

Thames Water

Final Water Resources Management Plan 2015 - 2040

Main Report



Section 1: Introduction and Background Information

Contents

Section 1	Introduction and Background Information	1
1.1	Water Resources Planning and the Water Resources Management Plan	2
1.1.1	Introduction	2
1.1.2	What is a Water Resources Management Plan?	2
1.1.3	The WRMP's relationship with other statutory and regulatory reports	6
1.2	Review of the recent drought and public inquiry	7
1.2.1	Drought 2010-12	7
1.2.2	The 2010 Public Inquiry	10
1.3	Government policy objectives for water resources	12
1.3.1	Taking a long-term perspective	12
1.3.2	Water scarcity and environmental damage	13
1.3.3	Abstraction Reform	13
1.3.4	Water trading, cross boundary solutions and third party resources	14
1.3.5	Reducing demand	16
1.4	Our water supply area	17
1.4.1	Water Resource Zones	17
1.4.2	Our levels of service	18
1.5	Engagement with our customers, stakeholders and regulators	20
1.5.1	Pre-consultation on our draft Plan	20
1.5.2	Customers	22
1.5.3	Government and regulators	23
1.5.4	Stakeholders	24
1.5.5	Statutory Public Consultation on our draft Plan	25
1.5.6	Communications from the Secretary of State	26

Figures

Figure 1-1: Building a water resources management plan (taken from the WRPB)	5
Figure 1-2: Timeline for key statutory and regulatory reports	7
Figure 1-3: Rainfall in the Thames catchment – 2010-2012	8
Figure 1-4: Examples of drought communications	9
Figure 1-5: Thames Water Supply Area with Water Resource Zones	18

Tables

Table 1-1: Summary of Defra instructions relevant to WRMP14, from the 2010 public inquiry ..	10
Table 1-2: Approach and timeline for discussions on options with other organisations	15
Table 1-3: Our levels of service for water restrictions	19
Table 1-4: Programme of pre-consultation on the draft WRMP14	21

Section 1 Introduction and Background Information

Our Water Resources Management Plan 2014 (WRMP14) sets out how we intend to provide a secure water supply to our customers over the next 25 years from 2015 to 2040.

In this section we provide an overview of the water resources planning process, background information to water resources and key developments which have shaped our plan including the introduction of competition in the sector.

We explain the approach we have followed in developing our plan including engagement with regulators, stakeholders and our customers and the consideration we have given to comments and directions received on our previous WRMPs.

This is a technical report providing detail about our Plan. The Appendices contain more detailed information.

This section introduces our Water Resources Management Plan 2014 (WRMP14) which covers the 25-year period from 2015 to 2040. It sets out the purpose of the WRMP and provides an overview of the water resources planning process including the legal and policy framework within which we have developed our plan. It explains how the WRMP is linked to our Business Plan and other regulatory documents.

In developing our plan we have taken account of information and learning from events such as the drought experienced between 2010 and 2012 and the public inquiry held in 2010 on our previous WRMP, WRMP09, which covered the period from 2010 to 2035. We also explain some of the key developments for water resource planning such as the introduction of greater competition to the sector and how these developments have been taken into account in developing our plan.

We have worked with regulators, stakeholders and customers in developing our plan, we explain how we have done this and how we have taken account of their views. We have included information on the public consultation on our draft Plan. As we have developed our plan we have shared it with the Customer Challenge Group and taken on board their feedback.

The remainder of this section is structured as follows:

- Water Resources Planning and an overview of a Water Resources Management Plan
- Review of the recent drought and public inquiry on WRMP09
- Government policy objectives for water resources
- Overview of our water supply area and levels of service
- Engagement with customers, stakeholders and regulators and public consultation

This is a technical report providing detail about our Plan. The appendices contain more detailed technical information.

1.1 Water Resources Planning and the Water Resources Management Plan

1.1.1 Introduction

A secure water supply is essential for public health, society and the economy and therefore it is critically important to manage water resources effectively. The purpose of the water resources planning process is to ensure security of water supply now and in the long-term, taking account of increasing pressures on water supply from factors such as increasing population, climate change and environmental requirements.

The Department for Environment, Food and Rural Affairs (Defra) and the Welsh Assembly Government have policy responsibility for water resources in England and Wales. They work closely with the following regulators:

- Environment Agency (EA), which manages water resources and enforces water quality standards;
- Water Services Regulation Authority (Ofwat), which is responsible for economic regulation of the water industry and protection of customers' interests;
- Drinking Water Inspectorate (DWI), which regulates the quality of drinking water; and
- Natural England (NE) which has responsibility for sites designated for conservation value, including rivers.

All water companies operate under a licence, granted by the Secretary of State for Environment, Food and Rural Affairs (Defra) and enforced by Ofwat, which sets out our duties (licence conditions). One such duty is to maintain the security of water supplies. To fulfil this duty water companies prepare and maintain WRMPs.

1.1.2 What is a Water Resources Management Plan?

The legal requirements for water companies to prepare and maintain a Water Resources Management Plan are set out under Sections 37A to 37D of the Water Industry Act 1991, (as amended by the Water Act 2003). The Water Resources Management Plan Regulations 2007 provide further detail on the process, particularly around consultation requirements and publication requirements. In addition, a number of Directions provide further detail on other matters to be addressed in WRMPs (see Appendix Y).

Water companies in England and Wales are required to produce a WRMP every five years which sets out how a water company intends to maintain the balance between supply and

demand for water over a 25 year period. This document is our plan which covers the 25-year period from 2015 to 2040.

In producing our plan we have used a set of guidelines, called the Water Resources Planning Guideline (WRPG)¹, jointly developed by Defra, the Welsh Government, Ofwat and the Environment Agency. These are available to download from the Environment Agency website².

The WRPG provide a framework for water companies to follow when developing and presenting their water resources plans. It sets out good practice, the various methodological approaches to follow, the scope for flexibility within the plan and the information that a plan should contain, under the following guiding principle:

“Water Resources Management Plans should ensure an efficient, sustainable use of water resources. They should focus on delivering efficiently the outcomes that customers want, while reflecting the value that society places on the environment.”

There are five main components to the WRPG, these are:

- the guiding principles for developing a water resources management plan provide details on the statutory process, legislation and government policies and objectives for water resource management plans;
- technical guideline sets out the technical methods and instructions and includes links to supporting methodologies and reports;
- supply-demand tables;
- technical methods and instructions for the supply-demand tables; and
- audit checklists.

Companies are expected to follow the WRPG unless they have good reasons not to, deviations from the WRPG should be discussed with the EA.

The core components of a WRMP are:

- A baseline forecast of demand which describes how much water customers will need now and in the future, considering factors such as climate change and population growth. It includes Government policy and any forthcoming changes in legislation about demand management (see Section 3).
- A baseline forecast of supply describing how much water is available for use now and how this may change in the future. Baseline forecasts of dry year and peak week available water supply are prepared assuming current resources and known future changes (see Section 4).
- An allowance for uncertainty, called headroom, which includes consideration of the impact of climate change on demand and supply (see Section 5).

¹ Defra, Welsh Government, Ofwat and Environment Agency (2012) Water Resources Planning Guideline

² Environment Agency WRPG page <http://www.environment-agency.gov.uk/business/sectors/39687.aspx>



- An estimate of the water resource position by comparing the baseline demand plus headroom and supply. This is known as the baseline supply demand balance, and will identify a surplus or deficit of water for each year (see Section 6).
- Where there is a deficit, water management options are assessed to close the gap. The costs and benefits of a range of options are assessed. A 'twin track approach' is followed, in which demand management measures are considered alongside resource development options in order to increase supply. A twin track approach is appropriate as it ensures that both sides of the supply demand balance are considered equally and allows prudent management of risk across the available options (see Section 7).
- A final planning supply demand balance is prepared setting out a preferred programme of options taking account of a range of factors including cost, environmental impacts, priorities of customers and wider strategic priorities. It sets out the company's view of the most cost effective, best value and sustainable solution to the planning problem (see Sections 8, 9, 10).
- A Strategic Environmental Assessment (SEA) and a Habitats Regulations Assessment (HRA), are undertaken to ensure full consideration of the potential impacts on the environment and on sites designated for conservation value (see Appendices B and C).

The process we have followed is shown in Figure 1-1.

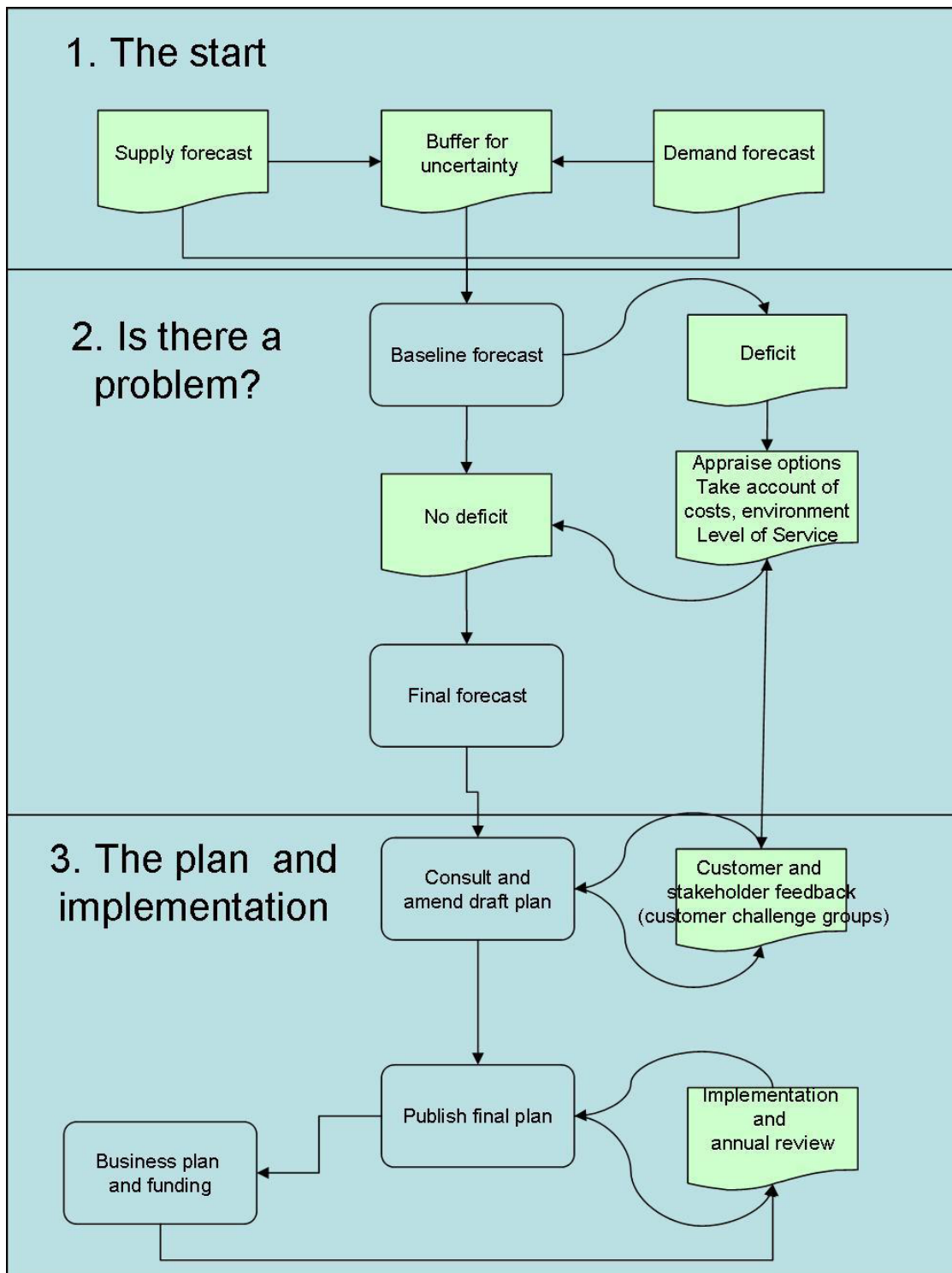


Figure 1-1: Building a water resources management plan (taken from the WRPG)

1.1.3 The WRMP's relationship with other statutory and regulatory reports

Every 5 years water companies are required to produce a WRMP and wider Business Plan. The Business Plan covers all aspects of a water company's business and shows where the company will spend the money it raises from customers over the next five years. It is expected that the supply-demand balance element of a company's business plan will reflect its WRMP. A core aim in updating the WRMP in 2011 was to align these processes more effectively thereby helping to deliver the best outcomes for customers and the environment.

A summary of the key regulatory documents are:

- Business Plans – Ofwat sets price limits for water charges every 5 years through a process known as the Price Review (PR). Water companies submit Business Plans to Ofwat setting out their funding requirements for the next 5 years as part of this process. The WRMP forms the supply demand balance section of the Business Plan. As part of the process of setting price limits, Ofwat assess companies' WRMPs to ensure that the measures proposed to maintain the balance between supply and demand for water provide value for money whilst taking account of environmental and social costs. We published our draft Business Plan covering the period 2015-2020 in May 2013 for public consultation. We have taken account of the views of respondents in refining our plan and submitted our revised draft Business Plan to Ofwat in June 2014.
- Long-term strategy – In recognition of the need to consider issues in a longer term context, Ofwat introduced the requirement for Strategic Direction Statements (SDS) in PR09 which set out a 25-year strategy and enabled the 5-year Business Plans to be framed within this longer term context. Ofwat did not require companies to produce an updated SDS for PR14 however we have updated our SDS and published it alongside our draft Business Plan in May 2013 for public consultation. To inform the review of our strategy we produced a discussion document called 'Making the most of the essential service'³. Customers and stakeholders were consulted on the priorities set out in this document. This document includes water resources and the findings have been incorporated into the development of the WRMP.
- Annual Return – This covers all business activities and provides regulatory bodies and the public with an up-to-date picture of the company's performance and progress against regulatory targets⁴. More detailed information on water resources is reported in the Thames Water Annual Review to the Environment Agency. The Annual Review (AR) provides information for the base year i.e. the year from which WRMPs forecast forward. We have used data from AR 2012/13⁵ to update the base year for the plan, where appropriate.

³ <http://www.thameswater.co.uk/about-us/15821.htm>

⁴ Our Annual Performance Report is available via <http://www.thameswater.co.uk/about-us/13874.htm>

⁵ Our Annual Review is available via <http://www.thameswater.co.uk/about-us/15548.htm>

- Drought Plans – The Drought Plan is an operational-level plan which sets out the short-term steps we will take in the event of a drought⁶. It is updated on a 3 yearly cycle. The Water Bill 2013 includes provision to align the timescales of Drought and Water Resources Management Plans.

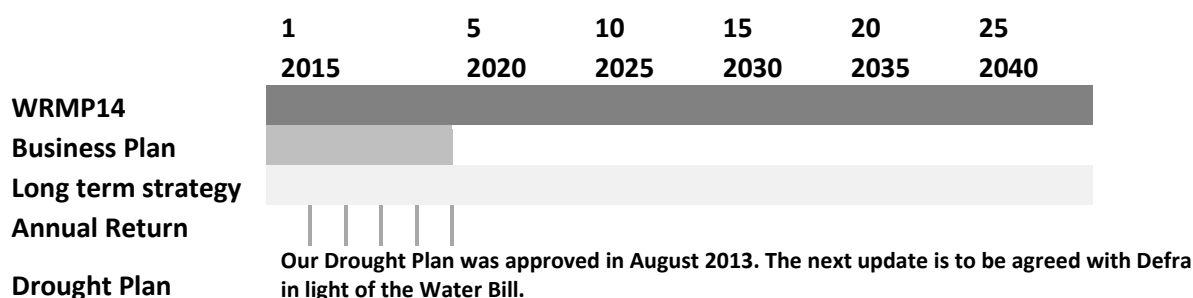


Figure 1-2: Timeline for key statutory and regulatory reports

In practice, this sequential process for producing WRMPs and Business Plans does not always occur and the outputs are therefore not always completely aligned. For example, this can occur when a public hearing or inquiry is called on a WRMP and consequently price limits can be agreed with Ofwat based on a WRMP which is subsequently changed following the completion of the hearing or inquiry. Defra commissioned a review of the WRMP process by the In House Policy Review (IHPR) team. This report⁷ produced 14 recommendations that were taken into account when the WRPG was updated.

1.2 Review of the recent drought and public inquiry

In preparing our plan we considered experience from the recent drought and recommendations from the public inquiry on WRMP09, to identify priorities and improvements.

1.2.1 Drought 2010-12

The 2010-12 drought was a result of an exceptionally dry 24 month period. The period from April 2010 to March 2012 was officially the driest on the 128 year record for the Thames catchment. The calendar year 2012 was the second wettest in the UK⁸ (7th wettest for the Thames catchment), Figure 1-3. This experience highlighted the challenges of water management under increasingly extreme weather conditions and the importance of appropriate

⁶ Our Drought Plan is available via <http://www.thameswater.co.uk/about-us/11092.htm>

⁷ Review of Water Resources Management Plan Final Report (IHPR, June 2011)
<http://www.defra.gov.uk/publications/files/pb13653-water-resources-review.pdf>

⁸ Met Office: 2012 was UK's second wettest year on record <http://www.bbc.co.uk/news/science-environment-20898729>

long-term planning to ensure preparedness for future uncertainties of climate change, population growth and environmental pressures.

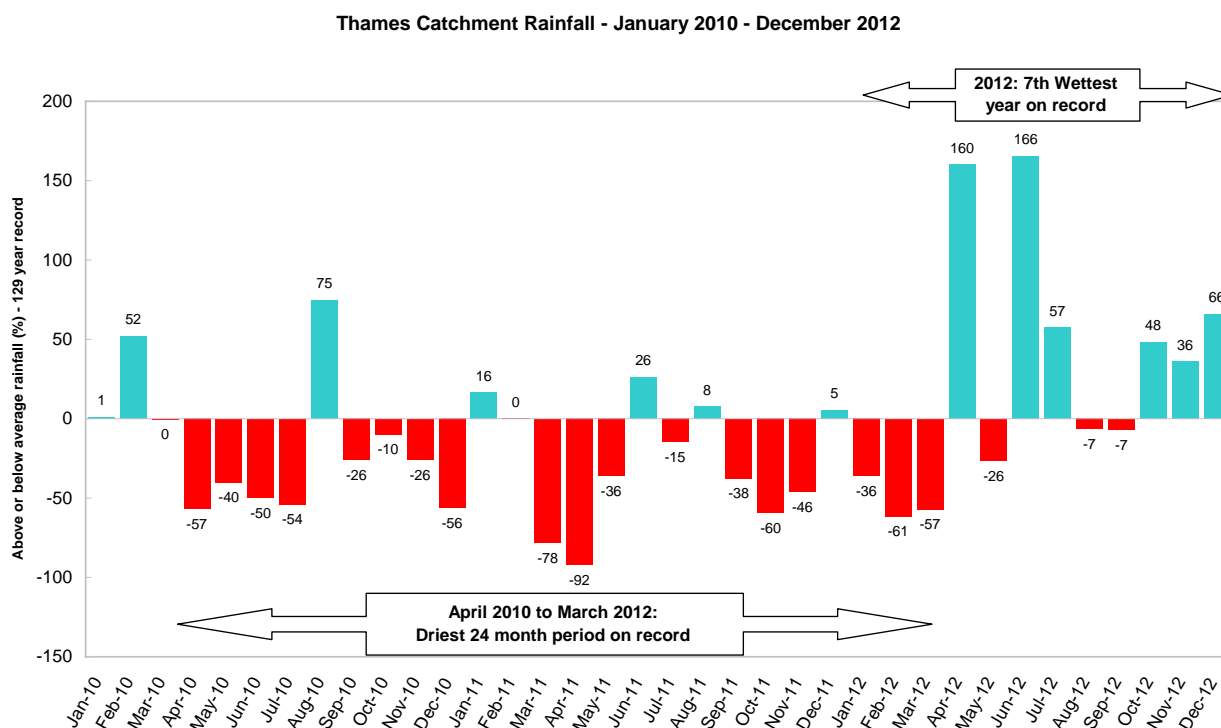


Figure 1-3: Rainfall in the Thames catchment – 2010-2012

A summary of the drought timeline and sequence of activities is noted below:

- June 2010: The prospect of drought was noted with initial preparations
- November 2011: A drought response team was set up given the increasing severity of the drought
- November 2011: Monthly briefings provided to Defra, Ofwat, Environment Agency, GLA, Natural England, CCWater and inset providers
- February 2012: The drought response team was expanded and led by a Director in line with our Drought Plan.
- 15 March 2012: A Temporary Use Ban (TUB) notification was issued in national media for public representations
- 29 March 2012: Amended notification published in national media
- 5 April 2012: TUB was implemented.

Throughout the drought we worked in collaboration with other water companies in the South-East to ensure consistent approaches to the introduction of restrictions and communications, and we proactively sought to engage and inform our regulators and key stakeholders.

We ran an effective public media campaign including radio, billboard and poster advertisements informing customers of the drought and promoting water efficiency. These were launched across the region in main line railway stations, London underground stations, on the sides of buses and on bus stops. These messages were developed from the spring period and the messages tailored to the changing weather situation from May 2012. The media campaign was subsequently recognised with a design effectiveness award⁹.



Figure 1-4: Examples of drought communications

The drought showed the vulnerability of our water supply to extreme weather conditions and subsequent work to understand the resilience of water supply to drought events has shown that if the frequency or intensity of such events is greater than experienced in the past we would fail to meet our levels of service. In developing our plan we have undertaken a range of modelling to develop a strategy and plan that is flexible to future uncertainty but delivers best value overall.

⁹ <http://www.effectivedesign.org.uk/winners/2013/external-communications/thames-water-drought-campaign>

1.2.2 The 2010 Public Inquiry

In summer 2010 a public inquiry was held to examine our draft WRMP09. A number of important issues were discussed at the inquiry. The Inspector determined that it was not possible to conclude that the plan was efficient and economical and as such recommended that the Secretary of State instruct us to amend our plan.

Following publication of the Planning Inspector's recommendations¹⁰, and consultation with the Environment Agency and stakeholders, in May 2011 Defra issued instructions¹¹ on the amendments needed to be made to the draft WRMP09 such that it met the minimum requirements recommended by the Planning Inspector. This was completed and the WRMP09 was subsequently approved by Defra in July 2012.

Defra also identified which of the Inspector's recommendations needed to be addressed as part of WRMP14. The instructions relevant to the WRMP14 are summarised in Table 1-1 and include an update and signposting to where this issue is addressed in the plan. We will continue to progress work in the areas identified as part of on-going water resource planning.

Table 1-1: Summary of Defra instructions relevant to WRMP14, from the 2010 public inquiry

No.	Task	Progress Update
Options Appraisal		
1, 2	Ongoing technical analysis to confirm feasibility and uncertainty of Severn-Thames transfer options.	We have completed work to examine Severn-Thames transfer options. This is presented in Section 2 and Section 7.
3	Ongoing technical analysis to confirm feasibility and uncertainty of options associated with changing bulk supply arrangements.	We have completed work to consider bulk supply arrangements. These are presented in Section 4 and Section 7.
4	Investigations of alternative sites for a 50 million cubic metres (Mm ³) reservoir.	We have completed work to investigate and assess alternative reservoir options. These are presented in Section 7.
5	Investigations into a greater range of effluent reuse schemes and alternatives to reverse osmosis technology.	We have completed work to examine alternative wastewater reuse options including potential sites and technology. These are presented in Section 2, Section 7 and Appendix L.

¹⁰ The Planning Inspectorate (December 2010) Water Resources Management Plan Regulations 2007, Inquiry into the Thames Water Revised Draft Water Resources Management Plan 2010-2035, September 2009, Report to the Secretary of State for Environment, Food and Rural Affairs by Wendy J Burden BA(Hons) DipTP MRTPI - an Inspector appointed by the Secretary of State for Environment, Food and Rural Affairs

¹¹ <http://archive.defra.gov.uk/environment/quality/water/resources/documents/thames-inquiry-decision-letter.pdf>

No.	Task	Progress Update
5	Update on public perception investigations and wastewater reuse trial at Deephams wastewater treatment works.	We have completed further research with customers to understand their concerns with respect to wastewater reuse and are working collaboratively with other companies who are also exploring wastewater reuse options. This is presented in Section 2.
6	Further breakdown of costs for all options and to support Water Resources in the South-East (WRSE) modelling work.	We have worked collaboratively with WRSE and provided detailed information on options for WRSE assessment. This work is discussed further in Section 2 and options are presented in Section 7.
7	Consideration of how a greater range of feasible options could be provided.	We have developed and considered a wider range of feasible options than WRMP09. These are reported in Section 7.
19	Further investigate and review some of the more uncertain contingency options such as aquifer storage and recovery.	We have explored aquifer storage and recovery options. This work is reported in Sections 2 and 7.
Programme Appraisal and Sensitivity		
10	Apply new methodology to programme appraisal to identify the Company's preferred strategic programme.	We have developed a clear and transparent decision making process to determine the preferred programme. The approach and methodology has been shared with regulators and stakeholders. This is presented in Sections 8 and 9.
12	Consideration of programme sensitivity to cost certainty.	Sensitivity analysis has been completed on several aspects of the preferred plan including cost. This is presented in Section 10.
17	Consideration of programme sensitivity to different potential sustainability reduction scenarios.	Programme sensitivity to different potential sustainability reduction scenarios has been considered and presented in Section 10.
18	Consideration of programme sensitivity to actual utilisation of schemes and to Net Present Value calculation over 80 years.	Consideration of programme sensitivity to actual utilisation of schemes and to Net Present Value calculation has been considered and presented in Section 10.
20	Need to explicitly quantify the probability of the main sources of scheme timing and yield uncertainty and include in target headroom.	Sources of uncertainty relating to individual schemes are stated in the scheme dossiers (Appendix R) and explained in Section 7.
21	Acknowledgement of shortcomings in willingness to pay surveys.	This is discussed in Section 1.5.2, Section 8 and Appendix T.

In addition, at the Inquiry Statements of Common Ground (SoCG) were agreed between Thames Water and the Consumer Council for Water (CCW) and Ofwat.

The SoCG with CCW was to reflect the need for further consideration in development of the proposed metering strategy of the following issues:

- Affordability and specifically the need to ensure adequate protection of vulnerable and low income households;
- The need for further consultation on tariff design before communal metering of shared supplies is introduced; and
- Ensuring that the measured/unmeasured charge differential is managed and does not penalise households in socially disadvantaged areas where metering is deferred or impracticable.

We have addressed each of these points in developing our metering strategy which is presented in Section 7 and Appendix N.

The SoCG with Ofwat was to address concerns about the assessment of the costs and benefits relating to our mains replacement proposals. At the public inquiry we both committed to jointly commission a study to review the performance of the mains replacement programme in London and proposals to reduce leakage in the period to 2020. This work, the Mains Replacement Programme Independent Review (MRPIR), is complete and the summary report of the findings of the study has been published on our website. This is presented in more detail in Section 2.

By taking these actions on board we believe our plan is significantly improved from our 2009 plan.

1.3 Government policy objectives for water resources

The Water White Paper and the WRPB highlight Government's principle policy objectives with respect to water resources, these are summarised below and our approach to addressing these is briefly explained.

1.3.1 Taking a long-term perspective

The planning horizon in water resources management plans is 25 years, however Government recognises that given the long lifespan of water infrastructure, it is important that water resources management plans are developed to be resilient and flexible to a range of potential future uncertainties, such as the impacts of climate change, population growth and changes in demand, and in doing so deliver the best results for customers and the environment. We have looked at plans over a 50 year period as well as 25 year. Our approach to the development of our preferred programme is explained in Section 8 and Appendix W and addresses this issue.

1.3.2 Water scarcity and environmental damage

There is wider recognition of the need to balance the needs of society and the economy with the environment. In our WRMP we have included an assessment of the environmental and social costs of options and this is presented in Section 7. We have also included the output of the Strategic Environmental Assessment in our programme appraisal and this is presented in Section 8.

The Environment Agency has identified 'confirmed' and 'likely' reductions required in existing abstraction licences. These reductions are known as Sustainability Reductions (SRs) and have been included in our plan. Further information is presented in Sections 2 and 4, for reductions between 2010-15 and 2015 onwards, respectively.

There are other potential SRs, called 'unknown' SRs. These require further work and are not included, nor is any allowance included for these, in our plan. We have tested our plan against these potential reductions and their impact on our strategy (see Section 10 and Appendix X).

1.3.3 Abstraction Reform

The Abstraction Incentive Mechanism (AIM) has been developed by Ofwat, the intention of the mechanism is to reduce the environmental impact of abstraction. It is an interim measure, designed to provide additional environmental protection until Defra completes its programme of work on long term abstraction reform. At present, existing data is not yet robust enough to set national financial incentives linked to AIM and this was recognised in Ofwat's final price setting methodology in July 2013.

We worked with Ofwat, and its appointed consultants, to explore the opportunities to manage sites that fall within the AIM performance measure. The work showed that we have very little flexibility within our water system to optimise our source usage further than it is already. This is largely because many of the potential AIM sites are our large surface water intakes in London and there are no significant unused sources that could be used to substitute for these existing sources. The cost of developing alternative supplies would be far greater than the benefit linked to a reduction in abstraction. Consequently, we do not envisage that AIM will impact significantly on the supply-demand balance. We continue to liaise with the Environment Agency to confirm our AIM sites and we will continue to explore opportunities to optimise our source usage further. It is possible that when we have a confirmed list of sites that will fall within the AIM we may determine that additional proposals such as localised progressive metering schemes are an appropriate means of responding to the incentive.

1.3.4 Water trading, cross boundary solutions and third party resources

Government has signalled competition and market opportunities in the water sector and companies are expected to demonstrate in their WRMPs inter-connections between water resources zones; review of bulk supplies between water companies (neighbouring or not); abstraction licence trading within catchments; and consideration of supply/demand options provided by other water companies or by third parties. In developing our plan we believe we have made considerable efforts to explore opportunities for water trading and cross boundary solutions, these are presented in Section 7. Our preferred plan detailed in Section 9 includes a number of new water trading agreements, two of which will be implemented in AMP6.

Inset Appointments

There are currently 18 appointed inset sites in our region, between three inset providers:

- Scottish and Southern Energy Water (13 sites)
- Independent Water Networks Limited (4 sites)
- Albion Water Limited (1 site)

Inset providers serve customers in some new developments (using >50Ml per annum) in our region. Although we provide a supply to inset providers, the area and customers within the inset boundary are not our direct responsibility. We have included these licences within our consultation process.

Separate to this, companies can ask to transport their water through our network for the benefit of their customers. Currently, we are not supplying any transport services under common carriage arrangements.

Inter-connection

We have undertaken a wide range of activities to explore opportunities for sharing resources with other water companies as bulk supply contracts or shared asset ownership and to share or trade water with non-water company providers or users of water.

- Engagement with other water companies: We have contacted all neighbouring water companies, as well as a number of water companies further afield, to discuss existing and potential bulk supply options for both import and export of water. A number of opportunities have been identified and, where appropriate, these have been included in our unconstrained and feasible lists of options (Section 7 and Appendix P).
- Water Resources in the South East (WRSE): We are a member of the WRSE Group which was established to investigate the potential for regional strategic solutions for water supply in the South East. Alongside all member companies, we provided costed resource and demand management options for consideration by WRSE and have taken account of the output from the WRSE Group in our plan.

- Other organisations: We have undertaken activities to raise awareness and engage with other organisations to explore opportunities to share and trade water and to manage demand. A summary of the approach and timeline is presented in Table 1-2.

Table 1-2: Approach and timeline for discussions on options with other organisations

Timetable	Activity
June 2012	Thames Water published an Official Journal of the European Union (OJEU) Notice asking organisations to register their interest in working with Thames Water to develop new water supply options. This was promoted at Thames Water Stakeholder Forums and through discussions with third party organisations.
July 2012	Engagement and meetings with organisations to identify and discuss opportunities.
September 2012	Baseline supply demand balances published to confirm water resource “availability and need” in Thames Water’s supply area.
October 2012	Contact Plan published on Thames Water website www.thameswater.co.uk/wrmp to provide information on the baseline water resource position and the approach to identify and assess potential options including information requirements from organisations.
November 2012	Information requested from third parties on potential options.
December 2012	Assessment of potential options to determine feasibility.
December 2012	Formal Request For Proposal issued to organisations who had registered an interest via the OJEU process.
January 2013	Close down of option assessment for draft WRMP.
May 2013	Public consultation on the draft WRMP.
May 2013 onwards	On-going process to identify and assess options in consultation with other water companies and third party providers. This has involved screening to refine options and to determine which to take forward into programme appraisal and which require further investigation in AMP6.

- The approach to assessing options from other water companies and third party organisations is the same for all options on the unconstrained options list taking into account economic, environmental and social costs, resource availability, risk and other parameters, where this information is available. The assessment methodology is outlined in Section 7.

- If an option was identified as feasible and sufficient information had been provided (e.g. all economic, social and environmental costs could be quantified), then it was taken forward for appraisal alongside existing options. Only one of the many options reached this level of maturity for the draft plan, however additional transfer options have been included in the unconstrained and constrained options list (Appendix P) and further work will continue on those options for which there was insufficient information available to allow a comparable assessment. Assessment of new options is on-going under resource planning.
- Other abstraction licences: We have analysed data on abstraction licences and licence utilisation to identify licence holders in the vicinity of our supply area who may be willing to trade or share water e.g. RWE N-Power. We have discussed our approach with the Environment Agency. We have identified a short-list of opportunities and have progressed discussions with the licence holders to understand the practicalities of supply and develop indicative costings. The process did not provide robust data for the draft plan but since then we have continued discussions regarding a commercial agreement with RWE N-power for a water transfer. this is included in Section 7.

The assessment of options is a dynamic and on-going process and discussion on new options will continue with other water companies and third party organisations. Furthermore new options will also be considered as part of the Annual Review process once the plan has been approved by the Secretary of State and could be substituted in period if they are considered to be particularly beneficial.

1.3.5 Reducing demand

Government expects water companies to show how they will promote efficient water use and the impact that will have in their water resources management plans. Where a company is in an area designated as water stressed as set out by the EA¹², or where it has demand that is above the national average (147 litres per head per day (l/h/d)), Government expects the demand trend to be significantly downwards. Where an increase in population or commercial use leads to increases in total demand, the company must ensure that its plan demonstrates a decrease in per capita consumption.

Our plan includes reductions in leakage and demand and these are cornerstones of our plan. We included the level of demand reductions as one of the criteria in our programme appraisal process (Section 8).

¹² Water stress: final classification, Environment Agency, July 2013

1.4 Our water supply area

1.4.1 Water Resource Zones

Our water supply area is divided into six Water Resources Zones (WRZs). A WRZ is the standard geographical unit for water resources planning and is defined by the Environment Agency as:

“The largest possible zone in which all resources, including external transfers, can be shared and hence the zone in which all customers experience the same risk of supply failure from a resource shortfall.”

The largest of these is London, which covers the Greater London area, followed by Swindon and Oxfordshire (SWOX). The water resources for both of these zones are largely based on abstraction from the River Thames, which is stored in reservoirs.

The other zones to the west of London are Kennet Valley (includes Reading and Newbury); Henley; Slough/Wycombe/Aylesbury (SWA) and Guildford. These latter four zones are largely reliant on groundwater abstraction although there are significant abstractions directly from local rivers, notably the River Kennet in Reading and the River Wey near Guildford.

Overall, existing supply is around 77% from surface water (rivers) and 23% from groundwater (aquifers).

A geographic overview of the WRZs can be found in Figure 1-5 below. A more detailed map of each WRZ along with a high level description of each zone can be found in Appendix D. Appendix D also covers our review of WRZ integrity.

As a part of our plan we reviewed and agreed these resource zones with the Environment Agency to ensure they were still the most appropriate planning unit.

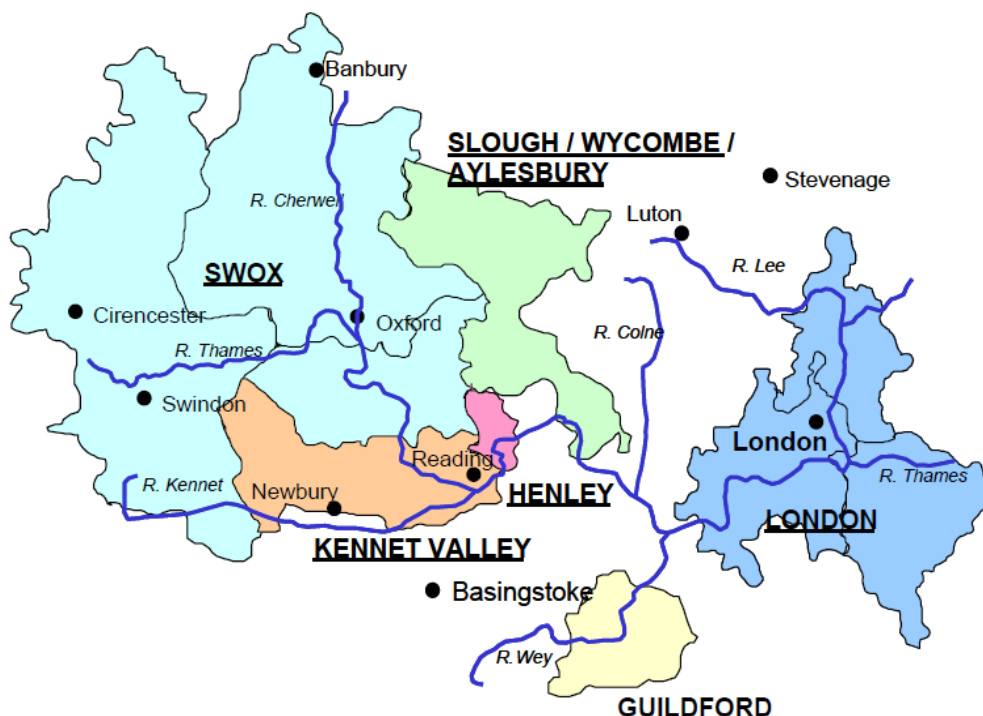


Figure 1-5: Thames Water Supply Area with Water Resource Zones

1.4.2 Our levels of service

Rainfall in London is lower per capita than in places like Rome, Dallas and Istanbul. Droughts are not uncommon – there have been five major droughts in the last 90 years;

- 1920–21;
- 1933–34;
- 1943–44;
- 1975–76;
- 2010–12.

These would threaten water supplies if we did not plan ahead for them. At the beginning of April 2012 the drought was so intense in South East England that it posed a very serious threat to water supply. It was only the unprecedented rainfall that occurred during April to July (the wettest period on record) that averted the need for more severe water use restrictions beyond the imposition of a temporary use ban. The question arises as to what *level of service* do we expect from our water supply system? Do we want no restrictions under any circumstances, or are we prepared to accept temporary restrictions at times of drought?

In water resources planning, levels of service describe the average frequency that a company will apply restrictions on water use to its customers. Levels of service will vary with different types of restrictions, as more severe restrictions are needed less often. For example, customer temporary use restrictions may have a level of service average frequency of 1 in 10 or 1 in 20 years, and a drought order restricting non-essential use of 1 in 20 years.

As part of our plan we researched levels of service with our customers. In our research, customers have shown strong preferences to avoid severe restrictions on water use during droughts. However, they would tolerate occasional hosepipe bans where these become necessary, provided they are satisfied that we as a company are also doing the most we can to conserve water supplies. Neither domestic nor business customers want a reduction in levels of service (see Appendix T).

As such, we propose to continue with the levels of service listed in Table 1-3, which is consistent with that stated in previous WRMPs.

There are four levels of demand management action we can take during a drought in order to conserve water supplies, as set out in Table 1-3 below. As the severity of drought increases, the actions we can take increase accordingly. In the most serious situations, this can include restricting non-essential water use.

Table 1-3: Our levels of service for water restrictions

Restriction Level	Frequency of Occurrence	Water use restrictions
Level 1	1 year in 5 on average	Intensive media campaign
Level 2	1 year in 10 on average	Sprinkler/unattended hosepipe ban, enhanced media campaign
Level 3	1 year in 20 on average	Temporary Use Ban (formerly hosepipe ban), Drought Direction 2011 (formerly non-essential use bans) requiring the granting of an Ordinary Drought Order. NB Drought Permits are also part of Level 3 measures, but do not impinge directly on customers and so are not strictly relevant to customer service levels.
Level 4	Never	If extreme measures (such as standpipes and rota cuts) were necessary their implementation would require the granting of an Emergency Drought Order

The Temporary Use Ban (TUB) and Non Essential Use (NEU) ban are defined as Level 3 (1 in 20 on average) in our Levels of Service, however in practice these would be applied in a staged manner, following our Drought Plan methodology, with the TUB powers (including exemptions) introduced at least 10 weeks before the more narrowly defined NEU ban. This is necessary as a prerequisite for a NEU Drought Order application is that the TUB demand management measures are in place. Following this approach, the severity of the drought event will be equivalent to 1 year in 20 at the time of TUB implementation, however, changes in rainfall patterns may subsequently alter this when the event is reviewed retrospectively, as happened for the 2012 drought event. There is, therefore, a small timing misalignment between our Drought Plan operational management at times of drought, and our stated Levels of Service.

In comparison the statistical frequency of hosepipe ban implementation over the last 90 years of record is 1 year in 13 on average.

1.5 Engagement with our customers, stakeholders and regulators

1.5.1 Pre-consultation on our draft Plan

There is wide interest in the sustainable management of water resources and we have undertaken considerable work with customers, stakeholders and regulators during the development of our plan. The water industry is one of a number of parties involved in managing water resources and as such, many stakeholders have an interest in our WRMP. Whilst we are legally required to consult the Secretary of State, the Environment Agency, Ofwat, and other licensed water suppliers as we develop our draft plan, we recognise the wider interest in our WRMP and broadened our approach to pre-consultation. This ensures all interested stakeholders have had an opportunity to input and contribute to the development of our draft plan both through WRMP activities and Business Plan activities (Appendix S).

The main components of our pre-consultation programme are set out in the Table 1-4. The programme includes consultation with regulators, stakeholders, neighbouring water companies, third party organisations and customers. We have sought to work with stakeholders as we have developed our WRMP explaining the framework, technical methodologies and assumptions, and decision making. We have held regular meetings and forums to present work as we have completed it, giving stakeholders the opportunity to review and challenge our work. This approach has been designed to ensure we understand priorities and concerns of stakeholders and can take them into account as best as we can as we develop the WRMP.

In July 2012 we wrote to all statutory consultees to inform them of our approach to pre-consultation to ensure they were aware of the programme and had an opportunity to contribute to the development of the draft WRMP.

Table 1-4: Programme of pre-consultation on the draft WRMP14

Group	Activity	Comment
Customers	Customer Challenge Group (CCG) established to challenge the Business Plan including water resource matters on behalf of customers.	The CCG has had an active role throughout the Business Planning and WRMP processes.
	Customer research	A programme of research has been completed to understand customers' views on specific matters including water resource matters.
Regulators	EA, Ofwat, CCWater	Monthly meetings March 2012 – March 2013 held with the EA. Ofwat and CCWater were invited to attend.
Stakeholders	Stakeholder forums	Quarterly forums held in March, June, October 2012 and March 2013.
	Technical meetings	Meetings set up in response to stakeholder feedback. Specific topics discussed including the Lower Thames Abstraction Investigations, Strategic Environmental Assessment (SEA) and Water Resource Options.
Water suppliers	Water companies and third party organisations	On-going dialogue with water companies and third party organisations. Further detail on the approach is provided in Section 2 and Section 7.
Strategic Environmental Assessment (SEA)	Statutory consultees and interested stakeholders	Consultation on the scope of the SEA completed in July 2012. A technical meeting was held in September.

In addition to the above, we have undertaken considerable research and engagement linked to the long-term business strategy and Business Plan, which includes water resources. Feedback from these activities has informed the development of the WRMP.

We believe our process has been a step change in performance since 2009.

The following sections provide further information on the engagement approach and findings with customers, regulators and stakeholders respectively.

1.5.2 Customers

Customers' views and priorities are core to our WRMP and Business Plan. We have completed a programme of customer research to understand customers' views and priorities on the services we provide including the levels of service (in terms of frequency of restrictions on use) and preferences for specific options to reduce demand and provide additional supply. This has included customer surveys, deliberative research and willingness to pay (WTP) studies (Appendix T).

The research has identified the following themes with respect to water resources:

Levels of service

- The safety, quality and reliability of their water supply remains a priority for customers.
- There is a high awareness of the 2012 drought but, just one in five customers said that the temporary use ban had a moderate or greater impact on their daily activities.
- Customers are more concerned with the duration than frequency of supply interruption events: very long supply interruptions are most unwanted.
- Neither domestic nor business customers want a reduction in the level of service provided, even if this would result in lower bills.
- Business customers tend to be more risk-averse than domestic customers and there may be a willingness among business customers, to support an investment programme that would result in increased bills, as long as such an increase is minimised and phased over time.

Water resource options

- Climate change, ageing infrastructure and population increase are identified by customers as important challenges for the future.
- Customers are most familiar with leakage reduction and metering; they are least familiar with the concepts of water transfer, desalination and abstraction.
- Preferences for options are driven by: 1) wanting to save water; 2) options that appear to be sensible; and 3) wanting to avoid environmental impact.
- Customers' order of preferences in terms of options is 1) reduce leakage; then 2) increase water efficiency e.g. metering; and then 3) consider new resources.

- Leakage is a key concern for customers; they believe current levels are too high and that we should be better at fixing leaks.
- Customers strongly support more education on water efficiency. There is an acknowledgement that they need to work together with us but that more public education should be provided.
- Metering as an option comes out favourably in the WTP research, but customers have reservations about mandatory programmes. There is a strong opinion that such a programme would need to be wholly transparent and be accompanied by a public education campaign.
- In terms of resource development, WTP research suggests that wastewater reuse is acceptable to customers, and is preferred slightly over new reservoirs. Water transfers, new direct surface water abstraction and desalination are marginally less preferred by customers.

We acknowledge the potential shortcomings of WTP surveys (and other study types). Questionnaire design and level of prior knowledge are very important and we have endeavoured to minimise the impacts of these issues through our survey designs. Through the range of research and engagement undertaken for this plan we believe we have developed a good understanding of our customers' views and preferences which we have sought to reflect where possible in our plan. We provide further detail on how we have used the customer research to inform the selection of our preferred plan later, in Sections 8 and 9. There is no single part of our plan which is reliant on customers' WTP to justify its inclusion.

In March 2012 we established our Customer Challenge Group (CCG). The role of the CCG is to test the quality of our engagement with customers and how we have responded to customer priorities in developing our strategic plans. We have regularly discussed water resource matters with this Group as we have developed our draft WRMP. They have commented on our approach, progress and the development of our plan.

1.5.3 Government and regulators

We have held regular meetings with the Environment Agency since March 2012. The purpose of these meetings has been to outline the methodologies and approaches to be used in the draft Plan, to ensure they are satisfied with our approach and to give them the opportunity to raise any concerns.

Meetings have also been held with Ofwat to update them on progress in the development of our draft Plan and to seek their feedback.

In the preparation of the Strategic Environmental Assessment (SEA) and Habitats Regulation Assessment (HRA) we have worked with statutory regulators; Natural England and Natural Resources Wales, and wider stakeholders. We have completed consultation on the scope and approach of the SEA and also the HRA.

We have communicated¹³ with the Welsh Assembly Government to ascertain their view on potential transfer options which involve the transfer of water resources from Wales.

We have also worked proactively as part of the Water Resources in the South East (WRSE) Group to help identify opportunities for better, more efficient use of resources.

1.5.4 Stakeholders

There is wide interest in water resources from a diverse range of stakeholders, from those organisations who have interest in a specific geographical area, watercourse or single option to organisations who have a broad interest in the sustainable management of resources for the long term. As an example, the Mayor of London's appetite for a sustainable and secure water supply is clearly set out in Greater London Authority's 2012 Water Strategy, 'Securing London's Water Future'. This calls for greater resilience in the face of future pressures on water and greater focus on leakage and metering to ensure the most effective use of available resources.

We have held forums since March 2012 to update stakeholders on progress with our draft WRMP and to give them the opportunity to discuss aspects of our draft Plan, to challenge our approach and to highlight issues and concerns. Statutory consultees and stakeholder organisations that have an interest in our draft WRMP were invited to attend such as the Group Against Reservoir Development (GARD).

In response to feedback from stakeholders we have held meetings on specific technical topics to give stakeholders the opportunity for greater discussion and scrutiny on specific technical matters. Meetings have been held on a range of topics including water resource options, the Strategic Environmental Assessment, Appropriate Assessment and the Lower Thames Operating Agreement Investigations.

To ensure transparency in the pre-consultation process, we have published minutes and presentations of meetings and technical reports on our website www.thameswater.co.uk/wrmp throughout the process. We believe this process has helped develop a better overall water resource plan.

¹³ Letter from Thames Water to Welsh Assembly Government 25 January 2013

1.5.5 Statutory Public Consultation on our draft Plan

On 1 May 2013, we launched a 12 week public consultation on the draft plan.

A CD-Rom of the draft plan was sent to 426 stakeholders, including all statutory consultees, stakeholder organisations who had participated in our water resources stakeholder fora and stakeholders who had participated in the public consultation on our previous Water Resources Management Plan covering the period 2010-2035. The draft Plan was also made available for stakeholders to download from our website www.thameswater.co.uk/haveyoursay. Customers could call a freephone telephone number or email to request copies of the documents. A paper copy of the draft Plan was made available to view throughout the consultation period by appointment at Thames Water's offices in Reading.

The public consultation was run online. People who did not want to, or were unable to participate online, could request a paper questionnaire or they could also submit freeform written responses by letter or email. A dedicated telephone line was also provided for stakeholders who were unable to respond online or in writing. Consultees were asked to direct all representations to the Secretary of State for the Environment, Food and Rural Affairs who collated all responses to the consultation and provided them to us.

The public consultation was widely promoted through employee channels, press and media, community roadshows and stakeholder events to give as many people and organisations as possible the opportunity to comment.

We received 350 representations in response to the consultation.

On 30 October 2013 we published a Statement of Response (SoR). The Statement was prepared in line with the WRP¹⁴ and includes:

- an explanation of the consideration given to the representations received as part of the public consultation;
- an outline of any changes made to the draft Plan, and the reasons for the changes;
- a clear explanation of how the changes affect parts or the whole of the plan including any changes to timing and schemes selected to maintain a balance of supply; and
- where we have not made any changes to the draft Plan as a result of consideration of the representations, an explanation of why no changes have been made.

In addition to changes to the draft Plan as a result of representations to the public consultation, there was also new and updated information and data since the publication of the draft Plan and this was also taken into account.

The Executive Summary of the revised draft WRMP14 was published as a separate document to accompany the Statement of Response and to give an outline of the changes made to the draft Plan.

¹⁴ WRP¹⁴ Guiding Principles Step 11 – Assess representations and produce Statement of Response

We consulted on our draft Business Plan in conjunction with the public consultation and engagement on the draft plan and comments raised on water resource matters from the Business Plan were also been considered in our Statement of Response.

We sent a copy of the Statement to all consultees who submitted a representation and we published the Statement on our website www.thameswater.co.uk/wrmpsor

1.5.6 Communications from the Secretary of State

The Secretary of State reviewed our Statement of Response, taking into account advice from technical experts and the responses to the public consultation, and in March Defra wrote to us to request additional information, this was provided in April and included:

- the work programme of studies to be undertaken during AMP6 and associated stakeholder engagement programme;
- the potential impacts of the proposed route for HS2 on TW sources;
- the potential impact of SLARS (Kidbrooke) on Oxleas Wood SSSI;
- the potential impact of Horton Kirby (Darent Valley) on the historic environment; and
- clarification of the new bulk transfers with Affinity Water and South East Water.

This additional information has been published in support of our final WRMP.

Following consideration of the additional information, on 23 July 2014 the Secretary of State notified Thames Water to publish our plan. We have made the required changes to incorporate changes identified in the Statement of Response and the further information submitted to Defra in April. We published our final plan on our website on 22 August and notified all stakeholders who participated in the consultation.

The remaining sections of this report present the building blocks and decision making process we have undertaken in the production of our plan. This starts with a review of our performance over 2010-2015.