

Southern Water

Final Water Resources Management Plan

Strategic Environmental Assessment

Revised Environmental Report

Non Technical Summary

October 2009

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Glossary of Terms

Term	Meaning / Definition
AMP	Asset Management Plan
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ASR	Aquifer Storage and Recovery
BAFF	Biological Aerated Flooded Filter
BAP	Biodiversity Action Plan
CSM	Conceptual Site Model
CAMS	Catchment Abstraction Management Strategy
CLG	Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
DO	Deployable Output
DWI	Drinking Water Inspectorate
ELL	Economic Level of Leakage
EU	European Union
GQA	General Quality Assessment
GWMU	Groundwater Management Unit
HA	Hampshire Andover WRZ
HK	Hampshire Kingsclere WRZ
HS	Hampshire South WRZ
IoW	Isle of Wight WRZ
KM	Kent Medway WRZ
KT	Kent Thanet WRZ
LDF	Local Development Framework
LLT	Lower London Tertiaries
MDO	Minimum Deployable Output
MI	Megalitre (1 million litres)
NO2	Nitrogen Dioxide
NVZ	Nitrate Vulnerable Zones
ODPM	Office of the Deputy Prime Minister
Ofwat	Water Services Regulation Society
ONS	Office for National Statistics
OS	Ordnance Survey
PDO	Peak Deployable Output
PM	Particulate Matter
PR04	Periodic Review 2004
PR09	Periodic Review 2009
RE	River Ecosystem

RIGS	Regionally Important Geological and Geomorphological Sites
RWSF	Raw Water Storage Facility
SAC	Special Area of Conservation
SM	Scheduled Monument
SDB	Supply-Demand Balance
SEA	Strategic Environmental Assessment
SEEDA	South East England Development Agency
SEERA	South East England Regional Assembly
SB	Sussex Brighton WRZ
SH	Sussex Hastings WRZ
SN	Sussex North WRZ
SO2	Sulphur Dioxide
SW	Sussex Worthing WRZ
SNCI	Site of Nature Conservation Interest
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
UKCIP	United Kingdom Climate Impacts Programme
UKWIR	UK Water Industry Research Limited
WFD	Water Framework Directive
WRMP	Water Resources Management Plan
WRMU	Water Resource Management Unit
WRSE	Water Resources in the South East
WRZ	Water Resource Zone
WSW	Water Supply Works
WTW	Water Treatment Works
WWTW	Wastewater Treatment Works

Non-Technical Summary

This document is the Non-Technical Summary of the Revised Environmental Report for the Strategic Environmental Assessment (SEA) of Southern Water's Final Water Resources Management Plan (WRMP). The WRMP sets out how Southern Water intends to provide sufficient security of supplies to meet the anticipated demands from its customers, whilst protecting the environment, over the 25-year planning period from 2010 to 2035.

The SEA assesses the environmental performance of options available to Southern Water against identified SEA objectives.

The Strategic Environmental Assessment Process

Overview

The Revised Environmental Report on Southern Water's Final WRMP has been prepared to fulfil the requirements of the SEA Directive. The SEA Directive came into force in the UK on 20 July 2004 through the Environmental Assessment of Plans and Programmes Regulations 2004, and requires an environmental assessment of certain plans and programmes which are likely to have significant effects on the environment. The WRMP is considered to be a "water management plan", within the terms of the SEA Directive, and will set the framework for future development. An SEA of the WRMP is therefore required.

The Directive's overall objective is to "*provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment.*" (Article 1)

The SEA involves an iterative process of collecting information, defining alternatives, identifying environmental effects, developing mitigation measures and revising proposals in light of the predicted environmental effects. The intention is that the SEA is fully integrated into the plan-making process from the earliest stages, both informing and being informed by it.

Figure A illustrates how the WRMP process relates to the SEA process and highlights the main stages in the SEA process.

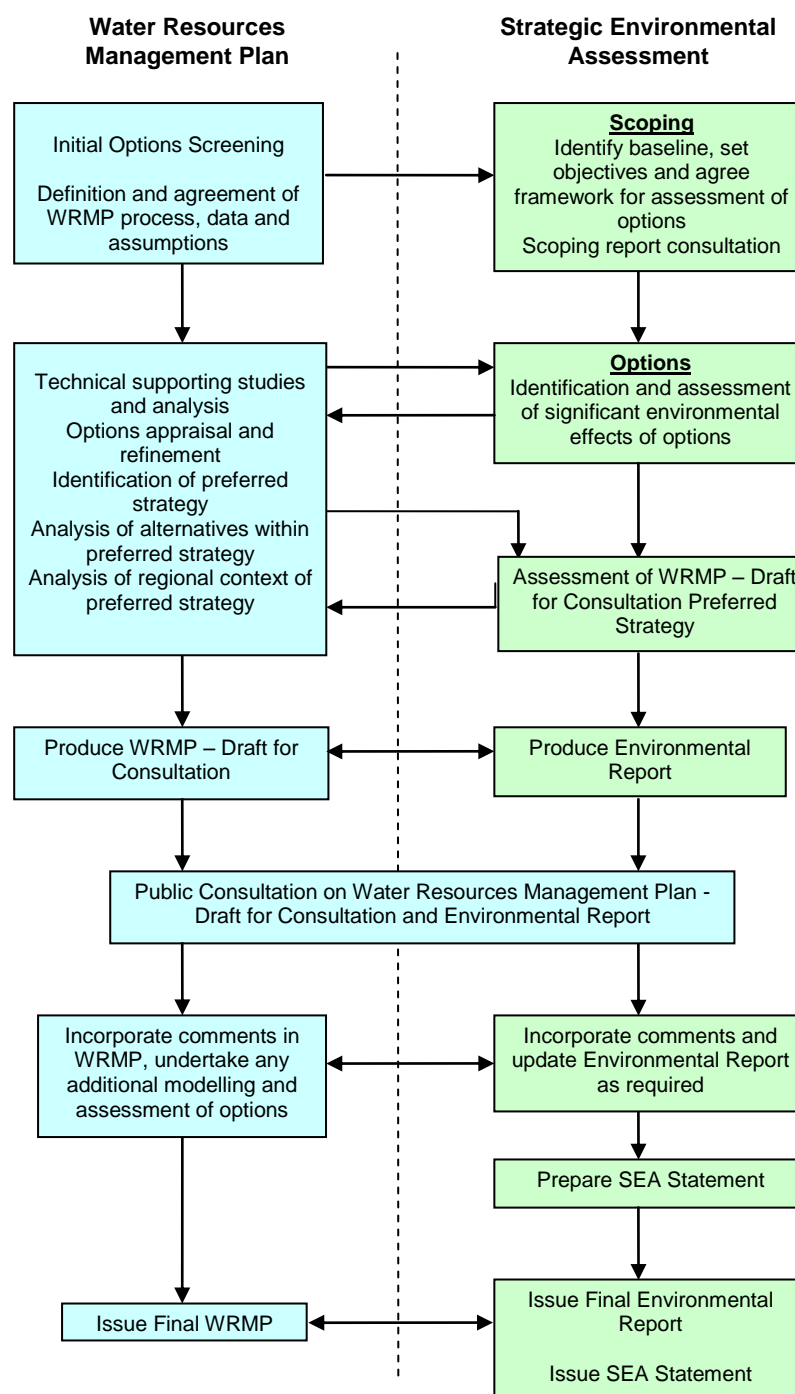
An SEA Scoping Report was produced in December 2007, consulted upon, and comments received were incorporated into the Environmental Report. The Scoping Report proposed a number of environmental objectives against which the assessment of the WRMP has been undertaken. The Environmental Report was published for information and consultation alongside the WRMP – Draft for Consultation. It summarised the findings and results of the SEA process and presented information on the likely significant effects of the options considered. This was carried out independently from the team responsible for the development of the WRMP – Draft for Consultation, although the results of the investigations undertaken to inform the development of the WRMP – Draft for Consultation have been used to inform the SEA. More importantly, the results of the SEA have been used to influence the selection of those options taken forwards for the Final WRMP.

The Revised Environmental Report, incorporating consultee comments on the Environmental Report, and an SEA Statement will be available alongside the Final WRMP.

Following the selection of the preferred options, further detailed environmental investigations will be carried out to assess the impact of these individual schemes. This will be reported as

part of the Environmental Impact Assessment of each scheme and will include details about alternatives and proposals to minimise the potential effects of each scheme.

Figure A - Relationship between the WRMP and SEA Process



Southern Water

The Southern Water area of supply is complex in nature. There are ten supply areas, called Water Resource Zones (WRZ), which are geographically separate (see Figure B). The WRZs are amalgamated into the following three sub-regional Areas for planning purposes:

- Western Area – comprising the Isle of Wight, Hampshire South, Hampshire Andover and Hampshire Kingsclere WRZs;

- Central Area – comprising the Sussex North, Sussex Worthing and Sussex Brighton WRZs; and
- Eastern Area – comprising the Sussex Hastings, Kent Medway and Kent Thanet WRZs.

Southern Water's area of supply is bounded by seven other water companies. A number of bulk supplies exist both within Southern Water's WRZs and between Southern Water and these adjacent water companies.

The SEA study area covers all Southern Water's WRZs in the Eastern, Central and Western Areas as well as the river catchments that influence these Areas. As there are no inter-company bulk transfers between Southern Water's three discrete Supply Areas (Western, Central and Eastern), it was considered appropriate for the purpose of this SEA to assess each Supply Area as a distinct entity.

Additionally, a steering group called Water Resources in the South East (WRSE) comprising all water companies in the South East Region, the Environment Agency and OFWAT has been created in order to identify a high level strategy for managing water resources across the south east, through the use of bulk supplies and shared resources. The WRMP includes a scenario utilising the WRSE shared resources development strategy. As part of the SEA of the WRMP, it is therefore necessary that the options included within the WRSE scenario be subject to SEA in order to ensure that no unacceptable effects on the environment are sustained.

Water Resources Management Plan (WRMP)

The existing Water Resources Plan (2004) identified future shortfall in water supplies relative to demand in some of these WRZs after 2010, particularly in relation to the predicted population growth. This is confirmed by the WRMP, which forecasts deficits in each Area over the 25-year planning period.

The WRMP considers a wide range of both supply and demand management options to ensure that the security of water supplies is maintained. A "twin-track" approach of reducing demand through demand management measures, and the development of new supplies as required, is being applied by Southern Water in the WRMP.

The demand management and resource development measures considered in the development of the WRMP are:

Demand Management

- Metering;
- Tariffs;
- Leakage reduction; and
- Water efficiency

Resource Development

- Bulk transfers;
- Wastewater recycling;
- Aquifer storage and recovery; and
- Desalination

Area Specific Water Resource Development

- New surface storage reservoirs;
- Increases in abstraction from either surface or groundwater;
- Enlarging existing reservoirs;
- Re-commissioning old/existing licences;
- Licence variations; and
- Upgrading WSW treatment facilities.

SEA Scoping Report

In December 2007, Southern Water published the WRMP SEA Scoping Report for a six-week period of consultation. The purpose of the Scoping Report was to identify the main environmental issues in the Southern Water area and to establish a framework for the assessment of the various water resource options being considered in the WRMP.

The Scoping Report included a review of other plans and programmes that may influence the WRMP, a summary of the environmental and baseline conditions in the Southern Water Supply Areas, highlighted key environmental issues pertaining to the area and proposed a number of environmental objectives against which the assessment of the WRMP has been undertaken. The scoping information was included in the Environmental Report, having been developed to take into account consultees' comments on the Scoping Report.

SEA Environmental Report

Between May and July 2008 Southern Water published the WRMP – Draft for Consultation and associated SEA Environmental Report for a twelve-week period of consultation. The purpose of the Environmental Report is to demonstrate the way in which the WRMP – Draft for Consultation has been produced to include sustainability considerations and to provide the results of the SEA of the WRMP – Draft for Consultation options and Southern Water's preferred strategy.

A Revised Environmental Report has now been produced. This is an updated version of the Environmental Report which has been revised following the publishing of results of recent relevant studies, investigations and guidance, the finalisation of the WRMP and taking on board comments from the consultation on the Environmental Report.

Appropriate Assessment

The EC Habitats and Birds Directives and the associated Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (hereafter the Habitats Regulations), place a requirement on plan-makers to assess the potential effects of their plans (in combination with other plans and projects) on sites designated under the Regulations. These sites are considered to be of European (and therefore international) importance for nature conservation. Sites designated under the Birds Directive are called Special Protection Areas (SPAs), and those designated under the Habitats Directive are called Special Areas of Conservation (SACs). Collectively these sites are referred to as "European sites".

The process of determining whether or not a plan will affect these site(s) is commonly referred to as "appropriate assessment". As detailed in PPS9, Ramsar Sites should be given the same level of protection as European Sites and therefore fall within the scope of Appropriate Assessment.

Some of the proposed options in the Final WRMP have the potential to adversely affect European and Ramsar sites on implementation. While it is as yet unclear whether WRMPs fall within the scope of the Habitats Regulations, as a precaution, Southern Water has subjected the Plan to a preliminary 'high-level' strategic assessment of the possible impact of proposed new resource developments in the Final WRMP on the integrity of European and Ramsar sites. The results of this assessment (which can be found in a separate report) have been taken into account in this SEA.

Figure B – Southern Water’s Supply Area



The Assessment Process

This section summarises the SEA objectives and the results of the assessment against these objectives.

SEA Objectives

An environmental assessment of the various options developed through the WRMP for the three sub-regional Areas (Western, Central and Eastern) has been undertaken against the following SEA objectives derived during the Scoping phase:

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species;
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species;
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option;
- SEA04 To protect and enhance geological and geomorphological diversity;
- SEA05 To maintain and enhance landscape character;
- SEA06 To maintain and enhance salmonid and freshwater fisheries;
- SEA07 To reduce contamination and safeguard soil quality and quantity;
- SEA08 To protect and enhance groundwater quantity and quality;
- SEA09 To protect and enhance coastal water quality;
- SEA10 To protect and enhance transitional surface water flows and quality;
- SEA11 To protect and enhance surface water flows and quality;
- SEA12 To minimise the risk of flooding taking account of climate change;
- SEA13 To maintain and enhance local air quality;
- SEA14 To reduce greenhouse gas emissions;
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products;
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest; and
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies.

The overall assessment process consisted of five stages, through which preferred SEA resource development options were identified and compared against the company preferred strategy described in the Final WRMP.

1. Assessment of the compatibility of WRMP objectives with the SEA objectives

In the earlier stages of development of the WRMP, an initial set of WRMP objectives was prepared to inform the development of the WRMP – Draft for Consultation. In order to identify the extent to which this initial set of objectives was aligned with sustainability objectives and to guide the development of the WRMP in a sustainable manner, the objectives set out in the WRMP – Draft for Consultation were tested for compatibility with the SEA objectives. The WRMP – Draft for Consultation objectives were:

1. To ensure the security of supplies for the next 25 years through the development of a robust and resilient supply system that is able to:
2. Reduce the risk of failure under any foreseeable scenario to an absolute minimum;
3. Meet target levels of service to our customers and the environment;
4. Be firmly based on a demand-led approach, supported by resource development as appropriate;
5. Ensure development of a water supply system that can cope with increased housing development;

6. Be fully prepared to meet the challenges of climate change, and to take into account the adverse impact of carbon emissions;
7. Develop those options that are the most environmentally sustainable, whilst being economically effective, and socially and politically acceptable, from the options available;
8. Select appropriate demand-side and supply-side options that can be implemented in a timely manner as and when they are required; and
9. Tailor the specific Area strategies to the specific individual requirements of the Areas.

As a result of the development of the WRMP, two additional objectives were identified within the Final WRMP. These are listed below:

1. Be flexible enough so that it can be adapted to changing circumstances; and
2. Contribute to an integrated regional solution.

2. Assessment of the demand management and resource development measures

Each demand management and resource development measure was assessed against the SEA objectives, allowing compatibility and potential for conflict with the sustainability objectives to be identified.

3. Assessment of individual options

Each of the potential resource development options was assessed against the SEA objectives in both the short and medium to long term. The assessment scale and corresponding scores are indicated in Table A.

Table A – Criteria for Assessing Significance of Effects

Assessment Scale	Significance of Effect/Appraisal Category
+++	Strongly positive
++	Moderately positive
+	Slightly positive
0	No effect
-	Slightly negative
--	Moderately negative
---	Strongly negative

The Environmental Report describes the identified effects and also considers ways of reducing negative effects through mitigation. These mitigation measures have been considered as an integral part of the options in the evaluation of medium to long term effects. Consequently the residual effect taking into account the proposed mitigation is reported.

4. Identification of the SEA preferred options

In order to assist with the identification of those options preferred from an SEA perspective, each demand management and resource development measure was given an overall environmental risk score. The rationale behind the allocation of risk scores is as follows:

- No risk – these are options where the medium to long term likely effects are positive or neutral. From an environmental perspective, these are the options which would preferably be taken forward.
- Low risk – these are options where the medium to long term likely effects are slight negative with no strong or moderate negative effects. From an environmental perspective, these are the options which would preferably be taken forward.

- Medium risk – these are options where there are one or more medium to long term likely effects which are moderately negative but no strong negative effects. Although not environmentally preferable, these options could be taken forward as long as they are subject to EIA at the scheme level and the recommended mitigation measures are implemented. An indication of these mitigation measures has been provided for each scheme.
- High risk – these are options where there are one or more medium to long term likely effects which are strongly negative even after mitigation has been taken into account. As a result, from an environmental perspective these options are considered to be unacceptable and may be difficult to promote. These are likely to be options where wetland/aquatic features of Natura 2000 sites are adversely affected by increased abstraction or where infrastructure would result in the permanent loss of nationally important resources.

Although this scoring was utilised in the identification of the SEA preferred options, it is important to note that a substantial number of resource development options was required in order to develop sufficient new water resources to meet the predicted deficit and therefore the implementation of higher risk resource development options became necessary.

5. Analysis of the WRMP Company Preferred Strategy

Finally, an assessment was made of the preferred strategy set out in the Final WRMP with regards to its accordance with the SEA preferred options.

Key Results of the Assessment Process

Compatibility of WRMP Demand Management and Resource Development Measures

Demand management and resource development measures considered in the development of the WRMP are discussed in detail in Sections 2 and 6 of the Environmental Report and are listed below:

- Demand Management:
 - Metering;
 - Tariffs
 - Leakage reduction; and
 - Water efficiency.
- Resource Development:
 - Bulk transfers;
 - Wastewater Recycling;
 - Aquifer storage and recovery; and
 - Desalination.
- Area Specific Water Resource Development:
 - New surface storage reservoirs;
 - Increase in abstractions in either surface or groundwater;
 - Enlarging existing reservoirs;
 - Re-commissioning old/existing licences;
 - Licence variations; and
 - Upgrading water supply works treatment facilities.

The compatibility of the demand management and resource development measures with the SEA objectives was assessed to identify the extent to which the WRMP promotes sustainability principles. The results of this assessment are set out in Table B. It was found that the demand management

measures were broadly compatible with the majority of SEA objectives due to the minimal amount of physical intervention required in implementing each measure. As such, the WRMP considered the implementation of all possible demand management measures and their ability to minimise the supply demand deficit prior to identifying necessary resource development measures.

A number of potential conflicts between the WRMP resource development measures and SEA objectives were identified in both the short and medium to long term. The nature and extent of many of these conflicts is dependent on the nature of implementation and location of the specific water resource development options. As such, each individual resource development option identified within the Final WRMP was subject to a more detailed assessment against the SEA objectives, in order to better identify the likely effect of the Final WRMP options. The results of this more detailed assessment are set out below.

Assessment of Water Resource Development Options

Tables C-H below provide an overview of the strength or significance of the effects against the SEA objectives expected to arise as a result of the construction (short term) and operation (medium to long term) of the resource development options identified in the Final WRMP for the three water supply areas (Western, Central and Eastern). Yellow, orange and red shaded cells indicate negative effects of increasing strength whereas light green and dark green cells indicate positive effects of increasing strength. Blue shaded cells indicate no effect on the SEA objective concerned. Negative effects of varying strengths and neutral effects were assessed as being likely to arise from all the resource development options. A number of the options were also assessed as having likely positive effects against a number of the SEA objectives.

The assessment of each of the water resource development options allowed the identification of the schemes with the lowest likely environmental risk which are the SEA preferred schemes. The degree to which the Final WRMP company preferred strategy is in accordance with the SEA preferred schemes, and seeks to adopt those schemes with the lowest environmental risk was then considered. The results of this assessment are summarised in the following pages, along with an assessment of the potential cumulative effects and suggested mitigation of the overall strategy considered.

Table B WRMP Demand Management and Resource Development Measures Assessment

Demand Management and Resource Development WRMP Measures														
	Demand Management Measures				Resource Development Measures				Area Specific Water Resource Developments					
	Metering	Tariffs	Leakage Reduction	Water Efficiency	Bulk Transfers	Wastewater Recycling	Aquifer Storage and Recovery	Desalination	New Surface Storage Reservoirs	Increases in Abstraction from either Surface or Groundwater	Enlarging Existing Reservoirs	Re-commissioning old / existing Licences	Licence Variations	Upgrading Water Supply Works Treatment Facilities
S E A O b j e c t i v e s	SEA01	✓	✓	✓	✓	X	X	?	X	X	?	X	?	?
	SEA02	✓	✓	✓	✓	?	?	✓	X	?	X	?	?	?
	SEA03	?		X	✓	X	X	?	X	X	?	X	✓	?
	SEA04	✓	✓	✓	✓	?	?	?	?	?	?	?	✓	?
	SEA05	✓	✓	✓	✓	?	X	?	X	X	?	?	✓	?
	SEA06	✓	✓	✓	✓	?	?	✓	?	?	?	?	?	?
	SEA07	✓	✓	✓	✓	?	?	?	?	X	?	X	?	?
	SEA08	✓	✓	✓	✓	✓	?	?	?	?	X	?	?	✓
	SEA09	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	✓	✓	✓
	SEA10	✓	✓	✓	✓	✓	?	✓	?	?	X	?	?	?
	SEA11	✓	✓	✓	✓	✓	?	✓	?	?	X	?	?	?
	SEA12					?	?		?	?	?	?	?	?
	SEA13					?	?		?	?		?		
	SEA14	✓	✓	✓	✓	?	?	?	X	?	?	?	?	?
	SEA15	✓	✓	✓	✓	?	✓	?	X	?	?	?	?	?
	SEA16	✓	✓	✓	✓	?	?	?	?	X	?	X	?	?
	SEA17					?	?		?	?	?	?	?	

✓ Broadly compatible
 X Potential conflict
 ? Not relevant
 ? Dependent on nature of implementation measures

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option
- SEA04 To protect and enhance geological and geomorphological diversity
- SEA05 To maintain and enhance landscape character
- SEA06 To maintain and enhance salmonid and freshwater fisheries
- SEA07 To reduce contamination and safeguard soil quality and quantity
- SEA08 To protect and enhance groundwater quantity and quality.
- SEA09 To protect and enhance coastal water quality
- SEA10 To protect and enhance transitional surface water flows and quality
- SEA11 To protect and enhance surface water flows and quality
- SEA12 To minimise the risk of flooding taking account of climate change
- SEA13 To maintain and enhance local air quality
- SEA14 To reduce greenhouse gas emissions
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies

Table C – Summary Assessment of Water Resource Development Options for the Western Area (Short Term)

Summary of assessment of Schemes - SHORT TERM																
	HSL3 - B513 New DAF plant to utilise full licence	HSL5 - New surface water storage site at Colden Common	HTD1 - Southampton Desalination Plant (all options)	HTD4 - Solent/South ampton Water (all options)	HBL1 - R176	HKL1 - J358 route 1	IWL1 - L536 marginal treatment	IWL2 - H614 Blue route	IWL6 - K628	IWL7 - Cross Solent Main 20 Ml/d	IWR1 - Wastewater recycling (all options)	IWD1 and IWD1-20 - IOW Coast desalination	HST2 - B513 to Y841	HWG-56 & HWO- 56 - Woodmill abstraction, treatment at Gaters Mill or Otterbourne	HWG-85, HWO- 85a & HWO-85b - Woodmill abstraction, treatment at Gaters Mill or Otterbourne	HCA1 - Augmentation with the Alre and Candover Schemes
S E A O b j e c t i v e s	SEA01	-	---	-	-	-	---	---	-	-	-	-	---	-	-	-
	SEA02	--	--	-	-	0	0	---	0	0	-	-	++	++	++	++
	SEA03	-	--	-	-	-	-	-	-	0	---	-	-	-	-	-
	SEA04	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
	SEA05	0	---	-	-	-	---	---	---	---	---	---	---	---	---	---
	SEA06	--	--	0	0	0	0	---	0	0	0	0	++	++	++	++
	SEA07	-	--	-	-	-	-	---	-	-	---	-	-	-	-	0
	SEA08	0	0	0	0	0	0	0	-	0	0	0	0	-	-	--
	SEA09	0	0	-	-	0	0	0	-	0	0	0	-	0	0	0
	SEA10	---	-	-	-	0	0	0	---	0	0	-	0	0	0	0
	SEA11	--	-	0	0	0	-	0	--	0	0	+	0	++	++	++
	SEA12	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0
	SEA13	-	-	-	-	0	-	-	-	0	0	-	-	-	0	0
	SEA14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	SEA15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	SEA16	-	--	-	0	-	-	---	---	---	---	-	0	-	---	-
	SEA17	0	-	0	0	0	0	0	-	0	0	0	0	0	0	0

0- no effect; +++ strongly positive; ++ moderately positive; + slightly positive; ---strongly negative; --moderately negative; - slightly negative

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option
- SEA04 To protect and enhance geological and geomorphological diversity
- SEA05 To maintain and enhance landscape character
- SEA06 To maintain and enhance salmonid and freshwater fisheries
- SEA07 To reduce contamination and safeguard soil quality and quantity
- SEA08 To protect and enhance groundwater quantity and quality.
- SEA09 To protect and enhance coastal water quality
- SEA10 To protect and enhance transitional surface water flows and quality
- SEA11 To protect and enhance surface water flows and quality
- SEA12 To minimise the risk of flooding taking account of climate change
- SEA13 To maintain and enhance local air quality
- SEA14 To reduce greenhouse gas emissions
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies

Table D – Summary Assessment of Water Resource Development Options for the Western Area (Medium - Long Term)

Summary of assessment of Schemes - MEDIUM TO LONG TERM																	
	HSL3 - B513 New DAF plant to utilise full licence	HSL5 - New surface water storage site at Colden Common	HTD1 - Southampton Desalination Plant (all options)	HTD4 - Solent/ Southampton Water (all options)	HBL1 - R176	HKL1 - J358 route 1	IWL1- L536 marginal treatment	IWL2 - H614 Blue route	IWL6 - K628	IWL7 - Cross Solent Main 20 Ml/d	IWR1 - Wastewater recycling (all options)	IWD1 and IWD1-20 - IOW Coast desalination	HST2 - B513 to Y841	HWG-56 & HWO- 56 - Woodmill abstraction, treatment at Gaters Mill or Otterbourne	HWG-85, HWO-85a & HWO-85b - Woodmill abstraction, treatment at Gaters Mill or Otterbourne	HCA1 - Augmentation with the Alre and Candover Schemes	
S E A O b j e c t i v e s	SEA01	0	--	0	0	0	0	-	---	0	0	0	0	-	-	0	
	SEA02	--	--	-	-	0	0	0	---	0	0	-	++	++	++	++	
	SEA03	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEA04	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
	SEA05	0	---	-	0	-	--	--	---	0	-	--	0	-	-	-	0
	SEA06	--	--	0	0	0	0	0	0	0	0	0	0	++	++	++	++
	SEA07	+	-	+	+	-	-	--	--	+	-	--	0	+	+	+	0
	SEA08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	SEA09	0	0	-	-	0	0	0	-	0	0	0	-	0	0	0	0
	SEA10	---	-	-	-	0	0	0	--	0	0	0	-	0	0	0	0
	SEA11	--	-	0	0	0	0	0	--	0	0	+	0	++	++	++	++
	SEA12	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0
	SEA13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEA14	--	--	---	---	--	--	--	--	--	--	--	---	--	--	--	--
	SEA15	0	0	-	-	-	-	-	0	-	-	-	-	0	0	0	0
	SEA16	-	--	-	0	-	-	-	---	-	-	-	0	-	--	--	-
	SEA17	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0- no effect; +++ strongly positive; ++ moderately positive; + slightly positive; ---strongly negative; --moderately negative; - slightly negative

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option
- SEA04 To protect and enhance geological and geomorphological diversity
- SEA05 To maintain and enhance landscape character
- SEA06 To maintain and enhance salmonid and freshwater fisheries
- SEA07 To reduce contamination and safeguard soil quality and quantity
- SEA08 To protect and enhance groundwater quantity and quality.
- SEA09 To protect and enhance coastal water quality
- SEA10 To protect and enhance transitional surface water flows and quality
- SEA11 To protect and enhance surface water flows and quality
- SEA12 To minimise the risk of flooding taking account of climate change
- SEA13 To maintain and enhance local air quality
- SEA14 To reduce greenhouse gas emissions
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies

Table E – Summary Assessment of Water Resource Development Options for the Central Area (Short Term)

Summary of assessment of Schemes - SHORT TERM															
S E A O b j e c t i v e s		N1 - Western Rother Irrigation Licences	N3 - Hardham MRF Seasonal Variation	N4 - Weir Wood Winter Refill (Western Rother / Arun)	N5 - Build New Reservoir at Blackstone	N6a and N6b - Surface Storage Reservoir at Hardham (N6a - 10MI/d and N6b - 20MI/d)	N7b - Arun Abstraction Above Tidal Limit (pipeline route 3)	N8a and N8b - Sussex North to Coast Winter transfer Phase 1&2	N9 - Arun Abstraction Below Tidal Limit 10MI/d abstraction & 75MI storage	C3 - Build New Reservoir on Coast	C4 - River Adur Abstraction	CD1 - Coastal Desalination (CD1a - 10Mld and CD1b - 20Mld)	CD3 - Tidal River Arun Desalination (CD3a - 10 Mld and CD3b - 20 Mld)	NR2 - Transfer of recycled wastewater to support flows within the River Rother (Route 2)	CA1- Sussex Coast ASR - 10 MI/d (Lower Greensand)
	SEA01	--	0	-	--	--	--	--	-	--	--	-	-	--	--
	SEA02	+	0	0	---	--	--	--	-	---	---	-	-	0	0
	SEA03	-	0	-	--	--	--	--	-	--	--	-	-	--	--
	SEA04	0	0	0	0	0	0	-	0	0	0	0	0	0	0
	SEA05	--	0	-	---	---	--	--	--	---	-	-	-	---	-
	SEA06	+	--	0	---	-	-	-	-	--	---	-	-	0	0
	SEA07	-	0	-	-	-	-	-	-	--	-	-	-	-	-
	SEA08	0	+	0	0	0	0	++	0	0	0	0	0	0	+
	SEA09	0	0	0	0	0	0	0	0	0	0	-	--	+	0
	SEA10	0	-	0	-	0	0	-	-	-	--	0	--	0	0
	SEA11	+	-	0	--	--	--	-	-	-	--	0	0	0	0
	SEA12	+	0	0	+	+	0	+	0	0	-	0	0	0	0
	SEA13	-	0	-	-	-	-	-	-	-	-	-	-	-	-
	SEA14	-	-	--	--	--	-	---	-	--	--	---	---	--	--
	SEA15	0	0	-	-	-	-	-	-	-	-	--	--	-	-
	SEA16	--	0	0	--	--	--	--	-	--	-	--	--	--	-
SEA17	--	0	0	-	0	0	0	0	0	-	0	0	0	0	

Assessment of Effects:

0- no effect; +++ strongly positive; ++ moderately positive; + slightly positive; ---strongly negative; --moderately negative; - slightly negative

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option
- SEA04 To protect and enhance geological and geomorphological diversity
- SEA05 To maintain and enhance landscape character
- SEA06 To maintain and enhance salmonid and freshwater fisheries
- SEA07 To reduce contamination and safeguard soil quality and quantity
- SEA08 To protect and enhance groundwater quantity and quality
- SEA09 To protect and enhance coastal water quality
- SEA10 To protect and enhance transitional surface water flows and quality
- SEA11 To protect and enhance surface water flows and quality
- SEA12 To minimise the risk of flooding taking account of climate change
- SEA13 To maintain and enhance local air quality
- SEA14 To reduce greenhouse gas emissions
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies

Table F – Summary Assessment of Water Resource Development Options for the Central Area (Medium - Long Term)

Summary of assessment of Schemes - MEDIUM and LONG TERM															
S E A O b j e c t i v e s		N1 - Western Rother Irrigation Licences	N3 - Hardham MRF Seasonal Variation	N4 - Weir Wood Winter Refill (Western Rother / Arun)	N5 - Build New Reservoir at Blackstone	N6a and N6b - Surface Storage Reservoir at Hardham (N6a 10MI/d and N6b - 20MI/d)	N7b - Arun Abstraction Above Tidal Limit (pipeline route 3)	N8a and N8b - Sussex North to Coast Winter transfer Phase 1&2	N9 - Arun Abstraction Below Tidal Limit 10MI/d abstraction & 75MI storage	C3 - Build New Reservoir on Coast	C4 - River Adur Abstraction	CD1 - Coastal Desalination (CD1a - 10MI/d and CD1b - 20MI/d)	CD3 - Tidal River Arun Desalination (CD3a - 10 Mld and CD3b - 20 Mld)	NR2 - Transfer of recycled wastewater to support flows within the River Rother (R11&2)	CA1- Sussex Coast ASR - 10 MI/d (Lower Greensand)
	SEA01	-	0	0	-	--	-	--	+	--	-	0	-	--	-
	SEA02	+	-	0	---	--	--	-	-	--	---	-	-	0	0
	SEA03	0	0	0	+	+	0	0	0	-	-	0	0	0	0
	SEA04	0	0	0	0	0	0	-	0	0	0	0	0	0	0
	SEA05	-	0	0	--	--	-	-	-	--	-	0	-	--	-
	SEA06	+	--	0	---	-	-	-	-	--	---	-	-	0	0
	SEA07	-	0	0	-	+	0	0	+	+	0	+	0	0	+
	SEA08	0	+	0	+	0	0	++	0	0	0	0	0	0	+
	SEA09	0	0	0	0	0	0	0	0	0	0	-	-	+	0
	SEA10	0	-	0	-	0	0	0	-	-	--	0	-	0	0
	SEA11	+	-	0	--	--	--	-	-	-	--	0	0	0	0
	SEA12	+	0	0	+	+	0	+	0	0	0	0	0	0	0
	SEA13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEA14	-	-	--	--	-	-	--	-	--	--	---	---	--	--
	SEA15	0	0	0	0	0	0	0	0	0	0	--	--	-	0
	SEA16	-	0	0	--	-	-	0	-	--	-	0	--	-	-
SEA17	--	0	0	-	0	0	0	0	0	-	0	0	0	0	

Assessment of Effects:

0- no effect; +++ strongly positive; ++ moderately positive; + slightly positive; ---strongly negative; --moderately negative; - slightly negative

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option
- SEA04 To protect and enhance geological and geomorphological diversity
- SEA05 To maintain and enhance landscape character
- SEA06 To maintain and enhance salmonid and freshwater fisheries
- SEA07 To reduce contamination and safeguard soil quality and quantity
- SEA08 To protect and enhance groundwater quantity and quality
- SEA09 To protect and enhance coastal water quality
- SEA10 To protect and enhance transitional surface water flows and quality
- SEA11 To protect and enhance surface water flows and quality
- SEA12 To minimise the risk of flooding taking account of climate change
- SEA13 To maintain and enhance local air quality
- SEA14 To reduce greenhouse gas emissions
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies

Table G – Summary Assessment of Water Resource Development Options for the Eastern Area (Short Term)

		Summary of assessment of Schemes - SHORT TERM																
S E A O b j e c t i v e s		M5a Raise Bowl Water 3m	M9 Implement licence variation combined with an increase in pump capacity in North Kent	M10 Licence amendment for G457	MD1 Isle of Sheppey Desalination 10 MI/d	MD2 River Medway Desalination, up as far as Allington Lock (options combined)	MR3 Medway wastewater recycling scheme	T5b Plucks Gutter WSW 25MI/d	T1 Development of New Reservoir at Broadoak, inclusive of new treatment works and mains	TT1 Duplicate transfer along existing Kent Medway to Kent Thanet main	H1 Enlargement of Darwell Reservoir	H3&H7 Re-introduction of disused boreholes	H8 New abstraction from the River Brede and transfer to Powdermill	HD4 Hastings WRZ Desalination 5 MI/d	HR1 a Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Darwell Reservoir	HR1 b Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Powdermill Reservoir	HT1 Enhance Bewl-Darwell transfer to 45MI/d	H9 Darwell Licence Variation
	SEA01	--	0	0	-	---	--	---	---	---	---	-	--	--	--	---	--	0
	SEA02	-	-	-	-	-	-	-	---	-	--	0	--	--	---	--	-	-
	SEA03	--	0	0	-	-	--	-	--	--	--	-	-	--	--	--	-	-
	SEA04	0	0	0	0	0	0	0	0	0	0	--	-	0	0	0	0	0
	SEA05	---	0	0	--	---	-	--	---	---	---	-	--	---	--	---	---	-
	SEA06	0	0	-	0	-	0	-	---	-	---	0	--	--	--	--	-	-
	SEA07	-	0	0	-	--	-	---	---	---	--	-	-	-	---	---	-	0
	SEA08	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
	SEA09	0	0	0	-	0	0	0	0	0	0	0	0	0	0	+	+	0
	SEA10	0	0	0	0	-	-	+	-	0	0	0	0	0	-	-	0	-
	SEA11	+	-	-	0	0	-	+	-	-	+	0	--	0	0	0	-	-
	SEA12	+	0	0	0	-	0	0	+	0	+	0	+	0	0	0	0	0
	SEA13	-	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	SEA14	--	---	---	---	---	---	---	--	--	-	-	-	--	---	---	--	-
	SEA15	-	0	0	--	--	-	-	-	-	-	-	-	--	--	--	-	0
	SEA16	--	0	0	--	-	--	--	---	---	--	0	-	--	--	--	--	0
	SEA17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0- no significant effect; +++ strongly positive; ++ moderately positive; + slightly positive; ---strongly negative; --moderately negative; - slightly negative

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option
- SEA04 To protect and enhance geological and geomorphological diversity
- SEA05 To maintain and enhance landscape character
- SEA06 To maintain and enhance salmonid and freshwater fisheries
- SEA07 To reduce contamination and safeguard soil quality and quantity
- SEA08 To protect and enhance groundwater quantity and quality.
- SEA09 To protect and enhance coastal water quality
- SEA10 To protect and enhance transitional surface water flows and quality
- SEA11 To protect and enhance surface water flows and quality
- SEA12 To minimise the risk of flooding taking account of climate change
- SEA13 To maintain and enhance local air quality
- SEA14 To reduce greenhouse gas emissions
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies

Table H – Summary Assessment of Water Resource Development Options for the Eastern Area (Medium - Long Term)

		Summary of assessment of Schemes - MEDIUM TO LONG TERM																
S E A O b j e c t i v e s		M5a Raise Bewl Water 3m	M9 Implement licence variation combined with an increase in pump capacity in North Kent	M10 Licence amendment for G457	MD1 Isle of Sheppey Desalination 10 MI/d	MD2 River Medway Desalination, up as far as Allington Lock (options combined)	MR3 Medway wastewater recycling scheme	T5b Plucks Gutter WSW 25MI/d	T1 Development of New Reservoir at Broadoak, inclusive of new treatment works and mains	TT1 Duplicate transfer along existing Kent Medway to Kent Thanet main	H1 Enlargement of Darwell Reservoir	H3&H7 Re-introduction of disused boreholes	H8 New abstraction from the River Brede and transfer to Powdermill	HD4 Hastings WRZ Desalination 5 MI/d	HR1 a Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Darwell reservoir	HR1 b Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Powdermill reservoir	HT1 Enhance Bewl-Darwell transfer to 45MI/d	H9 Darwell Licence Variation
	SEA01	--	0	0	0	---	-	--	--	--	---	0	-	0	-	-	-	0
	SEA02	-	-	-	-	-	-	0	--	-	-	0	-	--	--	--	0	-
	SEA03	+	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	-
	SEA04	0	0	0	0	0	0	0	0	0	0	--	-	0	0	0	0	0
	SEA05	---	0	0	-	0	0	-	---	--	---	-	-	-	-	-	-	-
	SEA06	0	0	-	0	-	0	+	+	0	---	0	-	-	--	--	0	-
	SEA07	-	0	0	+	--	0	---	---	-	--	0	0	0	-	-	0	0
	SEA08	0	-	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
	SEA09	0	0	0	-	0	0	0	0	0	0	0	0	0	+	+	0	0
	SEA10	0	0	0	0	-	0	+	-	0	0	0	0	0	0	0	0	-
	SEA11	+	-	-	0	0	-	+	-	-	+	0	-	0	0	0	-	-
	SEA12	+	0	0	0	-	0	0	+	0	+	0	+	0	0	0	0	0
	SEA13	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0
	SEA14	--	--	--	---	---	---	---	---	--	-	-	-	---	---	---	---	-
	SEA15	0	0	0	--	--	-	-	0	-	0	0	-	-	--	--	0	0
	SEA16	-	0	0	--	-	-	--	---	--	--	0	-	--	-	-	--	0
SEA17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

0- no effect; +++ strongly positive; ++ moderately positive; + slightly positive; ---strongly negative; --moderately negative; - slightly negative

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option
- SEA04 To protect and enhance geological and geomorphological diversity
- SEA05 To maintain and enhance landscape character
- SEA06 To maintain and enhance salmonid and freshwater fisheries
- SEA07 To reduce contamination and safeguard soil quality and quantity
- SEA08 To protect and enhance groundwater quantity and quality.
- SEA09 To protect and enhance coastal water quality
- SEA10 To protect and enhance transitional surface water flows and quality
- SEA11 To protect and enhance surface water flows and quality
- SEA12 To minimise the risk of flooding taking account of climate change
- SEA13 To maintain and enhance local air quality
- SEA14 To reduce greenhouse gas emissions
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies

WESTERN AREA

The resource development options proposed by the Final WRMP and located in the Western Area are listed in Table I below.

Table I – Western Area Resource Development Options

WRZ	Code	Name in Final WRMP
Hampshire South	HSL3	B513 New DAF plant to utilise full licence
	HSL5	New surface water storage site at Colden Common
	HTD1-15	Southampton Desalination Plant 15 MI/d
	HTD1-20	Southampton Desalination Plant 20 MI/d
	HTD1-25	Southampton Desalination Plant 25 MI/d
	HTD1-30	Southampton Desalination Plant 30 MI/d
	HTD4-25	Solent/Southampton Water 25 MI/d
	HTD4-45	Solent/Southampton Water 45 MI/d
	HTD4-60	Solent/Southampton Water 60 MI/d
	HBL1	R176
	HWG- 56	56 MI/d Woodmill abstraction, treatment at Gaters Mill
	HWO-56	56 MI/d Woodmill abstraction, treatment at Otterbourne
	HWG- 85	85 MI/d Woodmill abstraction, treatment at Gaters Mill
	HWO- 85a	85 MI/d Woodmill abstraction, treatment at Otterbourne
HWO- 85b	85 MI/d Woodmill abstraction, treatment at Otterbourne; assuming HCA1	
HCA1	Candover Alre Augmentation	
Hampshire Kingsclere	HKL1	J358 route 1
Isle of Wight	IWL1	L536 marginal treatment
	IWL2	H614 Blue route
	IWL6	K628
	IWL7	Cross Solent Main 20 MI/d
	IWR1	Wastewater recycling 2.5 MI/d
	IWR1-5	Wastewater recycling 5 MI/d
	IWR1-10	Wastewater recycling 10 MI/d
	IWR1-20	Wastewater recycling 20 MI/d
	IWD1	IOW Coast desalination 8.5 MI/d
	IWD1 - 20	IOW Coast desalination 20 MI/d
	HST2	B513 to Y841

SEA PREFERRED WATER RESOURCE DEVELOPMENT OPTIONS

The assessment of the 28 water resource development options proposed by the Final WRMP located in the Western Area identified a range of likely significant and non-significant positive and negative effects. Significant medium to long term negative effects were identified as likely to result from the implementation of some of the resource development options against the following SEA objectives:

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species;
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species;
- SEA05 To maintain and enhance landscape character;
- SEA06 To maintain and enhance salmonid and freshwater fisheries;
- SEA07 To reduce contamination and safeguard soil quality and quantity;
- SEA08 To protect and enhance groundwater quantity and quality;
- SEA10 To protect and enhance transitional surface water flows and quality;
- SEA11 To protect and enhance surface water flows and quality;

- SEA14 To reduce greenhouse gas emissions; and
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest.

In addition to the negative effects, likely medium to long term significant positive effects were identified against the following SEA objectives as a result of the implementation of some of the resource development options, principally as a result of proposed schemes contributing to meeting required sustainability reductions:

- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species;
- SEA06 To maintain and enhance salmonid and freshwater fisheries; and
- SEA11 To protect and enhance surface water flows and quality.

Following this assessment, each resource development option was given an overall environmental risk score, as detailed in the methodology section above, allowing those schemes preferred from a sustainability perspective to be identified. The environmental risks of the Western Area resource development options are detailed below:

Low risk:

None of the Western Area resource development options were assessed as having a low environmental risk.

Medium risk:

- HSL3 - B513 New DAF plant to utilise full licence;
- HBL1 – R176;
- HKL1 – J358 route 1;
- IWL1 - L536 marginal treatment;
- IWL6 – K628;
- IWL7 - Cross Solent Main 20 Ml/d;
- IWR1 - Wastewater recycling (all options);
- HST2 - B513 to Y841;
- HWG-56 & HWO-56 - Woodmill abstraction, treatment at Gaters Mill or Otterbourne;
- HWG-85, HWO-85a & HWO-85b - Woodmill abstraction, treatment at Gaters Mill or Otterbourne; and
- HCA1 - Candover Alre Augmentation.

High risk:

- HSL5 - New surface water storage site at Colden Common;
- HTD1 - Southampton Desalination Plant (all options);
- HTD4 -Solent/ Southampton Water (all options);
- IWL2 - H614 Blue route; and
- IWD1 and IWD1-20 - IOW Coast desalination.

The resource development options assessed as being likely to result in the lowest environmental risk are preferable from an SEA perspective. Low risk options would therefore be the preferred water resource development options. However, it is appreciated that the purpose of the WRMP is to guarantee that the preferred strategy provides enough water to meet anticipated demand over the plan period. As such, it will be necessary to include some Western Area resource development options assessed as having higher environmental risk within the Final WRMP company preferred strategy, in order to ensure that enough water is available for each Supply Area.

Company Preferred Strategy: Western Area

Table J below shows those Western Area demand management and resource development options selected to form the company preferred strategy. Further information on the reasoning behind the company's selection of preferred schemes is provided in the Final WRMP.

Table J – Company Preferred Strategy: Western Area Options

Option Code	Option Name	Environmental Risk
Western Area		
HSL3	B513 New DAF plant to utilise full licence	Medium risk
HCA1	Candover Arle Augmentation	Medium risk
HBL1	R176	Medium risk
IWL1	L536 marginal treatment	Medium risk
IWL6	K628	Medium risk
n/a	Universal metering	No risk
n/a	Leakage reduction	No risk
n/a	Water Efficiency Kit (Box)	No risk

It can be seen that the company preferred strategy comprises solely resource development options of medium environmental risk and demand management measures with no risk. Given that half of the Western Area resource development options set out in the WRMP and subject to SEA were considered likely to have a high environmental risk and none were considered likely to have low environmental risk, it can be seen that the Final WRMP has made significant efforts to select those resource development options considered to be the least environmentally damaging.

Cumulative effects

The SEA Directive requires that the cumulative effects of the implementation of options within a plan be considered. Options selected for the company preferred strategy in the Western Area are limited to demand management measures and two borehole options on the Isle of Wight, two borehole options in Hampshire South and increased abstraction at Testwood. No cumulative effects are considered likely in relation to the demand management options either with each other or with the resource development options.

The Rivers Test and Itchen both flow into the Solent. However, the large volume of water in the Solent compared with the options which may change flows in the Rivers Test (HSL3 and HBL1) and Itchen (HCA1) limits the extent of any cumulative effects. Additionally, option HCA1 will augment flows in the River Itchen, thus counteracting any potential decreases in flows in the River Test as a result of options HSL3 and HBL1. Any potential cumulative effects on reducing flows in the River Test as a result of options HSL3 and HBL1 should be prevented through the prudent use of restrictions set out within abstraction consents.

The two resource development options for the Isle of Wight are geographically distinct and are thus unlikely to result in any cumulative effects.

Increased pumping from this combination of schemes has the potential for negative cumulative effects on greenhouse gases. Mitigation in the form of renewable energy sources should be considered for these options.

CENTRAL AREA

The resource development options proposed by the Final WRMP and located in the Central Area are listed in Table K below.

Table K – Central Area Resource Development Options

WRZ	Code	Name in Final WRMP
Sussex North	N1	Western Rother Irrigation Licences
	N3	MRF Seasonal Variation
	N4	E282 Winter Refill (Western Rother/Arun treated water)

WRZ	Code	Name in Final WRMP
	N5	Build New Reservoir at Blackstone
	N6a	Surface Storage Reservoir in Sussex North- Rother/Arun abstraction 10 MI/d
	N6b	Surface Storage Reservoir in Sussex North - Rother/Arun abstraction 20 MI/d
	N7a	Arun abstraction above the tidal limit Scheme 1: 5MI/d abstraction
	N7b	Arun abstraction above tidal limit Scheme 2: 10MI/d abstraction & 100 MI storage
	N7c	Arun abstraction above tidal limit Scheme 3: 20MI/d abstraction & 200MI storage
	N9	Arun Abstraction Below Tidal Limit 10MI/d abstraction & 75MI storage
	NR2	Transfer of recycled wastewater to support flows within the River Rother
Sussex Worthing	C3	Build New Reservoir on Coast
	C4	River Adur Abstraction
	CA1	Sussex Coast ASR - 10 MI/d (Lower Greensand)
	CD3a	Tidal River Arun Desalination 10 MI/d
	CD3b	Tidal River Arun Desalination 20 MI/d
Sussex Brighton	CD1a	Coastal Desalination 10 MI/d
	CD1b	Coastal Desalination 20 MI/d
	N8a	Sussex North to Coast Winter transfer Phase 1&2 (assuming N9 available)
	N8b	Sussex North to Coast Winter transfer Phase 1&2 (assuming N9 not available)

SEA Preferred Resource Development Options

The assessment of the 20 resource development options proposed by the Final WRMP located in the Central Area identified a range of likely significant and non-significant positive and negative effects. Significant medium to long term negative effects were identified against the following SEA objectives:

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species;
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species;
- SEA05 To maintain and enhance landscape character;
- SEA06 To maintain and enhance salmonid and freshwater fisheries;
- SEA10 To protect and enhance transitional surface water flows and quality;
- SEA11 To protect and enhance surface water flows and quality;
- SEA14 To reduce greenhouse gas emissions;
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products;
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest; and
- SEA17 To minimise adverse effects to other abstractors, rights of navigation and other commercial users of water bodies.

In addition to the negative effects, likely medium to long term significant positive effects were identified against the following SEA objective as a result of the implementation of one scheme (N8a and N8b - Sussex North to Coast Winter transfer Phase 1&2):

- SEA08 To protect and enhance groundwater quantity and quality.

Following this assessment, each resource development option was given an overall environmental risk score, as detailed in the methodology section above, allowing those schemes preferred from a sustainability perspective to be identified. The environmental risks of the Central Area schemes are detailed below:

Low risk:

- N9 - Arun Abstraction Below Tidal Limit.

Medium risk:

- N1 - Western Rother Irrigation Licences;

- N3 - MRF Seasonal Variation;
- N4 - Weir Wood Winter Refill (Western Rother / Arun);
- N6a and N6b - Surface Storage Reservoir at Hardham (N6a - 10MI/d and N6b - 20MI/d);
- N7b - Arun Abstraction Above Tidal Limit (Scheme 2 – 10 MI/d abstraction and 100 MI storage) (with route 3);
- N8a and N8b - Sussex North to Coast Winter transfer Phase 1&2;
- C3 - Build new Reservoir on Coast
- NR2 - Indirect Effluent Reuse from Ford WWtW (Membrane) (route 2); and
- CA1 - Sussex Coast ASR - 10 MI/d (Lower Greensand).

High risk:

- N5 - Build New Reservoir at Blackstone;
- C4 - River Adur Abstraction;
- CD1 - Coastal Desalination (CD1-10 and CD1-20); and
- CD3 - Tidal River Arun Desalination (CD10 and CD20).

The resource development options assessed as being likely to result in the lowest environmental risk are preferable from a SEA perspective. The low risk option is therefore the preferred water resource development options. However, it is appreciated that the purpose of the WRMP is to guarantee that the preferred strategy provides enough water to meet anticipated demand over the plan period. As such, it may be necessary to include some resource development options assessed as having medium environmental risk within the Final WRMP preferred strategy, in order to ensure that enough water is available for each Supply Area.

Company Preferred Strategy: Central Area

Table L below shows those Central Area demand management and resource development options selected to form the company preferred strategy. Further information on the reasoning behind the company’s selection of preferred schemes is provided in the Final WRMP.

Table L – Company Preferred Strategy: Central Area Options

Option Code	Option Name	Environmental Risk
Central Area		
N9	Arun Abstraction Below Tidal Limit	Low risk
n/a	Universal metering	No risk

It can be seen that the company preferred strategy for the Central Area comprises just one resource development option, which was assessed by the SEA as being of likely low environmental risk, and one demand management option. The company preferred strategy for the Central Area is thus completely in accordance with the SEA principles.

Cumulative effects

The SEA Directive requires that the cumulative effects of the implementation of options within a plan be considered. Only one demand management option and one water resource development option located within the Central Area was selected as part of the company preferred strategy. Cumulative effects within the Central Area are therefore not considered likely to occur.

Increased greenhouse gas emissions associated with pumping for the proposed option in combination with options proposed for the other two supply areas has the potential for negative cumulative effects. Mitigation in the form of renewable energy sources should be considered for these options.

EASTERN AREA

The resource development options proposed by the Final WRMP and located in the Eastern Area are listed in Table M below.

Table M – Eastern Area Resource Development Options

WRZ	Code	Name in Final WRMP
Kent Medway	M5a	Raise Bewl Water 3m
	M9	Implement licence variation combined with an increase in pump capacity in North Kent
	M10	Licence amendment for G457
	MD1	Isle of Sheppey Desalination 10 MI/d
	MD2a	River Medway Desalination, up as far as Allington Lock 10 MI/d
	MD2b	River Medway Desalination, up as far as Allington Lock 20 MI/d
	MR3	Medway wastewater recycling scheme
Kent Thanet	T1	Development of new reservoir at Broadoak, inclusive of new treatment works and mains
	T5b	Plucks Gutter WSW 25MI/d
Sussex Hastings	TT1	Duplicate transfer along existing Kent Medway to Kent Thanet main
	H1	Enlargement of Darwell Reservoir
	H3&H7	Re-introduction of disused boreholes
	H8	New abstraction from the River Brede and transfer to Powdermill Reservoir.
	HD4	Hastings WRZ Desalination 5 MI/d
	HR1a	Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Darwell reservoir
	HR1b	Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Powdermill reservoir
	HT1	Enhance Bewl-Darwell transfer to 45MI/d
H9	Darwell Licence Variation	

SEA Preferred Resource Development Options

The assessment of the 18 resource development options proposed by the Final WRMP located in the Eastern Area identified a range of likely significant and non-significant positive and negative effects. Significant medium to long term negative effects were identified against the following SEA objectives:

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species;
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species;
- SEA04 To protect and enhance geological and geomorphological diversity;
- SEA05 To maintain and enhance landscape character;
- SEA06 To maintain and enhance salmonid and freshwater fisheries;
- SEA07 To reduce contamination and safeguard soil quality and quantity;
- SEA14 To reduce greenhouse gas emissions;
- SEA15 To reduce the generation of waste and encourage re-use and recycling of waste and use sustainably produced and local products; and
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest.

In addition to the negative effects, likely medium to long term slight positive effects were identified against a number of SEA objectives however no significant positive effects were considered likely.

Following this assessment, each resource development option was given an overall environmental risk score, as detailed in the methodology section above, allowing those

schemes preferred from a sustainability perspective to be identified. The environmental risks of the Eastern Area resource development options are detailed below:

Low risk:

- H8 - New abstraction from the River Brede and transfer to Powdermill; and
- H9 - Darwell Licence Variation.

Medium risk:

- M9 - Implement licence variation combined with an increase in pump capacity in North Kent;
- M10 - Licence amendment for G457;
- TT1 - Duplicate transfer along existing Kent Medway to Kent Thanet main;
- H3&H7 - Re-introduction of disused boreholes; and
- HT1 - Enhance Bewl-Darwell transfer to 45MI/d.

High risk:

- M5a - Raise Bewl Water 3m;
- MD1 - Isle of Sheppey Desalination 10 MI/d;
- MD2 - River Medway Desalination, up as far as Allington Lock (all options);
- MR3 - Medway wastewater recycling scheme;
- T5b - Plucks Gutter WSW 25MI/d;
- T1 - Development of New Reservoir at Broadoak, inclusive of new treatment works and mains;
- H1 - Enlargement of Darwell Reservoir;
- HD4 - Hastings WRZ Desalination 5 MI/d;
- HR1a - Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Darwell reservoir; and
- HR1b - Transfer of recycled wastewater from Bexhill and Hastings to augment storage within Powdermill reservoir.

The resource development options assessed as being likely to result in the lowest environmental risk are preferable from a SEA perspective. The low risk options are therefore the preferred water resource development options. However, it is appreciated that the purpose of the WRMP is to guarantee that the preferred strategy provides enough water to meet anticipated demand over the plan period. As such, it may be necessary to include some options assessed as having medium environmental risk within the Final WRMP preferred strategy, in order to ensure that enough water is available for each Supply Area.

Company Preferred Strategy: Easter area

The table N below shows those Eastern Area demand management and resource development options selected to form the company preferred strategy. Further information on the reasoning behind the company's selection of preferred schemes is provided in the Final WRMP.

Table N – Company Preferred Strategy: Eastern Area Options

Option Code	Option Name	Environmental Risk
Eastern Area		
H9	Darwell licence variation	Low risk
M10	Licence amendment for G457	Medium risk
M9	Implement licence variation combined with an increase in pump capacity in North Kent	Medium risk
H3&H7	Re-introduction of disused boreholes	Medium risk
M5a	Raise Bewl Water 3m	High risk

MR3	Medway wastewater recycling scheme	High risk
n/a	Universal metering	No risk
n/a	Leakage reduction	No risk

It can be seen that the company preferred strategy comprises two no risk demand management options and one low, two medium and two high environmental risk resource development options. Given that over half of the Eastern Area resource development options set out in the WRMP and subject to SEA were considered likely to have a high environmental risk, it can be seen that the Final WRMP has made significant efforts to select those options considered to be the least environmentally damaging. Furthermore, the two high environmental risk resource development options are required to be included in the Southern Water company preferred strategy by the WRSE group's regional strategy.

Cumulative effects

The SEA Directive requires that the cumulative effects of the implementation of resource development options within a plan be considered. No cumulative effects are considered likely in relation to the demand management options either with each other or with the resource development options.

However, there exists significant potential for cumulative aquatic effects arising from the selected Kent Medway WRZ Eastern Area resource development options. Options M10, M5a and MR3 all have potential effects on the Rivers Medway and/or Teise and/or Bewl Reservoir. The potential for cumulative effects on these three water bodies is complex and related to the interaction of these three options, the timing of their implementation and the nature of abstraction licence consents and permitted Minimum Residual Flows. Adherence to these restrictions should ensure that significant negative effects are not sustained on any of these water bodies.

Potential for terrestrial or aquatic cumulative effects arising from the Sussex Hastings WRZ resource development options is low because the two options are geographically distinct and are unlikely to affect the same water body.

Increased greenhouse gas emissions associated with pumping for the proposed schemes within the Eastern Area and across all of Southern Water's supply areas has the potential for negative cumulative effects. Mitigation in the form of renewable energy sources should be considered for these options.

Mitigation

The term 'mitigation' encompasses any approach which is aimed at preventing, reducing or off-setting significant adverse sustainability effects that have been identified. In practice, a range of measures applying one or more of these approaches is likely to be considered in mitigating any significant adverse effects predicted. In addition, it is also important to consider measures aimed at enhancing positive effects.

The medium to long term assessments have thus been undertaken to consider residual effects, i.e. those likely to remain after reasonable mitigation. Generic mitigation measures (considered integral to the resource development options) that were considered are described below.

- Air – Use of good practice for dust suppression during construction.
- Heritage/Archaeology – It is required that the nature, extent and significance of an archaeology resource is understood, in order for a decision to be made regarding the need for preservation in situ or any other mitigation. This usually requires a desk based assessment followed by evaluation in the field.
- Contaminated Land – A detailed desk study (including preparation of a conceptual site model) will be required to confirm the potential for contamination and associated

- risks of the preferred option and identify the requirements for further assessment of the site, which are likely to comprise intrusive investigation works.
- Ecology – Mitigation measures include: Avoidance of sensitive habitats; timing of works with regards to protected species; specific Defra licence requirements for work that may affect protected species; specific measures for protected species; ecological watching briefs; habitat creation; sett relocation; and mammal underpasses.
 - Landscape – Measures include landscape planting and bunding, avoiding areas of woodland and hedgerows and in the situation of unavoidable impacts, restoration of any affected areas of woodland, hedgerows or elements of the visual landscape.
 - Effects on Local Communities – Mitigation should consider ways to: Reduce the numbers of people affected by increased noise; reduce the level of increased noise people are subjected to; and reduce the amount of time they are subjected to increased noise.
 - Recreation – Minimising disruption to walking and cycling routes and other areas of high recreation usage.
 - Transport – Minimise traffic disruption; ‘no dig’ techniques should be used, where appropriate, for construction of the pipelines where they cross major roads.
 - Additional site specific mitigation measures that should be applied beyond those generic mitigation measures have been described.

Additional mitigation measures are also likely to be identified as part of any Environmental Impact Assessment or licence conditions that may be required for specific resource development options.

Monitoring

The SEA of the Final WRMP identified likely significant effects against the following SEA objectives:

- SEA01 To protect and enhance terrestrial biodiversity including designated and other important habitats and species;
- SEA02 To protect and enhance aquatic biodiversity including designated and important habitats and species;
- SEA03 To minimise negative effects on local communities resulting from construction and operation of option;
- SEA04 To protect and enhance geological and geomorphological diversity;
- SEA05 To maintain and enhance landscape character;
- SEA06 To maintain and enhance salmonid and freshwater fisheries;
- SEA07 To reduce contamination and safeguard soil quality and quantity;
- SEA08 To protect and enhance groundwater quantity and quality;
- SEA10 To protect and enhance transitional surface water flows and quality;
- SEA11 To protect and enhance surface water flows and quality;
- SEA14 To reduce greenhouse gas emissions; and
- SEA16 To protect and enhance sites and features of archaeological, historical and architectural interest

The SEA Directive requires that significant environmental effects be monitored in order to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action. A monitoring programme has thus been developed for the future monitoring of the implementation of the Final WRMP for those effects deemed to be significant by the SEA

Conclusions

The Final Water Resources Management Plan objectives, demand management measures, company preferred new water supply options and other alternatives considered for the three sub-regional Areas (Western, Central and Eastern) have been the subject of Strategic Environmental Assessment.

The final company preferred strategy is “demand management led”, seeking, in the first instance to reduce demand for water through the completion of a programme of universal metering by 2015; reductions in leakage; and the continued promotion of water efficiency initiatives. This approach is thoroughly supported by the objectives of the SEA and will result in significant water savings through the planning period.

Despite these savings, in order to secure sufficient water supplies to meet the anticipated demands of Southern Water’s customers, it is necessary that the Final WRMP identify a number of water resource development options which will increase the volume of water available for supply.

By identifying, characterising, and where possible quantifying significant environmental effects for each resource development option, this SEA has identified those water resource development options which are considered likely to have the lowest environmental risk. These results were then used during the development of the Final WRMP and, where possible (considering the requirement that the WRMP ensures sufficient water supply over the plan period), the resource development options assessed as being of lowest environmental risk were incorporated into the Final WRMP company preferred strategy.

The Southern Water company preferred strategy principally comprises resource development options of low and medium environmental risk, with only two of the twelve options being assessed as having high environmental risk. Furthermore, the two high environmental risk resource development options are required to be included in the Southern Water company preferred strategy by the WRSE Group.

Overall, it is therefore considered that within the requirements of the WRMP and assuming that appropriate mitigation measures are implemented, the Final WRMP company preferred options identified for each of the three sub-regional Areas are the most environmentally sustainable combination of options that could realistically be achieved.

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