide resource shortfall.
SWA	River Adur Abstraction	Direct abstraction from the Adur all year round without associated storage. It is considered that the eastern branch of the Adur is the only one that is potentially suitable for abstraction due to the very low flow rates in the western branch. Abstracted water from the River Adur would be treated directly and then supplied up to a rate of up to 5Ml/d. This is considered to be the maximum realistic upper limit, as flows within this branch of the Adur regularly fall as low as 12Ml/d during low flow years (the majority of which is formed from artificial discharges). The Option has two alternatives, one is to send the water into supply at the Coltstaple WSR, the alternative is to send the water into supply via the Rock Road transfer main.	Central	SW	No	Yes	No	No	Yes	No	No	No	No	Excluded due to significant concerns over water quality in the Adur at low flows.
SWA	New abstraction and WTW on the North and South streams, Hacklinge	The aim of this option is to develop the water resources in the North and South Streams area. The North and South Streams are two streams that run parallel to each other in the Hacklinge Water Resource Management Unit (WRMU) of the Stour catchment.	Eastern	KT	No	No	No	No	No	No	No	No	No	On the basis of the current environmentally poor condition, the limited resource and the environmental designations, it is unlikely that any increased abstraction from this area will be possible.
SWA	River Ouse Abstraction	New river abstraction on River Ouse	Central	SB	No	No	No	No	No	No	No	No	No	Excluded from AMP 5 feasible list based on social and environmental impacts. CAMS assessment stated, 'no water available'.
SWA	Utilising Water from Rock Common Sand Pit	Proposed transfer of water discharged from Rock Common sand pit operation for treatment and conveyance to supply.	Central	SN	No	No	No	No	No	No	No	No	No	This site is now being used for general landfill purposes so is no longer viable as a reservoir option.

SWA	Weir Wood Winter Refill (Medway)	This option refers to the refill of Weir Wood reservoir by the abstraction of water downstream in the Medway during dry winters (effectively this significantly increases the catchment size for the reservoir). This option does not involve extension of the capacity of Weir Wood reservoir or the water treatment works, rather it increases the volume of water held at the start of a drought event based on past hydrological experience. The abstraction will need to be sufficiently far downstream of Weir Wood so that its catchment area will be likely to have flows high enough to abstract from, without adversely impacting on the hydrology and ecology of the river.	Central	SN	No	Yes	No	Yes	No	Yes	No	No	No	There are significant doubts over resource benefits under certain drought conditions, including the 'design scenario'
WEF	Water butts	Free or subsidised provision of water butts to customers who apply for one on Southern Water's website.	Southern Water	-	Yes	No	No	Yes	No	Yes	No	No	No	Southern Water have undertaken initiatives to provide discount on water butts, so may be limited uptake as campaigns have previously taken place. Storage available during dry summers cannot be guaranteed
WEF	Non-household and commercial water efficiency	Non-household and commercial water efficiency audits (CWA) at e.g. public buildings and council-owned leisure centres, hospitals, water efficiency offset scheme for businesses/organisations.	Southern Water	-	Yes	Yes	No	No	No	Yes	Yes	No	No	Under market reforms, NHH demand management measures will be the responsibility of retail companies not Southern Water as the wholesale water provider. Demand management will be a key way in which retail companies retain and attract new customers because it will allow them to offer cheaper bills linked to lower consumption. There is an incentive for retail companies to be innovative in this respect and offer various services to help customers reduce their consumption.
WEF	Household water efficiency kit	(1) Customers are offered a household water efficiency kit containing (for example): CDDs, tap inserts, shower timers, tea towel, trigger/twist hosepipe devices and booklet containing advice on water efficiency. (2) Manned audit with retrofit of free devices (as outlined under sub-option 1).	Southern Water	-	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Already forms part of current AMP6 baseline water efficiency activity, with limited scope for further uptake
WEF	Media campaigns to influence water use	(1) Campaigns to raise public awareness can be carried out in a number of ways using a variety of different types of media. The central message is to urge all customers to conserve water, especially during periods of drought. This message must be underpinned by explanations of the background to the prevailing conditions and how the drought might continue to intensify. In addition, the Company may promote enhanced uptake of its water efficiency programmes. The option could be a Drought Option. (2) Build on the interest and responsiveness of the parish councils to promote water demand management issues. If possible incentivise them to take local action, perhaps with target challenges	Southern Water	-	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Important part of drought response. However, more limited as a WRMP measure, as it is very difficult to assign costs and water saving benefits to media campaigns. Furthermore, customer communications around water saving, particularly in the lead up to and during drought events, already form part of Southern Water's baseline water efficiency promotion activity.
WEF	Household reward scheme	Manned audit with retrofit of free water efficient devices where appropriate.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	There is insufficient confidence in the potential savings from this option to take it forward into the feasible as a standalone option for this WRMP, although it will be considered for inclusion within option T100.
WEF	Subsidised water efficient products	Options could include: (1) A flat rate subsidy offered to customers who purchase a new water efficient washing machine on replacement of their old one. The subsidy would cover the expected additional cost of purchasing an efficient machine over a less efficient machine. (2) Replacement of existing WCs in girls' facilities, with low dual flush WCs (4/2 litre). For schools to adopt this strategy, it is likely that Southern Water would have to pay for the whole cost of the replacement WC, rather than offering a subsidy. (3) Southern Water would offer a flat rate subsidy towards the replacement of customers' single flush WCs with a 4 1/2 litre dual flush WC. Installation would not be funded by the company, the cost of which is expected to be met by customers when replacing their bathrooms.	Southern Water	-	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Baseline demand forecast based on micro-components approach and implicitly assumes that water using devices are replaced approximately every 10 years. Therefore, inclusion of these options would lead to double counting.

		(4) Scheme would offer a flat rate subsidy to customers who purchase a new water efficient dishwasher based on replacement of their old one. The subsidy would cover the expected additional cost of purchasing an efficient appliance over a less efficient machine.												
WTW	Upgrade treatment capacity at Beauport WSW	Treatment works can act as strategic constraints within the supply system. They do not provide additional water, but can make water available from options if they act as a constraint within the network. The current capacity of Beauport WSW is 25Ml/d but it is subject to an AMP4 scheme to increase the treatment capacity to 30Ml/d. Network constraints and their impact on any schemes to increase DO within Sussex Hastings WRZ will be looked at.	Eastern	SH	-	-	-	No	No	No	No	No	No	Exclude as AMP5 review did not identify Beauport WSW capacity as a constraint.
WTW	Increase turbidity capability at South Arundel WSW	The South Arundel groundwater supplies regularly experience increased turbidities during Spring tides. An investigation to determine the optimal operation regime with the existing treatment facilities is currently ongoing, but this will still involve shut down of the works during high turbidity flows. It is thought that the introduction of a more sophisticated treatment works would enable the sources to be pumped through the peak turbidity periods, allowing the sources to produce an additional 5Ml/d.	Central	SW	-	-	-	No	No	No	No	No	No	Excluded from AMP 5 feasible list because this option would not increase the DO beyond the daily abstraction licence, so is duplicated by the asset enhancement scheme. This exclusion remains valid.
WTW	Upgrade treatment capacity at Rye WSW	Treatment works can act as strategic constraints within the supply system. They do not provide additional water, but can make water available from options if they act as a constraint within the network. The current capacity of Rye WSW is 15Ml/d. Network constraints and their impact on any schemes to increase DO within Sussex Hastings WRZ will be looked at.	Eastern	SH	-	-	-	Yes	No	Yes	No	Yes	No	AMP5 rejection remains valid: Review did not identify this treatment works as a strategic constraint
WTW	Increase in treatment and mains capacity at near Rochester WSW	This option seeks to increase the treatment and mains capacity at near Rochester. Treatment works can act as strategic constraints within the supply system. They do not provide additional water, but can make water available from options if they act as a constraint within the network. The current capacity of near Rochester WSW is 65Ml/d. The effect of constraints within the network on any schemes to increase DO within the Kent Medway WRZ will be looked at.	Eastern	KMW	-	-	-	Yes	No	Yes	No	No	No	AMP5 exclusion remains valid: Not selected by WRSE and not agreed between companies.
WTW	Newchurch WSW	Newchurch is an existing groundwater source and water treatment works. Newchurch consists of a Lower Greensand and a Chalk borehole. The waters from the chalk borehole go through a treatment process of super and de-chlorination as well as phosphoric dosing; as such there are no process losses which could be recovered. The waters from the Lower Greensand however undergo a process of aeration cascading, then 10-minute retention in a redox tank and then following by filtration through 3 rapid gravity filters. The treatment losses for the LGS water amounts to 0.17Ml/d and therefore the volume of water which could be recovered from treatment losses would be somewhat less than 0.17Ml/d. As the DO is source constrained there would be no extra DO available from lowering of pumps or increase of pump capacity.	Western	IOW	-	-	-	Yes	No	Yes	No	Yes	No	AMP5 exclusion remains valid: Insignificant increase in DO through recovery of process losses from limited treated
WTW	Test Surface Water WSW	Washwater recovery Increased treatment capacity to 120Ml/d Maintain existing treatment capacity at 105Ml/d Increase treatment capacity to 136Ml/d Conjunctive use of Test Surface Water with Lower Itchen sources Increase treatment capacity to 160Ml/d	Western	HSW	-	-	-	Yes	Yes	No	Yes	Yes	No	Licence currently under review
WTW	Worthing Turbidity Treatment	The original justification for this option was that there were a number of disparate sources in the Worthing area that were constrained by turbidity issues. It was considered that DO could be improved if these were treated, perhaps at a central location. However, AMP4 investigation and treatment schemes at sites such as South Arundel, Arundel etc have limited any potential only to North Worthing and Long Furlong B. The	Central	SW	-	-	-	No	Yes	Yes	Yes	No	No	AMP5 exclusion remains valid: Unstable source

		2005/06 drought then promoted further investigations at those sites. This has resulted in ongoing works at North Worthing and a realisation that turbidity at Long Furlong B is also linked to potential adit stability issues, which means pumping and treating for turbidity would carry a high risk of compromising the structure and hence yield of the source.												

Table 2 Constrained options not proceeding to the feasible list of options

Option category code	Option name	Option description	Area	WRZ	Screening criteria: unconstrained to constrained									Screening criteria: constrained to feasible								Comments
					Beneficial environmental outcomes?	Increased resilience?	Phased/Modular implementation?	Technically feasible?	Addresses water resources planning problem?	Meets customer and regulator expectations?	Avoids disproportionate costs and/or delivers appreciable water	Confidence in implementation/output	Include in constrained option list?	Scheme SEA grade: risk of adverse effects	Scheme SEA grade: opportunity for beneficial effects	Mitigation measures to address potential impacts?	Dependencies / mutual exclusivities with other options or third parties?	Is option at risk of climate change impacts or future uncertainty?	Can option be implemented in a phased/ modular way?	Does option contribute to overall resilience?	Include in feasible option list?	
AE	Chilbolton nitrate scheme	Chilbolton UGS is currently disused due to high nitrates (concentrations in breach of the DWS). This option comprises implementing a nitrate scheme so that the source can be reconnected to network and brought back into supply at licensed rate of 0.5Ml/d.	Western	HA	-	No	No	Yes	Yes	Yes	Yes	Yes	Yes	0	0	No	No	Yes	No	No	No	Not sufficiently progressed to include as a feasible option
AE	Increase transfer capacity at Gover Road	Increase or utilise transfer capacity of Gover Road from 6.9Ml/d to 9.8Ml/d	Western	HSE	-	-	-	-	-	-	-	-	-	-	-	-	-	No	No	-	No	Option to be considered in AMP7
AE	Kings Sombourne	Scheme to increase DO of the Kings Sombourne groundwater source from 1.5Ml/d to 5Ml/d by removing infrastructure constraints.	Western	HR	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	No	No	Uncertain potential until pump tests performed, too risky to assume DO benefit therefore exclude at the stage
AE	Newington Booster Pump	Booster pump.	Eastern	KME	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Locked in DO would require very minor works and will be released by leakage team; not a WRMP option
AE	Outage scheme (generic)	Generic option to allow review of measures to reduce outage at specific sources	Southern Water	-	-	-	-	-	-	-	-	-	Yes	N/A	N/A	No	No	No	No	No	No	Specific schemes will be identified as appropriate for feasible list - no need for generic "placeholder" any more
AE	Resilience scheme (generic)	Generic option to allow review of measures to increase resilience at specific sources or within the supply system.	Southern Water	-	-	-	-	-	-	-	-	-	Yes	N/A	N/A	No	No	No	No	No	No	Specific schemes will be identified as appropriate for feasible list - no need for generic "placeholder" any more
AE	Sandown WSW	(1) Flood resilience scheme (no DO benefit) (2) New WSW near Newchurch (3) Process Loss recovery - 1Ml/d	Western	IOW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	WRMP is not a suitable vehicle to pay for any resilience enhancements; no potential to increase yield
AE	Increase industrial main capacity to Bournemouth supply to 60Ml/d.	Increase industrial main capacity to Bournemouth supply to 60Ml/d. This option was developed to consider an increase in transfer capacity from Test Surface Water WSW to the Isle of Wight via the Bournemouth supply main to the Blackfield booster.	Western	HSW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Not required as a stand-alone option. Included within specific desalination schemes
ASR	Hampshire - Greensands	Hampshire Greensands ASR	Western	HR, HA, HW, HSW, HSE	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	Yes	No	Limited environmental benefit; highly unlikely to justify revision to licence
ASR	Sussex Coast – Lower Greensand	Because of the uncertainty over the scope for development within the Lower Greensand in a given area, two alternative schemes have been assessed under this option; a 4Ml/d output using two boreholes (scheme 1) and an 8Ml/d output using four boreholes (scheme 2). The option will take potable mains water and inject it into the aquifer within the Lower Greensands formation during winter and abstract it over the summer months. The abstracted water is then treated and then sent into supply via Tennants Hill WSR	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	1	No	Yes	Yes	No	Yes	No	Kent Medway schemes are unviable and are removed from the Drought Options list
BR	Recommission Petworth groundwater source	Recommission Petworth groundwater source	Central	SN	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	No	No	Excluded as not viable following internal investigations and discussions with Regulatory bodies
BR	Bewl Water increased filling	Scheme to reinstate DO.	Western	IOW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Confirmed that there is a scheme in AMP6 that will ensure the DO can be maintained, so no write down
BS	South East Water to Kent Thanet	South East Water to Kent Thanet	Eastern	KT	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded following WSRE negotiations
BS	Bulk supply to Southern Water Kent Medway from South East Water	Bulk supply to Southern Water Kent Medway from South East Water.	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	No options identified following inter-company discussions
BS	Abingdon–Basingstoke–Itchen WSW	Construct a pipeline from Thames Water's proposed UTMRD to Basingstoke then another pipeline from Basingstoke to Itchen WSW for treatment and distribution to Hampshire.	Western	HSE	-	-	-	-	-	-	-	-	Yes	3	0	Yes	Yes	Yes	No	Yes	No	Significant uncertainty with respect to the development of the UTMRD & South East Water requirements. Excluded in RDWRMP as South East Water no longer require a bulk supply
BS	Amalgamation of water supply companies	To improve water sharing across the region.	Southern Water	-	No	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Outside scope of WRMP. Regional solution is being covered by WRSE work. Practicality, reliability and deliverability - it is out of the remit of the WRMP to consider water company consolidation.

Option category code	Option name	Option description	Area	WRZ	Screening criteria: unconstrained to constrained									Screening criteria: constrained to feasible								Comments
					Beneficial environmental outcomes?	Increased resilience?	Phased/Modular implementation?	Technically feasible?	Addresses water resources planning problem?	Meets customer and regulator expectations?	Avoids disproportionate costs and/or delivers appreciable water	Confidence in implementation/output	Include in constrained option list?	Scheme SEA grade: risk of adverse effects	Scheme SEA grade: opportunity for beneficial effects	Mitigation measures to address potential impacts?	Dependencies / mutual exclusivities with other options or third parties?	Is option at risk of climate change impacts or future uncertainty?	Can option be implemented in a phased/ modular way?	Does option contribute to overall resilience?	Include in feasible option list?	
BS	Termination of Sheldwich scheme to SEW	SW currently has an agreement to supply South East Water with water from a group of boreholes in the Sheldwich area, known as the Sheldwich scheme. The agreement is for a transfer of approximately 22% of the yield of three sources. Terminating the bulk supply to Mid Kent Water allows more water to be abstracted from the Sheldwich boreholes for use within the Medway WRZ. The current contract ends on 31st March 2023.	Eastern	KME	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Bough Beech (SES Water) via R. Medway	A change to the MRF licence condition for Bough Beech of 10Ml/d.	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Additional extraction from Bray WTW	Bulk import into Sussex North from SEW's Bray WTW. Additional abstraction from Bray WTW in South East Water's northern supply area (as a result of Thames WaterThames Water resource development such as Abingdon reservoir). From here, transfers to Southern Water's Western (Hampshire) and Central (Sussex) Areas should be feasible. A previous assessment by Halcrow (2004) indicated that a transfer in the order of 58Ml/d may be feasible.	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	South East Water to Southern Water Sussex Brighton	New transfer. 4Ml/d bi-directional transfer between SEW's Barcombe Reservoir and Southern Water Swan WSR (Sussex Brighton).	Central	SB	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Excluded as no options identified during inter-company discussions
BS	Clay Hill reservoir transfer	South East Water development of a new reservoir at Clay Hill, which may enable a transfer from South East Water to Sussex Hastings. It might also enable South East Water to reduce their current dependency on Weir Wood, so freeing additional water for Southern Water to use. The status of Clay Hill reservoir is unknown.	Eastern	SH	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded because the status of Clay Hill reservoir remains unknown.
BS	Terminate Darwell reservoir supply to SEW	(1) Terminate Darwell reservoir supply to South East Water. This would save 8Ml/d of water, which would then be available for Sussex Hastings WRZ. This is turn reduces reliance on Bewl Water. (2) Drought Option: In the event of a drought the Company would hold discussions with a commercial customer (transfer from Bewl to Darwell providing a bulk supply to SEW) with regards to the resources position and their supply.	Eastern	SH	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Reduce industrial supply to Bournemouth supply	(1) Southern Water holds an existing contract to supply a reserve supply of water to the Bournemouth supply oil refinery in the event that the main supply from Bournemouth Water is not available, although this reserve is rarely called upon. Reducing this supply would make more water available to SWS. The supply of water to the refinery, including a reserve supply, is considered to have a national significance to ensure continued operation of the refinery. (2) Drought Option: In the event of a drought, Southern Water would hold discussions with the commercial customer (Bournemouth supply refinery) with regards to the resources position and their supply.	Western	HSW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Excluded following internal discussions
BS	Bi-directional transfer between Gatwick (SES Water) and Crawley	Bidirectional transfer with SES Water involving joint operation of Pulborough and Bough Beech WTWs using the major infrastructure that already exists in each company (Sussex Coast to Pulborough to Crawley/Horsham and Bough Beech to Horley) which could have significant conjunctive use benefits. A new transfer link would be required between the Horley area (SES Water) to Crawley/Horsham (Southern Water).	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Thames Water Guildford transfer to Southern Water Sussex North	Thames Water Guildford transfer to Southern Water Sussex North. This option was not investigated by Southern Water in AMP4 but was requested to be	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions

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					Beneficial environmental outcomes?	Increased resilience?	Phased/Modular implementation?	Technically feasible?	Addresses water resources planning problem?	Meets customer and regulator expectations?	Avoids disproportionate costs and/or delivers appreciable water	Confidence in implementation/output	Include in constrained option list?	Scheme SEA grade: risk of adverse effects	Scheme SEA grade: opportunity for beneficial effects	Mitigation measures to address potential impacts?	Dependencies / mutual exclusivities with other options or third parties?	Is option at risk of climate change impacts or future uncertainty?	Can option be implemented in a phased/ modular way?	Does option contribute to overall resilience?	Include in feasible option list?	
		reconsidered in 2012. Option was investigated in WRSE but excluded from Phase 2a.																				
BS	Bulk supply to Hants Andover from neighbouring Co.	It may be feasible to transfer water from Portsmouth Water to Hampshire Andover. It is unlikely that other water companies will have sufficient surplus to allow this transfer, however a transfer from Portsmouth might be feasible.	Western	HA	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Option replaced with another option
BS	Bulk supply to Hants Kingsclere from neighbouring Company	Bulk supply to Hampshire Kingsclere from a neighbouring water company, such as Portsmouth Water. This is most likely to be a bulk transfer Import from Portsmouth Water WSW to Southern Water Itchen WSW, dependent on additional import from Portsmouth Water (Havant Thicket reservoir development).	Western	HK	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Additional supplies from Portsmouth would go directly to HSW WRZ distribution up to 30Ml/d, with anything over this going to Itchen WSW. There is then an internal transfer option from Itchen WSW to HA/HK.
BS	South East Water to Southern Water Sussex North	New transfer. May be required following Sustainability Reduction. This option considers a 5Ml/d bi-directional transfer from SEW's Tilmore WSR (South East Water) to SW's Pulborough WTW. The transfer uses the existing mains system between Pulborough and Petersfield and would permit a domino transfer to South East Water Whitely Hill WSR.	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Supply from Portsmouth Water following construction of a Havant Thicket reservoir	Supply from Portsmouth Water following construction of Havant Thicket reservoir.	Central	SN	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Option replaced by another option.
BS	Kennet (TW) transfer to Southern Water Hants Kingsclere.	Kennet (TW) transfer to Southern Water Hants Kingsclere. Transfer reliant on the development of the Abingdon Reservoir, Upper Thames Major Resource Development (which is not currently a part of Thames Water's plan).	Western	HK	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded from AMP 5, WRSE and Western Area Options 2015 because there is no deficit in Kingsclere, and there is also an option for a transfer between the Upper Thames Reservoir and Itchen WSW, which should cover any deficit in Hants South.
BS	Reduce transfer to other commercial customers	Drought Option: In the event of a drought the Company would hold discussions with a commercial customer with regards to the resources position and their supply.	Southern Water	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Operational drought option, not a WRMP option
BS	Increase the existing Portsmouth Water transfer Littleheath to Pulborough	(1) Upgrades to Portsmouth-Pulborough transfer infrastructure by 15Ml/d to a total 90Ml/d (i.e. from 75Ml/d to 90Ml/d). These upgrades include improvements to the PS at Pulborough. (2) Maximise the use of the river abstraction at Pulborough in order to rest the available groundwater resources in the Pulborough basin. Increase transfer of water from Portsmouth Water in order to alleviate abstraction from Pulborough Groundwater.	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Portsmouth Water supply to Sussex Worthing (North Arundel to Littlehampton main)	15Ml/d bulk transfer from Portsmouth Water's near Arundel to Sussex Worthing. The scheme will be a duplication of the main from near Arundel to North Arundel with 15Ml/d of new pump capacity at near Arundel. The existing transfer is currently restricted by the North Arundel constraint. This option considers a new 15Ml/d main (500dia HDPE 9.25km long) between North Arundel WSW and the Littlehampton mains, where it will tee in and use existing capacity in the mains network to enter supply. It is assumed that this transfer will only be used in times of deficit within the Sussex Worthing area, when there is spare capacity in the mains. Improvements to North Arundel infrastructure would be required.	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	AMP5 exclusion remains valid and not agreed between companies.
BS	Transfer from South East Water Northern North to Southern Water Hants (Bray to Itchen WSW via Whitedown TR3)	Construction of a new bulk transfer from South East Water Northern North WRZ (Bray) to Hampshire (Itchen WSW) via Whitedown TR3 WSR. Transfer reliant on the development of the Abingdon Reservoir, Upper Thames Major Resource Development (which is not currently a part of Thames Water's plan).	Western	HSE	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Identified as a resilience for normal years only not drought years so not suitable for WRMP.

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					Beneficial environmental outcomes?	Increased resilience?	Phased/Modular implementation?	Technically feasible?	Addresses water resources planning problem?	Meets customer and regulator expectations?	Avoids disproportionate costs and/or delivers appreciable water	Confidence in implementation/output	Include in constrained option list?	Scheme SEA grade: risk of adverse effects	Scheme SEA grade: opportunity for beneficial effects	Mitigation measures to address potential impacts?	Dependencies / mutual exclusivities with other options or third parties?	Is option at risk of climate change impacts or future uncertainty?	Can option be implemented in a phased/ modular way?	Does option contribute to overall resilience?	Include in feasible option list?	
BS	Portsmouth Water near Arundel WTW to Pulborough via Whiteways Lodge	(1) Rehabilitation and improvement of the existing Portsmouth Water to Southern Water transfer between PW Eastgate and Pulborough WTW. (2) Duplication of the existing Portsmouth Water to Southern Water transfer between PW Eastgate and Pulborough WTW. New pipeline follows the route of the existing main in order to take advantage of existing easement.	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/a	N/a	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Rest Weir Wood reservoir source during early stages of drought	Drought Option: Maximising pumping from Pulborough WSW through the distribution network into Crawley in order to displace water normally supplied by Weir Wood, resting Weir Wood reservoir for use in later stages of a drought. Sources could be rested immediately provided that there is headroom available.	Central	SN	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Operational changes only as part of this drought option – it is not a WRMP option
BS	Bournemouth Water and Bournemouth supply refinery	A reduced Bournemouth Water supply to a large industrial user allowing an import into Southern Water. Bournemouth Water currently supplies around 40Ml/d of water to the large industrial user. It may be possible for a desalination plant to be built to supply water at peak periods (if this is an acceptable source of supply for refinery use) while water at average periods continues to be supplied by whichever water company wins the contract. This would mean that there would be around 40Ml/d of additional water available to Bournemouth Water at peak periods, some of which may be available to transfer to Southern Water Western Area.	Western	HSW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Option excluded as it is reliant on the separate provision of desalinated water to the nearby large industrial user to allow import from Bournemouth Water; however, it is supplier of last resort such that it is highly likely that Bournemouth Water would be able to release the spare water
BS	10Ml/d bulk supply to Kent Medway from South East Water (via Faversham4 Fleete Main)	10Ml/d transfer from South East Water Blean WSR to connect to Dunkirk break pressure tank along the Faversham4-Fleete main.	Eastern	KME	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Bulk import from South East Water	(1) Bulk import from South East Water. There are no specific details for this scheme. (2) In the event of a severe drought, the company would investigate the possibility of receiving bulk supplies from South East Water in the event of more severe drought conditions.	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Purchase of Portsmouth Water's source near Arundel	Purchase of Portsmouth Water's source near Arundel and transfer of water to Sussex Coast or Sussex North.	Central	SN	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Excluded as no options identified during inter-company discussions
BS	Water trading (3rd parties) - large abstraction licence holder	Southern Water to contact large abstraction licence holders to establish whether these 3rd parties were willing to trade some or all of their licence	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Only potential option is now its own option which is DS Smith in Sittingbourne so this option is no longer needed.
BS	Additional extraction from the Thames	Additional extraction from the Thames	Central	SN	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	This option is already covered by other options in the WRMP.
BS	Thames abstraction and transfer to SES Water, then to SWS	Transfer from Thames Water to Southern Water, via the North Deal and East Surrey Water (South East Water) system. South East Water currently have no water available for transfer to Southern Water. However, they share boundaries with both Thames Water and Southern Water. This option investigates reducing the supply of potable water from Bough Beech (South East Water) to their North Deal WRZ and replacing this with a dedicated supply from Thames Water to the North Deal WRZ. This will allow release from Bough Beech into the River Eden, which feeds into the Medway. Water would then be available for abstraction.	Eastern	KMW	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Terminate Weir Wood reservoir bulk supply to South East Water	Terminate Weir Wood reservoir bulk supply to SEW. This would save 5.9Ml/d of water, which would then be available to Sussex North WRZ. The agreement runs until March 2020. Southern Water is legally bound to continue the supply until 2020 and/or a time when South East	Central	SN	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	The current contract expires in 2020. Continuation is assumed but at a new charging scheme.

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		Water agree to termination having had sufficient notice to develop its own additional resources.																				
BS	Upper Thames Reservoir to Test Surface Water WSW	Upper Thames Reservoir to Test Surface Water WSW. AMP 4 Phase 2 stated the transfer would involve a pipeline approx. 94.92 km long. In AMP 4 and AMP5, transfers of between 10 and 80Ml/d were considered.	Western	HSW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Excluded as no options identified during inter-company discussions
BS	Reduce transfer to other water companies	Drought Option: In the event of a drought the Company would hold discussions with neighbouring companies with regards to their resources position and their supply. There are three main bulk transfers to the South East: its entitlement to 25% of the yield of the River Medway Scheme, the Sheldwich Scheme, and the Bewl-Darwell transfer. This option considers reduction of the transfer from Affinity Water to Southern Water Kent Thanet. The trigger for this would be when rainfall and groundwater level trigger is exceeded and/or if Affinity Water is not affected as much as Kent Thanet WRZ.	Southern Water	-	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Waller's Haven transfer from SEW	This option represents a transfer of water from SEW's Waller's Haven abstraction to Darwell Reservoir.	Eastern	SH	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no options identified during inter-company discussions
BS	Imports from other water companies outside south-east region & Thames Water	Imports from other water companies outside south-east region & Thames Water.	Southern Water	-	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	This is a generic option and there are now specific options that cover this scheme.
BS	South East Water Whitely Hill to Pulborough (Southern Water) transfer (bi-directional)	5Ml/d bi-directional transfer from Whitely Hill Service Reservoir (South East Water) to Pulborough WTW (Southern Water).	Central	SN	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Excluded as no options identified during inter-company discussions
BS	Bulk import from Wessex Water to Hampshire Andover	Construction of a new bulk transfer from Wessex Water to Hampshire Andover WRZ.	Western	HA	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	Reliant on Blashford Lakes which are an SR risk. The preferred option is from Bournemouth.
BS	Portsmouth Water to Sussex Worthing	(1) Portsmouth Water to Sussex Worthing. Requires Southern Water removing North Arundel constraint. (2) Portsmouth Water to extend current supply to Sussex Worthing spur link past 2015 (3) Portsmouth Water to Sussex Worthing, independent of Pulborough WTW	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	N	No	No	No	No	No	No	This option delivers resilience benefits but does not deliver an enhanced DO.
BS	Change of bulk supply to Wessex	(1) Terminate bulk supply to Wessex. The termination of this small supply would save 0.19Ml/d of water, which would then be available to Hampshire Andover WRZ. (2) In the event of a drought, Southern Water would hold discussions with Wessex Water with regards to the resources position and their supply.	Western	HA	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Option 1 excluded due to insignificant DO and option 2 excluded because it provides a very small saving.
CM	Nitrate Option – South Arundel	Nitrate removal.	Central	SW	-	-	-	-	-	-	-	-	-	0	1	-	Yes	Yes	No	Yes	No	Excluded as treatment has now been installed
CM	Brighton Block Pilot Scheme - Further implementation of CHAMP actions	Brighton Block Pilot Scheme - Further implementation of CHAMP actions	Central	SB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	CHAMP work already underway and this WRMP has source specific nitrate options included instead
CM	Broadlands Fish Farm Carrier	Divert or revise operation of the Broadlands Fish Farm Carrier to provide more water at Test Surface Water WSW	Western	HSW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by overall River Test catchment management option
CM	Generic scheme - Cryptosporidium risk reduction at surface or groundwater water source.	Pending outcome of At Risk investigations in Feb	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Other uses for effluent reuse	For example, use as compensation water downstream of abstractions or used by farmers or industry. Benefit that WQ has already paid for improvements in treatment	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Has been assessed as part of other effluent reuse options
CM	Enhancing natural recharge	Expansion of area of chalk grassland in North Downs to enhance aquifer recharge. Needs some investigation first, but could provide positive environmental benefits. Done through agreements with land owners or land purchase.	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	No specific locations/DO benefit identified. Option to be flagged as further development for 2024 plan

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		Potential benefit to chalk aquifer blocks and local groundwater dominated abstractions																				
CM	Nitrate Option – North Worthing	Option to address nitrate risk by 2016-17, using both conventional treatment and catchment management together to ensure successful reduction of nitrates in limited time frame	Central	SW	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	No	Yes	Yes	No	Excluded as treatment has now been installed
CM	Flood storage / wetland creation	Slow down run off into rivers and provide storage of water to be released later on	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	No specific locations to implement this type of option have been identified. To be flagged as further development for 2024 plan.
CM	Revise existing fishing practices	Increased resources to tackle illegal exploitation in Southampton Water and the rivers to enable the salmon population to reach its Conservation Limit, and to increase salmon migration for spawning etc. Measures could include; re-introduction of bollards to prevent vehicles, re-writing byelaws to make salmon fishing/spinning illegal, additional patrols/wardens, CCTV.	Western	HSW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by overall River Test catchment management option
CM	Nitrate Option – Hove	Nitrate removal.	Central	SB	-	-	-	-	-	-	-	-	-	0	1	-	Yes	No	Yes	Yes	No	Excluded as treatment has now been installed
CM	Nitrate Option – Hartlip Hill	Option to address nitrate risk by 2016-17, using both conventional treatment and catchment management together to ensure successful reduction of nitrates in limited time frame	Eastern	KME	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	No	No	Yes	No	Excluded as treatment has now been installed
CM	Generic Scheme: In-stream measures to complement WR AMP7 NEP (March 2017) sustainability reductions and sustainable catchment options	The EA will release its first iteration of the AMP7 NEP in March 2017. For the sources with sustainability reductions and at risk of deterioration - catchment management including in-stream measures will be identified and appraised.	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Intelligent Irrigation	Work with Agriculture sector to improve water use efficiency and so reduce private abstraction, allowing potential diversion of aquifer supplies for public use	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Linked to catchment management advice which has been incorporated into the site-specific catchment management options
CM	Identify and implement sediment reduction measures, e.g. Pulborough, Rye, Test Surface Water	Roll out sediment traps for high risk areas across catchment. Subsidies. Additional benefits in pesticide and nutrient reduction. Benefit to Pulborough	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	No site-specific locations/Do benefits identified. To be flagged for further development for 2024 plan
CM	Modify, Remove and revise Operation of structures controlling flows on the River Test River management (Itchen)	Consider all of the options identified during the 2015 Investigation into the Western Supply Area covering the removal, modification or revision to operation of structures controlling flow on the River Test to identify if there is a water resource benefit	Western	HSW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by overall River Test catchment management option
CM	New Borehole compensation in River Test headwaters in low flows	A scheme whereby any water abstracted downstream during low flow periods is offset/compensated for, by the pumping of groundwater from the underlying aquifer and transferred back into the River Test upstream in order to maintain the same river flow volume.	Western	HSW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by overall River Test catchment management option
CM	Generic scheme: Nitrate reduction at groundwater source via advice and training.	Advice and training: Farmer visits to advise on management. Southern Water paid training for nutrient management and nutrient management planning.	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Generic scheme: Nitrate reduction at groundwater source via incentives for land management.	Incentives for better land management: incentive payments for different crop rotations, cover crops, undersowing, overwintering stubbles, lower nitrogen applications	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Generic scheme: Nitrate reduction at groundwater source via capital funding for precision farming.	Capital funding to improve precision farming: Southern Water funding for precision farming technologies	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Generic scheme: Pesticide reduction at surface water	Advice and training: advice on pesticide risks and management and generic pesticide management farmer	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options

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	source via advice and training.	visits. Southern Water paid training for pesticide handling, application and pelleter calibrations																				
CM	Generic scheme: Pesticide reduction at surface water source via incentives for land management.	Incentives for better land management: Product substitution incentives, reduced dose, payment for ecosystem services (PES) at a catchment scale.	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Generic scheme: Pesticide reduction at surface water source via capital funding for precision farming.	Capital funding to improve precision farming: 50:50 funding for farm yard drainage, biobeds, biofilters etc	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Generic scheme - Pesticide reduction at surface water source via smart abstraction	Use of triggers to pause abstraction at times of high pesticide risk	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Generic scheme - Pesticide risk reduction at groundwater sources	Pending outcome of AMEC NEP investigations in Feb	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by site-specific catchment management options
CM	Generic scheme: Water quality risk reduction at surface or groundwater water source for at risk or emerging substances.	Pending outcome of At Risk investigations in Feb	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Pending outcome of At Risk investigations in Feb, therefore not progressed
CM	Re-circulate water down Great Test during drought	The construction of a pumping station located before the River Test tidal limit, and associated infrastructure required to transfer the water to be re-circulated to an upstream location and put back into the main River during drought events. This would have the effect of maintaining flows in the main channel allowing abstractions to still occur.	Western	HSW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Superseded by overall River Test catchment management option
CM	Hampshire Southampton East WRZ River Itchen catchment mgmt. options & river restoration pilot	Catchment management solutions can contribute to making our water environment more resilient to changing climatic conditions, and in delivering permanent environmental improvements in our rivers. Catchment management solutions have, to date, proved difficult to quantify in sufficiently robust and certain terms that can meet the requirements of a WRMP process that focuses on achieving a supply demand balance. However, Southern Water is committed to exploring with other stakeholders the potential for catchment management not only as part of the Western Area strategy needed to meet the challenges posed by the notified River Itchen sustainability reductions, and/or in response to any potential future sustainability reductions that may be considered, but also as part of more integrated management of the water environment. The Company believes that such solutions may well provide the best outcomes for both customers and the environment.	Western	HSE	-	-	-	-	-	-	-	-	Yes	N/A	N/A	No	No	No	No	No	No	No definitive Deployable Output benefit, although Hampshire Rural and Hampshire Andover WRZ options are being considered
CM	Nitrate Option – Shoreham	Option to address nitrate risk by 2016-17, using both conventional treatment and catchment management together to ensure successful reduction of nitrates in limited time frame	Central	SB	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	No	No	Yes	No	Excluded as treatment has now been installed
CM	Nitrate Option – Sompting	Option to address nitrate risk by 2016-17, using both conventional treatment and catchment management together to ensure successful reduction of nitrates in limited time frame	Central	SB	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	No	No	Yes	No	Excluded as treatment has now been installed
CM	Sediment reduction catchment measures. Additional payments for ecosystem services to farmers / landowners. E.g., Rother.	Land management to reduce soil loss and link with HLS/Single farm payments. This needs to have very clear boundaries and has to have the extent, boundaries, what is being paid for regarding the ecosystem clearly defined. Reliant on EU policy to continue and deliver this. No point if the monitoring and analysis is not being done properly,	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	No Specific locations/DO benefit identified. To be flagged for further development in 2024 plan

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		need to check that the farmers are following protocol. Need all farmers in target area to be signed up to the scheme.																				
CM	Sediment reduction in-stream measures. E.g. Rother.	River restoration addressing over-widened over-depended river channel. Installing small weir, proper fish/eel passages. Allow reduction in MRF as more water available for abstraction. Providing benefit to Pulborough	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	No specific locations/DO benefit identified. To be flagged for further development in 2024 plan
CM	Using SUDS to replenish aquifers	Using SUDS to replenish aquifers in upper parts of catchments	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	No Specific locations/DO benefit identified. To be flagged for further development in 2024 plan
CM	Nitrate Option Brighton B	Nitrate removal.	Central	SB	-	-	-	-	-	-	-	-	-	0	1	-	Yes	No	No	Yes	No	Excluded as treatment has now been installed
CM	Thanet & Lyden - Stour IDB	Retain higher levels (& water volume) in winter for subsequent pumping to treatment and supply. Utilise existing water level control structures. Water currently going to waste. Could purchase farming land for storage & purchase abstraction rights. May allow resting of groundwater sources	Eastern	KT	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Excluded, pending scheme identification
CM	Nitrate Option – South Arundel A		Central	SW	-	-	-	-	-	-	-	-	-	0	1	-	Yes	No	No	Yes	No	Excluded as treatment has now been installed
CU	Change in level of service to reduce deficit	A change to level of service (LoS) could be considered to reduce a SDB deficit. A change in level of service could result in increased DO and thus help to reduce a given deficit. It would need to be supported by customer preferences	Southern Water	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as customers are not willing to accept a lower level of service
DES	Coastal Aquifers	Investigation into desalination from coastal aquifers	Southern Water	-	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	Investigative work has identified sites where coastal aquifer abstraction could support a surface water abstraction, but did not identify sites that could be fully supported by abstraction. It is advised that coastal aquifer boreholes are investigated during feasibility studies of those options if chosen by the optimisation modelling.
DES	Deep Groundwater	Abstraction of deeply confined aquifers with poor water quality is carried out in conjunction with desalination technology.	Southern Water	-	No	No	Yes	Yes	Yes	No	No	No	Yes	N/A	N/A	No	No	No	Yes	Yes	No	The cost of investigating the potential for deep groundwater exploration would be prohibitive for the expected maximum yields. This type of scheme could be reconsidered in the future if furthers studies completed by third parties reveal potential locations where deep groundwaters could be economically and sustainably exploited.
DES	Fawley	This option involves construction of desalination plant on the site of the now disused Fawley power station. The power station has a large intake structure (nominally 5,500Ml/d) and corresponding outfall which could be used by a desalination plant. With distribution enhancements treated water could be supplied to the following customers/areas: 1. Nearby large industrial user, currently Southern Water confirm supply of 10Ml/d but could be increased to 36Ml/d; 2. The Isle of Wight is supported by transfer through the Cross-Solent main, currently up to 18Ml/d, but it is proposed to increase capacity to 30Ml/d; 3. Test Surface Water WSW currently supplies approx. 105Ml/d (proposed increase to 160Ml/d) but is at risk of low flow reductions to 0Ml/d; 4. Itchen WSW currently supplies approx. 90Ml/d, but is at risk of low flow reductions to 0Ml/d, the Test Surface Water to Itchen WSW Link Main is currently proposed to supply 45Ml/d.	Western	HSW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	No	Yes	Yes	Yes	No	10Ml/d sub-option excluded, although larger capacity options are being considered.
DES	Tidal River Itchen	This option proposes the construction of a desalination plant at the River Itchen Industrial Estate north of the Itchen Bridge on the eastern side of the estuary was identified as a potential area for a desalination plant. The industrial area consists of densely packed large	Western	HSE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	Exclude from optimisation model due to difficulties distributing significant volumes of water and poor outfall modelling.

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		warehouse buildings and there are small pockets of undeveloped land.																				
DES	Tidal River Medina and Eastern Yar Desalination	Out of the three potential options (Cowes power station, West Medina Mills, Grain store/ aggregate sites) the site adjacent to the Cowes power station is preferred as the planning allocation leaves the best opportunity for a desalination plant.	Western	IOW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	Exclude from optimisation model due to issues with dispersion, river navigation and distribution limitations.
DES	Millbrook desal - Southampton urban area, docks and terminal	This option proposes installation of a seawater desalination plant at Southampton Water, which would be capable of producing up to 200Ml/d. It is envisaged that it would be located within the land of the existing Millbrook Waste Water Treatment Works and it would be connected into supply via the trunk main close to the site. If the plant produces 25Ml/d or less, the water can be pumped into the trunk main (18” diameter) parallel to the railway line just north of the site. If the plant capacity is 30Ml/d a connection is required into the 24” diameter trunk main 200 m further west. Further distribution enhancements are anticipated to be required to produce more than 30Ml/d.	Western	HSE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	Yes	No	Significant engineering issues associated with transfer and distribution pipelines. Locating a desalination plant in the Millbrook area would require constructing new transfer and distribution pipelines beside railways, motorways and protected areas. Potential planning risks. For this reason, this option has been excluded.
DES	Test Estuary Desalination	Construction of a 10Ml/d or 20Ml/d desalination plant. Depending on the capacity, the water could be pumped into supply at one of two locations. Both connections would supply water to the Test Surface Water zone. Further mains enhancements could allow supply of treated water to Test Surface Water WSW for onward distribution to the wider WRZ. There is also potential to supply the nearby large industrial user, between 10 and 36Ml/d depending on negotiations.	Western	HSW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	3	0	Yes	No	Yes	Yes	Yes	No	10Ml/d and 20Ml/d sub-options not included
DES	Test Estuary Desalination	This option is similar to other Test Estuary Desalination option but differs in that for this option, the hyper-saline waste flow would be discharged at the north end of Southampton Water, while for the other option the discharge would be pumped to the Solent for discharge.	Western	HSW	-	-	-	-	-	-	-	-	Yes	N/A	N/A	No	Yes	Yes	Yes	Yes	No	The Fawley discharge option provides the same amount of water without having as great an impact on salinity levels in Southampton Water. Therefore, it is considered that this option would be less acceptable on environmental grounds and has therefore been excluded from the optimisation modelling.
DES	Tidal River Ouse Desalination	The option has the potential for brackish water desalination. The area with most potential was identified as the industrial and business area located within Newhaven (Denton Island and North Quay Road industrial estate) which is within easy access of the river. Additionally, there may be room at Newhaven East WwTW to construct a desalination plant. The treated water would then be transferred to Longridge Telscombe WSR for distribution to the Sussex Brighton WRZ. Discharge of hyper-saline waste would be through Newhaven East WwTW's existing long sea outfall	Central	SB	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	Option excluded from optimisation model due significant engineering and planning difficulties for a low output scheme.
DES	Sandown Coastal desalination IOW	Installation of a new coastal seawater desalination plant at Sandown on the Isle of Wight which would be capable of producing a range of outputs between 3Ml/d and 22.5Ml/d. The proposed location is at the site of the Sandown WwTW. Outputs above 8.5Ml/d (local demand) require the construction of a transfer pipeline to High Alvington WSR for distribution to the rest of the island. Due to the extensive coverage of designated areas on the Isle of Wight, Sandown WwTW was identified as the only industrial site with potential for a coastal desalination plant. For this option to be technically viable, a pumping station would need to be located on the seafront. Sensitive location selection and design of this facility would be necessary.	Western	IOW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	Some sub options excluded

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DES	Desalination plant at Sholling	This option would see a desalination plant constructed to the east of Southampton near Sholling and would supply potable desalinated water to Southampton.	Western	HSE	-	-	-	-	-	-	-	-	Yes	2	0	Yes	No	Yes	Yes	Yes	No	The environmental risk of discharging to Southampton water is considered too great compared to other large desalination schemes that can provide the same volume of water while discharging to the Solent.
DES	Desalination on the Western Yar	This option would see a desalination plant constructed on in the west of the Isle of Wight and would supply potable desalinated water to the Isle of Wight.	Western	IOW	-	-	-	-	-	-	-	-	Yes	3	0	Yes	No	Yes	Yes	Yes	No	Rejected due to planning and environmental risks of location within a SINC and area of Ancient Woodland, the proposed river intake and discharge pipes being from a SAC, and pipeline routed through the AONB.
DES	Coastal Desalination – Shoreham Harbour	A site in Shoreham Harbour was identified as a the most feasible location for a coastal desalination plant that could supply the Central Area WRZs. The new desalination plant would be constructed within the site of an existing power station and make use of its abstraction and discharge structures. The treated water would be supplied to the Sussex WRZ distribution network.	Central	SB	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	10 and 30Ml/d sub-options not included
DES	River Stour Desalination	This option would be to abstract brackish water from the tidal River Stour. Much of the River Stour is subject to environmental designations, however two locations for a desalination plant have been identified: at land next to Sandwich WTW; and, land next to Ramsgate WwTW. In either case an abstraction structure and raw water pipeline would be required from the River Stour, and it is assumed possible to dispose of the hyper-saline discharge through the existing long-sea outfall that serves Sandwich WTW. Treated water would then be transferred to Fleete Manston WSR for distribution to the Kent Thanet WRZ.	Eastern	KT	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	No	Yes	Yes	Yes	No	Option considered to have too great an environmental impact from dispersion of hyper-saline waste to the designated reach of the River Stour compared to less environmentally sensitive options available in the WRZ.
DP	East Worthing - licence variation	East Worthing PS is located within SWS's Sussex Worthing Water Resource Zone. The source is located in Worthing, approximately 2 km north of the coast, with the source of supply being the Chichester-Worthing-Portsdown Chalk Block. It is part of the Worthing group licence and is subject to this group's aggregate constraints. The annual group licence is 26,000 Ml, whilst the daily abstraction limit from East Worthing PS is 7Ml/d from January-September. This is reduced to 4.5Ml/d between October and December. The purpose of this seasonal constraint is unclear, but it may have been to protect flows at the end of the groundwater recession into cress beds. These no longer exist, but used to be located on the southern boundary of the East Worthing PS site. This option is a GW Drought Permit to remove the seasonal restrictions between Oct and Dec and enable the daily abstraction to increase from 4.5 to 7Ml/d (can operate at 7Ml/d for the remaining months). Southern Water would only consider applying for a Drought Order / Permit at this site in a severe drought, such as a third dry winter (with an assumed drought action duration of 92 days).	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	1	-	-	-	No	-	No	Drought option, not WRMP
DP	Rest groundwater sources – Isle of Wight	IOW – Drought Intervention Option. Operational strategy to limit the use of indigenous groundwater sources (such as Newport) as much as possible during the early stages of drought so that these groundwater supplies are available as a last resort as surface water recesses during extended drought periods	Western	IOW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	No	-	No	Drought option, not WRMP
DP	Rest groundwater sources – Sussex Worthing	Drought Option – Worthing – Use any spare winter/spring water available from the Pulborough river abstraction to supply customers in Worthing and in Brighton. This allows groundwater to be rested in key 'storage' sources, such as North Worthing and Worthing, which can improve drought resilience in those sources during the following summer and autumn, and help provide some protection against saline intrusion in sources down gradient	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	No	-	No	Drought option - operational change in drought - not WRMP

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DP	Rest specific groundwater sources during early stages of drought - Kent Medway	Drought Option - Kent Medway - During a drought where recharge of groundwater is reduced, the overall strategy for the Kent Medway WRZ is to rest groundwater sources and maximise the use of the River Medway Scheme. Within this strategy, there are a number of sources which are constrained by hydrogeological constraints, such as the source yield or features such as adits. Priority will be given to resting these sources, over and above those that are simply constrained by the abstraction licence or pump capacity.	Eastern	KME and KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Kent Medway schemes are unviable and are removed from the Drought Options list
DP	Rest groundwater sources – Sussex North	Drought Option. Use any spare winter/spring water available from the Pulborough river abstraction preferentially over the Pulborough Groundwater sources. This allows the groundwater to be rested to improve its drought resilience during the following summer and autumn, and help to provide some protection against saline intrusion in sources down gradient.	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	No	-	No	Drought option - operational change in drought - not WRMP
DP	Shalcombe – licence variation	Relax groundwater level constraint to increase abstraction. New Drought Option identified Southern Water meeting 17/11/16.	Western	IOW	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	-	-	-	No	-	No	Drought option - operational change in drought - not WRMP
GWA	Re-commission existing or old licences	Investigations to identify sources to be considered for re-commissioning	Southern Water	-	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	N/A	N/A	No	No	Yes	No	No	No	Excluded pending test pumping with characterisation of sediment to inform filtration plant design and to ascertain sediment loading.
GWA	River Yar augmentation boreholes	On the Isle of Wight there is an existing scheme where the river Eastern Yar is augmented with flows from groundwater sources within the same catchment, as well as ground and surface water from an adjacent catchment. The scheme is to improve the effectiveness of this augmentation.	Western	IOW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	This option has been excluded from investment modelling pending further investigation of DO benefit achievable.
IWR	Ashlett Creek WWTW Industrial Reuse - 3Ml/d	Treated effluent from Ashlett Creek WwTW could be used to reduce demand in a planned housing development or to supply boiler feed water to Bournemouth supply oil refinery.	Western	HSW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	Yes	No	The low output of this scheme would make it uneconomic to implement.
IWR	Agricultural Treated Effluent Recycling	To re-use effluent from WWTW by farmers and agriculture uses	Southern Water	-	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	Yes	No	No	No specific locations for this option have been identified to turn this into feasible option.
IWR	Peel Common WWTW Industrial Reuse - 40Ml/d	The combined demand from the Bournemouth supply industrial site is circa 55Ml/d, with 40Ml/d supplied by Bournemouth Water. This option seeks to replace this Bournemouth transfer with effluent reuse in order to free up the 40Ml/d of potable supply from Bournemouth. Peel Common WwTW is on the eastern side of Southampton Water and to transfer the water to Bournemouth supply a tunnel will be required.	Western	HSE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	Yes	No	Yes	Yes	No	Issues with tunnelling and planning constraints have excluded this option - no further Level 2 assessments progressed. Not taken forward to optimisation model.
IWR	Sittingbourne 1 Industrial Water Reuse	This option is to use the reuse scheme to free up additional volume in borehole licence to increase the scope of the licence trading. Company utilises the groundwater in its paper/board making processes. It has been assumed at this stage that the RO wastewater can be discharged through Sittingbourne 1 WwTW existing outfall. .	Eastern	KME	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	No	No	Yes	No	Yes	No	Excluded as covered by combination of licence trade option and another option.
IWR	Woolston WWTW Industrial Reuse -15Ml/d	Woolston WWTW is on the opposite side of Southampton Water to Bournemouth supply but has the advantage that tertiary treatment in the form of MBR is already being implemented. As such, this option benefits from the fact that it does not include the cost of tertiary treatment installation and operation, but requires the construction of a pipeline beneath Southampton Water. The DWF of Woolston WWTW is circa 15Ml/d and this flow could be used to either provide the back-up supply to Bournemouth supply or be substituted for some of the Bournemouth supply (as full treatment will be occurring all of the year).	Western	HSE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	Yes	No	Yes	Yes	No	Constructing a pipeline across Southampton Water would be prohibitively expensive, and therefore this option has not been investigated further.

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IZT	Andover reservoir to Hampshire Kingsclere WRZ	This scheme is dependent upon Crabwood Reservoir to Andover Reservoir transfer. The transfer pipeline for this scheme branches off the Andover to Whitchurch pipeline. The scheme involves the construction of a pipeline to transfer from the Andover- Whitchurch pipeline to Hampshire Kingsclere WRZ. In addition, the scheme includes a further pipeline to near Basingstoke for distribution the Basingstoke area and Bishops Green WSRs.	Western	HK	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	No	No	No	No	No	No	This scheme has been assessed as part of other options
IZT	Enhance Bewl transfer to 45Ml/d	The Bewl to Beauport WTW transfer scheme option proposes to increase the existing transfer capacity between the Bewl and Beauport WTW with the construction of a new raw water transfer main. This effectively allows increased transfer from the Kent Medway WRZ to Sussex Hastings WRZ. The option originally considered an increase in transfer capacity between Bewl and Darwell reservoirs (35Ml/d to 45Ml/d). However, this has since been removed following SWS/EA consultation (25/09/12) due to concerns regarding invasive species (white clawed crayfish). The concerns regarding invasive species have led to a requirement for the water from Bewl to bypass Darwell Reservoir and be transferred directly to Beauport WSW. After treatment, the flows will enter supply using the existing network. The Stage 2 report (April 2003) detailed assessment noted that an enhanced Bewl transfer is only feasible once the capacity of Bewl is raised to 40,000Ml.	Eastern	SH	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Screened out until Southern Water have clarity on new Rye-Beauport pipeline. This should be designed to meet future needs
IZT	Crabwood reservoir to Andover reservoir	This option involves the construction of a pipeline between Crabwood water service reservoir (WSR) and Andover WSR in Hampshire South and Hampshire Andover WRZs. The scheme includes a short spur off the main pipeline to feed Chilbolton WSR (water tower). The WSR at Andover would also be connected to the WSRs to the East of Andover via new pipelines.	Western	HA	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	No	No	No	No	No	No	Scheme assessed as part of another option.
IZT	Cross Solent Main to 20Ml/d	This option incorporates the additional assets required to utilise the spare capacity of the two most recent 300 mm diameter Cross-Solent mains. The new mains have been constructed between the Lepe on the Hampshire coast and Gurnard on the IOW to replace two slightly smaller mains that had reached the end of their design life. The scheme includes refurbishment or replacement of Broadfield and Newport pumps along with a new 450 mm diameter main between near Cowes and High Alvington WSR. The capacity of High Alvington WSR would also be increased with an additional 10Mlservice reservoir to accommodate the increased transfer.	Western	IOW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	No longer required as Southern Water are enhancing the Blackfield and near Cowes PS capacities in AMP6 and the pipeline restriction will be removed in another option
IZT	Pulborough Winter transfer	During the winter there is surplus water available at Pulborough WSW. Pulborough Winter Transfer involves four stages, each of which provides cumulatively increasing benefit in terms of DO. Implementation of all stages would enable transfer from Pulborough WSW to Tenants Hill WSR in Sussex Worthing, which would then gravitate to Sussex Brighton. This option considers the potential for excess surface water that may be available within the River Rother during the winter to be used (either within the existing licence, or using an extended winter licence at Pulborough WSW) to supply Sussex Coast. This would allow coastal groundwater sources to be rested, which would help Southern Water's Source Drought Management Strategy (SDMS) and hence increase groundwater capabilities during the summer and autumn of a drought year. (1) This stage addresses turbidity and sludge handling issues at Pulborough which would otherwise constrain the	Central	SB	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	excluded as Pulborough to Weir Wood has been built

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		DO that can be achieved following the implementation of the transfer. Improvements at Pulborough WSW would allow increased transfer capacity to 7Ml/d, providing a DO benefit of 2Ml/d for the Brighton Block (SB). Constrained by V6 Worthing-Brighton transfer main. To achieve further DO benefit to Brighton, it would be necessary to alleviate pressures in the V6 main. (2) New main between Shoreham WSW/North Shoreham WSW and Brighton A WSR. This would allow 7Ml/d to be pumped via a different route and relieve pressure issues in the existing V6 main. Additional water from Pulborough is only available during winter, so the benefit comes from resting groundwater sources in the Brighton Block during winter. The 7Ml/d capacity increase would only result in a 4Ml/d DO increase. (3) New main between Tenants Hill WSR and Shoreham WSW. This would allow an increase of the winter supply and resting strategy (resting the Brighton groundwater sources). (4) Pulborough to Sussex Brighton transfer – 4Ml/d. Details unknown at this stage. Introduced following WRSE meeting 17/10/11.																			
IZT	Hampshire Rural (Romsey/Kings Sombourne) locked in DO scheme	Remove constraint by installing booster stations (~5Ml/d) at Woodside transfer (increasing inter-zonal transfer to HSE) and Broadlands (increasing inter-zonal transfer to HSW).	Western	HR	-	-	-	-	-	-	-	-	Yes	N/A	N/A	No	No	No	No	No	No	Scheme now assessed as part of other IZT schemes
IZT	Faversham4–Fleete	(1) Conditioning of existing Faversham4–Fleete main to enable bi-directional transfers (and specifically from Kent Thanet to Kent Medway). It is not thought that any additional pipeline would be required, although this is dependent on the existing main being structurally sound. A new 25Ml/d pumping station is required at Fleete WSR along with a possible booster pumping station to reduce the pressure head along the main. (Option TT3 in AMP 5). Minimum engineering requirements: new 25Ml/d pumping station at Fleete Reservoir, modifications to pipework at Dunkirk Break Pressure Tank or alterations to pipework and construction of a new Dunkirk Break Pressure Tank, installation of energy dissipation measures at Faversham4. (2) The Kent Medway to Kent Thanet transfer scheme option proposes to increase the existing transfer capacity by 10Ml/d between the Sheldwich boreholes and Fleete service reservoir. This would be achieved by duplicating the existing transfer main and a new pumping station at Faversham4. (Option TT1 in AMP 5). Main elements of scheme are: modification of borehole pumps at Sheldwich to allow additional 10Ml/d to be pumped to Faversham4 through the new main, pumping main from Sheldwich to Faversham4 (approx. 6.5km), booster PS at Faversham4 and a disinfection unit, break pressure tank at Dunkirk, gravity main from Dunkirk to Fleete reservoir – 31.5km of main and phosphate dosing at Fleete reservoir for 10Ml/d (3) The operational transfer is limited to the output from Faversham4. This option enables flows from the Faversham3 source to be directed, via an existing main, towards Faversham4 WSW. A soakaway is installed at Faversham4 to allow for reconditioning of the existing main and the addition of UV treatment at Faversham4 permits disinfection of the Faversham3 flows. (Option TT1a in AMP 5). Main scheme components are: 13Ml/d soakaway at Faversham4, increased pumping capacity at Faversham4, new UV treatment at Faversham4 WSW.	Eastern	KT	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	1	0	No	Yes	Yes	Yes	Yes	No	Excluded following NE comments 14/06/17

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IZT	Sandown to High Alvington transfer	High lift pumping station at Sandown WSW and a transfer pipeline to the High Alvington WSR above Newport. (1) 10Ml/d Transfer from Sandown WSW to High Alvington WSR and construction of a new WSR at High Alvington. Likely to be used in conjunction with IWD1 (Sandown Desal). (2) 2.5Ml/d Transfer from Sandown WSW to High Alvington WSR and construction of a new WSR at High Alvington. Likely to be used in conjunction with IWD1 (Sandown Desal). (3) 20Ml/d Transfer from Sandown WSW to High Alvington WSR and construction of a new WSR at High Alvington. Likely to be used in conjunction with IWD1 (Sandown Desal). (4) 5Ml/d Transfer from Sandown WSW to High Alvington WSR and construction of a new WSR at High Alvington. Likely to be used in conjunction with IWD1 (Sandown Desal).	Western	IOW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Not required as a stand-alone option. Included within specific desalination and reuse schemes
IZT	Transfer between Sussex Hastings WRZ and Sussex Coast WRZ	Transfer between Sussex Hastings WRZ and Sussex Coast WRZ. No specific details available at this stage.	Central	SH	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Screened out as replaced by consideration of options sharing resources with South East Water (RZ 2 & 3)
IZT	Sussex North to Sussex Worthing	(1) Sussex North to Sussex Worthing dependent on Pulborough winter transfer. (2) Drought Option - As part of the activities undertaken during the previous drought, the Company has completed a scheme to allow part of the Portsmouth Water Company transfer to Sussex North WRZ to be diverted to Sussex Worthing WRZ in the Arundel area. (3) Details unknown at this stage.	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Removed from feasible list as duplicated by other schemes
IZT	Weir Wood Winter Refill (Western Rother/Arun treated water) Stage 1 of the Pulborough to Sussex Brighton Transfer	This option involves the transfer of water to Weir Wood for storage from sources other than the Medway. The only feasible option for transfer from these sources is a treated water transfer from Pulborough to Weir Wood using existing infrastructure. The option would rely on using excess surface water capacity at Pulborough during the winter (which exists in even the most severe droughts) to treat and transfer water to Weir Wood. The option involves a new main installation between Pulborough WTW and Stopham (on the northern bank of the River Arun) to overcome pressure issues in the current main. This allows surplus water at Pulborough during the winter to be utilised by increasing transfer capacity by 2-5Ml/d. The scheme does not actually transfer the water to Weir Wood, rather it supplies the areas of demand that would otherwise have to be fed by Weir Wood. This allows Weir Wood to enter a 'non- consumptive mode' during the winter and spring, which ensures that it can be filled even during severe drought events. Alternatively, Weir Wood may continue to be used and flows may be transferred towards Worthing (Pulborough Winter Transfer option), but this is not considered in the DO calculation for this option. This option was option N4 in AMP 4 (Weir Wood Winter Refill Western Rother/Arun), which was then excluded as a single option in AMP 5 as it became part N8a of option N8 (Pulborough Winter Transfer).	Central	SN	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Removed as scheme has been completed
LM	Fixed link pressure reduction valves	Leakage reduction options focused on pressure management, including potential future dynamic pressure management	Southern Water	-	Yes	No	No	No	No	Yes	No	Yes	Yes	1	1	No	No	Yes	No	Yes	No	Limited scope for further pressure reduction given number of PRV's installed as part of previous pressure management scheme

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LM	Supply pipe leakage reduction associated with option MET_MAMR3	This option accounts for the supply pipe leakage reductions that are assumed to result from the enhanced AMR meter reading strategy for existing metered households, moving to monthly meter readings.	Southern Water	-	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	1	1	-	Yes	Yes	No	Yes	No	MET_MAMR3 has been excluded from the RWRMP feasible options list as a standalone option because it now forms part of the Target 100 option. Its associated SPL option is therefore not required.
LM	Supply pipe leakage reduction associated with option MET_MSM1	This option accounts for the supply pipe leakage reductions that are assumed to result from the installation of a smarter metering network to allow daily meter readings of existing metered households. This option starts in AMP7.	Southern Water	-	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	Yes	No	Yes	No	MET_MSM1 has been excluded from the RWRMP feasible options list as a standalone option because it now forms part of the Target 100 option. Its associated SPL option is therefore not required.
LM	Supply pipe leakage reduction associated with option MET_MSM1b	This option accounts for the supply pipe leakage reductions that are assumed to result from smarter metering of all HH customers.	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Option no longer required as MET_MSM1b not included in options appraisal
LM	Supply pipe leakage reduction associated with option MET_MSM2	This option accounts for the supply pipe leakage reductions that are assumed to result from a long-term smarter metering programme.	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Option no longer required as MET_MSM2 no longer included in options appraisal
LM	Telemetry	Use of appropriate telemetry to improve repair times	Southern Water	-	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Replaced by acoustic loggers option LM_ACL
LTR	Sittingbourne licence trade	Sittingbourne licence trade	Eastern	KME	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	1	0	No	Yes	Yes	No	Yes	No	Would need a commercial agreement with DS Smith and subsequent WQ surveys to determine ultimate treatment requirements
LTR	Purchase Groundwater licences: Brighton/Worthing Blocks	This option involves purchasing existing licences from other abstractors within the Worthing or Brighton Blocks in Sussex, where it is believed that there is significant excess capacity in the licence for the summer period.	Central	SW and SB	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	Yes	No	Yes	No	No specific locations/licences have been identified that would be suitable for Southern Water to purchase.
LTR	Water trading (3rd parties) - Kimberly-Clark Limited	Water trading (3rd parties) - Kimberly-Clark Limited. Kimberly-Clark Limited have 6 abstraction locations within SWS. This option would involve discussions between Southern Water and Kimberly-Clark Limited for Southern Water to determine whether Kimberly-Clark Limited are willing to trade some or all of their licence with SWS.	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	Yes	No	No further discussion between Southern Water and Kimberley Clark therefore significant uncertainty as to cost, available water and other key determining factors. This option can be reconsidered following further discussions with Kimberley Clark.
LTR	Water trading (3rd parties) - Lafarge Cement UK PLC	Water trading (3rd parties) - Lafarge Cement UK PLC	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	Yes	No	No further discussion between Southern Water and Lafarge therefore significant uncertainty as to cost, available water and other key determining factors. This option can be reconsidered following further discussions with Lafarge.
LTR	Water trading (3rd parties) - large abstraction licence holder	Obtain data on holders of abstraction licences >1Ml/d for Southern Water to contact to establish whether these 3rd parties were willing to trade some or all of their licence. This option concerns The Property Manager. Southern Water to contact The Property Manager to discuss trading all or part of their licence.	Southern Water	-	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/a	N/a	No	No	No	No	No	No	No locations or suitable large abstractors of water identified.
LTR	Purchase under-utilised licences from industry	This option considers the feasibility of purchasing the use of existing large industrial abstraction licences by Southern Water that have not been used either in part, or in their entirety.	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Additional work undertaken as part of this options appraisal, no other feasible options identified.
LV	Lukely Brook MRF	Drought Option: This Drought Permit is concerned with borehole abstraction from Lower Chalk in Lukely Brook Valley. The proposed drought option involves relaxation of the minimum flow requirement (Minimum Residual Flow, MRF) at Sheep Dip Weir in Plaish Meadows, through the application for and implementation of a Drought Permit, to enable continued abstraction from Lukely Brook.	Western	IOW	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	1	0	-	-	-	No	-	No	0
LV	Caul Bourne	Drought Option: Reduce or remove the MRF which controls the abstraction from this source. Drought Order. Level of intervention: Severe drought conditions.	Western	IOW	No	-	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	-	-	-	No	Yes	No	0
LV	Pulborough MRF Seasonal Variation including river restoration	Work carried out during drought permit applications in the 2005 and 2006 drought permits indicated that the MRF (Minimum River Flow) could potentially be reduced by 10Ml/d without unacceptable environmental impacts,	Central	SN	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Excluded as no DO benefit identified

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		particularly if this is done outside of the summer critical period when river temperatures are at their highest. Currently the licence at Pulborough is 75Ml/d (combined surface and groundwater), but surface water abstraction is constrained by a requirement that the flow over Pulborough Weir should be no less than 63.64Ml/d (daily average). River restoration measures have been included to compensate for any environmental / ecological damage that may otherwise been caused as a result of increased abstraction.																			
MET	Enhanced AMR meter reading strategy for existing metered households: monthly meter readings	Enhanced AMR meter reading strategy for existing metered households: monthly meter readings	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	Yes	Yes	Yes	No	This option has been incorporated into and therefore superseded by the Target 100 option for the RWRMP therefore has been excluded from the feasible options list as a standalone option.
MET	Smarter metering of all HH metered customers	Introduce smarter meter technology which can provide continuous meter reading data to the customer and Southern Water	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	Yes	Yes	Yes	No	This option has been incorporated into and therefore superseded by the Target 100 option for the RWRMP therefore has been excluded from the feasible options list as a standalone option.
MET	Seasonal tariff	Seasonal tariffs provide incentives to reduce discretionary water use at peak times. This tariff option would see customers being charged more in summer months (June to September inclusive) and less during the rest of the year (October to May inclusive). Relies upon smarter metering being in place.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	Yes	Yes	Yes	No	This option has been incorporated into and therefore superseded by the Target 100 option for the RWRMP therefore has been excluded from the feasible options list as a standalone option.
MET	Rising block tariff	Tariff that increases as customers use additional water. Does not require smart meter technology although may be more effective if it was in place. Issue around benchmarking and occupancy to avoid social implications of tariff.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	-	Yes	Yes	Yes	Yes	No	This option has been incorporated into and therefore superseded by the Target 100 option for the RWRMP therefore has been excluded from the feasible options list as a standalone option.
MET	Drought awareness reward tariff	This reward-based tariff would be designed to encourage customers to use less water during times of drought. The level of the benchmark below which customers would need to reduce their consumption, as well as the level of the reward would require development and a high level of analysis by Southern Water. Communications relating to this tariff could be aligned with Drought Plan communications that Southern Water would already be undertaking. In this way, the tariff could form one of Southern Water's drought management actions. Issues around assessing the potential demand saving associated with the tariff from a WRMP perspective.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	No	No	Yes	No	No	No	This drought tariff is to be discussed as something Southern Water is 'keen to explore' in the WRMP Technical Summary, but due to the following issues, it is henceforth excluded from the optimisation process: - Mechanism for cross-subsidy of revenue loss/the cost of rewards resulting from these tariffs is not clear at this stage - Drought triggers are WRZ-based - difficult to communicate this to customers who would potentially be subject to different tariffs as a result of WRZ-specific drought triggers bring breached - Potential double-counting of TUBs savings/delay of TUBs as a result of these tariffs - would need to be reflected in the SDB as TUBs savings are included in baseline DO for many sources
MET	Drought levy	Additional tariff applied during droughts to discourage water use - based on the principle of the rising block tariff but only applied when the resource state falls below Southern Water's impending drought trigger levels. As with the seasonal tariff, customers may not support this tariff; issues around affordability and protecting vulnerable customers would need to be considered. This option could be best linked to the Rising Block tariff (MET_Tar2) so customers are already used to the concept of volumetric 'block' charging, but to draw attention to the specific need to reduce consumption during a drought event, customers could see an additional charge for the 'discretionary' block of water to discourage use of water during a drought.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0	1	No	Yes	Yes	No	No	No	This drought tariff is to be discussed as something Southern Water is 'keen to explore' in the WRMP Technical Summary, but due to the following issues, it is henceforth excluded from the optimisation process: - Mechanism for cross-subsidy of revenue loss/the cost of rewards resulting from these tariffs is not clear at this stage - Drought triggers are WRZ-based - difficult to communicate this to customers who would potentially be subject to different tariffs as a result of WRZ-specific drought triggers bring breached - Potential double-counting of TUBs savings/delay of TUBs as a result of these tariffs - would need to be reflected in the SDB as TUBs savings are included in baseline DO for many sources
MET	Individual reward tariff	This tariff would be designed to encourage individuals to reduce their year-round water use, therefore targeting annual average and peak period demand savings. The	Southern Water	-	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Until such time as the trials have been carried out and the demand savings and associated reward levels and costs are assessed, it is not possible to assign a meaningful cost

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		option could be structured in a similar way to MET_Tar8 - the community reward tariff scheme. Similarly to that option, one or more trials would be required to inform the level at which the reward should be set to achieve a meaningful reduction in demand. Customers could be offered a financial reward for reducing their consumption below the identified threshold level (e.g. money off their next water bill) or alternatively could be offered reward points to redeem.																				or demand saving to this option for this WRMP. Hence this option is not being taken forward as a standalone option, but Southern Water will review the outcomes of the community reward tariff when available and re-consider this option within T100 at an appropriate stage.
NT	Water from Air	New Technology which extracts water from the air using a wind turbine to drive a heat exchanger to cool and condense water	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	N	No	No	No	Yes	Yes	No	Initial desktop studies revealed that this option would be prohibitively expensive to run on a large scale. Academic literature suggests that operating costs for this technology are much higher than for desalination which itself is already considered an energy intensive technology. Using wind powered turbines as the cooling mechanism would reduce the energy requirements considerably, however, the volume of water produced by this type of device is low, and it would be cost prohibitive to install enough devices, treat the water and distribute to customers. This type of approach is much more suited to small communities in extremely water scarce environments.
PWR	Medway WWTW Indirect Potable Water Reuse – Medway	This option involves the transfer of approx. 18Ml/d of treated effluent from Medway WWTW to the River Medway upstream of Springfield abstraction. This would be used to supplement flows within the Medway during low flow periods, thus reducing the releases from Bewl Water and conserving storage.	Eastern	KMW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	Excluded as 18Ml/d option is the only one taken forward.
PWR	Medway water reuse pumped to near Maidstone and onwards to Bewl	This scheme involves tertiary treatment of waste water effluent at Medway WTW, and pumping through a new discharge pipeline to the River Medway upstream of the abstraction near Maidstone. The extra water would then be re abstracted near Maidstone and pumped up to Bewl Reservoir for storage. A raw water supply pipe would be constructed directly from Bewl Reservoir to near Rochester WSW to be used when there would be a risk of Metaldehyde contamination by releasing water to the River Medway.	Eastern	KMW	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	This option is among a number that increase supply to near Rochester WSW using treated wastewater from Medway WTW. This variation includes constructing at least three times as much pipeline as the other variations with little or no gain additional DO. The reasoning behind investigating this option is that it would enable the direct supply of metaldehyde free water from Bewl to near Rochester when metaldehyde would otherwise be a risk. However, another variation of this scheme would reduce the metaldehyde risk without requiring as much pipeline to be constructed. This option has therefore been rejected on the grounds of disproportionate costs. No detailed L2 assessment undertaken on the grounds outlined.
PWR	Hastings WWTW effluent to augment storage in Darwell Reservoir	This option proposes the transfer of treated effluent from Hastings WTW, currently being discharged to sea at Pebsham Gap, in order to augment storage in either the Darwell reservoir. This option includes tertiary treatment of Hastings wastewater, this may include Membrane Bio Reactors and Reverse Osmosis. Additional GAC and UV treatment may be required at Rye WSW.	Eastern	SH	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	No	Yes	Yes	Yes	Yes	No	The size and the volume of turnover of Powdermill reservoir mean that the once the reuse scheme is running treated wastewater would make up a large proportion of the reservoir's volume. As the reservoir supplies water directly to Rye WSW via pipes there would be no further in river dilution making this in effect a direct reuse scheme with greater levels of treatment required and additional public perception issues. Additionally, treated wastewater from Hastings WwTW could be used to augment Darwell Reservoir without the above issues. Therefore this option has not been carried forward on grounds of suitability.
PWR	Portsmouth Harbour WTW Indirect Potable Reuse	There is significant wastewater resource at Portsmouth Harbour WTW that could be treated for reuse, up to 85Ml/d DWF. This option looks at tertiary treatment at Portsmouth Harbour WTW then pumping to Ambersham 30 km away for downstream abstraction by Pulborough.	Central	SN	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	This option includes construction of a long pipeline to supply Pulborough WSW. There is another option to supply Pulborough WSW with treated wastewater. This option has therefore been excluded on grounds of disproportionate costs, however could be revisited if it is determined that Pulborough WSW requires significantly more water during drought periods. On this basis no detailed L2 assessment undertaken.
PWR	Chickenhall WwTW Indirect Potable Water Reuse	This options transfers 30Ml/d of treated effluent to a site immediately downstream of Itchen WSW abstraction.	Western	HSE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	Yes	No	No	Excluded from optimisation model as discharge is used by Portsmouth Water as part of the Gater's Mill abstraction

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		When sustainability reductions are imposed on Itchen WSW abstractions the treated effluent will be used offset the abstraction restrictions. No further treatment capacity at Itchen WSW is required to enable this scheme.																				licence therefore this option has been rejected on grounds of the water not being available for use. This option could be revisited if some form of sharing agreement could be developed that would be beneficial to Portsmouth Water and Southern Water. No detailed L2 assessment on grounds outlined
PWR	Medway WWTW Indirect Potable Water Reuse – Eccles Lake (18Ml/d)	This option involves the transfer of 18Ml/d of treated effluent from Medway WWTW to near Rochester WSW's raw water storage reservoir Eccles Lake.	Eastern	KMW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	Replaced by another option
PWR	Littlehampton WTW Indirect Potable Water Reuse	This scheme proposes the transfer of treated effluent from Littlehampton WTW to a new discharge point to the western River Rother upstream of the Pulborough WSW abstraction. This would support flows over the weir as the MRF is approached, therefore prolong production at Pulborough during a drought. 20Ml/d represents the upper end of the reliable flow that could be expected from Littlehampton WTW. Once abstracted at Pulborough WSW this water would be used to meet demand in the Sussex North WRZ.	Central	SN	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	Only 10Ml/d and 20Ml/d options taken forward
PWR	Generic Water Reuse Schemes	The generic investigation into effluent reuse possibilities will focus on a number of areas: 1. Identify potential opportunities to substitute either treated water or private abstractions with reuse water to large industrial water users. In the former this would reduce demand on Southern Water supply; in the case of the latter this may free up the licence for use by SWS. Where possible, this information will also be sourced outside of Southern Water water supply region but within the sewerage supply area with a view to examining the options for utilising reuse from Southern Water wastewater treatment works to reduce demand on other water supply companies' systems – this may also be considered within the context of water trading. 2. Large agricultural water users, primarily those with their own abstraction licences, may also provide an opportunity to reduce agricultural abstraction which may allow Southern Water to take up the slack existing licences. 3. Identify locations where large population growth is forecast as the additional flow generated could provide an opportunity to augment flows upstream of an existing abstraction and/or support agricultural reuse. 4. Map existing Southern Water discharges with water treatment works abstractions (Southern Water and neighbouring water companies) to identify additional reuse options over and above those already considered in the WRMP14 options to be examined. Typically, this will include WWTWs with lower DWF as than previously considered financially viable.	Southern Water	-	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	Yes	-	No	Any identified schemes will be assessed in their own right in their own factfiles. No specific L2 assessments undertaken here.
PWR	Millbrook WwTW Indirect Potable Water Reuse	This option involves the transfer of up to 40Ml/d (consented DWF) of treated effluent from Millbrook WwTW to the River Test upstream of Test Surface Water abstraction. This would be used to supplement flows within the Test during low flow periods, thus maintaining abstraction periods of low flow.	Western	HSE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	Yes	-	No	Exclude from optimisation model due to significant engineering/planning issues associated with constructing a transfer pipeline through/alongside a motorway and dual carriageway. Environmental issues associated with CSMG requirements bring high level of uncertainty and there are better options. No detailed L2 assessment undertaken on these grounds.
PWR	Medway estuary WTW	Medway estuary WTW has a consented DWF of 44Ml/d which is currently discharged to the sea. This option proposes advanced treatment and transfer of this effluent	Eastern	KMW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	Excluded due to concerns that instream dilution will not be sufficient for this volume of water.

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		to support the flows in the River Medway upstream of the Springfield Abstraction that supplies near Rochester WSW with raw water. Two alternative locations for the discharge location have been identified, both of which are small streams that flow into the River Len, a tributary of the Medway.																				
PWR	Effluent re-use & transfer from the Sevenoaks area	Sewage within the Sevenoaks area is collected by Thames Water and transported to their Crossness WWTW. This represents water 'lost' from the Medway catchment. This option relates to the use of any increased discharge as a result of expansion in the Sevenoaks area, by a transfer to the headwaters of the River Medway.	Eastern	KMW	No	Yes	Yes	-	-	-	-	-	Yes	-	-	-	-	-	Yes	-	No	Exclude from optimisation model due to significant engineering/planning issues associated with constructing a transfer pipeline through/alongside a motorway and dual carriageway. Environmental issues associated with CSMG requirements bring high level of uncertainty and there are better options. No detailed L2 assessment undertaken on these grounds.
PWR	Sandown WwTW Indirect Potable Reuse	This option proposes the transfer of treated effluent from Sandown WwTW (currently discharged to sea), to support flows in the Eastern River Yar upstream of the Sandown WSW abstraction at Alverstone. Treated water in excess of the local demand will be transferred through a new transfer pipeline to the Alvington High Level WSR, near Newport, for supply to much of the island. This option is reliant on the WSR enlargements carried out in IZT_CSM Cross-Solent upgrade. (2) Option 2 also includes upgrades to Sandown WSW to achieve the extra flow.	Western	IOW	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	0	Yes	Yes	Yes	Yes	Yes	No	Covered by other options
PWR	Weir Wood Reservoir augmentation with treated effluent	Discharge highly treated effluent from neighbouring WwTWs into Weir Wood Reservoir. Potential WwTW include Tunbridge Well South WwTW, East Grinstead WwTW, and Scaynes Hill WwTW. There are smaller WwTW which could also contribute. Effluent would be treated to a very high quality either at the WwTWs individually or collectively at a new tertiary treatment site near Weir Wood Reservoir for transfer and discharge to the reservoir. The extra water would be used to prolong how long Weir Wood Reservoir can support flows during a drought.	Central	SN	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	Yes	-	No	Exclude from optimisation model as option requires removing water permanently from the WwTW catchments and transferring to another, there is a high risk that the EA would not accept this on the grounds of reduced flows into those rivers previously accepting discharges. On these grounds no further L2 assessment work undertaken.
RES	Bewl Operational Control	Bewl Water fills from three sources: (1) Its own small natural catchment; (2) Water from the River Teise catchment pumped from intake; and (3) Water from the River Medway catchment pumped from intake near Maidstone Currently, the River Teise intake is used preferentially for filling the reservoir, and the intake near Maidstone is only used when the reservoir falls to defined critical levels. There are operational control curves in place which are used to determine the operation of both of these supplies to the reservoir. There is a balance between increasing the deployable output during worst-case drought events by raising the control curve, and incurring additional year-on-year operational expenditure through increased use of the abstraction near Maidstone to fill Bewl. This option would entail investigating these operational control rules to explore the relationships between security of supplies and operational expenditure. Initial investigations will explore a limited number of alternative control rules. If the option is taken forward, more complex optimisation routines are available to select the best control curve. If found to be of benefit, the implementation of the scheme	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	Yes	No	Operational changes to the control rules are already included in the DO assessment

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		would be through the use of different operational control rules.																				
RES	Blue Lake	Blue Lake is a former quarry, located close to Northfleet, which is owned by Blue Circle. It is reported to have flooded during the 1930s while being worked. It is thought that this is due to the quarry intercepting a fissure. There are a number of current abstraction licences around the site. There are a number of constraints that would influence the ability to develop a new source at Blue Lake. The main constraint is that of water quality as this is understood to be poor. It is reported that the site is contaminated by flue dust. There is also the potential for saline intrusion and there is a cemetery close to the lake.	Eastern	KMW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	Blue Lake would not be suitable for strategic water resource development because of water quality problems and high cost
RES	Raise Bewl Water 3000mm plus licence variation	Bewl water fills from 3 sources: its own small natural catchment, River Teise catchment (pumped) and the River Medway catchment (pumped). There are operational control curves in place to determine the operation of both the pumped supplies to the reservoir. The Teise is used preferentially with the Medway only used when the reservoir falls to critical levels. To increase DO during drought events the control curve could be raised depending on the relationship between security of supplies and operational expenditure. This will be explored in 5 sub-options all of which include the major works: Investigate operational rules; Raise the dam crest and build new wave wall; Raise overflow and valve chamber shafts; and many ancillary works around the perimeter of the reservoir. For sub-option 5 this will also include licence variation M10. The sub-options involve raising Bewl water by: 0.4m,1m, 2m and 3m.	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Licence variation has already been applied for and is assumed to be in place
RES	Blue Water	This option would utilise dewatering flows from Blue Water (a former quarry). The option would include ozonation/GAC treatment, and include a pipeline to Singlewell Reservoir. DO would be half of the discharge consent.	Eastern	KMW	-	-	-	-	-	-	-	-	-	N/A	N/A	No	No	No	No	No	No	No discharge consent held by the Agency for Blue Water so a Deployable Output benefit cannot be quantified
RES	Reservoir at Pulborough	3,500Mlbankside surface storage reservoir at Pulborough with Rother and Arun abstractions of 30Ml/d and 20Ml/d to provide additional resources to Pulborough WSW when the flow in the river Rother is low.	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	3	0	No	Yes	Yes	No	Yes	No	Potential WFD risks and associated impacts of reservoir construction
RES	Abstract from fluvial flow captured and stored around the Medmerry realignment scheme and on Adur and Arun flood plains	Medmerry captures coastal waters. Bund stops fluvial water getting into the sea. Store and abstract it, same for Adur and Arun floodplains. Increase capacity of Appledram STW and recycle waste water	Central	SN	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	No	-	No	Excluded from feasible list as scheme lies in Portsmouth Water supply area. Same as AMP5 exclusion.
RES	Raise Bewl Water by 1.00 m	The scheme involves the raising of Bewl Water to increase storage and yield. The major works for raising Bewl to higher TWL levels will include: • Raise the dam crest and build new wave wall; • Raise overflow and valve chamber shafts; and • Many ancillary works around the perimeter of the reservoir.	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	3	0	No	No	Yes	No	Yes	No	Only 0.4m option taken forward following comments from EA and NE. Difficult to mitigate flooding of ancient woodland.
RES	Raise Bewl Water by 2000mm	The scheme involves the raising of Bewl Water to increase storage and yield. The major works for raising Bewl to higher TWL levels will include: • Raise the dam crest and build new wave wall; • Raise overflow and valve chamber shafts; and • Many ancillary works around the perimeter of the reservoir.	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	3	0	No	No	Yes	No	Yes	No	Only 0.4m option taken forward following comments from EA and NE. Difficult to mitigate flooding of ancient woodland.
RES	Raise Bewl Water by 3000mm	The scheme involves the raising of Bewl Water to increase storage and yield. The major works for raising Bewl to higher TWL levels will include: • Raise the dam crest and build new wave wall;	Eastern	KMW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	3	0	No	No	Yes	No	Yes	No	Only 0.4m option taken forward following comments from EA and NE. Difficult to mitigate flooding of ancient woodland.

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		• Raise overflow and valve chamber shafts; and • Many ancillary works around the perimeter of the reservoir.																				
RES	Investigate and develop other new reservoir sites	Assess the broad potential for other reservoir sites within south-east England with a capacity greater than 2000Ml.	Southern Water	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	This generic option has been replaced by site-specific options
RES	Capture surplus river flow	Flood meadows and pump water to works/ or reservoir. Capture water before it flows out to sea in times of high flow. Potential flood alleviation benefits	Central	SB and SW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	Yes	Yes	No	Excluded as it is a duplicate of other schemes and it is not a specific option.
RES	Convert Test Surface Water Lake into a surface water storage site	Little Test Surface Water Lake is a fully operational reservoir. It is filled by water abstracted from the River Test when the water is not directly pumped to the Test Surface Water WSW. It is proposed that Test Surface Water Lake, previously developed as a nature conservation and recreation resource, be used as a reservoir. The exact volume of the existing Test Surface Water Lake is unclear but is assumed to be in the region of 500Ml much of which would be required to provide emergency storage. Permission, which lasted until 2010, allowed for the capacity to increase to 1750Ml, half of which would be used for emergency storage.	Western	HSW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	This option has been replaced by an option that is thought to be more feasible
SI	Pulborough – reduce MRF	Drought Option: This Drought Permit is concerned with the surface water off-take from the River Rother. The Permit allows a reduction in the MRF at Pulborough, which effectively allows greater abstraction from the Pulborough Surface water intake once abstraction in the river becomes constrained by the existing licensed MRF. Typical Permits are in the order of 10–30Ml/d reduction in MRF, although larger Permits may be sought under more extreme conditions. This option allows both increased supplies and can also be used to maintain storage in Weir wood and groundwater sources during drought conditions. This remains a viable option for both summer and winter conditions, as it allows more water to be taken from the river when abstraction is constrained by the MRF	Central	SN	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	1	-	-	-	Yes	-	No	Drought options not WRMP
SI	North Arundel – increase abstraction	Drought Option: Under more severe droughts, where resources in Sussex Coast themselves are under threat, and drought measures in Sussex North (such as the Pulborough MRF reduction) are not sufficient or suitable to address the situation, then a Drought Permit/order may be sought to increase licensed abstraction at North Arundel. The proposed drought option involves increasing groundwater abstraction at North Arundel PS through the application for and implementation of a Drought Order. This source typically pumps at 4.5Ml/d and is constrained by the licence. The drought action would seek to increase the daily abstraction rate by 2.5Ml/d to 7Ml/d, which is the peak deployable output of the source. Increasing the abstraction from North Arundel will provide additional supply for Sussex Coast and possibly support bulk transfers to Sussex North. However, this is only a severe drought option due to the sensitivity of Swanbourne Lake.	Central	SW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	-	-	-	No	-	No	Drought options not WRMP
SI	Test surface water abstraction	Reduce or remove the MRF which controls the abstraction from this source	Western	HSW	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	0	0	-	No	Yes	No	Yes	No	Replaced by other options following changes to the abstraction licence
SI	Weir Wood – reduce compensation flow	Drought Option: The Company can apply for a Drought Permit or Order to reduce the compensation flow from Weir Wood reservoir to maintain water levels. This is a possibility for both summer and winter conditions but typically will only be sought when a specific drought issue is affecting the integrity of the reservoir. This Drought Permit is concerned with a reduction in compensation flow	Central	SN	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	1	-	-	-	No	-	No	0

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		from Weir Wood Reservoir and Weir Wood WSW to maximise available resources for public water supply																				
SRF	Candover Augmentation	Emergency drought option: Conjunctive operation of the Candover augmentation scheme and Alresford BH and WSW.	Western	HSE	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	No	-	No	Superseded by another option
SWA	New abstraction from the River Brede and transfer to Powdermill Reservoir	This option would require the construction of a river abstraction on the River Brede close to the existing abstraction, from where the water would be pumped through a new transfer main to Powdermill Reservoir.	Eastern	SH	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	No	No	Option excluded pending investigation of the achievable DO from the scheme.
SWA	Relocation of Portsmouth Water abstraction to saline limit	Relocating the GM river intake downstream would mean that water would be kept in the River Itchen for longer (approximately 1.4 km until the tidal limit) thereby the benefits to the river flora and fauna would be in excess of those achieved by the sustainability reductions from Itchen WSW and Portsmouth Water abstraction alone. To minimise the loss of deployable output this option initially considered a 75Ml/d surface water abstraction just upstream. This would allow Portsmouth Water to continue to supply 45Ml/d and also allow Southern Water to utilise the maximum capacity of the Moor Hill WSR with an additional 30Ml/d bulk supply from Portsmouth Water.	Western	HSW	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	No	No	Option excluded pending investigation of how this scheme would interact with the planned Sustainability Reductions on the Itchen
SWA	Tidal barrage on Medway estuary	To put in place a tidal barrage in the Medway Estuary downstream of Allington Lock. Flood water to be stored in this estuarine area for abstraction to Eccles Lake during drought periods.	Eastern	KME	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	Yes	No	Option excluded as likely to breach the WFD requirement of 'No Deterioration' for water habitat.
SWA	Stourmouth WSW	There is an existing 10Ml/d capacity WSW at Stourmouth which is constrained by an MRF in the summer. It was constructed in the 1970s as a temporary measure and in AMP5 was reported to be in disrepair but may be operable if required in a drought. The last recorded use was during 2006. This scheme comprises the construction of a new water treatment works at Stourmouth including two days' worth of covered storage to replace the existing temporary works in a location c. 2.5 km to the north, outside of the 1 in 100 yr. floodplain. Sub-options 2 and 3 include additional open, raw water bankside storage which would be filled during winter (Oct-Mar) from the Great Stour. Sub-option 4 comprises abstraction of water at Stourmouth and transfer to a new 'super WSW' located near the existing Ramsgate B source. (Note that this options does not include water (effluent) reuse from Sandwich WTW)	Eastern	KT	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	No	Yes	Yes	No	Yes	No	Sub-option (1) included in optimisation model Sub-options (2) and (3) excluded based on concerns from Kent International Airport regarding potential bird strikes, Sub-option (4) excluded as only a single new WSW option is required. Ramsgate B water will be pumped to the new works for blending with lower nitrate water. Sub-option (5) included in optimisation model.
SWA	Relocation of abstraction point	This option involves the relocation of an existing surface water abstraction for SWS's Itchen WSW to a new abstraction further downstream, closer to the tidal limit. It is assumed that the new abstraction would meet the imposed Sustainability Reductions on the Lower Itchen as the scheme would lead to increased flow volumes along the length of the River Itchen between the two sites. The new abstraction would replace the entire surface water abstraction at Itchen WSW (45Ml/d) plus 11Ml/d to compensate for the Sustainability Reductions (SR) imposed on Portsmouth Water Company. With the provision of additional water treatment infrastructure to account for a comparative reduction in raw water quality, flows may be treated by the existing supply works at Itchen WSW, or alternatively, an Import from Portsmouth	Western	HSE	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	Yes	No	No	No	Option excluded pending investigation on how this would interact with planned sustainability reductions on abstractions from the River Itchen

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		Water following expansion of the existing water treatment works																				
WEF	Household water efficiency audit	Manned audit with retrofit of free water efficient devices where appropriate.	Southern Water	-	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	0	1	-	No	No	Yes	Yes	No	This option has been incorporated into and therefore superseded by the Target 100 option for the RWRMP therefore has been excluded from the feasible options list as a standalone option.
WTW	Generic nitrate removal scheme	Consider applicability across all sources to address those at risk of nitrate threshold exceedance over the planning horizon. Nitrate removal plant to be installed or blending to be undertaken.	Southern Water	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A	No	No	No	No	No	No	Replaced by site-specific options
WTW	Southampton Link Main	This option is a transfer from Test Surface Water WSW to the areas served by Itchen WSW. The option involves a 21.5 km 60mm HPPE pipeline and a new high-lift pumping station at Test Surface Water WSW.	Western	HSE	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	2	0	-	Yes	No	No	Yes	No	Raw water sub-option has been excluded. Potable water transfer of additional water resource created by desalination in HSW retained