

**Thames Water
Draft Water Resources
Management Plan 2019**

Technical Appendices

**Appendix Z: Defra Directions and
Environment Agency Water Company
Checklist**



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Appendix Z.

Defra Directions and Environment Agency Water Company Checklist

- Defra and the Welsh Government have issued specific Directions that a water company must follow in developing a WRMP. Additionally, the Environment Agency has produced an optional, comprehensive checklist for each WRPG requirement.
- This Appendix contains the Directions and Checklist to signpost to consultees where each point has been addressed in the WRMP

A. Introduction

How to use this Appendix

Z.1 This Appendix contains the WRMP Direction 2017 and Environment Agency Checklist, with our annotation to signpost to consultees where each point has been addressed in the WRMP.

B. Defra Directions 2017

Z.2 The Secretary of State issued specific Directions (dated 22 April 2017) that a water company must follow.

Z.3 Below we set out these Directions and signpost to where they are addressed in the WRMP.

Direction	Direction text	Explanation	Location within WRMP
2	—A water undertaker must prepare a water resources management plan, for a period of at least 25 years commencing on 1st April 2020.	Water resources management plans must cover a 25 year time horizon. However, this in itself does not constrain water companies to a 25 year forward look and if it is important to its plans, a water company can provide information past this planning horizon.	We have provided a plan that covers a time period from 1 April 2020 to 31 March 2100 (Section 1).



Direction	Direction text	Explanation	Location within WRMP
3(a)	—the appraisal methodologies which it used in choosing the measures it intends to take or continue for the purpose set out in section 37A(3)(b) ¹ , and its reasons for choosing those measures;	<p>1. Section 6 of the water resources planning guideline technical document sets out the approach to be followed by a water company when appraising a new option or solution to remove a deficit.</p> <p>2. Where this method is used a water company need only state that it is using the approach set out in the Guideline.</p> <p>3. A water company may use an alternative approach, but it must set out the appraisal method and the reasons for choosing that method.</p> <p>4. If the water company is part way through delivery and using an alternative approach, it must explain its existing measures and reasons. A narrative rather than a full appraisal will suffice.</p>	<p>We have followed the approach set out in the Guideline 2017 to appraise options and produce our preferred plan.</p> <p>In Sections 7, 8 and 9 we set our approach for the appraisal of demand management and resource options.</p> <p>In Section 10, we evaluate long-term uncertainty through the use of a scenario analysis approach.</p> <p>We have showed transparency through the decision process.</p>

¹ Section 37A(2) Water Industry Act 1991 – to manage and develop water resources to meet its obligations of providing water.



Direction	Direction text	Explanation	Location within WRMP
3(b)	<p>— for the first 25 years of the planning period, its estimate of the average annual risk, expressed as a percentage, that it may need to impose prohibitions or restrictions on its customers in relation to the use of water under each of the following -</p> <p>(i) section 76²</p> <p>(ii) section 74(2)(b)³ of the Water Resources Act 1991 (b); and</p> <p>(iii) section 75⁴ of the Water Resources Act 1991;</p> <p>And how it expects the annual risk that it may need to impose prohibitions or restrictions on its customers under each of those provisions to change over the course of the planning period as a result of the measures which it has identified in accordance with section 37A(3)(b)</p>	<p>A water company must set out its planned level of service that it will achieve throughout the planning period for its final planning scenario.</p> <p>The company will need to explain any changes or variation with this planned level of service. The company should indicate, as good practice, if customers will actually be receiving a different level of service as options are implemented.</p>	<p>Our planned levels of service are set out in Section 1 and our Drought Resilience Statement is in Section 11 expressed as percentage of average annual risk. In Section 10 we demonstrate that our preferred programme will meet those levels of service from the end of AMP6. Drought Resilience Statement is in Section 11 expressed as percentage of average annual risk.</p>
3(c)	<p>—the assumptions it has made to determine the estimates of risks under sub-paragraph (b), including but not limited to drought severity</p>		<p>In Section 4 and Appendix I we give details of the stochastic forecasting approach that we have used to understand the probability of occurrence of more extreme drought events than those with the historic record. In Section 5 and 10 and Appendix V and W we discuss how we have considered and accounted for risk and uncertainty.</p>

² Section 76 Water Industry Act 1991 - Temporary use bans, including hosepipe bans

³ Section 74(2)(b) of the Water Resources Act 1991(c) - ordinary drought orders to restrict use

⁴ Section 75 of the Water Resources Act 1991- emergency drought orders



Direction	Direction text	Explanation	Location within WRMP
3(d)	—the emissions of greenhouse gases which are likely to arise as a result of each measure which it has identified in accordance with section 37A(3)(b) ⁵ ; unless that information has been reported and published elsewhere and the water resources management plan states where that information is available	A water company will need to produce an assessment of the likely emissions of greenhouse gases from its current and future activities. This should be produced in the water resources management plan for its final planning scenario. The company can decide at what point it starts its assessment but it should be the same for all components.	Our Corporate Responsibility and Sustainability Report 2016/17 includes an estimate of the greenhouse gases from our water supply activity. The carbon emissions associated with each of the constrained options in our draft WRMP19 is reported in Appendix A (EA Tables). In Section 11, we have produced a clear set of information about the total emissions of greenhouse gases for our preferred plan.
3(e)(i)	—the assumptions it has made as part of the supply and demand forecasts contained in the water resources management plan in respect of— the implications of climate change, including in relation to the impact on supply and demand of each measure which it has identified in accordance with section 37A(3)(b)	Climate change may have a large impact for some water companies. The technical guideline sets out the approach for assessing climate change for supply and demand using the latest information and methods available. Section 3 details impacts on supply and Section 4 details impacts on demand. A water company can decide to include an allocation with target headroom using the methods presented in the technical guideline. All water companies should follow these methods, clearly displaying the results and how they achieved them. If a water company follows an alternative approach it must give reasons for not following guideline.	In Section 5 and Appendix U we present the assessment of the impacts of climate change, using methods covered in the Guideline.

⁵ Section 37A(3)(b) Water industry Act 1991- to manage and develop water resources as in section 37A(2), but also taking into account bulk supplies.



Direction	Direction text	Explanation	Location within WRMP
3(e)(ii)	—the assumptions it has made as part of the supply and demand forecasts contained in the water resources management plan in respect of— household demand in its area, including in relation to population and housing numbers, except where it does not supply, and will continue not to supply, water to domestic premises,	A company must describe how it has estimated current and future household demand unless it only supplies industrial/commercial customers.	In Section 3 and Appendix F we have included a demand forecast for households in the baseline and final planning scenarios, based on the methods detailed in the Guideline.
3(e)(iii)	—the assumptions it has made as part of the supply and demand forecasts contained in the water resources management plan in respect of— non-household demand in its area, except where it does not supply, and will continue not to supply, water to non-domestic premises or to an acquiring licensee	A company must describe how it has estimated current and future non-household demand unless it only supplies domestic customers.	In Section 3 and Appendix G we have included a demand forecast for non-households in the baseline and final planning scenarios, based on the methods detailed in the Guideline.
3(f)	— its intended programme for the implementation of domestic metering and its estimate of the cost of that programme, including the costs of installation and operation of meters	Section 144A of the Water Industry Act 1991 relates to the right of a consumer to elect to be charged by reference to volume of water. A water company must provide an estimate of how many additional meters it will install over the planning period.	Information presented in Sections 3, 8 and 11 demonstrate that we have allowed for an optant metering programme in our forecasts.



Direction	Direction text	Explanation	Location within WRMP
3(g)	<p>— its estimate of the number of premises which will become subject to domestic metering during the planning period as a result of—</p> <p>(i) optant metering;</p> <p>(ii) change of occupancy metering;</p> <p>(iii) new build metering;</p> <p>(iv) compulsory metering; or</p> <p>(v) selective metering,</p> <p>and its estimate of the impact on demand for water in its area of any increase in the number of premises subject to domestic metering;</p>	Self explanatory	Our metering programme includes optant and progressive meters. The number and types of meter installations are presented in Section 8, 10, 11 and Appendix A. Section 10, Programme Appraisal, sets out the economic justification for continuing the roll out of our progressive household metering policy. The assumptions for the reduction in demand are presented in Section 8 and Appendix N.
3(h)	<p>— its assessment of the cost-effectiveness of domestic metering as a mechanism for reducing demand for water by comparison with other measures which it might take to meet its obligations under Part III of the Act</p>		Covered in Section 8, where metering is compared to other demand options, and optimised using the IDM decision support tool. Additionally, against resource options in Section 10.
3(i)	<p>— its intended programme to manage and reduce leakage, including anticipated leakage levels and how those levels have been determined;</p>		The leakage reduction programme is presented in Section 8, 10, 11 and Appendix A. Section 10, Programme Appraisal, sets out the economic justification for continuing to reduce leakage throughout our supply area



Direction	Direction text	Explanation	Location within WRMP
3(j)	— if leakage levels are expected to increase at any time during the planning period, why any increase is expected;		Our preferred plan includes for a substantial reduction in leakage in the period to 2045. There is a very minor increase reported in the Tables in Appendix A after this date which is an artefact of the modelling approach that we have used. We will remove this discrepancy in our revised draft WRMP19. This is not a strategy of our business.
4	—Except where the Secretary of State otherwise permits, a water undertaker must send its draft water resources management plan to the Secretary of State or the Welsh Ministers in accordance with section 37B(1) ⁶ before 1 December 2017.	A water company must submit its water resources plan to the Secretary of State by 1 December 2017, unless directed otherwise.	We submitted the draft Plan to the Secretary of State by 1 December 2017.
5 (1)	—Except where the Secretary of State otherwise permits, a water undertaker must publish its draft water resources management plan in accordance with section 37B(3)(a) for consultation within 30 days beginning with the date on which the Secretary of State directs it to do so—	The water company must publish its draft plan within the set timescale and exclude information that is determined to be commercially confidential or contrary to the interests of national security.	We expect to publish our draft WRMP19 for consultation on 8 January 2018, pending Defra checks.

⁶ Section 37B Water Industry Act 1991 – Water resources management plans: publication and representations

Direction	Direction text	Explanation	Location within WRMP
5 (2)	—Except where the Secretary of State otherwise permits, a water undertaker must publish its draft water resources management plan in accordance with section 37B(8)(a) within 30 days beginning with the date on which the Secretary of State directs it to do so—	The water company must publish its draft plan within the set timescale and exclude information that is determined to be commercially confidential or contrary to the interests of national security.	N/A
6	—Except where the Secretary of State permits, a water undertaker must publish the statement required by regulation 4(2)(a) of the Water Resources Management Plan Regulations 2007(a), and send a copy of the statement to the persons specified in regulation 4(2)(b), within 26 weeks beginning with the date of publication of the draft water resources management plan.	The water company must publish its statement of response within 26 weeks of the publication date of the draft water resources management plan. The statement of response must be sent to any person that has made a representation. Within the 26 week period, Government suggests a period of 12 weeks for the consultation.	We will undertake a 12 week consultation which is expected to finish on 2 April 2018 (assuming date in 5(1)) is achieved. We plan to submit our Statement of Response on 9 July and publish it within the required timeframe. A link to the Statement of Response will be sent to all respondees to the consultation.

C. Environment Agency Water Company Checklist

Z.4 Defra and the Welsh Government have issued specific Directions that a water company must follow.

Z.5 Below we set out these Directions and signpost to where they are addressed in the WRMP.

WRMP guideline supplementary document



WRMP 2019 - Water company checklist



This checklist has been developed for companies in both England and Wales. Where there are differences in approach for England and Wales, these are indicated throughout.

This checklist has been designed to help you make sure that all the requirements of the Water Resources Planning Guideline (WRPG) have been met and that your water resources management plan (WRMP) complies with statutory obligations. The checklist sets out the main considerations from the WRPG in tabular format with references to the relevant WRPG section and page number. It is an optional tool that you can use to confirm and reference where you have addressed each WRPG requirement in your WRMP. It is not a requirement to publish the checklist alongside your WRMP, however it should provide a useful way for both statutory and non-statutory consultees to see and cross-reference what has been included in the plan.

The document can be amended as required for your own use. For example, you may wish to edit the titles or the number of columns. Deleting or adding questions/rows or amending the numbering of questions is, however, not recommended.

The WRMP guideline and all supporting documents are available at [Huddle.com](https://www.huddle.com) or upon request from water-company-plan@environment-agency.gov.uk

Contents

Use the hyperlinks to jump to the checklist relating to relevant sections of the WRMP guideline:

Section	Question numbers
Section 1 – Planning for a secure supply of water (there are no checklist tables for Section 1)	
Section 2 – Process of forming and maintaining a WRMP	1-36
Section 3 – Technical methods	37-86
Section 4 – Developing your supply forecast	87-147
Section 5 – Developing your demand forecast	148-203
Section 6 – Deciding future options	204-269

Section 2 – Process of forming and maintaining a WRMP

Section 2 can be used throughout the process to gauge progress and understand the next steps. If you choose to include this section with your draft plan you will only need to consider Section 2.1 through to 2.7 inclusively. Sections 2.8 through to 2.11 would be filled out following the consultation period.

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2.1 The legal requirements

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
1	You have considered and taken into account links between your WRMP and River Basin Management Plans.	S2.1, Page 3	Appendix B	Y	Appendix B details our assessment of the preferred WRMP with other plans
2	You have considered and taken into account links between your WRMP and your Business Plan.	S2.1, Page 3	Section 1, part D, E and F Appendix S, part D Appendix T, part B & D	Y	
3	You have considered and taken into account links between your WRMP and your Drought Plan.	S2.1, Page 3	Section 7 and Table 10	Y	Drought Permits have not been included in DO, this has been through audit and the approach has been agreed with the EA.
4	You have considered and accounted for links between your WRMP and the Environment Agency's drought plans and/or Natural Resources Wales' drought plans as appropriate.	S2.1, Page 3	Appendix B	Y	Appendix B details our assessment of the preferred WRMP with other plans

5	You have considered and taken into account links between your WRMP and flood risk management plans.	S2.1, Page 3	Appendix W, part C	Y	
6	You have considered and taken into account links between your WRMP and any local plans produced by Local Authorities.	S2.1, Page 3	Section 3, Part C	Y	
7	You have considered and taken into account the requirements of the relevant legislation listed in section 2.1, including the WRMP Direction 2017 for water companies in England and WRMP (Wales) Directions 2016 for water companies in Wales.	S2.1, Page 3	Section 1 References throughout the plan	Y	

2.2 Early engagement with regulators, customers and interested parties

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
8	<p>You have followed the principles of UKWIR's 'Decision Making Process' and 'Risk Based Planning' frameworks to:</p> <ul style="list-style-type: none"> • characterise the problem you need to solve • choose the best decision making process for appraising the options available to you • determine your approach for dealing with risks in your plan • determine methods for supply, demand, outage and headroom calculations that are consistent with your chosen options appraisal method and risk composition. 	S2.2, Page 4	Section 4, Section 10, Section 7, Appendix W	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
9	You have prepared a method statement which clearly explains the choice and justification of methods, and communicated your statement to statutory consultees including the Environment Agency and/or Natural Resources Wales, Ofwat, licensed suppliers in your area that operate through your supply system any other relevant parties.	S2.2, Page 4	Section 1F, Section 10, Appendix S: Stakeholder Engagement	Y	<p>We have undertaken an extensive programme of engagement with regulators and stakeholders since January 2014 to support the development of our draft WRMP19. In delivering this programme we have aimed to cover all the component topics of the WRMP, and for each topic we have explained the technical methods and approaches, application of the methods and source data, and the analysis and outputs. In adopting this approach we have tried to build stakeholder's understanding of the work that we have undertaken, and provide the opportunity to discuss this work with us and input to it in a timely way. This approach has been valuable to us, helping us to identify, understand, and respond to issues and concerns during the development of the draft WRMP19.</p> <p>We have followed UKWIR guidance in assessing the problem in each WRZ, referred to as problem characterisation. This assessment has helped to evaluate the duration of the planning horizon and types of decision support tools required. We published technical papers on problem characterisation, planning horizons and programme appraisal metrics in November 2016 and discussed these with the EA and stakeholders.</p>
10	You have engaged with the Environment Agency and/or Natural Resources Wales to discuss the approaches laid out in your method statement and have appropriately recorded the outcomes of this engagement.	S2.2, Page 3	Section 1, Appendix S: Stakeholder Engagement (S16-S17)	Y	<p>We have held regular update meetings with the Environment Agency throughout the development of our draft WRMP19. The purpose of these meetings has been to outline the methodologies, approaches and assumptions to be used in the draft WRMP, to ensure the Environment Agency is briefed on our approach and to provide the opportunity to raise any concerns. We have also hosted technical seminars with Environment Agency representatives to present new approaches and discuss specific topics in more detail such as the stochastic analysis of drought, and the PolyVis visualisation tool used in programme appraisal. The Environment Agency has provided feedback and comment on our approaches, method statements and technical reports. We have agreed minutes of these meetings and made these available to stakeholders on request.</p> <p>We have also held discussions with NRW on relevant topics, specifically raw water transfers</p>

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
					which will affect Wales.
11	You have engaged with your Board, customers and other parties to discuss the approaches laid out in your method statement. You have appropriately recorded and incorporated the outcomes of this engagement.	S2.2, Page 3	Section 1 (F&G), Appendix S: Section E, Appendix T: Our customer priorities and preferences	Y	<p>We have undertaken a detailed programme of research and engagement with our customers to ensure we understand, and respond to, their priorities and preferences. This is written up in detail in Appendix T: Our customer priorities and preferences. We have also worked closely with our Customer Challenge Group (CCG).</p> <p>We have engaged with our Executive Management Team and the Board at key stages in the development of the WRMP and the Board approved the draft WRMP in November 2017 prior to submission to the Secretary of State for Food and Rural Affairs.</p>

2.3 Hold a pre-consultation

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
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12	You have held pre-consultation discussions with statutory consultees including the Environment Agency and/or Natural Resources Wales, Ofwat and licenced water suppliers that operate through your supply system, revising your proposed approach accordingly.	S2.3, Page 5	Section 1, Appendix S: Stakeholder Engagement	Y	We have undertaken an extensive programme of engagement with stakeholders since January 2014 to support the development of our draft WRMP. The programme has included engagement with a range of stakeholders including regulators, stakeholders, neighbouring water companies, third party organisations and customers. The main stakeholder groups, and how we have engaged with them, is summarised in Table S-2. We have responded to points raised by stakeholders, and have commissioned further work as needed to fully answer points raised. A summary of the main points raised by stakeholders and our response to them is presented in Table S-9.
13	You have accounted for outcomes of pre-consultation discussions with other consultees (including consumers, companies with which you share supply or have bulk supply) and have revised your proposed approach accordingly.	S2.3, Page 5	Section 1, Appendix S: Stakeholder Engagement	Y	We have undertaken an extensive programme of engagement with stakeholders. We have recorded minutes of discussions and published these on our website. We have responded to points raised by stakeholders, and have commissioned further work as needed to fully answer points raised. A summary of the main points raised by stakeholders and our response to them is presented in Table S-9.
14	You have indicated how consultee feedback has been incorporated into the methods and approaches you will use to produce your draft plan.	S2.3, Page 5	Section 1, Appendix S: Stakeholder Engagement	Y	We have recorded minutes of discussions with stakeholders and published these on our website. We have responded to points raised by stakeholders, and have commissioned further work, as needed, to fully answer points raised. A summary of the main points raised by stakeholders and our response to them is presented in Table S-9. A further example is the engagement on the work to examine resource options; we published Resource Option Feasibility Reports and screening reports for comment in Autumn 2016. We received over 300 comments. We held a technical meeting to discuss the comments received (February 2017) and published a log of comments and our responses to them.

2.4 Write a draft plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
15	You have accounted for pre-consultation outcomes and followed any written Directions received from the Secretary of State and/or Welsh Ministers. For water companies in England, follow the WRMP Direction 2017. For water companies in Wales, follow the WRMP (Wales) Direction 2016.	S2.4, Page 5	Section 1	Y	We have referred to the Guiding Principles and Water Resource Planning Guideline as a framework for the development of our draft WRMP19. We have not received further Directions from the Secretary of State.
16	You have used a logical structured layout for your draft WRMP and included a separate non-technical overview, and supported the main technical document with appendices.	S2.4, Page 5	Section 0 and throughout	Y	Section 0 is provided as an Executive summary for a non-technical audience. But additionally we will prepare a 'glossy' customer facing summary for consultation in January. The structure of Section 0 mirrors the main body of our report and we have provided more than 25 appendices of more detailed technical information.

2.5 Send your draft plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
17	You have appropriately flagged national security information or data within the draft WRMP,	S2.5, Page 5	Security and Commercial letter	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	ready for redaction if necessary following security checking.		attached with plan		
18	You have flagged commercially confidential or sensitive information or data that you prefer should not be published.	S2.5, Page 5	Security and Commercial letter attached with plan	Y	We have utilised the Non Public domain tables to send to Defra. The Public Domain tables will be used for the consultation. Our security advisor has stated, for example, in the letter that Appendix R: Scheme Dossiers should not be released into the public domain

2.6 Publish and distribute your draft plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
19	You have not published your draft plan until instructed to do so by the Secretary of State or the Welsh Ministers and have followed the WRMP Regulations 2007 in making your plan publically available.	S2.6, Page 6		N/A	
20	You have redacted sensitive information prior to publication.	S2.6, Page 6		N/A	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
21	You have prepared a statement for issue with the draft plan, which explains where commercially sensitive information has been redacted and clearly explains the process for making representations on the draft plan.	S2.6, Page 6		N/A	
22	You have taken appropriate steps to advertise the publication of the plan and to explain its contents to key stakeholders at the start of or during the consultation period.	S2.6, Page 6		N/A	

2.7 Carry out a public consultation on your draft plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
23	You have allowed for a consultation period appropriate for the complexity of the plan, and that gives you adequate time to prepare a response to consultation feedback by the specified	S2.7, Page 6		N/A	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	deadline (26 weeks after publication).				

2.8 Publish a statement of response

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
24	You prepared and published your statement of response by the specified deadline.	S2.8, Page 7		N/A	
25	You have considered all consultation responses in your statement and have explained whether/how you have acted on them and why.	S2.8, Page 7		N/A	
26	You have set out any changes due to other factors during the consultation period (for example, external influences).	S2.8, Page 7		N/A	
27	You have clearly set out the main changes you have made for the final plan and have accompanied your	S2.8, Page 7		N/A	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	statement with an updated version of the draft plan if changes are substantive.				
28	You have notified any party that responded to the consultation as you publish the statement of response (and revised draft WRMP if necessary).	S2.8, Page 7		N/A	
29	You have considered the impact of any changes to your draft WRMP that might affect your Drought Plan, Business Plan or other plans.	S2.8, Page 7		N/A	

2.9 Send your draft final plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
30	You have submitted your statement of response and final draft plan (if different to the draft WRMP) to the Secretary of State or Welsh Ministers, repeating the checklist steps as given in Section 2.6. The final	S2.9, Page 7		N/A	

	draft plan should take account of any additional works required by Defra or the Welsh Government or advised by the Environment Agency or Natural Resources Wales following your statement of response.				
31	You have undertaken any additional works as required by the Environment Agency or Natural Resources Wales following their review of your final draft plan, and have fully checked all changes.	S2.9, Page 7		N/A	
32	You have completed and submitted the WRMP tables alongside the final WRMP.	S2.9, Page 7		N/A	

2.10 Publish your final plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
33	You have accounted for any relevant Directions with regards to publishing your final plan and the appropriate permissions from the Secretary of State or Welsh Ministers have been given.	S2.10, Page 7		N/A	

34	You have notified any party that responded to the consultation as you publish the final plan.	S2.10, Page 7		N/A	
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2.11 Revise and review your final plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
35	You have planned for annual review of the published plan in line with the Annual Review guidelines.	S2.11, Page 8		N/A	
36	You will consult with the Environment Agency and/or Natural Resources Wales on any material changes that you wish to make to your plan in future.	S2.11, Page 8		N/A	

Section 3 – Technical Methods

[3.1 Developing your plan](#)

[3.2 Defining a water resource zone](#)

[3.3 Problem characterisation](#)

[3.4 Drought risk assessment](#)

[3.5 Planning scenarios](#)

[3.6 Levels of service](#)

3.1 Developing your plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
37	Your plan consistently complies with relevant government policy documents/publications.	S3.1, Page 9	Section 1 References throughout the plan	Y	
38	You have provided a full explanation of the planning period assumed in the plan, which covers, as a minimum, the statutory period from 2020 to 2045.	S3.1, Page 9	Section 1, Section 10, Appendix W	Y	
39	You have included a robust forecast of the water you have available to supply customers with for each year within the planning period, accounting for climate change, and demonstrating that supply is both efficient and sustainable. You have achieved this by following the steps in Section 4 of this checklist.	S3.1, Page 9	To be covered throughout Section 4 of this checklist	Y	
40	You have included a robust forecast of customers' demand for water during each year within the planning period, accounting	S3.1, Page 9	Section 3 Part D	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	for climate change. You have achieved this by following the steps in Section 5 of this checklist.				
41	You have allowed for uncertainties in your calculations and forecasts for both supply and demand over the planning period, and have used best practice methods to quantify uncertainty.	S3.1, Page 9	Section 5 and Appendix V Section 10/Appendix W	Y	Describe how we have assessed risk and uncertainty relating to our supply demand balance to calculate an allowance called target headroom. We evaluate long-term uncertainty through the use of a scenario analysis approach.
42	You have compared supply and demand to determine whether there is a surplus or deficit in any of your resource zones.	S3.1, Page 9	Section 6	Y	
43	If you are in surplus in any of your resource zones you have flagged to other water companies that water is available for trading.	S3.1, Page 10	Section 7, Section 10	Y	We have worked closely with the Water Resources in the South East working group at all levels, providing clear guidance on available water.
44	If you are in deficit in any of your resource zones, you have considered all reasonable options for addressing the deficit, including options for increasing supplies, reducing demand and	S3.1, Page 9	Section 7 & 8	Y	Sections 7 set out how the resource options have been identified, including cross company/third party options (7C). Section 8 set out how demand management options have been identified.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	cross-company/third party options				
45	Where new options are required, you have given opportunity for neighbouring companies or third parties to bid into your plan.	S3.1, Page 10	Section 7, Section 10	Y	We sent an OJEU. A number of water companies have responded and have been included in our plan where their offers are robust economically and environmentally.
46	You have adopted options that support the environmental objectives set out in RBMPs and if required, have carried out a Habitats Regulations Assessment including appropriate assessments, and a Strategic Environmental Assessment (SEA).	S3.1, Page 10	Section 9, Appendix B	Y	We have carried out an HRA and concluded that no further appropriate assessments were required. We have also completed a WFD assessment. Both Assessments have fed into our overall SEA.
47	If you supply customers in Wales or your plan affects catchments in Wales, you have worked with Welsh Government and Natural Resources Wales with regards to understanding implications of the Environment (Wales) Act and Wellbeing of Future Generations (Wales) Act in developing your plan and	S3.1, Page 10	Section 7 & Appendix S: Stakeholder Engagement	Y	We have considered opportunities for raw water transfers via the River Severn. We have discussed these with the Welsh Government and NRW to ensure that issues and concerns are fully addressed in the evaluation of these options.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	how your plan contributes to Nature Recovery Plans.				
48	If you supply customers in England, you have adopted options that support the well-being of future generations, are compatible with Defra's long term plans for the environment including Biodiversity 2020, and whose social and environmental benefits/costs are properly understood and taken account of.	S3.1, Page 10	Section 9, Appendix B	Y	A comprehensive SEA has been undertaken, which has ensured that the environmental and social effects of both options and programmes have been fully taken into account. One of our key criteria for appraisal of alternative programmes is intergenerational equity to ensure that the interests of future generations have been accounted for.
49	You have included confirmed or likely sustainability changes that you have been informed about.	S3.1, Page 9	Section 4	N	We have included measures identified in the National Environment Programme through scenario testing. We have not included measures identified in the NEP as AMBER because the NEP2 was provided too late for inclusion in our baseline. Therefore all measures are included in a scenario rather than the baseline. Our approach has been agreed with the Environment Agency. Pann Mill has not been included in the baseline, but has been included in the scenario from 2020. There is no reduction in average to SWA as it is a licence transfer therefore there is only an impact to the peak DO. The impact is not material and we will include Pann Mill within the baseline for the revised draft.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
50	You have demonstrated a system that can cope with droughts of a magnitude and duration that you reasonably expect to occur in your area over your chosen planning period and have considered contingencies for challenging but plausible droughts beyond the capabilities of your supply system (with relevant links to your Drought Plan) including whether they require options to provide additional resilience.	S3.1, Page 9	Section 7 and Table 10	Y	The impact of a 1 in 200 (and 1 in 500) drought on DO has been modelled as part of the stochastic modelling as well as a worst historic drought. This is covered in our Draft Drought Plan 2017 in which we have assessed the impact of a 1:300 and 1:500 year drought based on stochastic analysis. The assessment shows that we could be resilient to this level of Drought, but that it would have a significant impact on the environment and the economy because of the duration required for Drought Permits of greater than 6 months. The scenario also assumes all sources working to full output for the whole of the drought period.
51	You have documented the impact of drought interventions on supply and demand and links with your Drought Plan.	S3.1, Page 9	Section 7 and Table 10	Y	These are included in table 10. Please see no 83.
52	You have accounted for the views of customers, other interested parties, statutory and non-statutory consultees in developing your plan.	S3.1, Page 10	Appendix S: Stakeholder Engagement & Appendix T: Our customer	Y	We have undertaken an extensive programme of engagement with customers and stakeholders. We have taken account of customers' preferences and priorities, and issues and concerns raised by stakeholders in the development of the draft WRMP19

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			priorities and preferences		
53	You have produced a flexible and adaptive plan that allows for risks and uncertainties in decisions, calculations and forecasts undertaken as part of the development of the plan.	S3.1, Page 10	Section 5 and Section 10: Section I	Y	Results TBC in Appendix Y (will expand in revised draft)
54	You have gained Board buy-in with respect to the cost and long-term sustainability of proposals.	S3.1, Page 10			
55	You have provided all the necessary supporting information at WRZ level and entered this in the water resources planning tables.	S3.1, Page 9	Appendix A	Y	

3.2 Defining a water resource zone

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
56	You have defined your Water Resource Zones (WRZs) using the Environment Agency's WRZ assessment methods (Water Resource Zone Integrity, 2016).	S3.2, Page 10	Appendix D	Y	
57	<p>You have demonstrated that, for each WRZ:</p> <ul style="list-style-type: none"> • the abstraction and distribution of supply is largely self-contained (excepting agreed bulk transfers). • the majority of customers experience the same risk of supply failure and same level of service for demand restrictions. <p>You have explained and justified any deviations from the above.</p>	S3.2, Page 10	Section 1	Y	

3.3 Problem characterisation

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
58	You have applied the problem characterisation step of the <i>WRMP 2019 Methods – Decision Making Process: Guidance</i> (UKWIR, 2016) to determine the nature of the planning problem (including scale and complexity) as well as related issues, risks and uncertainties.	S3.3, Page 10	Appendix W	Y	
59	You have demonstrated that the effort and cost you have given to the selection of a decision-making process is proportional to the problem. You have described the significance of the choice of decision making method and its wider implications with respect to the plan outcomes.	S3.3, Page 11	Section 10, Appendix W	Y	
60	You have adopted processes outlined in <i>WRMP 2019 Methods – Decision Making Process: Guidance</i> (UKWIR, 2016) using methods that are most appropriate for your company.	S3.3, Page 11	Appendix W, Section 10	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
61	You have explained how/why the solutions(s) you have identified have been arrived at, and given assurance that uncertainties have not been double counted.	S3.3, Page 11	Appendix W, Appendix V	Y	
62	You have applied the <i>Economics of Balancing Supply and Demand [EBSD] method</i> (UKWIR, 2002) to determine a benchmark solution for comparison.	S3.3, Page 11	Section 7: Section F and Appendix V: Section K	Y	Uncertainty is assessed around scheme cost and scheme yield, both of which are considered against a fixed scope of assets delivered to be delivered by the scheme as described in the conceptual design reports (which are available on request).

3.4 Drought risk assessment

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
63	You have explained how you have followed the processes outlined in <i>WRMP 2019 Methods – Risk Based Planning: Guidance</i> (UKWIR, 2016) to identify an appropriate design drought.	S3.4, Page 11	Section 4: Section D and Appendix I: Section L	Y	Reference to Risk Based Planning, UKWIR (2016) The historic record and key events with the record as opposed to a design drought has been used to assess base year baseline DO. Conjunctive Use WRZs - London - Droughts used to assess DO are 21/22 and 33/34 as stated in Section F and in Section I it is stated that there are in fact four major events 21/22, 33/34, 43/44 and 75/76

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			Appendix I: Section C, Para I.34 to I.37, Section F and Section I Appendix I: Section C, Para I.34 to I.37		that drive the DO calculation (Note: DO based on total London reservoir storage). SWOX - DO based on river flow in 1976 (Note: DO based on storage in Farmoor reservoir). 21/22 and 33/34 droughts were more severe in the Eastern as opposed to the Western region, the 75/76 drought however impacted both the Eastern and Western regions equally. Groundwater - London, 1921, SWOX 1976 (driven by river), Kennet Valley 1976, Henley 1976, Slough/Wycombe/Aylesbury 1976, Guildford 1992
64	You have clearly set out and justified the risk composition you have selected for each WRZ and the reasons that lead you to select that option, including the availability of data where more complex risk compositions have been used.	S3.4, Page 11	Section1: Section D Section 10: Section B	Y	The results of a Water UK study showing the significant and growing risk of severe drought and water deficit which Thames Water's faces in the future is presented. Problem characterisation mentioned in Table 1-2 in line with UKWIR risk based planning guidance and how this has been used to inform approach. Understanding the planning problem: Approach, characterising the problem for each WRZ, Planning period extension, regional context and assessment methods Description of the supply component methodology which follows the principles of 'Risk Composition 3 - Fully Risk Based Plan' with justification provided specifically in Para I.110.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			Section 4: Section D and Appendix I: Section L		<p>Justification for Thames Water following Risk Composition 3 and selecting a stochastic modelling approach for WRMP19 to assess the supply component in line with this risk composition:</p> <ol style="list-style-type: none"> 1) The most recent drought in the Thames Water area (2010-2012) exposing potential weaknesses in the existing processes for assessing the impact of climate change on supplies with the approach not reflecting how the system would respond to multi-year droughts 2) Analysis of 'Future Flows and Groundwater Levels' data set found that prolonged periods of drought, more severe than those seen in the historical record are predicted to occur 3) Sensitivity testing of WRMP14 showed vulnerability of the preferred plan to severe droughts.
65	Where different risk compositions are used in different parts of your supply system, you have explained this clearly and justified your reasoning. Also, where a more complex risk composition has been adopted but later abandoned to a simpler approach, this has been noted but your WRMP reflects the final risk	S3.4, Page 11	Section 10: Section B Appendix I: Section L, Para I.109 to I.116	Y	<p>Understanding the planning problem: Approach, characterising the problem for each WRZ, Planning period extension, regional context and assessment methods</p> <p>Description of how the methodology for the supply component which follows the principles of a 'Risk Composition 3 - Fully Risk Based Plan' varies across the water resource zones</p>

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	composition adopted.				
66	You have included a drought resilience statement in your plan which is consistent with your chosen risk composition, and have explained how this reflects the hydrological risks that drought may impose on your supply system.	S3.4, Page 11	Section 1 Section C Section 4 and Appendix I Appendix I, Section L Section 10/Appen	Y	<p>States levels of service provided to our customers including level of service for Level 4 restrictions stand pipes and rota cuts. We intend to reduce the risk of these restrictions to a 1:200 year frequency over the next 15-20 years. The lead time to enact this change will ensure it is deliverable and affordable for our customers. This is explained further in Section 10.</p> <p>The current standard of protection against Level 4 restrictions for drought events which occurred in the twentieth century in the Thames Region is approximately 1 in 125 years.</p> <p>The stochastic weather data set has enabled us to understand the recurrence intervals of the historic 20th century droughts we have previously used for planning (1 in 125 year recurrence) so that we have been able to determine what resilience level we should be planning to (1 in 200 or 500 year, depending on customer support) including the ability to set out, and present as a scenario, a reference level of service that would mean resilience to a 1 in 200 year drought event in line with the 2017 WRPG.</p> <p>We will achieve resilience to a 1 in 200 drought event by 2030.</p> <p>Drought Plan links and Deployable Output Review</p>

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			dix X Appendix A: Table 10		

3.5 Planning scenarios

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
67	You have demonstrated that your plan is based on the dry year annual average for demand.	S3.5, Page 12	Section 3: Part C	Y	
68	You have reiterated the design drought you are basing your plan on for supply, and have based this on the drought risk assessment activities carried out under Section 3.4.	S3.5, Page 12	See Row 63 of this Checklist	Y	See Row 63 of this Checklist for design drought comments

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
69	If you have chosen to consider how you will deal with a period of peak strain (critical period), you have set out which WRZs this applies to, the reasons for this and have described the underlying factors that impact on the supply-demand balance during the critical period.	S3.5, Page 12	Section 3 Part C	Y	
70	You have explained the assumptions made when assessing your baseline figures for your demand forecast. Your documentation includes assumptions about mains renewal and capital maintenance, your baseline forecast of consumer need, losses through leakage and operating losses. You have demonstrated that the baseline case represents what happens excluding any changes in operations or company policy.	S3.5, Page 12	Section 3	Y	
71	You have described how/where you have allowed for uncertainty in your demand forecast and how this is appropriate to your selected methods.	S3.5, Page 12	Section 5 Part D	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
72	You have explained the assumptions made when assessing baseline figures for your supply forecast. You have demonstrated that the baseline case represents the supplies that can be maintained through a design drought as appropriate for your company area.	S3.5, Page 12	Section 4: Section C Section 2: Section D Refer to Row 89 of this Checklist	Y	General supply forecast assumptions AMP6 Resource Development Programme - assumed increases in water available for supply by 2019/20 Refer to Row 89 of this Checklist for sections which refer to supply forecast component assumptions
73	You have reported the baseline figures for supply and demand in the water resources planning tables at WRZ level.	S3.5, Page 12	Appendix A	Y	
74	For your final plan, you have explained any decisions related to developing options to manage or meet the forecast demand of your customers.	S3.5, Page 12	Section 11: Section I	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
75	You have documented each of the demand side options considered and the reason for choosing each option. If relevant, you have categorised your options as – change to existing policies, operations, infrastructure and resilience solutions (including drought measures and orders).	S3.5, Page 12	Section 8: Section B	Y	The individual option types considered in Section 8.B are not visible in EA table 5 as all feasible demand management options are optimised in to demand management programmes which contain an amalgam of options.
76	You have considered all available demand and supply side options in the process of developing your preferred plan. You have explained how you have done this, and demonstrated how third party and collaborative options with other companies have been evaluated. You have accounted for opportunities to improve resilience at regional level.	S3.5, Page 12	Section 7 and Appendix L	Y	
77	You have provided details of and explained your preferred programme of solutions to restore your supply-demand balance under a dry year average annual scenario.	S3.5, Page 12	Section 11	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
78	You have provided details of and explained your preferred programme of solutions to restore your supply-demand balance under a critical period scenario, if relevant.	S3.5, Page 12	Section 11	Y	
79	Where you are in deficit in dry year average annual or critical period scenarios, you have demonstrated how you have addressed these deficits and how your plan allows you to be compliant with your statutory duties.	S.5, Page 12	Section 10	Y	
80	You have indicated clearly if you have included resilience solutions for more challenging but plausible droughts beyond the capabilities of your final plan.	S3.5, Page 12	Section 10: Section E (Pg 42), Section 7	Y	
81	If you are in surplus, and you have still decided to include options in your plan, you have explained the benefits from this (such as more efficient supply of water, improvements in long-term resilience, demand reduction etc.)	S3.5, Page 12	Section 10: Section H (Pg. 58)	Y	

3.6 Levels of service

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
82	For water companies wholly or mainly in England you have clearly set out your level of service as an annual percentage risk of restrictions, and set out if/how you expect it to change across the planning period as you implement supply-demand or resilience measures.	S3.6, Page 13	Section 1: Section C and Appendix I: Section D Appendix A: Table 10	Y	Level of Service stated as a frequency of occurrence. We plan to maintain our level of service across the planning period. Drought Plan links and Deployable Output Review
83	You have presented evidence to demonstrate that your level of service is appropriate and have used appropriate assumptions and methodologies to develop your levels of service.	S3.6, Page 13	Section 1: Section C Section 4: Section B, Para 4.19 and Appendix I: Section D and Section I Appendix I: Section C	Y	Presents Levels of service provided to our customers London and SWOX Conjunctive Use WRZs - Level of Service introduced as restrictions implemented in association with the Lower Thames Control Diagram in Section 4 and then Level of Service impact as a % demand reduction stated and explained in Appendix I: Section D Table I-7 and I-8. Sensitivity around Level of Service and the DO benefit of demand restrictions stated in Appendix I: Section I (DO benefit presented in Table I-18 and I-19). Describes the impact of implementing Level of Service on groundwater sources across all 6 WRZs See Row 66 for assumptions behind drought resilience statement ie. for Level 4 restrictions stand pipes and rota cuts.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			See Row 66 of this checklist Appendix A: Table 10		Drought Plan links and Deployable Output Review
84	You have engaged with your customers and stakeholders and their views have been considered when developing your level of service. You have communicated your level of service appropriately.	S3.6, Page 13	Section 1 & Appendix T: Our customer priorities and preferences	Y	We have engaged with customers and stakeholders on the levels of service provided in terms of water use restrictions. Customers do not want levels of service to deteriorate. They also expressed a preference for improvement in levels of service for more severe water use restrictions such as rota cuts (level 4), and to a lesser extent drought permits (level 3) Customers' preferences for improved levels of service for Level 4 restrictions (rota cuts), from the current levels 1:125 years to plans which provide a higher level of resilience, of a 1:200 year drought event is included in the customer preference performance metric and as such is taken into account in the review and development of alternative programmes of options.
85	For water companies in England, you have set out a reference level of service that would mean resilience to an event of approximately 0.5% risk of annual occurrence (1:200 year drought event). You have presented this as a scenario and explained how you have modelled the	S3.6, Page 13	Section 4, Section D and Appendix I: Section L	Y	The stochastic weather data set has enabled us to understand the recurrence intervals of the historic 20th century droughts we have previously used for planning (1 in 125 year recurrence) so that we have been able to determine what resilience level we should be planning to (1 in 200 or 500 year, depending on customer support) including the ability to set out, and present as a scenario, a reference level of service that would mean resilience to a 1 in 200 year drought event in line with the 2017 WRPG. Section 10 and Appendix X contains information on how resilience to a 1 in 200 drought event has been included in programme appraisal. We will achieve resilience to a 1 in 200

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	drought event used.		Section 10/Appendix X Appendix A, Table 10 See Row 66 of this checklist		drought event by 2030. Drought Plan links and Deployable Output Review See Row 66 for assumptions behind drought resilience statement ie. for Level 4 restrictions stand pipes and rota cuts.
86	You have quantified the deployable output and incremental costs of your reference level of service scenario and explained how you have calculated these. You have set out if and how this could be achieved at any point in the planning period.	S3.6, Page 13	See Row 85 of this checklist	Y	See Row 85 of this checklist

Section 4 – Developing your supply forecast

[4.1 How to develop your supply forecast](#)

[4.2 What should be included in your water supply forecast?](#)

[4.3 What should be covered in your deployable output assessment?](#)

[4.4 Your role in achieving sustainable abstraction](#)

[4.5 Invasive Non-Native Species \(INNS\)](#)

[4.6 How to include changes to your abstraction license in your plan](#)

[4.7 Abstraction reform – evidence needs](#)

[4.8 Climate change](#)

[4.9 Water transfers](#)

[4.10 Drinking water quality](#)

[4.11 Outage](#)

[4.12 Water available for use](#)

4.1 How to develop your supply forecast

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
87	Your approach to calculating your supply forecast is consistent with your risk composition choice, and the risk and uncertainty involved have been quantified using appropriate methods.	S4.1, Page 14	Section 4: Section D and Appendix I: Section L Appendix I: Section L, Para I.110 Appendix V	Y	Supply forecasting methods are in line with the UKWIR 2016 Risk Based Planning guidelines with modelling considering risk and uncertainty via the stochastic modelling approaches adopted. Supply component is consistent with Risk Composition 3 Risk and uncertainty appendix
88	You have discussed your approach to calculating your supply forecast as early as possible with the Environment Agency or Natural Resources Wales.	S4.1, Page 14	Section 1: Section F	Y	Method statements submitted to EA and discussed and feedback addressed by Thames

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
89	<p>You have considered all individual components making up the supply forecast, and taken account of pressures on future supplies including (but not limited to):</p> <ul style="list-style-type: none"> • climate change • abstraction licence changes due to abstraction reform or sustainability improvements • pollution or contamination implication for sources • development and new infrastructure • changes in contractual arrangements relating to transfers. <p>You have clearly documented all assumptions made.</p>	S4.1, Pages 14-15	<p>Section 4: Section B and Appendix I</p> <p>Section 4: Section C</p>	Y	<p>Base Year WAFU:</p> <p>DO, Process (Treatment Works) Losses, Constraints, Outage, Bulk Supplies, Inset Appointments and Summary of Base Year WAFU</p> <p>Forecast WAFU</p>
90	<p>You have recorded in the water resources planning tables the quantities for all baseline supply components as well as the amount of water that your analysis indicates you can</p>	S4.1, Page 14	Section 4: Section C	Y	Impact of climate change on supply

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	reliably supply.				
91	As part of your supply assessment, you have determined and explained how your supply system behaves during the design drought.	S4.1, Page 14	<p>Section 5, Section C and Appendix V Section C</p> <p>Section 4: Section A</p> <p>Section 4: Section C</p> <p>Section 4: Section C and Appendix</p>	Y	<p>Following a review of our time-limited licences we have made a presumption of renewal with the exception of Bexley within our London WRZ where a risk of non-renewal has been identified and this has been included as an unconfirmed sustainability reduction. The only licence changes due to changes to trading agreements and sustainability reductions.</p> <p>When forecasting WAFU over the planning period we take into account increases and decreases due to:</p> <ul style="list-style-type: none"> • the impact of climate change • changes as a result of trading agreements expiring • new schemes coming online and changes to abstraction licences in the period to 2019/20 (as discussed in Section 2: Water resources programme) <p>The assumptions behind step changes in DO/WAFU due to licence changes (including changes in upstream licencing and trading agreements due to expire) which will change WAFU through the baseline forecast.</p> <p>Sustainability Reductions</p> <p>Changes in WAFU through the baseline forecast in part due to step changes in DO due to licence changes.</p>

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			I: Section J Section 4: Section C Section 1: Section D		Referring to Table 1-2 Flexibility to accommodate reasonably predictable changes to regulation such as abstraction reform - Uncertainty is inherent in all forecasts. We have assessed our plan against a range of plausible future scenarios, and also used an adaptive pathways approach, to ensure our plan can flex in response to future risks, and ensure a “no regrets” approach.
92	You have explained links between your WRMP and your drought plan, including the likelihood of achieving planned levels of service and their impact on available supply.	S4.1, Page 14	See Row 102 this Checklist Section 5: Section C, Para 5.20 and Appendix V: Section C, Para V.9 Section 5: Section	Y	See Row 102 this Checklist which describes how water quality has been included as a constraint as part of the DO assessment. With regard to S5 'Gradual Pollution' component of target headroom - We have reviewed the risk of groundwater sources to gradual pollution and confirmed that there are no issues to include at this stage. We have Drinking Water Safety Plans (DWSP) in place for all our supply sources, which include the assessment of their source catchments, as defined by their Source Protection Zones (SPZs), and the hazards to raw water quality. The DWSP drive the implementation of measures to ensure no deterioration in raw water quality due to anthropogenic sources of pollution, and help to reduce the level of water treatment required while meeting drinking water standards. This includes working with the EA to develop suitable Catchment Management Plans that mitigate recognised raw water quality issues. In addition, the risk from gradual pollution is managed, where necessary, by the installation (or programmed installation) of suitable treatment processes for nitrates and cryptosporidium.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			<p>C, Para 5.26 to 5.28 and Appendix V: Section C, Para V.9 and Section J, V.130 to V.133</p> <p>Appendix K: Section C Para K.11, Section D, Section F K.30 and Section G</p>		<p>An additional uncertainty has been included within the target headroom modelling which relates to the risk of to the Northern New River Well (NNRW) sources from bromate pollution. This has been considered under the S9 'Uncertain output from new resource developments' component assessed as part of the development of the final planning programme.</p> <p>Seasonal raw water quality variations, in particular algal bloom challenges, taken into consideration within process loss assessment. Furthermore, Thames Water are working with experts to develop decision support tools to predict raw water quality (algal) behaviours in the future and to better understand the implications of climate change on process losses.</p>

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
93	You have explained how drought interventions (drought permits and orders) that are contained within the drought plan have been dealt with in the WRMP in accordance with levels of service, and outlined any contingencies for extreme droughts that exceed the capability of your system to meet.	S4.1, Page 14	Appendix I: Section B	Y	Assuming that this is this referring to changes to effluent returns, as part of the re-development of WARMS steps were taken to re-calibrate the model to improve the representation of flows at key sites (particularly looking at effluent returns)
94	For water companies in England you have not included benefits drawn from supply drought measures (e.g. drought permits and orders) in your baseline supply forecast.	S4.1, Page 14	Section 4: Section B	Y	Bulk supplies and inset appointments
95	For water companies wholly or mainly in Wales, you should have discussed inclusion of supply drought measures in baseline forecasts with Natural Resources Wales or Environment Agency.	S4.1, Page 14	Section 4: Section C Section 2: Section D	Y	General assumptions - Base Year and Forecast AMP6 Resource Developments - assumed increases in water available for supply by 2019/20

4.2 What should be included in your supply forecast?

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
96	You have provided a breakdown of your supply forecast for the dry year annual average scenario for all WRZs and presented this in the planning tables.	S4.2, Page 15	Appendix A	Y	
97	You have explained your decision to include a critical period, if relevant, and have provided a supply forecast for it.	S4.2, Page 15	Section 4: Section B Appendix I: Section C Appendix H	Y	Critical period described in Section 4 Explanation of critical period for groundwater sources Table I-15 in Appendix I shows that no critical period DO has been calculated for London - this is due to the fact that the London reservoirs and the Thames Water ring main provide a buffer during peak periods. Peaking factors for demand as discussed in Appendix H
98	Where you abstract water for supply, your supply forecast for that WRZ sets out the deployable output, future changes to deployable output (e.g. from sustainability changes or climate change), transfers and future inputs from third parties, outage and other short-term	S4.2, Page 15	See 89 of this Checklist Appendix A	Y	See 89 of this Checklist

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	losses, operational losses related to abstraction or treatments.				
99	Where you receive a raw or treated water import from a third party, your supply forecast reflects the contractual arrangements with this third party supplier.	S4.2, Page 15	Section 4: Section B	N/A	Thames Water are a net exporter so contractual agreements with third party suppliers are not an issue.
100	You have demonstrated that your supplier will be able to maintain supply during your design drought and that levels of service can be achieved. You have demonstrated that your supplier has assessed that their statutory and policy obligations can be met.	S4.2, Page 15	See Row 99 of this Checklist	N/A	See Row 99 of this Checklist
101	You have expressed the supply forecast as the Water Available for Use (WAFU).	S4.2, Page 15	Section 4: Section A Appendix A	Y	Base Year and forecast WAFU equations provided

4.3 What should be covered in your deployable output assessment?

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
102	You have explained which factors constrain deployable output, such as hydrological yield, licensed quantities/constraints, pumping constraints, transfer issues, water quality and treatment.	S4.3, Page 15	Section 4: Section B and Appendix I: Section B and Section C	Y	Definition of Deployable Output and explanation of constraints
103	You have identified where deployable output is constrained by licences that are time limited and due to expire in the period covered by the plan, and evaluated the risks of non-renewal.	S4.3, Page 15	Section 5: Section C and Appendix V: Section C Section 4: Section C Section 5: Section C	Y	<p>Following a review of our time-limited licences we have made a presumption of renewal with the exception of Bexley within our London WRZ where a risk of non-renewal has been identified and this has been included as an unconfirmed sustainability reduction. The only licence changes due to changes to trading agreements and sustainability reductions. (see Row 104 of this Checklist)</p> <p>The assumptions behind step changes in DO due to licence changes (including changes in upstream licencing and trading agreements due to expire) which will change WAFU through the baseline forecast.</p> <p>Changes in WAFU through the baseline forecast in part due to step changes in DO due to licence changes.</p> <p>Time-limited licences are not included as a target headroom component following guidance from the EA</p>

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
104	You have checked that licenced volumes are sustainable and that their use will not cause deterioration.	S4.3, Page 15	Section 4: Section C Appendix I: Section J	Y	Sustainability reductions
105	Your method for deployable output determination is consistent with your risk composition and the methods outlined in <i>Handbook of source yield methodologies</i> (UKWIR, 2014) or <i>WRMP 2019 Methods – Risk Based Planning: Guidance</i> (UKWIR, 2016); you have fully explained and documented your choice of method and supporting techniques.	S4.3, Page 16	Section 4 and Appendix I: Section B, Section C, Section D, Section E, Section F and Section G Section 4: Section D and Appendix I, Section L	Y	Base Year DO under worst historic design drought Base Year DO under more extreme droughts. Supply forecasting methods are in line with the UKWIR 2016 Risk Based Planning guidelines with modelling considering risk and uncertainty via the stochastic modelling approaches adopted.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
106	You have described how deployable output will be affected by demand side drought restrictions according to the level of service you have planned for.	S4.3, Page 15	See Row 83 of this Checklist	Y	See Row 83 of this Checklist

4.4 Your role in achieving sustainable abstraction

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
107	Your proposals support WFD obligations and RBMP objectives in relation to sustainable abstraction.	S4.4. Page 16	Section 4	Y	We have included measures identified in the National Environment Programme through scenario testing. We have not included measures identified in the NEP as AMBER because the NEP2 was provided too late for inclusion in our baseline. Therefore all measures are included in a scenario rather than the baseline. Pann Mill has not been included in the baseline, but has been included in the scenario from 2020. There is no reduction in average to SWA as it is a licence transfer therefore there is only an impact to the peak DO. The impact is not material and we will include Pann Mill within the baseline for the revised draft.
108	You have determined if changes to your abstractions are required to meet RBMP objectives, and you have discussed the scope of changes with the Environment Agency or Natural Resources Wales as part of WINEP for PR19.	S4.4. Page 16	Section 4	Y	We have included measures identified in the National Environment Programme through scenario testing. We have not included measures identified in the NEP as AMBER because the NEP2 was provided too late for inclusion in our baseline. Therefore all measures are included in a scenario rather than the baseline. Pann Mill has not been included in the baseline, but has been included in the scenario from 2020. There is no reduction in average to SWA as it is a licence transfer therefore there is only an impact to the peak DO. The impact is not material and we will include Pann Mill within the baseline for the revised draft.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
109	You have determined that all existing abstractions (including any planned increases to abstracted volumes with current licence limits, and any time limited licences) are compliant with RBMP objectives and any other legally binding environmental objectives.	S4.4. Page 16	Section 4	Y	We have included measures identified in the National Environment Programme through scenario testing. We have not included measures identified in the NEP as AMBER because the NEP2 was provided too late for inclusion in our baseline. Therefore all measures are included in a scenario rather than the baseline. Pann Mill hasnt been included in the baseline, but has been included in the scenario from 2020. There is no reduction in average to SWA as it is a licence transfer therefore there is only an impact to the peak DO. The impact is not material and we will include Pann Mill within the baseline for the revised draft. Any licences highlighted by the EA that have the potential to cause a WFD deterioration will be investigated in AMP7 as included in WINEP2.
110	You have liaised with Environment Agency and/or Natural Resources Wales to determine if you have any abstractions from water bodies that are at risk from deterioration.	S4.4. Page 16	Section 4	Y	We have liaised with the EA to identify the abstractions that need assessment to determine whether they are at risk due to the potential to cause deterioration. We have agreed a programme of investigations to determine whether they could result in deterioration and this programme of investigations will be delivered in AMP7. We have made an estimation of licences that may be at risk due to the potential to cause deterioration and have used this to develop a scenario to test the potential impact of the no deterioration requirement.
111	You have reviewed potential mitigation measures for any waterbodies at risk and put into place plans to manage the risk of deterioration, or where deterioration has occurred because of your actions, you have put in place plans to restore the waterbody.	S4.4. Page 16	N/A	N/A	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
112	You have completed all investigations and options appraisals in your PR14 water industry NEP for AMP6 by the agreed dates and included any options needed to manage any sustainability changes in your plan.	S4.4. Page 16	Section 4	Y	We have undertaken investigations which are required in AMP6 and completed those which have an end date of 2017 where this date has not needed to be extended to late in the AMP period.
113	You have considered any regulator measures to improve fish/eel passage or water quality and accounted for likely impact on supply forecasts.	S4.4. Page 16	N/A	N/A	We have considered any regulator measures to improve fish/eel passage or water quality and accounted for likely impact on supply forecasts and found that no measures have impact on supply forecasts.

4.5 Invasive Non-Native Species (INNS)

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
114	You have considered whether/how any current or future abstractions or operations might cause the spread of INNS and have determined measures to reduce the risk of this. You have liaised with Environment Agency and/or Natural Resources Wales to discuss the risk of	S4.5. Page 17	Appendix B	Y	One the objectives of the SEA is the need to control the spread of Invasive Non-Native Species (INNS). All options and programmes have been assessed against this objective. Where an impact has been noted, follow-on discussions have been held with EA, NE and NRW as appropriate.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	INNS and reflected the outcomes of this in your plan.				
115	For water companies in England, you have reflected the February 2017 position statement and its principles in your plan.	S4.5. Page 17	Appendix B	Y	The February 2017 position statement has been used to inform the design of options with respect to the impact of the scheme on INNS.

4.6 How to include changes to your abstraction licence in your plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
116	You have liaised with the Environment Agency or Natural Resources Wales to determine the likely impact of sustainability measures on abstraction licences and agreed a mutually acceptable timescale for the implementation of new licence conditions.	S4.6. Page 17	Section 4	N	We have agreed appropriate timescales where investigations and options appraisals have been completed. We have not yet agreed timescales for ongoing investigations, because it has not yet been determined if a licence change is required.
117	You have determined the impact of any sustainability reductions on your deployable output and included these in your plan	S4.6. Page 17	Section 4	N	We have determined the impact of any sustainability reductions on our deployable output and included these in our plan appropriately, with the exception of Pann Mill which will be corrected in the revised draft.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	appropriately.				
118	You have assessed the impact of possible future sustainability changes on your plan through scenario testing and not included any uncertainty about sustainability changes within your plan.	S4.6. Page 17	Section 10: Section I (Pg 60)	Y	
119	Where changes to abstraction licences or new options threaten security of supply and there are no alternatives, you have considered and prepared evidence for exemption under Article 4.7 of the WFD.	S4.6. Page 17	N/A	N/A	We currently have no requirement for alternatives to sustainability reductions due to threat to security of supply and so have therefore not prepared evidence for exemption under Article 4.7 of the WFD.

4.7 Abstraction reform – evidence needs

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
120	For catchments managed by the Environment Agency, you have not included any changes to DO from abstraction	S4.7, Page 17	Section 4 Table 1	Y	We have not included any changes to DO from abstraction reform. The licence volumes required for emergency abstraction are included in table 1 and the definition is included in the abstraction licence and agreed with the EA. We have also included details on

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	reform. You have identified sources having unused licence volumes that are required for emergency purposes and have explained how you define these (e.g. drought source or other purposes).				unused licences in Table 1.
121	For catchments managed by Natural Resources Wales, you have included evidence to justify retaining any of your daily or annual licensed volumes within your plan. You have discussed the evidence requirements with Natural Resources Wales.	S4.7, Page 17		N/A	
122	If you operate using licences within the three cross-border catchments (Rivers Dee, Wye and Severn), you have included information in your plan that justifies retention of any unused volumes associated with those licences.	S4.7, Page 17		N/A	

4.8 Climate change

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
123	You have determined the impact of climate change on river flows and groundwater recharge using one of the three methods set out in the guideline.	S4.8, Page 18	Section 4: Section C Appendix U: Section C and D	Y	An overview of the impacts of climate change on supply provided. Detail of the assessment methods used within each resource zone to calculate the impacts of climate change on supply provided.
124	You have assessed and clearly demonstrated the vulnerability and risks your sources and supplies face for each of your WRZs.	S4.8, Page 19	Appendix U: Section B	Y	Basic vulnerability assessment found that Guildford and Henley WRZs to be Low vulnerability; Kennet and the Slough, Wycombe and Aylesbury (SWA) WRZs as Medium vulnerability and Swindon and Oxfordshire (SWOX) and London WRZs as High vulnerability requiring further intermediate assessment subsequently carried out.
125	You have set out and justified your assessment methods, outlined any assumptions made and clearly presented your results, explaining any differences in methodology between your resource zones.	S4.8, Page 19	Appendix U: Section C and D and Section G	Y	Supply side climate change impact: Climate change impact on groundwater sources Section C Impact on London Section C Impact on SWOX DO Section C Impact on Thames Valley Section C Summary of impact across WRZs Section D
126	You have clearly explained whether and how climate change has been accounted for in your headroom assessment and	S4.8, Page 19	Appendix U: Section D and	Y	Climate change uncertainty considered in climate change impact on DO assessment.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	have reported this separately.		Section G Section 5: Section C, Para 5.30 to 5.50 Appendix V: Section I, Para V.117 to V.126		S8 climate change component within target headroom
127	You have set out if/how you have used scaling methods to account for climate change that has already happened, and how this has affected your supplies.	S4.8, Page 19	Appendix U: Section F	Y	Scaling factor within guidance found to have an immediate significant impact on DO in the AMP6 period, agreed with EA to apply a scaling factor over the period to 2030 which provides a more gradual move to the climate change projection and is more aligned with the WRMP14 forecast.
128	You have calculated the impacts of climate change on supply and have entered this into the water resources planning tables as changes to DO.	S4.8, Page 19	Appendix A	Y	

4.9 Water transfers

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
129	You have quantified all water transfers including all raw and potable imports/exports and entered this in the water resources planning tables. You have noted the direction of transfers along with the potential to change the direction if needed.	S4.9, Page 18	Appendix A	Y	
130	You have documented agreed limits between supplier and recipient companies for all transfers, including any contractual variations that might apply (e.g. in times of drought).	S4.9, Page 18	Section 4: Section B	Y	Bulk supplies and Inset Appointments Fixed bulk supply figures for exports which do not vary under drought conditions more extreme than the worst historic as per bulk supply/trading agreements
131	You have documented the total volume available to you via transfer for each year of your plan (accounting for operational or infrastructure constraints that may reduce quantities).	S4.9, Page 18	Section 4: Section B Appendix I: Section E	Y	Bulk supplies and Inset Appointments WARMS2 includes water treatment capability and transfer capabilities as well as bulk supplies
132	You have assessed and documented the quality of transferred water and any impact of the transfer on the quality of receiving waters.	S4.9, Page 18	Section 4: Section B Appendix L:	Y	Where we have external imports or transfers between WRZs, the associated water quality is considered in our Drinking Water Safety Plans. Water quality impact on receiving waters is a key consideration in the assessment of new resource schemes involving water transfer, including assessment in the context of WFD

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			Sections B and D, and Appendix R		and no deterioration. This is particularly relevant for schemes based on reuse (Appendix L) as well as other raw transfer options covered by the Resource Scheme Dossiers (Appendix R)

4.10 Drinking water quality

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
133	You have supported objectives for drinking water in protected areas.	S4.10, Page 20	Section 4, Section 2, Section 7	Y	
134	You have checked that the drinking water arising from the water treatment regime applied meets the Standards of the Drinking Water Directive plus any other legislation.	S4.10, Page 20	Appendix L	Y	
135	You have abided by Section 68(1) of the Water Industry Act 1991 in terms of quality of supplied water, and applied this to water from your own sources as well as transfers.	S4.10, Page 20	Section 1, Section 7	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
136	You have considered appropriate measures to prevent deterioration of water quality in a protected area.	S4.10, Page 20	Section 4, Section 7	Y	
137	You have recorded how you have calculated treatment works losses and operational use for each WRZ.	S4.10, Page 20	Section 4: Section B Appendix I: Section E Appendix K	Y	Process loss methodology described Treatment work capabilities and process loss %s as included within DO Process loss appendix
138	You have provided diagrams and other supporting evidence for complex major works that can be used in pre-consultation discussions with the Environment Agency or Natural Resources Wales.	S4.10, Page 20	N/A	N/A	Schematics of complex major works could be made available to the EA on request
139	You have considered options to reduce losses where possible, especially if your plan has a supply-demand balance deficit.	S4.10, Page 20	N/A	N/A	There are no process loss options. Process losses support flows over Teddington weir and process loss recovery schemes are already operational eg. Coppermills WTW which recovers the majority of process water by treatment and recycling (Section 4: Section B); some additional pre-treatment to support extreme events negligible DO impact.
140	You have considered measures to protect supplies against long term	S4.10, Page 20	See Row 102 this	Y	See Row 102 this Checklist which describes how water quality has been included as a constraint as part of the DO assessment.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	risks of pollution.		<p>Checklist</p> <p>Section 5: Section C, and Appendix V: Section C and Section J</p> <p>Appendix K: Section C, Section D, Section F and Section G</p>		<p>With regard to S5 'Gradual Pollution' component of target headroom - We have reviewed the risk of groundwater sources to gradual pollution and confirmed that there are no issues to include at this stage. We have Drinking Water Safety Plans (DWSP) in place for all our supply sources, which include the assessment of their source catchments, as defined by their Source Protection Zones (SPZs), and the hazards to raw water quality. The DWSP drive the implementation of measures to ensure no deterioration in raw water quality due to anthropogenic sources of pollution, and help to reduce the level of water treatment required while meeting drinking water standards. This includes working with the EA to develop suitable Catchment Management Plans that mitigate recognised raw water quality issues. In addition, the risk from gradual pollution is managed, where necessary, by the installation (or programmed installation) of suitable treatment processes for nitrates and cryptosporidium.</p> <p>An additional uncertainty has been included within the target headroom modelling which relates to the risk of to the Northern New River Well (NNRW) sources from bromate pollution. This has been considered under the S9 'Uncertain output from new resource developments' component assessed as part of the development of the final planning programme.</p> <p>Seasonal raw water quality variations, in particular algal bloom challenges, taken into consideration within process loss assessment. Furthermore, Thames Water are working with experts to develop decision support tools to predict raw water quality (algal) behaviours in the future and to better understand the implications of climate change on process losses.</p>
141	You have considered measures to reduce the treatment process whilst	S4.10, Page 20	See Row 140 of	Y	See Row 140 of this Checklist

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	still complying with the requirements of the drinking water regulations.		this Checklist		
142	You have demonstrated that all sources you may rely on have been correctly identified and measures taken to provide protection where necessary, e.g. SPZs around groundwater abstractions.	S4.10, Page 20	See Row 140 of this Checklist	Y	See Row 140 of this Checklist.
143	You have applied your approach consistently across all WRZs.	S4.10, Page 20	N/A	Y	Approach to modelling is consistent with the latest EA and UKWIR guidance

4.11 Outage

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
144	You have documented your outage allowance and your approach is in line with <i>WRMP 19 methods -Risk based planning</i> (UKWIR, 2016) or the <i>Outage allowances</i> (UKWIR 1995) approach.	S4.11, Page 20	Section 4: Section B and Appendix J	Y	Approach is in line with WRMP 19 methods - Risk based planning (UKWIR, 2016) or the Outage allowances (UKWIR 1995) approach. We concluded that our outage allowance would be more representative of the current day, and would avoid bias from the earlier record, if we were to reduce the length of the historic data used in the assessment from 2001/02 to 2015/16 (15 years) to 2007/08 to 2015/16 (9 years). The length of record has been discussed and agreed with EA.
145	You have entered outage calculations in the water resources planning tables.	S4.11, Page 20	Appendix A	Y	

146	You have included details of options you propose for reducing outage, particularly in cases of a supply-demand balance deficit.	S4.11, Page 20	N/A	N/A	There are no outage reducing options.
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4.12 Water available for use

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
147	You have clearly set out the total WAFU, and demonstrated how changes in deployable output, transfers, operational use and outage impact on the calculated total.	S4.12, Page 20	See Row 89 of this Checklist Appendix A	Y	See Row 89 of this Checklist

Section 5 – Developing your demand forecast

[5.1 What should be covered in your demand forecast](#)

[5.2 Forecast household demand](#)

[5.3 Forecast population, properties and occupancy](#)

[5.4 Forecasting customers' demand for water](#)

[5.5 Forecasting your non-household consumption](#)

[5.6 Forecasting leakage](#)

[5.7 Other components of demand](#)

[5.8 Metering](#)

[5.9 Impacts of climate change](#)

[5.10 Allowing for uncertainty](#)

5.1 What should be covered in your demand forecasts?

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
148	You have provided a demand forecast for the dry year annual average where demand is unrestricted, which includes adjustments for likely future changes in demand due to factors such as climate change, population growth, household size, property numbers, and current company demand management policy/activity.	S5.1, Page 21	Section 3: Part D	Y	No
149	You have provided a demand forecast for the critical period (if considered in your plan) that accounts for the factors you expect will drive demand during the critical period, such as seasonal changes or population growth.	S5.1, Page 21	Section 3: Part D	Y	No
150	You have provided a demand forecast for the final plan dry year annual average which includes adjustments to reflect solutions identified through your options appraisal.	S5.1, Page 21	Section 11	Y	No
151	You have provided a demand forecast for the final plan critical period which includes adjustments to reflect solutions identified through your options appraisal.	S5.1, Page 22	Section 11	Y	No
152	You have explained how demand forecasts have been arrived at and documented any underlying assumptions, including how you have determined unrestricted demand.	S5.1, Page 22	Section 3: Part D	Y	No
153	You have explained your reconciliation of current best estimates of demand with other parts of the water balance.	S5.2, Page 22	Section 3: Part B	Y	No

5.2 Forecast household demand

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
154	You have demonstrated how you have arrived at your forecast of population and property numbers and the assumptions on which these are based.	S5.2, Page 22	Section 3 Part C, Appendix E	Y	No
155	You have demonstrated an understanding of what is driving future household demand and how you have estimated this.	S5.2, Page 22	Section 3 Part C, Appendix F	Y	No
156	You have included forecast savings data for existing water efficiency initiatives in your baseline forecast.	S5.5, Page 22	Section 3 Part C	Y	No

5.3 Forecast population, properties and occupancy

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
157	For water companies supplying customers in England you have aligned your method for forecasting population and property growth with the most recent local plans published for your area(s), and accounted for potential	S5.3, Page 22	Section 3: Part C, Appendix E	Y	No

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	changes in published figures if a local plan is not yet finalised.				
158	Where no local plan project(s) exist to inform your plan, you have used other appropriate methods such as household projections for Dept. for Communities, Local Government, those produced for DCLG by the ONS or the methods outlined in <i>Population, household property and occupancy forecasting</i> (UKWIR, 2016). You have documented and explained assumptions and data sources used.	S5.3, Page 22	Section 3: Part C, Appendix E	Y	No
159	You have provided evidenced justification if your property forecasts deviate from planned figures.	S5.3, Page 22	N/A	N/A	N/A
160	You have accounted for the planning period in your forecast property and population figures and have explained where/if different forecasting methods are applied for different time	S5.3, Page 23	Section 3: Part C, Appendix E	Y	No

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	horizons, especially if your planning period is longer than 25 years.				
161	For companies supplying customers in Wales, you have based your forecast population and property figures on the latest Local Authority population and property projections published by the Welsh Government. Your analysis of the uncertainties in your forecast population and property figures has been informed by local development plans in your supply area.	S5.3, Page 23	N/A	N/A	N/A
162	You have demonstrated that your plan does not constrain supply such that it may not meet planned property forecasts.	S5.3, Page 23	Section 11	Y	No
163	You have engaged with local planning authorities to inform your analysis and understand uncertainties in your forecast population	S5.3, Page 23	Section 3: Part C, Appendix E,	Y	No

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	and property figures.		Appendix V		
164	You have properly communicated limitations in your forecast and uncertainty associated with your forecast.	S5.3, Page 23	Section 5: Part D, Appendix E	Y	No
165	You have described assumptions and supporting information that you have used to develop property and occupancy forecasts, including uncertainties.	S5.3, Page 23	Section 3: Part C Appendix E	Y	No
166	You have explained how you have allocated unaccounted for populations for each WRZ, including your assumptions.	S5.3, Page 23	Section 3: Part C Appendix E	Y	No
167	You have accounted for local council and neighbourhood plans, when calculating future demand.	S5.3, Page 23	Section 3: Part C, Appendix E	Y	No

5.4 Forecasting your customers' demand for water

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
168	You have selected a method for forecasting demand that is appropriate to each WRZ, based on the supply-demand situation, any problem characterisation approaches you have considered and the data available.	S5.4, Page 23	Section 3: Part D, Appendix F Appendix D	Y	No
169	Your method for forecasting demand is aligned with the following guidelines: <ul style="list-style-type: none"> • <i>WRMP-19 Household demand forecasting - Integration of behavioural change into demand forecasting and water efficiency practices (UKWIR 2016).</i> • <i>Customer behaviour and water use – good practice for household consumption forecasting (UKWIR,</i> 	S5.4, Page 23	Section 3	Y	No

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	2012).				
170	You have documented your reasons for choice of method, including your assumptions and their associated uncertainties.	S5.4, Page 23	Section 3: Part D Appendix F	Y	No
171	You have demonstrated a forecast demand for the critical period scenario (if appropriate) as well as the dry year annual average.	S5.4, Page 23	Section 3: Part D WRP Tables Appendix F	Y	No
172	You have provided a breakdown of total consumption, per capita consumption and micro-components within the water resources planning tables.	S5.4, Page 23	Section 3: Part D, Appendix A	Y	No

5.5 Forecasting your non-household consumption

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
173	You have calculated a demand forecast for non-households.	S5.5, Page 23	Section 3: Part E Appendix G	Y	No
174	You have described your assumptions about customer/property types that you have considered as non-household and demonstrated that your decisions are aligned with part 17C of the Water Industry Act 1991 and guidance on non-household customers as reported in <i>Eligibility guidance on whether non-household customers in England and Wales are eligible to switch their retailer</i> . You have consulted with retailers of water to non-household customers.	S5.5, Page 24	Section 3: Part E Appendix G	Y	No
175	You have accounted for the likely other retailers to non-household sectors in your area following the changes introduced in April 2017 and have consulted with retailers of water to non-	S5.5, Page 24	N/A	N	They will be consulted as part of the consultation on the draft WRMP

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	household customers.				
176	You have determined non-household demand into different economic sectors, for example by using the UK SIC codes or applying a service and non-service split approach.	S5.5, Page 24	Section 3 Appendix G	Y	No
177	You have assessed the likely new uptake of public water from non-household customers / sectors that previously used private supplies.	S5.5, Page 24	N/A	N	No evidence of any shift and unclear exactly how such an exercise would take place
178	You have examined and taken account of planned or existing water saving initiatives by both the wholesaler and retailer and have determined in the likely saving in non-household demand.	S5.5, Page 24	Section 3: Part E Section 8 Appendix O	Y	No
179	You have included forecast savings data for existing water efficiency initiatives in the baseline forecast that you have presented.	S5.5, Page 24	Section 3: Part D	Y	No

5.6 Forecasting leakage

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
180	You have determined baseline leakage over the planning period and explained your method in the WRMP	S5.6, Page 24	Section 3: Section F	Y	
181	You have used <i>UKWIR Consistency of reporting performance measures (2017)</i> to forecast levels of leakage.	S5.6, Page 24	Section 3: Section F and Appendix M: Section D	Y	
182	If you are unable to use the guidance outlined in <i>Consistency of Reporting Performance Measures (UKWIR 2017)</i> , you have explained why you have not used the revised approach for base year leakage, what steps you are taking to comply with the new approach and when this data will be available.	S5.6, Page 24	N/A	N/A	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
183	Where the revised approach to calculating base year leakage leads to uncertainty or significant changes in your base year or projected leakage, you have used scenarios to demonstrate how this affects your plan and any options you have selected.	S5.6, Page 25	Appendix M: Section D	N	We do not consider there to be significant uncertainty in our reporting of leakage under the revised methodology. KPMGs audit of our shadow leakage reporting showed no 'Red' outstanding actions and the water balance discrepancy is less than 1%. We have used the new leakage methodology in building our plan and do not consider it necessary to run scenarios using other methodologies given we believe our reporting to be relatively certain.
184	You have described how your approach to calculating base year leakage affects your ability to meet government aspirations to reduce leakage over the planning period.	S5.6, Page 25	Section 3: Section B Leakage. Appendix M: Section D, Para11.1	N	Section 3.B Leakage and Appendix M.D discuss the reporting of base year leakage. Section 11.I presents the impact of our final plan on leakage, showing a reduction over the planning period.
185	You have accounted for any actions or policies that may reduce leakage (e.g. mains improvements) in your leakage forecast.	S5.6, Page 25		Y	Yes. In terms of mains rehabilitation we have aligned our work with asset health service to ensure burst and service benefits. This will be improved with the further development of our Ofwat business plan.
186	You have accounted for your customers' views on leakage reduction and their resulting willingness to participate in demand management activities.	S5.6, Page 25	Section 10: Section E	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
187	You have included all feasible options for further leakage control, and any other options you are actively investigating with support from your customers.	S5.6, Page 25	Section 8: Section B	Y	

5.7 Other components of demand

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
188	You have included details on other components of demand, the methods you have adopted for their calculation and your source datasets.	S5.7, Page 25	Section 3: Part F	Y	No

5.8 Metering

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
189	You have reported household metering figures in the water resources planning tables.	S5.8, Page 25	Appendix A	Y	Appendix A
190	For water companies in England, you have complied with the WRMP	S5.8, Page 25	Section 8: Section	Y	We have assessed this according to the Water resources planning guideline – April 2017

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	Direction 2017 with regard to household metering.		E and G		
191	If you are in an area of serious water stress, you have considered the costs and benefits of compulsory metering.	S5.8, Page 25	Section 8: Section E and Appendix N	Y	
192	You have assessed which tariffs are appropriate to your company as part of your options appraisal and included in your plan as appropriate.	S5.8, Page 25	Section 8	Y	

5.9 Impacts of climate change

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
193	You have documented the allowance included in your plan for the impact of climate change on demand, including the assumptions on which this is based.	S5.9, Page 26	Section 3: Part D Appendix U	Y	No
194	If your allowance is outside expected impact range (<3%), you have robustly demonstrated and justified	S5.9, Page 26	Section 3: Part D Appendix	Y	No

	the reasons for this.		U		
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5.10 Allowing for uncertainty

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
195	You have reduced uncertainty by using the most up to date methods and data when determining supply and demand forecasts.	S5.10, Page 26	Section 5: Section B and Appendix V: Section C Appendix V: Section G	Y	<p>Improved methodology (UKWIR 2002) guidance followed to estimate supply side headroom uncertainty and Uncertainty and Risk in Supply/Demand Forecasting (UKWIR 2002) guidance followed to estimate demand side headroom uncertainty. Both methodologies use risk analysis software @Risk.</p> <p>The industry, through UKWIR have developed methodologies for assessing the supply demand balance and the planning of water resources (eg. Risk Based Planning UKWIR 2016). These are based on assessing the risks and uncertainties around the information used in the planning process.</p> <p>We have made the decision to use the same approach for estimating headroom for WRMP19 as was used in WRMP14 as one of the strengths of the methodology is that it provides information on which to base a decision on risk.</p>
196	You have analysed, quantified and discussed any uncertainties associated with your calculations of dry year annual average demand	S5.10, Page 26	Appendix V	Y	Appendix V describes the assessment of risk and uncertainty surrounding dry year annual average supply and demand.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	(and critical period scenarios if applicable).				
197	You have used risk-based planning techniques to assess individual components of uncertainty, avoiding any double counting for (e.g. for target headroom components) or omission of uncertainties.	S5.10, Page 26	See Row 195 of this Checklist Section 5: Section B and Appendix V: Section C, E and G Supply-Section 5: Section C Appendix V: Section C, E, I, J and K	Y	See Row 195 of this Checklist Calculation of headroom uses Monte Carlo - risk accounted for in quantitative analysis and decision making. Separate supply and demand models used drawn together using Monte Carlo to produce a combined uncertainty. One of the strengths of the methodology is that it provides information on which to base a decision on risk. Supply Components and Demand Components. Clearly stated where components are 'switched off' within baseline target headroom are instead considered within programme appraisal (eg. New Resource Developments (S9) on the supply side (Para V.18 to V.22) and demand management measures on the demand side) which ensures no double counting for target headroom components. Appendix V, Section C, Para V.7 describes these two stages for calculating target headroom. Stage 2 assessed as part of the programme appraisal (Appendix V: Section K). Assumptions include that headroom components are generally independent but can be inter-related and all sources of uncertainty occur simultaneously. Monte Carlo allows for inter-relationships to be allowed for and combined uncertainty estimated.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			Demand-Section 5: Section D and Appendix V: Section C, D and K		
198	Alternatively, if you have applied an older target headroom approach to assess individual components of uncertainty, you have justified why this is appropriate. You have evaluated target headroom with regards to risk appetite and have allowed risk to increase with time as adaptations will occur in practice.	S5.10, Page 26	See Row 195 of this Checklist Section 5: Section G and Appendix V: Section G	Y	See Row 195 of this Checklist explaining our decision to use the same approach for estimating headroom for WRMP19 as for WRMP14. A smaller allowance for uncertainty is made in the future as we consider the opportunity to review plans and adapt to changes. A profile has been adopted of 5% in AMP6, which then increases at 1% per annum until 2043-44. Thus the risk taken is increased from 5% to 29% by 2043-44 and is then held at this level over the remainder of the planning period till 2100. We have based our risk profile on a range of factors and made a judgement on what we consider is a reasonable balance of risk over the plan period

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
199	You have documented all assumptions and information used in the assessment of uncertainties and have discussed the relative significance of uncertainties showing which impact most on each WRZ.	S5.10, Page 26	Section 5: Section G Appendix V	Y	Section 5 show the significance of the components Appendix V includes component breakdown for each WRZ
200	You have considered options for reducing uncertainty in the planning period.	S5.10, Page 26	N/A	N/A	There are no specific uncertainty reducing options
201	You have communicated uncertainty such that customers can clearly understand the issues and risks.	S5.10, Page 26	Section 1: Section C and Section D, Section F Appendix T	Y	Summary of discussions with customers on Levels of Service, Table 1-2 sets a WRMP priority as focusing on delivering the outcomes that our customers want and a summary of customer engagement is presented. Our customer priorities and preferences appendices presents the results of discussions with customers
202	You have explained where there are any uncertainties related to non-replacement of time-limited licences (TLLs).	S5.10, Page 26	Section 5: Section C and Appendix V:	Y	Time limited licences have not been included in headroom as following a review of our time-limited licences we have made a presumption of renewal with the exception of Bexley within our London WRZ where a risk of non-renewal has been identified and this has been included as an unconfirmed sustainability reduction.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			Section C		
203	You have not included an allowance for possible future sustainability changes in headroom, and where relevant you have explored this through scenario analysis.	S5.10, Page 26	Section 5: Section C and Section G and Appendix V: Section C Section 10: Section I	Y	<p>In line with the Environment Agency Guidelines our plan does not include any allowance for uncertain sustainability reductions to be included in our plan. However, studies to date, as detailed in Section 4: Current & future water supply, show that in London these could be significant. As such we have tested our plan against these to assess how robust it is to this uncertainty and details are outlined in Section 10 and Appendix W: Programme appraisal.</p> <p>Three WINEP scenarios have been run as a 'what if' analysis to test the impact if components of the preferred plan were to change: 1) WINEP2 scenario that reflects the central position 2) WINEP (low) scenario that is our estimate of the most likely outcome of the investigations 3) WINEP (high) scenario that is the WFD 'no deterioration' position. The next WINEP will be released in March 2018 for inclusion in the final plan.</p>

Section 6 – Deciding on future options

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6.1 Considerations when choosing future solutions

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
204	You have considered all options that will address any deficit(s) between supply and demand in any WRZ at any time during the planning period. You have justified your preferred solution(s) in your final plan.	S6.1, Page 27	Section 7, 8 & 10. Appendix P and Appendix Q	Y	Sections 7 and 8 set out the resource and demand management options considered, while Section 10 sets out how the preferred programme has been selected. Appendix P gives the list of all considered options. Appendix Q justifies the rejection reasoning
205	You have distinguished whether options apply to the dry year annual average and/or critical period scenarios, and your final plan addresses deficits in all scenarios for all WRZs across the planning period.	S6.1, Page 27	Section 7, Table 7-3, Appendix A	Y	Deployable Outputs provided for options on the Feasible List reflect this. Appendix A shows how the plan addresses deficits in all scenarios for all WRZs across the planning period.
206	You have considered options that will allow you to improve your service to customers, provide long-term best value, benefit the environment or collaborate with other water companies. You have justified your preferred solution(s) in your final plan.	S6.1, Page 27	Section 10 Appendix W	Y	Section 10 Appendix W
207	You have documented all factors that have led you to consider options (whether in deficit or not) in your	S6.1, Page 27	Section 10: Section	Y	

	plan, including reasons.		E (Pg 38)		
208	You evaluated the environmental impacts of all possible and discarded options that could have unacceptable impacts that could not be overcome. You have further considered only those options that support achievement of RBMP objectives and would not result in deterioration.	S6.1, Page 27	Appendix B, BB, C	Y	We have undertaken a comprehensive SEA of all options and programmes. No options or programmes were taken forward that would lead to permanent deterioration of status between status classes. However there remains some uncertainty over the impact of some options on WFD status and the scale of mitigation necessary to ensure no deterioration on another option.
209	You have considered the need to undertake an SEA or HRA for each option, and if appropriate undertaken them as a result.	S6.1, Page 27	Section 9, Appendix B		SEA, including HRA and WFD has been undertaken for all options on the constrained list.

6.2 Resilience options

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
210	You have evaluated whether options are needed to improve resilience to significant	S6.2, Page 28	Section 10 Appendix	Y	Section 10 Appendix W

	vulnerabilities which are not addressed within the planned level of service, and if needed explained this fully.		W		
211	The hazards you considered when evaluating resilience options were those listed in <i>Resilience planning: good practice guide</i> (UKWIR, 2013), and you have also considered hazards other than drought.	S6.2, Page 28	Section 10 Appendix W	Y	
212	You have considered the results of the <i>Water Resources Long Term Planning Framework</i> (Water UK, 2016), and WRSE and/or WRE as appropriate and incorporated the outcomes into your plan.	S6.2, Page 28	Section 1, 2 and 4 Section 10 Appendix W	Y	
213	If resilience options have been considered, you have considered the costs and benefits and justified the solution.	S6.2, Page 28	Section 10.E	Y	
214	You have demonstrated customer support for the options you have proposed to improve resilience and the level of resilience the options will provide, and have a business case for the additional spending that resilience measures will involve.	S6.2, Page 28	Section 10.E Appendix T.D Appendix W.C Appendix X.A	N	Section 10.E (and Appendix X) presents the results of programme appraisal with and without our ambitions for resilience. This includes assessing all alternatives using our customer preference metric described in Appendix W. There was insufficient variance in the score for the customer preference metric between alternatives including for and not including for resilience, thus it was not particularly considered in the appraisal. Appendix T.D discusses our customers attitudes to resilience

215	You have described the option(s) in detail and have conducted the appraisal of resilience options to the same standard as non-resilience options.	S6.2, Page 28	Section 10.E Appendix X.A	Y	Section 10.E Appendix X.A
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6.3 Third party options

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
216	You have considered options, where appropriate, that involve engaging with third parties to help deliver solutions at lower cost, such as upstream services, leakage detection and demand management. You have used the Market Information Platform to assess third party bids (when available).	S6.3, Page 29	Section 7	Y	OJEU Notice
217	You have subjected options involving third parties to the same scrutiny and testing as other options.	S6.3, Page 29	Section 7 and Section 10	Y	
218	Where relevant, your plans clearly sets out which options within the final planning scenario are third party options.	S6.3, Page 29	Section 7	Y	

6.4 Upstream competition

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
219	For water companies in England, you have checked that there are no requirements with regards to reforms relating to competitive services for supply to/removal from your network following the Water Act 2014.	S6.4, Page 29	Section 7, Part C	Y	

6.5 Assessing solutions for your plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
220	Your appraisal of options follows the eight stage approach outlined in <i>WRMP 2019 Methods – decision making process guidance</i> (UKWIR, 2016). 1. Collate and review planning information. 2. Identify unconstrained options. 3. Problem characterisation and evaluate strategic needs/complexity	S6.5, Page 29	Stage 1 – Sections 3,4, 5 and 6. Stage 2 – Sections 7 and 8 Stage 3 – Section 10.B Stage 4 – Section 10.C and	Y	

	<p>4. Decide modelling method.</p> <p>5. Identify and define data inputs.</p> <p>6. Undertake decisions making modelling / options appraisal.</p> <p>7. Stress testing and sensitivity analysis.</p> <p>8. Final planning forecast and comparison to EBSD benchmark.</p>		<p>Appendix W</p> <p>Stage 5 – Section 10.C</p> <p>Stage 6 – Section 10.E-H</p> <p>Stage 7 – Section 10.I</p> <p>Stage 8 – Section 11</p>		
221	You have demonstrated that your final planning forecast is your best value plan, not necessarily the least cost solution, accounting for all criteria that sensitivity analysis has established are important to the plan.	S6.5, Page 29	Section 10: Section B (Pg. 8)	Y	

6.6 Unconstrained list

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
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222	You have developed an unconstrained list of all plausible technically feasible options, including drought measures, and have at least considered options presented in <i>WR27 Water resources tools</i> (UKWIR, 2012) and the EBSD method.	S6.6, Page 30	Section 7, Appendix P	Y	Appendix P sets out the Unconstrained List for resource options and for Demand Management Options. Section 7 - Part G covers our consideration of Drought permits
223	For water companies in England, you have included third party options (see 6.3) in the unconstrained list, and have demonstrated you have invited or considered third party collaborations or provide a clear explanation of why third party option have not been included.	S6.6, Page 30	Section 7	Y	

6.7 Feasible list

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
224	Your feasible list is a subset of your unconstrained list and you have demonstrated that all options on your preferred list are suitable for promotion.	S6.7, Page 30	Section 7, 8, 9, Appendix P	y	Any schemes which have definite unacceptable impacts have been discarded. Appendix P demonstrates how the Feasible List and the Constrained List have been identified from the Unconstrained List for Demand and Resource options. Section 9 covers the environmental appraisal of options

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
225	You have communicated your feasible list to the Environment Agency and/or Natural Resources Wales as soon as possible and discussed it with them.	S6.7, Page 30	Appendix S	Y	Engagement sessions, monthly meetings
226	You have clearly described the screening criteria you have used to identify feasible options and have applied these consistently to achieve a balance between the number of options included and availability of realistic choices.	S6.7, Page 31	Section 7 and 8	Y	Feasibility reports have been prepared to identify resource options. A consistent approach has been adopted and the criteria are clearly described in the Resource and Demand Management screening reports
227	You have provided a full description of all feasible options that you have considered, including main operational features, expected implementation extent, conceptual diagram etc.	S6.7, Page 31	Appendix R	Y	Feasibility reports describe the resource options on the Feasible List. For resource and system elements on the Constrained List element summaries have been provided in Appendix R.
228	You have compared each feasible option to the baseline case, and provided a profile of the extra water available over the 80 years from initial investment in the option.	S6.7, Page 31	EA Table 5	Y	The DOs for resource options on the Feasible List are provided in Table 7-3. A profile of water availability for resource elements and demand options on the Constrained List is provided in EA Table 5.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
229	Where you are transferring water / commissioning new sources and this increases the risk of non-compliance, you have included steps to mitigate those risks (e.g. INNS, discolouration, nitrates, pesticides).	S6.7, Page 31	Section 9, Appendix B, BB, C	Y	For discharges of raw water to the environment an assessment of treatment requirements has been conducted to mitigate impacts to the environment and downstream abstractors (see Discharge Design Standard Cross - Option Study). For inter-zonal transfers a comparison of the water quality between donor and recipient zones has been conducted. Further information is included in detailed reports relating to water quality and INNS risk on the Thames Water website
230	You have assessed the level of customer support for each option.	S6.7, Page 31	Appendix T	Y	We undertook research with customers to understand their views on potential options. This was included in programme appraisal through the customer preference metric as described in Section 10
231	You have appropriately estimated the amount of time needed to investigate and implement the option and have proposed an earliest start date based on your review.	S6.7, Page 31	Appendix R	Y	Appendix R provides resource summaries including estimates of lead times. Implementation programmes are included in Conceptual Design Reports.
232	You have appropriately assessed and reported the risks and uncertainties associated with each option, including the likelihood of reduced yield due to factors such as climate change, environmental constraints and customer	S6.7, Page 31	Section 7, Appendix V	Y	Cost and programme risks associated with resource options on the Constrained List are captured in the CDRs and for large options they are quantified in the risk register. Uncertainty around yield is covered in Appendix V

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	behaviour. You have considered the flexibility of the option to adapt to future uncertainty.				
233	You have explained any factors or constraints specific to the option, and have highlighted any links or dependencies on other existing schemes, other options and any mutual exclusivity with another option.	S6.7, Page 31	Appendix R,	Y	Element summaries (Appendix R) for resource options on the Constrained List include dependencies and mutual exclusivity between options. Cost and programme risks associated with resource options on the Constrained List are captured in the CDRs and for large options they are quantified in the risk register.
234	You have described how the option will be utilised and the impact on costs.	S6.7, Page 31	Appendix A, Operating Philosophy	Y	The proposed approach to operating resource options is set out in the Operating Philosophy Report. The Fine Screening Report shows the range of operating costs between minimum and maximum utilisation for resources on the Feasible List.
235	You have assessed the environmental impacts of the option, including implications for RBMP objectives, and have undertaken and reported the outcomes of a Habitats Regulations Assessment (HRA) if the option has been found to potentially affect any designated site.	S6.7, Page 31	Appendix C	Y	The results of the HRA assessment are reported in the HRA report.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
236	You have undertaken a cost-benefit appraisal of the option, including a cost breakdown over the 80 year period and covering capital, operating and financing costs. Your method is aligned to Ofwat's most recent guidance for PR19 and the WRPG, and gives Average Incremental Costs (AIC) based on maximum capacity costs divided by maximum capacity outputs expressed as net present value (NPV). You have explained how you arrived at your AIC figure.	S6.7, Page 31	EA Table 5	Y	Table 5 includes AIC's for all options. In addition to this, a resource option fine screening report is available which includes Thames Water's own analysis of AIC's
237	As part of the cost-benefit appraisal, you have evaluated the environmental and social (including carbon) costs and benefits of the options and show either a monetised profile of Average Incremental and Social Costs (AISC), or a non-monetised assessment of impacts. You have stated your approach to calculation of	S6.7, Page 31	Section 9, Appendix A	Y	Section 9 - Environmental Valuation details our approach to non-monetised assessment. All monetised aspects are included in Appendix A.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	AISC.				
238	For supply options, as part of your cost-benefit appraisal you have determined supplementary costs required to distribute the new supply (e.g. service reservoirs, pumping stations, mains upgrades), excluding costs associated with local infrastructure enhancements.	S6.7, Page 31	Section 7, Appendix R	Y	Appendix R shows the system elements (raw water system reinforcement, water treatment and network reinforcement) that are required to combine with resource elements to provide overall supply options. Costs for these elements are allocated in AICs.
239	You have evaluated whole-life costs that include treatment, pumping, network, storage, maintenance and operation costs (the latter included control measures relating to water quality optimisation, fluoridation, chemical stabilisation, aesthetic impacts on consumers and control of disinfection by-products).	S6.7, Page 32	Section 7, Appendix A	Y	Appendix A includes costs for relevant system elements have been accounted for in option costs including operation and maintenance costs (including chemical costs).

6.8 Environmental and social impacts

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
240	You have considered the environmental and social impact of each option of the feasible list.	S6.8, Page 32	Section 9 and Appendices B, BB & C	Y	
241	You have assessed impacts using a method that is proportionate to the scale of the problem and have fully justified your approach.	S6.8, Page 32	Section 9 and Appendices B, BB & C	Y	Appendix B justifies our approach to SEA, WFD and HRA
242	You have applied an Ecosystem Services approach to environmental evaluation, if appropriate, and your method gives accountable and transparent outcomes that consider stakeholder needs.	S6.8, Page 32	Section 9	Y	The environmental valuation section of section 9 explains our consideration of an Ecosystem services approach
243	You demonstrate that you have used the best available evidence and data in your assessment, and the conclusions you draw are robust, locally valid and justifiable.	S6.8, Page 32	Section 9 & Appendices B, BB & T	Y	Evidence can be found in Appendix B, BB and C

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
244	You provide a clear audit trail of your appraisal of environmental and social impacts and explain the data you use, the results and recommendations from the appraisal.	S6.8, Page 32	Section 9, 10 & Appendices B, BB & C	Y	Section 9 explains the approach to metrics and SEA methodology. Section 10 explains appraisal of alternative programmes

6.9 Solutions driven by changes to existing abstraction licences

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
245	You have worked with the Environment Agency or Natural Resources Wales to understand the cost effectiveness of solutions that are driven by changes to existing abstraction licences.	S6.9, Page 32		NA	Options Appraisals have not yet been completed for ongoing investigations as agreed in the NEP, therefore the cost effectiveness assessment has not yet been completed. The scenarios developed for this plan will be used in the cost benefit assessment process.
246	You explain how any solution driven by changes to existing abstraction licences meets the objectives of the Habitats Directive, Wildlife and Countryside Act and Water Framework Directive and prevents any deterioration of water bodies.	S6.9, Page 32		NA	Options Appraisals have not yet been completed for ongoing investigations as agreed in the NEP, therefore the cost effectiveness assessment has not yet been completed. The scenarios developed for this plan will be used in the cost benefit assessment process.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
247	You have considered whether measures needed to meet sustainability and environmental objectives (e.g. related to HD, WCA and WFD) are cost-effective and cost-beneficial, and are supported by customers.	S6.9, Page 32		NA	Options Appraisals have not yet been completed for ongoing investigations as agreed in the NEP, therefore the cost effectiveness assessment has not yet been completed. The scenarios developed for this plan will be used in the cost benefit assessment process.
248	You have explained how the cost has been evaluated (where cost include non-monetised costs) and that the benefit outweighs the cost, the option is not disproportionately costly and has the lowest overall costs even when accounting for the need for customer support.	S6.9, Page 33		NA	Options Appraisals have not yet been completed for ongoing investigations as agreed in the NEP, therefore the cost effectiveness assessment has not yet been completed. The scenarios developed for this plan will be used in the cost benefit assessment process.

6.10 Deciding on a solution

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
249	You have explained the approach you have taken to arrive at the best solution(s), making use, as appropriate, of the UKWIR Decision Making process to develop a decision-making framework and identify methods to determine which solution(s) is/are best.	S6.10, Page 33	Appendix W: Section B (Part B)	Y	
250	You have used the EBSD method within the process of identifying best solution(s), e.g. to provide a benchmark against which outcomes of alternative methods can be compared.	S6.10, Page 33	Section 10: Section B (Pg 8)	Y	
251	You have explained which methods other than EBSD have been used within the process of identifying best solutions, including justification for their appropriateness, such as differences and improvements.	S6.10, Page 33	Appendix W: Section C (Part C)	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
252	You have clearly and transparently set out the economic, social and environmental justifications for your final choice of solution, and demonstrated why you have decided on this approach and discounted others. You have provided a clearly reasoned justification for how the decision has been made, as well as the decision. Your explanations are able to be clearly interpreted by customers, interested parties and regulators.	S6.10, Page 33	Section 10 (Pg 12)	Y	We recognise how important it is that we are able to clearly present the decision making process to stakeholders hence have sought to provide transparency and assurance of the process.
253	You have considered how future changes might affect the solution or whether any potential future changes might make it redundant.	S6.10, Page 33	Section 10: Section I	Y	
254	You have considered the resilience of the solution against a range of possible futures.	S6.10, Page 33	Appendix W: Section C (Part C), Para W.158 Section	Y	Results TBC in Appendix Y (will expand in revised draft)

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
			10: Section I (Pg 60)		
255	You demonstrate that the possible futures considered include potential future impacts of regional or cross sector demand.	S6.10, Page 33	Appendix W: Table W-8 Section 10: Section B (Pg. 7)	Y	
256	You have assessed the costs and benefits of the chosen solution, and have set out your assessment of whether the benefits of implementing the solution are greater than the costs. Your preferred solution is best value.	S6.10, Page 33		NA	Options Appraisals have not yet been completed for ongoing investigations as agreed in the NEP, therefore the cost effectiveness assessment has not yet been completed. The scenarios developed for this plan will be used in the cost benefit/effectiveness assessment process.
257	You have described the steps you have taken to carry out a Strategic Environment Assessment and Habitat Regulations Assessment for your chosen solution, or	S6.10, Page 33		NA	Options Appraisals have not yet been completed for ongoing investigations as agreed in the NEP, therefore the cost effectiveness assessment has not yet been completed. The scenarios developed for this plan will be used in the cost benefit assessment process. New Options included in WRMP have been subject to an SEA, WFD and HRA assessment.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	demonstrated why this is not needed. Where relevant, you have incorporated any outcomes from the SEA and/or HRA into your final plan.				
258	Where the option involves sharing resources, you have explained who will have ultimate rights to the water and why. You have also provided details of how the option will operate, funding mechanisms, legal arrangements, drought implications.	S6.10, Page 33	Section 7	Y	

6.11 Water Framework Directive

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
259	You have considered and prioritised solutions that promote the requirements of Article 7 of the WFD and are consistent with RBMP objectives and solutions, highlighting how you will or are working with others to	S6.11, Page 33	Appendix S and Q	Y	Appendix Q includes our consideration of catchment management as an option and reasons for not including these options as part of the WRMP. There is also a note in Appendix S about our engagement on this point with stakeholders and regulators. Thames Water will also be progressing such schemes as part of the wider business plan.

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	achieve this.				
260	You have described how the impact of changes to the operation of existing sources and / or the impacts of new sources on WFD water body status has been established, and that you have rejected sources that might cause deterioration or prevent the achievement of good status.	S6.11, Page 33	Appendix B	Y	We have undertaken a comprehensive SEA of all options and programmes, including WFD assessment. No options or programmes were taken forward that would lead to permanent deterioration of status between status classes. However there remains some uncertainty over the impact of some options on WFD status and the scale of mitigation necessary to ensure no deterioration on another option.
261	You have described any intended actions that may cause deterioration of status/potential or prevent good status/potential being achieved. You have discussed this with the Environment Agency or Natural Resources Wales and made a	S6.11, Page 33	Appendix BB	Y	The impact on WFD is clearly set out in the WFD report (Appendix BB)

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	clear statement in the plan of any potential impacts of any intended actions.				
262	You have included targeted and cost effective restoration measures, and have considered how you will apply adaptive management measures solely or working in partnership with other relevant organisations.	S6.11, Page 33		N/A	We do not consider it appropriate to include options that require significant restoration measures to be environmentally acceptable. We have a programme of river rehabilitation that we are delivering as part of the current AMP programme as described in Section X of the dWRMP.

6.12 Testing your plan

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
263	You have explained the scenario testing you have undertaken to evaluate the resilience of your plan to a range of risks.	S6.12, Page 34	Appendix W: Section C (Part C), Para W.158	Y	

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
264	Based on scenario testing, you have described the factors and risks having the most significant impact on your plan, and the possible timings of these impacts.	S6.12, Page 34	Section 10: Section I	Y	
265	You have explained the scenario testing you have undertaken to show the plan is robust to minor changes to supply and demand forecasts in the near future and to more moderate changes as the plan progresses.	S6.12, Page 34	Appendix W: Section C (Pg. 49 to Pg. 62)	Y	Results TBC in Appendix Y (will expand in revised draft)
266	You have explained the scenario testing you have undertaken to compare your preferred plan with, or to identify, alternative options.	S6.12, Page 34	Section 10: Section I (Pg 618)	Y	
267	Based on scenario testing, you have justified how you will manage risk and future uncertainties (e.g. in response to new evidence becoming available), and what you will monitor to help manage these risks.	S6.12, Page 34	Appendix W: Section C (Pg 49 to Pg 62)	Y	Results TBC in Appendix Y (will expand in revised draft)
268	Based on scenario testing, you have explained when and why	S6.12, Page 34	Appendix W: Section	Y	Results TBC in Appendix Y (will expand in revised draft)

No.	Action or approach	WRPG ref.	Draft WRMP ref.	Proposed inclusion (Y, N or n/a)	Any issue identified
	important decisions should be made within the period of the plan.		C (Pg 49 to Pg 62)		
269	You have explained how scenario testing demonstrates that you have not over-planned for a worst-case scenario that is very unlikely.	S6.12, Page 34	Appendix W: Section C (Pg 49 to Pg 62)	Y	Results TBC in Appendix Y (will expand in revised draft)