

# **DRAFT WATER RESOURCES MANAGEMENT PLAN 2019**

**CONSULTATION  
STATEMENT OF  
RESPONSE**

**September 2018**

## DOCUMENT CONTROL SHEET

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Reviewed by	Martin Lunn		31/08/18	Head of Technical Strategy & Support
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## 1 INTRODUCTION

This document is our draft Water Resources Management Plan 2019 (dWRMP19) Consultation Statement of Response.

We updated our dWRMP19 and then invited statutory consultees, our customers and other interested stakeholders to comment on it. The consultation on our dWRMP19 took place over a twelve week period between Monday 5th March and Sunday 27th May 2018. The dWRMP19 was available for review on our website <https://www.nwl.co.uk/wrmp>.

Consultees were asked to send their written representations on our dWRMP19 to the Secretary of State for Environment Food and Rural Affairs which were then forwarded to Northumbrian Water at the end of the consultation period.

This statement of response details:

- (a) the consideration that we have given to the consultation responses;
- (b) any changes that have been made or will be made to the dWRMP19 as a result of consideration of those consultation responses and the reasons for doing so; and
- (c) where no change has been made to the dWRMP19 as a result of consideration of any consultation response, the reason for this.

If our responses to the consultation comments are accepted by Defra, they will be included in our final WRMP19 which should be published on our website [www.nwl.co.uk/wrmp](http://www.nwl.co.uk/wrmp) during 2019.

## 2 CONSULTATION STATEMENT OF RESPONSE

The following consultations responses on our draft Water Resources management Plan 2019 (dWRMP19) were made during the consultation period:

- Environment Agency
- Northumberland County Council
- Ofwat
- The Water Forums
- Mr R. Curruthers

The following table presents our response to representation made on our dWRMP19.

### 2.1 Environment Agency Response

Area of issue	NWL Response	Change Required
<p><b>Recommendation 1: Confirm Berwick and Fowberry resource zone has secure supply of water and protected environment at the presented level of service</b></p> <p>We recommend the company:</p>		
<p>- clearly explains how the Berwick and Fowberry reduced water levels are translated into the climate change curves and gives a clear indication of how representative the drought curves drawn are, compared to historic droughts</p>	<p>We have provided further detail on how the climate change curves have been produced and how they compare to historical droughts where this has been possible. The lack of historical data is a constraint as is the lack of a groundwater model for the Fell Sandstone. However, now that our AMP6 NEP investigation has improved the conceptual understanding of the Fell Sandstone, we are now able to start developing a Fell Sandstone groundwater model. A contract was awarded to British Geological Survey (BGS) in June 2018 who will complete the work by Spring 2019. Assuming BGS is able to develop a calibrated and validated model, we will then use this to undertake further climate change assessments for PR24.</p>	<p>We have updated Section 6.3.5 in line with our response.</p>
<p>- presents the detail and outcomes of the groundwater changes and investigations</p>	<p>Since submitting the draft WRMP in November 2017, further work has been completed including an updated NEP investigation report and an NEP options</p>	<p>We have updated Section 3.4.2 in the WRMP in line with</p>

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<p>delivered in Asset Management Plan 6 (National Environment Programme) - this is an important piece of work and we would encourage greater clarity of the works undertaken, the measures the company has taken to date and how the final investigation report will inform the final WRMP</p>	<p>appraisal report. Key results include:</p> <ol style="list-style-type: none"> <li>1. Recharge calculations: Revised recharge calculation provide very similar results to previous assessments and thus provides more confidence in results. Comparison between abstraction and recharge rates indicates groundwater abstractions are sustainable.</li> <li>2. Burn support: We will introduce a compensation flow into Newbiggen Dean and Horncliffemill Burn (around 0.6MI/day to each) in order to ensure the Environmental Flow Indicator (EFI) is met.</li> </ol> <p>We have completed an Options Appraisal Report. In order to meet the WRMP supply surplus, our current preferred option is to drill a new abstraction BH at Felkington.</p>	<p>our response</p>
<p>- confirms that the 2014 modelling and water level assumptions associated with the long-term average recharge spreadsheet calculations are still applicable in light of data issues identified in this resource zone</p>	<p>Our PR19 WRMP assessment did not use the previous data and was based on the fully validated data and information collected since 2014 and through our AMP NEP investigation. Therefore, our PR19 assessment supersedes our PR14 assessment.</p>	<p>We have updated Section 6.3.5 in line with our response.</p>
<p>- describes in more detail how practical an option it is to lower borehole pumps and consider whether this needs to be factored into assessments of outage, deployable output and/or drought actions</p>	<p>It is technically very easy to lower a borehole pump. This can be a suitable short term method, for example during a severe drought, but may not be suitable for longer-term issues such as deployable output and outage.</p>	<p>We have updated Section 3.1.4 in line with our response</p>
<p>- updates the technical report on deployable output, which</p>	<p>The Deployable Output technical report has been updated to include our Berwick WRZ DO assessment.</p>	<p>We have updated the Technical</p>

Area of issue	NWL Response	Change Required
only covers the Kielder resource zone, to include Berwick and Fowberry		Report
<ul style="list-style-type: none"> <li>- clarifies how investigations into nitrates deterioration risks are considered in the assessment of headroom - the company must provide a more detailed assessment of headroom to show how these have been included; including assumptions on renewal of time limited licences, water quality and the relative contribution of these components</li> </ul>	<p>Nitrates have been included alongside other sources of point pollution in the S5 component. The Berwick boreholes have been included as “high risk of point pollution” which translates as a 1 in 50 year (2%) chance of losing 100% of the DO in any year over the planning period.</p> <p>Section 7.2 of the dWRMP states <i>“the Agency has been instructed by ministers to ensure that there is not a risk of security of supply due to time-limited licences”</i> therefore S3 (uncertainty of renewal of time-limited licences) has not been included in the Target Headroom calculation.</p> <p>Section 7.2 of the dWRMP states <i>“All NW groundwater sources were included as being at risk from pollution, with the headroom uncertainty for each source separated into point and diffuse pollution. Catchment risk assessment work was undertaken to determine the uncertainty of point and diffuse pollution at all of NW’s groundwater sources. The calculation of the uncertainty of point pollution additionally made use of the number of petrol and diesel storage sites currently within the total groundwater protection zone of each groundwater source.”</i></p> <p>This has been amended to state that impounding reservoirs were excluded due to the extremely low risk of pollution given the remote location and isolated nature of the catchments. River intake treatment works were also excluded on the basis that the Kielder WRZ is sufficiently resilient to allow a short term shutdown of the river intake WTW to allow any pollution to pass by the intakes.</p>	We have updated Section 7.2 WRMP in line with our response
<ul style="list-style-type: none"> <li>- explains why the Asset Management Plan 5 work to connect the Berwick and Fowberry wellfields is no longer required and what has changed in the resource zone to improve the resilience compared to the needs</li> </ul>	<p>In the WRMP 2014 we wrote:</p> <p><i>“In the PR09 Business Plan the company proposed linking more of the Fowberry area of the WRZ to the Berwick supplies. This additional water was required due to summer demands, in very warm summers, causing the daily licensed volumes for the Fowberry system being exceeded on a few days in 2006. An interim solution of varying up the total Fowberry daily licence by 0.5Ml/d was put in place between 2010 and 2015 by varying the existing licence. Since the licence variation was</i></p>	We have updated Section 3.5.2 in the WRMP in line with our response.

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<p>identified previously</p>	<p><i>granted in 2010 the original licence volume was marginally exceeded for only a few days in the 3 year period. The proposed pipeline linking Berwick and Fowberry would allow some of the surplus licensed Berwick supplies to feed the Fowberry area, thereby no longer needing the licence variation, and it also more fully integrated the whole WRZ.</i></p> <p><i>Consultants were contracted to carry out a feasibility study into this proposed linking of the areas and their report was finalised in November 2012. Prior to completion of the feasibility report the company met with the EA in 2011 to discuss water resources in the Berwick WRZ. The EA informed us that now a conceptual groundwater model of the Fell Sandstone had been completed there was concern as to the sustainability of our abstractions from the Berwick area sources.</i></p> <p><i>Given that our licensed volumes, and possibly even our currently abstracted volumes, may turn out to be unsustainable, then developing a link between Berwick and Fowberry supplies that required a further 0.5 to 1.0Ml/d from Berwick boreholes may prove to be an abortive investment. Under these circumstances we decided to continue the feasibility study to its conclusion but not to move forward to scheme development. The EA advised that a further variation to the Fowberry licence was a better option to pursue.</i></p> <p><i>The main points from the feasibility study show various combinations of increasing the supply from the Felkington borehole (once refurbished), adding some turbidity treatment to the treatment stream at Berwick and laying a 5.9km pipe between Felkington and Watchlaw Service Reservoir (in the Fowberry system) would be the best feasible option of ensuring all demands could be met.</i></p> <p><i>Depending on the outcome of the NEP work on the Berwick WRZ, this option may be pursued in AMP7.”</i></p> <p>The outcome of the Sustainability report and subsequent Options Appraisal undertaken as part of the NEP eliminated the pipeline option as a sustainability measure.</p> <p>However, future resilience studies in the Berwick and Fowberry area will consider the link as a resilience measure.</p>	

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<b>Recommendation 2 – Ensure the company is fully resilient</b>		
We recommend the company:		
<ul style="list-style-type: none"> <li>- enhances the narrative it provides concerning the deployable output of the Kielder resource zone, including detail of the assumptions it has used in the Aquator modelling</li> </ul>	<p>All updates to the Aquator model, including any assumptions, were agreed with the EA who have been provided with a copy of the Aquator model. As stated in the dWRMP “<i>The key features included within the Aquator model are catchment time series flows, minimum maintained flow conditions for the rivers, daily and annual licence conditions, treatment works minimum and maximum capacities, transfer main capacities, raw water pumping capacities, reservoir control curves, compensation flows and VBA coding to define the behaviour of components under certain circumstances, such as a control curve being crossed.</i>”</p> <p>All of these ‘assumptions’ are either detailed in the relevant abstraction licence or the Kielder Operating Agreement. All additional assumptions that were incorporated into the Aquator model are detailed in Section 3.1.1. Since the dWRMP was published NWG have submitted applications to increase the abstraction volumes at Ovingham and Waskerley Airshaft.</p>	We have updated Section 3 of the WRMP in line with our response.
<ul style="list-style-type: none"> <li>- addresses the differences between the WRMP and its drought plan which currently do not complement each other in terms of assumptions and terminology</li> </ul>	<p>As agreed with the Environment Agency, we have developed and used a new Aquator model for our dWRMP Kielder WRZ deployable output assessment. This model was not available when we prepared our new Drought Plan although we agreed with the EA that we would update our Drought Plan to ensure that it is consistent with our new WRMP. This will be completed in 2018/19.</p>	We have addressed this comment in our Drought Plan.
<ul style="list-style-type: none"> <li>- explains clearly how it has derived its revised level of service</li> </ul>	<p>Given the level of Kielder remains above 78% during the design drought year with a demand in the model of 836MI/d (17% above any dry year forecast demand plus target headroom in the planning period) we feel that the likelihood of imposing any level 2, 3 or 4 restriction on our customers is negligible unless an extreme drought coincides with a prolonged period of extraordinarily high demand. Therefore, we believe that low return periods for levels 2, 3 and 4 restrictions are appropriate.</p> <p>Sensitivity testing of the Kielder WRZ DO, as detailed in Section 3.1.2, shows that a DO of 837MI/d has a return period of 1 in 154 years. It is therefore reasonable to set our level 2 restriction at 1 in 150 years (0.66% probability in any one year), as</p>	We have updated Section 2.9.1 of the WRMP in line with our response.



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	<p>should we ever experience an annual average demand of 837MI/d during a dry year, it is feasible that level 2 restriction would need to come into force to reduce demand below the 836MI/d DO of the Kielder WRZ.</p> <p>Similarly the sensitivity testing shows that the DO of 835MI/d has a return period of 1 in 200, therefore it is rational to need restrictions beyond level 2, i.e. level 3 restrictions, once every 1 in 200 years (0.5% probability in any one year).</p> <p>NW does not consider the use of standpipes or rota cuts to be viable options. It is considered that they are not technically possible and that they are unacceptable in modern society. Our customers in the North East are justifiably proud of Kielder reservoir and are fully aware of its importance to their water supplies. Neither they, nor many other important stakeholders in the region, would accept any form of temporary reduction to supply without exceptional reasons.</p> <p>However, reducing pressure at the customer tap is a viable option in extreme drought conditions and therefore the level 4 restrictions has been set at 1 in 250 years (0.4% probability in any one year).</p> <p>To demonstrate these levels of service are appropriate, the Kielder WRZ Aquator model was run with the peak annual demand in the planning horizon - the resulting storage for Burnhope, Waskerley, Smiddy Shaw and Hisehope reservoirs were combined. This group of reservoirs was chosen as a suitable representation of when the WRZ would be stressed as these reservoirs are in the area that is least capable of being supported by Kielder. The minimum combined stock for each month was then extracted and ranked from low to high. This enabled a distribution to be fitted to the data and the 1 in 20 year (5%) return period to be calculated. This gives a curve for when level 1 restrictions would be enabled.</p> <p>The level 1 curve has then been incorporated into the model and assigned a demand reduction of 7% (based on previous experience).</p> <p>The Kielder WZR Aquator model was then run again, with the peak annual demand in the planning horizon and the level 1 restriction curve in place. The resulting minimum monthly group storage for Burnhope, Waskerley, Smiddy Shaw and Hisehope reservoirs was again ranked. Extreme Value Analysis of the monthly ranked annual minimum storage levels was carried out, to obtain a fitted distribution</p>	

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	that could be extrapolated to estimate storage levels for a range of return periods. This allowed the curves for 1:150, 1:200 and 1:250 return periods to be developed.	
<p>- ensure non-drought risks are assessed e.g. freeze-thaw</p>	<p>We have extensive experience in supplying high levels of demand not associated with drought conditions. Typically high demands occur either due to customers using more water during hot weather, for watering the garden or filling paddling pools etc, or in the winter when freeze-thaw events lead to an increase in burst water mains.</p> <p>Our network is sufficiently resilient to such increases in demand. This is because potable storage in the network allows any sudden increase in demand to be met whilst the headroom in our treatment capacity allows the DI of the treatment works to be increased to recover this lost network storage whilst supplying the higher level of demand.</p> <p>Our production planning and short interval control processes use seasonal peak demands to ensure that WTW are able to increase production if high demand does occur.</p> <p>Recent examples of high summer demand include the summer of 2006 and the recent heat wave in 2018 where demand increased by 20%. We have been able to maintain supplies without issue during these events.</p> <p>The recent “Beast from the East” presented some challenging conditions to the water industry. We were proud that we did not have any interruptions to supply during that period which demonstrates the resilience of our network to freeze / thaw events. We will however review the impact of the “Beast from the East” on the water industry and apply learning where relevant to do so.</p>	<p>We have updated Section 2.1 of the WRMP in line with our response.</p>
<p><b>Recommendation 3 – Ensure the plan is legally compliant by adhering to the WRMP Directions</b></p>		
<p><b>Direction 3(a) Describe the appraisal methodologies used to choose measures and its reasons for choosing those measures</b></p>		
<p>The company should describe the appraisal methodologies which it used in choosing the measures which it has identified.</p>	<p>We have included our demand management options appraisal in Appendix 1 of our draft Final WRMP. This presents the costs and benefits of each demand management measure and the rational for including or discounting these options in our final plan.</p>	<p>We have included the options appraisal in the appendix of our</p>

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<p>It should present the evidence that it has used to evaluate a full list of compulsory metering, reducing leakage and water efficiency options including cost-benefit analysis.</p>		<p>WRMP in line with our response.</p>
<p><b>Direction 3(b) Describe the annual average risk of all restrictions as a percentage, and how they change through the planning period</b></p>		
<p>The company should state the average annual risk that it may need to impose temporary water use restrictions, ordinary drought orders and emergency drought orders as a percentage as required by Direction 3(b). The company has also not provided a description of how it expects the annual average risk of all restrictions to change through its planning period as a result of implementation of the options in its preferred plan.</p> <p>The company must provide its estimate of the planned annual risk for temporary water use restrictions, ordinary drought orders, and emergency drought orders and how this risk changes across its planning period to meet Direction 3(b).</p>	<p>We have updated Section 2.9.1 of the WRMP to show the annual risk as a percentage and included a table showing how this risk does not change across the planning period.</p>	<p>We have updated Section 2.9.1 of the WRMP in line with our response.</p>
<p><b>Direction 3(c) Describe the assumptions it has made to determine the annual average risk of all restrictions</b></p>		

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<p>The company should describe the assumptions or methodology it has used to estimate the annual average risk for temporary use restrictions, ordinary drought orders and emergency drought orders that should be set out as part of Direction 3(b).</p> <p>The company should describe the assumptions it has used to estimate its level of service and the planned annual risk in the planning period of temporary water use restrictions, ordinary drought orders and emergency drought orders.</p>	<p>Given the level of Kielder remains above 78% during the design drought year with a demand in the model of 836MI/d (17% above any dry year forecast demand plus target headroom in the planning period), we believe the likelihood of imposing any level 2, 3 or 4 restriction on our customers is negligible unless an extreme drought coincides with a prolonged period of extraordinarily high demand. Therefore, we believe that the return periods for levels 2, 3 and 4 restrictions are appropriate.</p> <p>Sensitivity testing of the Kielder WRZ DO, as detailed in Section 3.1.2, shows that a DO of 837MI/d has a return period of 1 in 154 years. It is therefore reasonable to set our level 2 restriction at 1 in 150 years (0.66% probability in any one year), as should we ever experience an annual average demand of 837MI/d during a dry year, it is feasible that level 2 restrictions would need to come into force to reduce demand below the 836MI/d DO of the Kielder WRZ.</p> <p>Similarly the sensitivity testing shows that the DO of 835MI/d has a return period of 1 in 200, therefore it is rational to need restrictions beyond level 2, i.e. level 3 restrictions, once every 1 in 200 years (0.5% probability in any one year).</p> <p>NW does not consider the use of standpipes or rota cuts to be viable options. It is considered that they are not technically possible and that they are unacceptable in modern society. Our customers in the North East are justifiably proud of Kielder reservoir and are fully aware of its importance to their water supplies. Neither they, nor many other important stakeholders in the region, would accept any form of temporary reduction to supply without very good reason.</p> <p>However, reducing pressure at the customer tap is a viable option in extreme drought conditions and therefore the level 4 restriction has been set at 1 in 250 years (0.4% probability in any one year).</p> <p>To demonstrate these levels of service are appropriate, the Kielder WRZ Aquator model was run with the peak annual demand in the planning horizon - the resulting storage for Burnhope, Waskerley, Smiddy Shaw and Hisehope reservoirs were combined. This group of reservoirs was chosen as a suitable representation of when the WRZ would be stressed as these reservoirs are in the area that is least capable of being supported by Kielder. The minimum combined stock for each month was then extracted and ranked from low to high, this enabled a distribution</p>	<p>We have updated Section 2.9.1 of the WRMP in line with our response.</p>

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	<p>to be fitted to the data and the 1 in 20 year (5%) return period to be calculated, this gives a curve for when level 1 restrictions would be enabled.</p> <p>The level 1 curve is then incorporated into the model and assigned a demand reduction, 7% based on previous experience.</p> <p>The Kielder WZR Aquator model has then been run again, with peak annual demand in the planning horizon and the level 1 restriction curve in place. The resulting minimum monthly group storage for Burnhope, Waskerley, Smiddy Shaw and Hisehope reservoirs was again ranked. Extreme Value Analysis of the monthly ranked annual minimum storage levels was carried out, to obtain a fitted distribution that could be extrapolated to estimate storage levels for a range of return periods. This allowed the curves for 1:150, 1:200 and 1:250 return periods to be developed.</p>	
<p><b>Direction 3(d) Describe the emission of greenhouse gases likely to arise as a result of baseline operations and each measure in its plan</b></p>		
<p>We recommend the company must:</p>		
<ul style="list-style-type: none"> <li>- include an assessment of the greenhouse gas emissions from both its current operations and each of its preferred options to meet Direction 3(d)</li> <li>- update the carbon cost assessment using the more recent data including traded and non-traded elements using the government's carbon costing toolkit</li> <li>- define the carbon implications associated with its demand management components</li> </ul>	<p>Our operational GHG emissions are among the lowest in the industry and are set to fall over time. The main driver for such a fall is a reducing emissions factor for grid electricity that will lower Scope 2 emissions as the UK power industry makes the transition to low emissions generation. This is a common feature for all water companies.</p> <p>Since the draft WRMP we have entered into a contract for electricity with the power generator Ørsted, commencing April 2018. The power supplied by Ørsted is all from renewable sources and backed by certificates of origin. The latest GHG reporting protocols allow for emissions impact of this to be reflected in the use of market derived emissions factors as an alternative to using location-based or national factors. As a result we can say that our emissions derived from grid electricity – both Scope 2 and Scope 3 emissions linked to transmission and distribution – are effectively zero.</p> <p>In our revised WRMP we reflect this new position, providing an estimate of emissions over time applying the market-based factor. We also provide a location-based estimate using the national grid emissions factor for comparison.</p>	<p>We have updated Section 6.5 in the WRMP in line with our response.</p>

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	<p>We have no supply-side proposal in our plan that will impact on our emissions going forward. We do though have demand-side actions that will have an impact. The impact on emissions is provided for each of these, i.e.:</p> <ul style="list-style-type: none"> <li>▪ Metering;</li> <li>▪ Leak management;</li> <li>▪ Water efficiency measures.</li> </ul> <p>In each case we have also taken account of the carbon value in line with HM Treasury guidelines.</p>	
<p><b>Direction 3(e)(i) Describe the assumptions made regarding the implications of climate change, including in relation to the impact on each of its supply and demand measures</b></p>		
<p>The company has provided an estimation of the impacts of climate change on its future demand and supply forecasts. However, it has not described the impacts of climate change on each of its options in the final planning scenario. This is required by Direction 3(e)(i).</p> <p>The company must include an assessment of the impacts of climate change on each of its measures in the final planning scenario to meet Direction 3(e)(i). This must include an assessment of all options, including demand side options.</p>	<p>There are no supply-side options in our plan but demand management measures are included under the headings of:</p> <ul style="list-style-type: none"> <li>▪ Metering;</li> <li>▪ Leak management;</li> <li>▪ Water efficiency measures.</li> </ul> <p>The updated WRMP includes an assessment of how climate change might impact on each of these. Only with leakage is there any significant effect.</p>	<p>We have updated Section 6.5 of our WRMP in line with our response.</p>
<p><b>Direction 3(f) Describe its metering programme, including costs, approach, implementation and timing of the programme</b></p>		
<p>The company has included optant</p>	<p>We have now included our demand management options appraisal in the Appendix</p>	<p>We have updated</p>

Area of issue	NWL Response	Change Required
<p>metering as part of its preferred programme. However, it has not fully described how it plans to implement this metering. The costs of installing and operating these meters has also not been provided. This is required by Direction 3(f).</p> <p>The company must include further details of its chosen metering programme and describe how it will implement metering across its supply area, including the costs of installing and operating the meters in its metering programme to meet Direction 3(f). This must include an assessment of all options, including demand side options.</p>	<p>of our WRMP. A description of the options appraisal approach and a summary of the options appraisal have been included in Section 9 of the WRMP.</p>	<p>Section 9 of our WRMP in line with our response.</p>
<p><b>Direction 3(g) Estimate the properties that will be subject to household metering during the planning period</b></p>		
<p>The company has not provided a clear estimate of the number of household properties it intends to meter as part of its targeted metering programme over the planning period.</p> <p>The company must include an estimate of the number of optant, change of occupier and selective metering in its WRMP and this must be presented for each type</p>	<p>We intend to meter a total of 70,000 properties per AMP for AMP 7 and 8. For AMP 9 and 10 50,000 properties per AMP and AMP 11 will see a total of 30,000 properties metered. All these properties will be as a result of optant metering. This will increase our meter penetration to 75% by 2060.</p> <p>Selective metering within NW is limited to high users only which is estimated to be just 5 properties per year for the rest of the planning horizon.</p> <p>No compulsory metering has been included as we do not operate in an area of serious water stress.</p> <p>We have now included our demand management options appraisal in the Appendix of our WRMP. A description of the options appraisal approach and a summary of</p>	<p>We have updated Section 9 of our WRMP, in line with our response.</p>

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<p>of metering individually. It does not have to provide an estimate of compulsory metering as it is not operating in an area of serious water stress.</p>	<p>the options appraisal have been included in Section 9 of the WRMP.</p>	
<p><b>Direction 3 (h) Describe its assessment of the cost-effectiveness of domestic metering types</b></p>		
<p>The company should provide an individual assessment of the cost-effectiveness for each type of household metering including include selective, change of occupier and optant. Table 5 should be fully completed with the all identified scheme costs.</p>	<p>We have now included our demand management options appraisal in the Appendix of our WRMP. A description of the options appraisal approach and a summary of the options appraisal have been included in Section 9 of the WRMP.</p>	<p>We have updated Section 9 of our WRMP in line with the our response.</p>
<p><b>Improvement 1 – Identify and describe the sub-components of its leakage and water efficiency options as part of options appraisal (linked to Direction 3(a))</b></p>		
<p>We suggest the company should:</p>		
<ul style="list-style-type: none"> <li>- describe the option appraisal methodology it used, why it chose to use that methodology and its reasons for selecting those options in its preferred plan</li> <li>- present the full list of potential demand management options including approaches to increase meter uptake and reducing leakage, together</li> </ul>	<p>We completed an options appraisal to inform our demand management strategies which fed into our draft WRMP19. However, we did not include it in the main WRMP report. We have included this appraisal as an appendix to the draft final WRMP. The Options Appraisal describes the options appraisal method that has been used.</p>	<p>We have included our Options Appraisal in the appendix to our draft final WRMP19.</p>



Area of issue	NWL Response	Change Required
<p>with the benefits and costs</p> <ul style="list-style-type: none"> <li>- explain in more detail what its preferred strategy is and demonstrate how this represents the best option for its customers</li> </ul>		
<ul style="list-style-type: none"> <li>- include options to reduce demand from third parties and retailers in the plan</li> </ul>	<p>Following the introduction of retail competition to 1.2 million business, charities and public sector organisations in 2017, it was rightly perceived that water efficiency would act as a key benefit for such customers and an opportunity for retail water companies.</p> <p>As a supporter of Waterwise, we agree with their finding in 'Assessing water efficiency services offered by water retailers; March 2018' which was that there is a wide variation in the number and types of services being offered by retail water companies. We also agree with their recommendation and proposal of a Water Efficiency League Table for retailers, given the lack of water efficiency services being offered and the issues with collaboration between wholesalers and retailers. We perceive that such a league table, and the creation of retail water efficiency forum, will ensure retailers deliver more water efficiency services. We will commit to working with Waterwise and the retail water efficiency forum to push this forwards.</p>	As above.
<p><b>Improvement 2 – Align the WRMP with the drought plan and required drought scenarios</b></p> <p>We suggest the company should the company should:</p>		
<ul style="list-style-type: none"> <li>- align the modelling of the WRMP and drought plan making it clear which control curves have been used in the modelling for each plan - it should also ensure that the emergency storage/dead water terms are consistently represented and modelled</li> </ul>	<p>As agreed with the Environment Agency, we have developed and used a new Aquator model for our dWRMP Kielder WRZ deployable output assessment. This model was not available when we prepared our new Drought Plan although we agreed with the EA that we would update our Drought Plan to ensure that it is consistent with our new WRMP. This will be completed in 2018/19.</p>	<p>We have addressed this comment in our Drought Plan.</p>

Area of issue	NWL Response	Change Required																		
and reflect information in the text																				
<p>- test the plan against different types of droughts (in terms of magnitude and duration as outlined in the drought plan representation) - it should also identify when its supply is likely to be vulnerable</p>	<p>We are required to test the plan against different types of droughts (in terms of magnitude and duration as outlined in the drought plan representation) and identify when our supply is likely to be vulnerable.</p> <p>To do this, we have reviewed rainfall data for several site across the region which starts in 1926. We have then calculated monthly rainfall deficits for rolling 6, 12, 18, 24 and 36 month periods. For each of these drought duration periods, we have then identified the highest rainfall deficit and confirmed the year in which it occurred.</p> <p>Several historic drought are contained within the model as detailed below.</p> <table border="1" data-bbox="703 695 1731 1007"> <thead> <tr> <th>Drought Duration</th> <th>Percentage of LTA</th> <th>Date of drought end</th> </tr> </thead> <tbody> <tr> <td>6 month</td> <td>44%</td> <td>16th Oct 1959</td> </tr> <tr> <td>12 month</td> <td>56%</td> <td>16th Oct 1959</td> </tr> <tr> <td>18 month</td> <td>68%</td> <td>27th Sept 1996</td> </tr> <tr> <td>24 month</td> <td>76%</td> <td>29th June 1974</td> </tr> <tr> <td>36 month</td> <td>79%</td> <td>6th Dec 1973</td> </tr> </tbody> </table> <p>Our Kielder WRZ Aquator modelling shows that the final plan DO of 836M/d is achievable through all of these droughts without the need for any demand reduction measures.</p> <p>Further work will be undertaken to test against droughts of greater magnitude than those currently in the model using the Agency’s Drought Vulnerability Framework. Inline with the recent revision to the Water Resources Planning Guideline, this work will be reported in our first Annual Update of the published WRMP19.</p>	Drought Duration	Percentage of LTA	Date of drought end	6 month	44%	16th Oct 1959	12 month	56%	16th Oct 1959	18 month	68%	27th Sept 1996	24 month	76%	29th June 1974	36 month	79%	6th Dec 1973	<p>We have updated Section 5.1.12 of the WRMP in line with our response.</p>
Drought Duration	Percentage of LTA	Date of drought end																		
6 month	44%	16th Oct 1959																		
12 month	56%	16th Oct 1959																		
18 month	68%	27th Sept 1996																		
24 month	76%	29th June 1974																		
36 month	79%	6th Dec 1973																		
<p>- complete Table 10 and demonstrate how drought actions support the WRMP</p>	<p>We have completed Table 10 and will include demand savings from Level 1 (Appeals for Restraint) and Level 2 (Hosepipe Ban – TUB) in our WRMP.</p>	<p>We have updated Section 2.13.2 in line with our</p>																		

Area of issue	NWL Response	Change Required
		response and completed Table 10
<b>Improvement 3 – Demonstrate the environmental sustainability of its abstractions</b> We suggest the company should:		
<ul style="list-style-type: none"> <li>- ensure modelling from any Asset Management Plan 6 investigations is accurately reflected in its deployable output assessment (and technical report) for both resource zones</li> </ul>	<p>Since submitting the draft WRMP in November 2017, further work has been completed including an updated NEP investigation report and an NEP options appraisal report. Key results include:</p> <ol style="list-style-type: none"> <li>1. Recharge calculations: Revised recharge calculation provide very similar results to previous assessments and thus provides more confidence in results. Comparison between abstraction and recharge rates indicates groundwater abstractions are sustainable.</li> <li>2. NWL will have to introduce some compensation flow into Newbiggen Dean and Hornclyffemill Burn (around 0.6MI/day to each) in order to mitigate current impacts of groundwater abstractions on surface water EFI's.</li> </ol> <p>NWL have completed an Options Appraisal Report. In order to meet the WRMP supply surplus NWL's current preferred option is to drill a new abstraction BH at Felkington.</p>	<p>We have updated Section 3.4.2 in the WRMP in line with our response</p>
<ul style="list-style-type: none"> <li>- clarify whether it plans to increase abstraction licence volumes (to match 'modelled' volumes) and demonstrate that there is no environmental risk from doing so (this is linked to recommendation 1 and the modelling of deployable output)</li> </ul>	<p>The planned increases in licences are at Waskerley Airshaft and Ovingham. At Waskerley Airshaft the additional water is required to maintain the DO at Honeyhill Water Treatment Works in light of the NEP obligation to commence a compensation release from Waskerley Reservoir. This is a Kielder supported system taking water directly from the Tyne-Tees Transfer and given the Tyne is a minimum maintained flow river covered by Kielder releases.</p> <p>The increase at Ovingham is to enable the newly refurbished Horsley Water Treatment Works to achieve its DO of 150 MI/d totally from the River Tyne instead of having to be supported from Whittle Dene reservoirs. Again the Tyne is supported by Kielder releases and therefore the additional abstraction of some 14 MI/d will not have any environmental impact.</p>	<p>We have updated Section 3.4.2 and 3.1.1 in line with our response.</p>
<ul style="list-style-type: none"> <li>- demonstrate that the</li> </ul>	<p>The DI data has been updated since the dWRMP was published. The updated</p>	<p>We have updated</p>

Area of issue	NWL Response	Change Required
<p>proposed increased raw water abstraction identified in the planning tables will not lead to environmental deterioration</p>	<p>metering strategy will reduce the PCC over the planning period resulting in a demand in 2059/60 of 66MI/d less than today in the Kielder WRZ and a slight decrease in the Berwick and Fowberry zone of 0.84MI/d. This results in less raw water abstraction in 2059/60 than the current.</p>	<p>the WRMP in line with our response</p>
<p>- ensure Berwick and Fowberry investigations are completed and licensed volumes are tested against deployable output assumptions i.e. if growth in abstraction is not sustainable whether the individual sources meet the stated source deployable output and increased raw water abstraction</p>	<p>Since submitting the draft WRMP in November 2017, further work has been completed including an updated NEP investigation report and an NEP options appraisal report. Key results include:</p> <ul style="list-style-type: none"> <li>i. Recharge calculations: Revised recharge calculation provide very similar results to previous assessments and thus provides more confidence in results. Comparison between abstraction and recharge rates indicates groundwater abstractions are sustainable.</li> <li>ii. NWL will have to introduce some compensation flow into Newbiggen Dean and Horncliffemill Burn (around 0.6MI/day to each) in order to mitigate current impacts of groundwater abstractions on surface water EFI's.</li> </ul> <p>NWL have completed an Options Appraisal Report. In order to meet the WRMP supply surplus NWL's current preferred option is to drill a new abstraction BH at Felkington.</p>	<p>We have updated Section 3.4.2 in the WRMP in line with our response</p>
<p><b>Improvement 4 – Define resource zones and describe their integrity more clearly</b> We suggest the company should:</p>		
<p>- provide a greater description of the Industrial zone and populate the planning tables for the Industrial zone fully</p>	<p>The Industrial WRZ was originally constructed in the 1940's to meet a growing demand for non-potable water on Teesside. Water can be abstracted from the River Tees at three locations to support the Industrial WRZ these being Blackwell RWPS, Broken Scar RWPS and Low Worsall RWPS.</p> <p>The Industrial WRZ, comprises two connected networks referred to as the Gately and Low Worsall systems. The Gately network takes its supply from Blackwell RWPS and Broken Scar RWPS. Under normal operation Blackwell RWPS provides the supply to the Gately Moor Reservoirs with Broken Scar RWPS providing emergency backup if required. The Low Worsall network takes its supply</p>	<p>We have updated Section 2 of the WRMP in line our response.</p> <p>We have updated Section 3.1.5 of the WRMP in line our response.</p>

Area of issue	NWL Response	Change Required
	<p>from Low Worsall RWPS.</p> <p>Below is a description of how the various abstraction licences on the River Tees interact and the volume of water available for the Kielder WRZ and the Industrial WRZ.</p> <p>Demand in the Industrial WRZ has dropped significantly over the course of the past 15 years from 200MI/d to 85MI/d a reduction of 57% since the early 2000's, the demand has held fairly level at 85MI/d over the past 3 years.</p> <p>As a result of this significant reduction in demand going forward NW are forecasting to supply the Industrial WRZ wholly from Blackwell RWPS with standby pumping capacity available at Broken Scar RWPS.</p> <p>DO of the Industrial WRZ is 170MI/d, this is based on the following reasoning:</p> <ul style="list-style-type: none"> <li>- Dry year DO of Broken Scar WTW (just for potable water in the Kielder WRZ) is 150MI/d; and</li> <li>- Combined licence condition of Broken Scar and Blackwell is 320MI/d. This leaves 170MI/d of water available for abstraction to support the Industrial WRZ.</li> <li>- This means that based on current demand the WRZ has a headroom value of 85MI/d.</li> </ul>	
<ul style="list-style-type: none"> <li>- be consistent throughout the plan that there are three resource zones but one is for non-potable water</li> </ul>	<p>We have updated the WRMP to reflect that there are three water resource zones, one of which is non-potable.</p>	<p>We have updated the WRMP accordingly.</p>
<ul style="list-style-type: none"> <li>- ensure description of demands (non-household) and deployable output is split so it is clear what is applicable to Kielder resource zone and which is Industrial zone (e.g. modelling of Broken Scar)</li> </ul>	<p>For clarity, the demand in the Industrial WRZ is treated independently from the demand in the Kielder WZR although both demands are included in the Aquator model. All non-potable demand is within the Industrial WRZ and all non-household demand is within the Kielder WRZ. All demand forecasting mentioned elsewhere in this document is only applicable to the two potable WRZs. Due to the nature of demand in the Industrial WRZ (i.e. for industrial process as opposed to traditional demand profiles), the standard demand forecasting techniques are not appropriate. For planning purposes we have assumed a consistent demand forecast for the Industrial WRZ of 85MI/d based on the demand experienced in the past 3 years.</p>	<p>We have updated Section 2.2.8 of the WRMP in line with our response.</p>

Area of issue	NWL Response	Change Required
	<p>NWL feels this is appropriate as any increase in annual average demand will only be experienced if new industry is developed on Teesside and given the current economic climate, we believe that the likelihood of this is low. Additionally, any new industry that develops in Teesside will inevitably be designed with more water efficient processes than has previously been the case.</p>	
<p>- update assessment of resource zone resilience in light of new modelling and delivery of Asset Management Plan 6 schemes</p>	<p>Since submitting the draft WRMP in November 2017, further work has been completed including an updated NEP investigation report and an NEP options appraisal report. Key results include:</p> <ul style="list-style-type: none"> <li>i. Recharge calculations: Revised recharge calculation provide very similar results to previous assessments and thus provides more confidence in results. Comparison between abstraction and recharge rates indicates groundwater abstractions are sustainable.</li> <li>ii. NWL will have to introduce some compensation flow into Newbiggen Dean and Horncliffe Mill Burn (around 0.6MI/day to each) in order to mitigate current impacts of groundwater abstractions on surface water EFI's.</li> </ul> <p>NWL have completed an Options Appraisal Report. In order to meet the WRMP supply surplus NWL's current preferred option is to drill a new abstraction BH at Felkington.</p>	<p>We have updated Section 3.4.2 in the WRMP in line with our response</p>
<p><b>Improvement 5 – Explain the climate change assessment and show the impact on the company's deployable output</b> We suggest the company should:</p>		
<p>- provide details of how it has applied the climate change scaling methodology</p>	<p>In order to analyse the impact of climate change on any year of interest, the effect of climate change in the 2080's needs to be scaled back to base year to provide a change in DO for each year in the planning period. This also allows climate change uncertainty to be included in the target headroom assessment.</p> <p>The WRMP19 supplementary information (Environment Agency, 2017b) defines a new scaling equation, to be applied for every year from the start of the planning period of (2016/17, in this case) to 2079/80:</p> $\text{Scale factor} = \frac{\text{Year} - 1975}{2085 - 1975}$	<p>We have updated Section 6 of the WRMP in line with our response.</p>

Area of issue	NWL Response	Change Required
	<p>The year 2085 is required in the equation for the impact to be correctly scaled in the 2080s. This results in a loss of DO at the start of the planning period implying that climate change has already occurred in the base year.</p> <p>In order to take a more representative approach, the scaling factor equation was used for 2025/26 onwards and pre 2025/26 the impact of climate change was scaled linearly from zero in 2018/19 to the impact calculated in 2025/26.</p>	
<p>- demonstrate how the assessment it has done affects deployable output</p>	<p>We have now included a graph in the WRMP showing DO (including the impact of climate change) over the planning period.</p>	<p>We have updated Section 6 of the WRMP in line with our response.</p>

## 2.2 Northumberland County Council Response

Area of issue	NWL Response	Change Required
<b>Water Resources North</b>		
<p>We also note and welcome the initiative referred to as Water Resources North, looking across the northern regions but wonder if there should be some reference to cross-border working with suppliers providing for nearby areas of Scotland, given the Berwick-Fowberry issues.</p>	<p>We will feedback this comment to WRN at the next meeting.</p>	<p>No change required.</p>

## 2.3 Ofwat Response

Area of issue	NWL Response	Change Required
<p><b>We have concerns around the transparency of the approach to water resource zones, the level of service calculation and non-drought resilience.</b></p>		
<p>The plan narrative identifies that Northumbrian Water has two water resource zones (Kielder, and Berwick and Fowberry), however, the draft plan also references a third, the Industrial zone, and planning tables have been produced for all three zones. The Industrial zone is a significant zone, with a demand of 100 MI/d, but is presented inconsistently throughout the plan and greater clarity on this zone needs to be provided in the final plan.</p> <p>Further observations:</p> <p>The Industrial zone is noted as including a small group of large industrial customers located on Teesside. However, the industrial zone is not highlighted in Figure 2.1, no supply-demand balance graphs or tables are presented for it and the supply forecast is presented inconsistently in the narrative and planning tables. It is</p>	<p>The Industrial WRZ was originally constructed in the 1940's to meet a growing demand for non-potable water on Teesside. Water can be abstracted from the River Tees at three locations to support the Industrial WRZ these being Blackwell RWPS, Broken Scar RWPS and Low Worsall RWPS.</p> <p>The Industrial WRZ, comprises two connected networks referred to as the Gately and Low Worsall systems. The Gately network takes its supply from Blackwell RWPS and Broken Scar RWPS. Under normal operation Blackwell RWPS provides the supply to the Gately Moor Reservoirs with Broken Scar RWPS providing emergency backup if required. The Low Worsall network takes its supply from Low Worsall RWPS.</p> <p>Below is a description of how the various abstraction licences on the River Tees interact and the volume of water available for the Kielder WRZ and the Industrial WRZ.</p> <p>Demand in the Industrial WRZ has dropped significantly over the course of the past 15 years from 200MI/d to 85MI/d a reduction of 57% since the early 2000's, the demand has held fairly level at 85MI/d over the past 3 years.</p> <p>As a result of this significant reduction in demand, going forward, we are planning to supply the Industrial WRZ wholly from Blackwell RWPS with standby pumping capacity available at Broken Scar RWPS.</p> <p>DO of the Industrial WRZ is 170MI/d, this is based on the following reasoning:</p> <ul style="list-style-type: none"> <li>- Dry year DO of Broken Scar WTW (just for potable water in the Kielder WRZ) is 150MI/d;</li> <li>- Combined licence condition of Broken Scar and Blackwell is 320MI/d;</li> <li>- This leaves 170MI/d of water available for abstraction to support the Industrial WRZ.</li> </ul> <p>This means that based on current demand, the WRZ has a headroom value of</p>	<p>We have updated Section 2.2.8 of the WRMP in line with our response.</p>



Area of issue	NWL Response	Change Required
<p>important that there is sufficient transparency about each zone identified.</p> <p>The planning tables indicate that some abstraction licences are shared between the Kielder and Industrial zones. The final plan should provide clarity on the relationship between these two zones. It is not clear whether the Industrial zone impacts on the supply availability for the Kielder zone in any way.</p>	<p>85MI/d.</p> <p>For clarity the demand in the Industrial WRZ is treated independently from the demand in the Kielder WZR although both demands are included in the Aquator model. All non-potable demand is within the Industrial WRZ and all non-household demand is within the Kielder WRZ. All demand forecasting mentioned elsewhere in this document is only applicable to the two potable WRZs. Due to the nature of demand in the Industrial WRZ (i.e. for industrial process as opposed to traditional demand profiles), the standard demand forecasting techniques are not appropriate. For planning purposes, we have assumed a consistent demand forecast for the Industrial WRZ of 85MI/d based on the demand experienced in the past 3 years. We believe this is appropriate as any increase in annual average demand will only be experienced if new industry is developed on Teesside and given the current economic climate, the likelihood of this is low. Additionally, any new industry that develops in Teesside will inevitably be designed with more water efficient processes than is currently the case.</p>	
<p>While the draft plan proposes a 1-in-250 year return period for level 4 restrictions, for example standpipes, it appears that performance has only been tested against a 1-in-200 year drought event. The evidence used to support the higher level of service should be provided in the final plan.</p>	<p>Given the level of Kielder remains above 78% during the design drought year with a demand in the model of 836MI/d (17% above any dry year forecast demand plus target headroom in the planning period), we believe that the likelihood of imposing any level 2, 3 or 4 restriction on our customers is negligible unless an extreme drought coincides with a prolonged period of extraordinarily high demand. Therefore, low return periods for levels 2, 3 and 4 restrictions are appropriate.</p> <p>Sensitivity testing of the Kielder WRZ DO, as detailed in Section 3.1.2, shows that a DO of 837MI/d has a return period of 1 in 154 years. It is therefore reasonable to set our level 2 restriction at 1 in 150 years (0.66% probability in any one year), as should we ever experience an annual average demand of 837MI/d during a dry year, it is feasible that level 2 restriction would need to come into force to reduce demand below the 836MI/d DO of the Kielder WRZ.</p> <p>Similarly, the sensitivity testing shows that the DO of 835MI/d has a return period of 1 in 200. Therefore, it is rational to need restrictions beyond level 2, i.e. level 3 restrictions, once every 1 in 200 years (0.5% probability in any one year).</p> <p>We do not consider the use of standpipes or rota cuts to be viable options. The</p>	<p>We have updated Section 2.9.1 of the WRMP in line with our response.</p>

Area of issue	NWL Response	Change Required
	<p>industry considers that they are not technically possible and that they are unacceptable in modern society. Our customers in the North East are justifiably proud of Kielder reservoir and are fully aware of its importance to their water supplies. Neither they, nor many other important stakeholders in the region, would accept any form of temporary reduction to supply without very good reason. However, reducing pressure at the customer tap is a viable option in extreme drought conditions. Therefore, the level 4 restriction has been set at 1 in 250 years (0.4% probability in any one year).</p> <p>To demonstrate these levels of service are appropriate, the Kielder WRZ Aquator model was run with the peak annual demand in the planning horizon - the resulting storage for Burnhope, Waskerley, Smiddy Shaw and Hisehope reservoirs were combined. This group of reservoirs was chosen as a suitable representation of when the WRZ would be stressed as these reservoirs are in the area that is least capable of being supported by Kielder. The minimum combined stock for each month was then extracted and ranked from low to high. This enabled a distribution to be fitted to the data and the 1 in 20 year (5%) return period to be calculated. This gives a curve for when level 1 restrictions would be enabled. The level 1 curve was then incorporated into the model and assigned a demand reduction, 7% based on previous experience.</p> <p>The Kielder WZR Aquator model was then run again, with peak annual demand in the planning horizon and the level 1 restriction curve in place. The resulting minimum monthly group storage for Burnhope, Waskerley, Smiddy Shaw and Hisehope reservoirs was again ranked. Extreme Value Analysis of the monthly ranked annual minimum storage levels was carried out, to obtain a fitted distribution that could be extrapolated to estimate storage levels for a range of return periods. This allowed the curves for 1:150, 1:200 and 1:250 return periods to be developed.</p>	
<p>There is limited evidence of non-drought resilience to the full range of potential hazards and threats being assessed in the draft plan. For example the plan makes no reference to flood risk</p>	<p>All of our water supply assets were assessed to be resilient to pluvial, fluvial and coastal flood risk in our PR14 flood risk assessments. We will review and update our flood risk assessment when the CP18 climate projections are issued.</p> <p>The “Beast from the East” presented some challenging conditions to the water industry. We are proud that we did not have any interruptions to supply during that</p>	<p>We have updated Section 2.10 of our WRMP in line with our response.</p>

Area of issue	NWL Response	Change Required
<p>or freeze-thaw events. Greater clarity on this should be provided in the final plan.</p>	<p>period which demonstrates the resilience of our network to freeze / thaw events. However, we will review the impact of the “Beast from the East” on the water industry and apply learning where relevant to do so.</p>	
<p><b>Customer Participation</b></p>		
<p>There is limited evidence of customer participation in the development of the draft plan, however, it does reference qualitative research through workshops about metering, supply and demand with customers. While this is positive, there are areas of the draft plan where greater clarity is needed to provide us with confidence that customers were able to participate effectively in the planning process.</p> <p>The draft plan makes reference to outputs of customer participation, but the supporting evidence presented is relatively limited and this is an area of concern. There are limited details on the extent and range of customers consulted in the development of the draft plan. Also in a number of areas, such as metering, the plan appears to rely on research completed in 2011, and does not explain how</p>	<p>Our customers are at the heart of everything we do and every decision we make. We carry out an ongoing and comprehensive programme of bespoke activity around short-, medium- and long-term strategic aspects of service, including operational service, inclusivity, charges and the future.</p> <p>This section provides more information about the research, participation and engagement activities that have shaped our WRMP plan. Our plan is shaped upon insight derived from several of our qualitative and quantitative customer research and engagement projects into areas which influence water resource management and water efficiency. Our rationale for this approach is founded in our ‘Defining the Conversation’ and ‘Communicating Risk’ research projects, which took place in late 2016 and early 2017.</p> <p>Defining the Conversation (2016 and 2017) explored what matters most to our customers about the services we provide and which areas of service they most want to influence. Our customers told us that we should engage with them to understand their views on customer service, value for money and trust. In regards to other areas of service, the majority viewpoint was that we should ‘just deal with it’, meaning that they trusted us to deliver the service, using our internal expertise without having to consult customers or external specialists. The areas of service participants most frequently stated we should ‘just deal with’ relate to water resource management and included ‘supplying a reliable and sufficient supply of water’ and ‘providing clean, clear drinking water that tastes good’. Customers also told us that we should engage with other expert organisations when considering how to manage our performance in the wider environment.</p> <p>Our Communicating Risk (2017) research was about engaging our customers around how they prefer probability, chance and risk to be communicated. We conducted this research for two reasons; firstly because we knew that some of our customers, who are less comfortable with numbers, struggle to interpret numerical</p>	<p>We have added Section 1.3.2 in to the WRMP in line with the response.</p>

Area of issue	NWL Response	Change Required		
<p>more recent research has validated the previous results. This needs to be clarified in the final plan.</p> <p>It is unclear if customers have been engaged on levels of service. Here we would expect the relative drought resilience levels with other companies to be discussed and explored.</p> <p>It is also unclear whether feedback from customer research has influenced the selection of the preferred options, such as leakage, and whether any research was undertaken on the package of options or on each attribute independently. Greater clarity is required on this area and this should include whether willingness to pay values have been determined and how they have influenced option selection.</p>	<p>presentations of risk. This includes the types of ratios typically used to indicate the likelihood of drought or appeal for restraint (e.g. a 1 in 200 year drought). During the research we presented participants with different numeric options (i.e. percentages, ratios, fractions, and visual formats) and asked them to order them from the most to least likely to happen. A considerable minority instantly switched off, perturbed by their belief that they struggle with numbers. This disengagement impacts on the reliability of any data resulting from customer research into risk management.</p> <p>Secondly, we knew that our customers tend to perceive risks based on what they have seen or heard, rather than first-hand experience or performance data. Hence, more common service failures such as bursts and leakage tend to be prioritised higher than addressing longer term strategic issues, such as water resource management.</p> <p>Our Communicating Risk research findings supported the findings of Defining the Conversation in that participants told us that there are some complex aspects of service which they expect us to manage and plan for without the need for consultation. The most often cited areas of population increases, climate change and ageing infrastructure all relate to our approach to water resource management.</p> <p>Over 2017 and 2018 we engaged our customers on water resource management options, as part of the shaping of our plan. Informed from our engagement and risk research findings we chose to concentrate on demand management options, rather than the more complex and poorly understood levels of service, such as hose pipe ban frequency. Our first project, which was held predominantly in the Essex &amp; Suffolk Water regions, explored the views of 831 of our customers' We explored the views of 500 of our customers', via an online survey, on leakage, metering, tariffs, consumption and preferences for managing the supply demand balance. Participants were asked how they would allocate a £10 budget across five potential water resource management investment options, in order to understand their priorities.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <table border="1" style="width: 100%;"> <tr> <td style="background-color: #0056b3; color: white; padding: 5px;"><b>1. Highest Priority</b></td> <td style="padding: 5px;">Build more reservoirs, water treatment works and pipes</td> </tr> </table> </div>	<b>1. Highest Priority</b>	Build more reservoirs, water treatment works and pipes	
<b>1. Highest Priority</b>	Build more reservoirs, water treatment works and pipes			

Area of issue	NWL Response		Change Required
	2.	Reduce consumption with compulsory water meters at all customers' homes	
	3.	Inform customers about water meters for optional meters	
	4.	Reducing leaks	
	1. <b>Lowest Priority</b>	Installing water meters whenever someone moves house	
	<p>In addition to this research we have gone on an extensive journey to understand the views of our customers and have conducted several other projects which touch on elements of water resource management planning including:</p> <ul style="list-style-type: none"> <li>▪ Trust &amp; Value (2017)</li> <li>▪ Service Measures (2017)</li> <li>▪ Communicating Risk (2017)</li> <li>▪ Behaviour change and funds (2017)</li> <li>▪ Tariff Structures (2017)</li> <li>▪ Resilience, Asset Health and Long-Term Affordability (2017)</li> <li>▪ Long-Term Strategy Consultation (2018)</li> </ul> <p>The key messages from customers, from these projects, which have influenced the design of our WRMP are:</p>		
<b>Customer research finding</b>	<b>How the research influenced our WRMP</b>		

Area of issue	NWL Response		Change Required
	1. Increasing supply capacity is prioritised over demand management	We understand customers to be saying that they want us to plan ahead and develop new resources rather than pursue an aggressive demand management policy. We do not actually have a supply deficit in our operating area which requires us to invest in new water resources at this time. We do plan to reduce demand further in order to reduce the amount of water that is wasted through leakage and also in the way it is used. However, we want to respect what our customers have told us and our ambitions relating to water consumption are shaped accordingly.	
	2. Customers prefer water meters to be optional	We are introducing 'whole area metering' with opt-in measured billing to replace change of occupier metering.	
	3. Customers take individual responsibility for levels of water consumption but also expect us to do more to encourage water efficiency in future.	We commit to sustained gradual reductions in consumption which will enable us to put customer experience first. We will invest in both existing and new approaches to incentivise water efficiency.	
	<p>Our independent Water Forum, whose role it is to challenge us to always make sure we put our customers at the heart of our future plans and pricing, were updated on the development of our WRMP in November 2017. Members challenged the presentation of return periods, suggesting that percentage chance of restrictions would be much more meaningful (e.g. 5% chance in 20 years as opposed to a 1 in 20 year restriction). We noted in response that the use of return periods, expressed as annual ratio (e.g. 1 in 20 years) was explicitly required by DEFRA. Members also agreed that our selective metering strategy was a good scheme.</p> <p>These views have shaped our draft WRMP plan, which is currently going through a final round of testing as part of our PR19 Acceptability Research. A representative sample of our customers are being given the opportunity to look at a summary of our whole PR19 Business Plan and to tell us whether or not they accept it. A section of</p>		

Area of issue	NWL Response	Change Required
	<p>the summary specifically relates to water resource management. Here participants can read about how from 2020 we will focus on:</p> <ul style="list-style-type: none"> <li>▪ Improving how we can move water around our regions to reduce the chance of customers' water supplies being interrupted</li> <li>▪ Always making sure that local communities have sufficient water to meet their needs</li> <li>▪ Reducing the risks of hazards like climate change and extremes of weather impacting on our ability to maintain water and wastewater services to customers</li> <li>▪ Increasing our ability to respond to and recover from long-term interruptions to the water supply which could impact up to 100,000 customers</li> <li>▪ We will continue to make sure that none of our customers are at risk of supply restrictions in a 1 in 200 year drought</li> <li>▪ We will reduce interruptions to water supply lasting longer than twelve hours</li> <li>▪ Offering our customers smart water meters</li> </ul> <p>Our customers are asked one 'killer question' to measure their acceptability of our whole business plan:</p> <div style="background-color: #e6f2ff; padding: 10px;"> <p>To summarise, in our proposed plan we will make improvements to the services you receive between 2020 and 2025, and will also reduce the risk of more serious problems happening in the future. Our plan is built on what customers have already said is important to them and will be delivered for a lower bill than you pay today. On the basis of this information, do you accept Northumbrian Water's plan?</p> <p style="text-align: center;"><b>Yes – I accept the plan</b></p> <p style="text-align: center;"><b>No – I don't accept the plan</b></p> <p style="text-align: center;"><b>Don't know</b></p> </div> <p>The acceptability research has not concluded at the time of preparing this summary. However, initial results on acceptability is high.</p>	
The draft plan suggests that	When we started developing the dWRMP we presented sections and gave details to	No change

Area of issue	NWL Response	Change Required
<p>Northumbrian Water has engaged with its Customer Challenge Group (CCG) although it is not clear how this engagement has shaped the draft plan and this should be clarified in the final plan.</p>	<p>the Northumbrian Forums. The Forums then reviewed and discussed the dWRMP and provided a number of challenges in their formal response to Defra.</p> <p>At the Forums Water Quality sub-group meeting on 28 June 2018, they discussed our response to the challenges made by EA, Ofwat and the Water Forums to its draft WRMP and concluded that they were happy with what had been done.</p>	<p>required.</p>
<p><b>The draft plan appears to have followed the relevant guidance and assessed consideration of appropriate components, including the use of local authority plan-based projections. We are concerned around the clarity of non-household demand forecasts.</b></p>		
<p>There is a lack of clarity relating to the allocation of non-household demand between the Industrial and Kielder zones which needs to be addressed in the final plan. Specifically:</p> <p>The levels of non-potable demand and its allocation between the Kielder and Industrial zones is not clearly identified in the draft plan.</p> <p>The submitted planning tables for the Industrial zone are incomplete and include no demand data which undermines the credibility of the plan. Full complete tables should be provided as part of the final plan.</p>	<p>For clarity, the demand in the Industrial WRZ is treated independently from the demand in the Kielder WZR although both demands are included in the Aquator model. All non-potable demand is within the Industrial WRZ and all non-household demand is within the Kielder WRZ. All demand forecasting mentioned elsewhere in this document is only applicable to the two potable WRZs. Due to the nature of demand in the Industrial WRZ (i.e. for industrial process as opposed to traditional demand profiles), the standard demand forecasting techniques are not appropriate. For planning purposes, we have assumed a consistent demand forecast for the Industrial WRZ of 85Ml/d based on the demand experienced in the past 3 years. We believe this is appropriate as any increase in annual average demand will only be experienced if new industry is developed on Teesside and given the current economic climate this is a low likelihood. Additionally any new industry that develops in Teesside will inevitably be designed with more water efficient processes than has been seen historically.</p> <p>A completed table will be available for the final WRMP.</p>	<p>We have updated Section 2.2.8 of the WRMP in line with our response.</p>
<p>Northumbrian Water has developed a methodology that uses trend data based on</p>	<p>Over the years of producing WRMP's various methods have been used to forecast non-household demand. Economic forecasts used to produce non household water forecasts have proved unreliable and given to dramatic change even between the</p>	<p>No change required.</p>



Area of issue	NWL Response	Change Required
<p>historical usage to forecast non-household demand. However, it does not appear the company has engaged with large users or retailers to enhance and validate this forecast and should consider the steps it could take to achieve this.</p>	<p>draft plan and draft final plan. Talking with large users has also proved meaningless as even if future closure is planned they do not inform us before their own workforce being informed at the appropriate time. Their forecasts of potential growth, based on future economic forecasts prove equally unreliable, certainly beyond a few years. The retailers are not mature enough for this year to produce reliable forecasts and they would meet with the same degree of uncertainty from their larger customers that we have found. We have used trend analysis for the previous two WRMP's and these have proved sufficiently accurate.</p>	
<p>The overall approach to the supply forecast appears satisfactory and appears to be calculated in line with guidance. However, greater clarity is required on the changes to available supply in the Kielder zone and levels of service.</p>		
<p>Compared to the previous plan there is a reduction in supply availability for the Kielder zone of more than 100 MI/d. This is a material change and while Northumbrian Water attributes the reduction to a change in methodology, limited information is provided to assure us that the change is appropriate. We would expect the company to provide a full justification for such a material change in the final plan.</p>	<p>In the Kielder Zone, the DO has reduced from 969.38 MI/d to 836 MI/d. This reduction is purely due to the improved methodology ensuring our analysis uses the dry year yield assessments, as opposed to the maximum treatment works capacities used in the PR14 plan. The change in resource modelling software has also allowed the impact of a dry year on the entire Kielder WRZ to be evaluated.</p> <p>All treatment works are still capable of the individual DOs stated in the PR14 WRMP, and are able to meet a peak in demand greater than the 836MI/d dry year average. A DO run of the Aquator model between the years 1930 and 1935 suggests a DO of 895MI/d for the Kielder WRZ under average conditions.</p> <p>The period 1930-1935 was chosen as the 12 month average rainfall for the NW region is 1287.2mm, the average 12 month rainfall over the 1930-1935 period is 1287.5mm</p> <p>It is also worth noting that in the design drought year, Kielder does not drop below 78% and with a change to rules that govern when Kielder water can be used, a higher DO will be achievable.</p>	<p>Updated Section 3.2 of the WRMP in line with our response.</p>
<p>As noted in earlier, supply has only been assessed for a 1-in-200 year drought event and not for the adopted 1-in-250 year return period level of service.</p>	<p>Further work will be undertaken to test against droughts of greater magnitude than those currently in the model using the Environment Agency's Drought Vulnerability Framework. In line with the Water Resources Planning Guideline, we will report progress on this in the first Annual Review of our published WRMP19.</p>	<p>No change required.</p>

Area of issue	NWL Response	Change Required
<p>The impact on supply of the more severe drought event should be clarified in the final plan.</p>		
<p><b>NW has presented a sub-set of options focused on demand that include an ambition to reduce leakage by over 15% by 2025 which we welcome. However, we have concerns around the approach taken to options, including the development of options screening criteria and third party options. There are also issues with the planning tables which reduce the transparency of the draft plan.</b></p>		
<p>Only preferred options are included in the draft plan and it is unclear if there was an unconstrained list of options to which screening criteria were applied. This should be clarified in the final plan. Information should also be provided on the screening criteria used to demonstrate that the options appraisal process is robust and has identified the best options for customers.</p>	<p>We have included our demand management options appraisal in Appendix 1 of our draft Final WRMP. This presents the approach which started off with identifying unconstrained options and then used best practice screening criteria to create a constrained list of options. The costs and benefits of each demand management measure and the rationale for including or discounting these options in our final plan is also included in the options appraisal.</p>	<p>We have included the options appraisal in the appendix of our WRMP in line with our response.</p>
<p>The draft plan does not include any third party provision of supply or demand options. No information is provided on the approach to third party engagement and the company should provide clarity on its approach in its final plan.</p>	<p>We have produced a Bid Assessment Framework which is designed to set out the principles, policies and procedures that we will adopt to ensure a level playing field is created when assessing a bid from a third party for the provision of water resources and/or leakage demand management services against our own provision.</p> <p>It aims to provide clarity and confidence to third party bidders about the process and that all bids will be assessed in a fair and transparent way against any in house solutions.</p> <p>We are willing to accept bids from any party that would bring innovation and allow us to identify more efficient ways of delivering water resources, demand management and leakage services without adding avoided costs. We have published the water</p>	<p>We have included a new section (2.15) in our WRMP to cover this response.</p>

Area of issue	NWL Response	Change Required
	<p>resources market information on our website.</p> <p>Through this bid assessment framework, we are looking to promote innovation which will allow us to deliver water resources, demand management and leakage services more efficiently for the benefit of customers. This will ultimately mean a reduced cost for our customers.</p>	
<p>Northumbrian Water has a significant supply surplus and has the potential to be a significant exporter of water in the future. Further considerations:</p> <p>The draft plan sets out a number of potential trades with neighbouring companies, including with Yorkshire Water and United Utilities. It notes that these have not been selected as preferred options by these companies and are therefore not included in the plan.</p> <p>Given the scale of the surplus we expect Northumbrian Water to continue to actively engage on the potential for water trades prior to the final plans being published.</p>	<p>We remain open to trading water with any parties and our surplus supply has been published in the WRMI on our website. Whilst our neighbouring companies have discussed trades with us, they have not currently included these trades in their WRMPs. Direct or indirect trades with companies further afield, whilst welcomed by us, are unlikely to prove viable unless water is cascaded through neighbouring companies. At this stage we have received no proposals but continue to be active members of the regional water resource groups (WRN) which are looking at opportunities.</p>	<p>No change required.</p>
<p>The company proposes to reduce leakage by 15% by 2025 which shows a good level of ambition. After 2025 it proposes further reductions to leakage of</p>	<p>We have included our demand management options appraisal in Appendix 1 of our draft Final WRMP. This presents the costs and benefits of each demand management measure and the rationale for including or discounting these options in our final plan.</p>	<p>We have included the options appraisal in the appendix of our WRMP in line with</p>

Area of issue	NWL Response	Change Required
<p>34% of 2020 levels by 2045. However, only a single leakage option is presented and cost information on this has been omitted from the draft plan. Greater clarity on the approach to leakage should be provided in the final plan and clear costings should be provided to assure us that the proposed leakage reductions have been assessed appropriately.</p>		<p>our response.</p>
<p>The company has low levels of metering; this is forecast to be 41% in 2020 and is forecast to increase by 7% by 2025 as a result of maintaining current optant strategies. It is unclear if the company has considered alternative approaches to metering and this should be clarified in the final plan.</p>	<p>Given the current rate of meter installation from the AMP6 optant programme, and the views of customers, optant only metering will continue for AMP7 and AMP8 at the current rate of 14,000 properties per annum. Achieving these numbers will see the company reaching a meter penetration of 48% by the end of AMP7 and 55% at the end of AMP8. Achieving an average of 14,000 optant meters per annum in AMP8 may require a more targeted promotion of meters to customers. Experience in Essex &amp; Suffolk by using personalised communications and the use of pre-metering (installing meters at properties that remain unmeasured but providing them with the equivalent bill they would receive if measured) makes us confident we can maintain 70,000 optant meters over AMP8.</p> <p>The more active promotion of meters to potential optants, by either personalised communications or pre-metering already installed but empty meter chambers, may be trialled during AMP7 in the Berwick WRZ to further increase the level of metering in this ground water fed WRZ.</p> <p>We have now included our demand management options appraisal in the Appendix of our WRMP. A description of the options appraisal approach and a summary of the options appraisal have been included in Section 9 of the WRMP.</p>	<p>Update Section 9 WRMP in line with our response.</p>
<p>Northumbrian Water has demonstrated effective water</p>	<p>We have now included our water efficiency options appraisal in the Appendix of our WRMP. A description of the options appraisal approach and a summary of the</p>	<p>Options appraisal included as</p>

Area of issue	NWL Response	Change Required
<p>efficiency engagement with customers through the Every Drop Counts programme. This includes an area by area approach to maximise its impact, customer incentives, promoting behavioural change and retrofit programmes. However, in the final plan greater clarity on the costs and benefits of the various strands will help show that an optimal level of each activity is proposed.</p>	<p>options appraisal have been included in the WRMP.</p>	<p>Appendix in WRMP.</p>
<p>Linked to the above, per capita consumption (PCC) is slightly above the national average and with only modest reductions in PCC over the plan period the company forecasts an average PCC of 129 l/h/d by 2045. The company should consider if further ambition to reduce the PCC across the planning period could further help provide more water for trading and increase resilience.</p>	<p>We have increased the level of ambition with regards to water efficiency. In conjunction with smart metering, we will commit to reducing per capita consumption in the NW area from 141.1 litres per person per day in 2016/17 to 113.9 litres per person per day in 2045. This equates to a 19.3% reduction over that time horizon.</p> <p>In the shorter term, we will deliver an ambitious programme of water efficiency activity that will reduce per capita consumption in the ESW operating area to 130.5 litres per person per day.</p>	<p>Update Section 5.1.12 WRMP in line with our response.</p>
<p>The planning tables are not fully completed and need to be updated for the final plan. For example: Only preferred options have</p>	<p>We have now included our demand management options appraisal in the Appendix of our WRMP. A description of the options appraisal approach and a summary of the options appraisal have been included in Section 9 of the WRMP.</p> <p>The WRMP feasible option table will include preferred options. NW is in surplus and a full options appraisal is not required. However the appendix gives full details of the</p>	<p>Update Section 9 WRMP in line with our response.</p>

Area of issue	NWL Response	Change Required
<p>been added to the table of feasible options. All feasible options should be included in this table.</p> <p>Cost information has been omitted from leakage options which reduces the transparency of the draft plan.</p>	<p>options and costings.</p>	
<p><b>As the only options presented are preferred there is no transparency on how the final programme was selected. This means it is not possible to assess whether scenarios and deliverability considerations have influenced the preferred programme. We also have concerns around the robustness of the assurance of the plan.</b></p>		
<p>As no evidence of non-preferred options has been found there is a lack of transparency regarding option appraisal and the decision making process. In the final plan for clarity we would expect to see a clear summary that concisely explains how and by whom the preferred portfolio was decided on.</p>	<p>We have included our demand management options appraisal in Appendix 1 of our draft Final WRMP. This presents the costs and benefits of each demand management measure and the rational for including or discounting these options in our final plan.</p>	<p>We have included the options appraisal in the appendix of our WRMP in line with our response.</p>
<p>Board assurance was part of Defra's guiding principles for water resources planning. Evidence of Board assurance is limited to approval of the plan noted on the document control sheet and this raises a concern about the robustness of plan development. This concern is compounded as there is limited</p>	<p><b>Our Approach to Assurance</b></p> <p>We have used a three line of defence model for assurance, similar to that used for our other regulatory returns. Each piece of data has been provided by someone of appropriate skill and experience and has been peer reviewed.</p> <p>The key approach, assumptions and strategy have been approved by key directors (principally the former Water Director and the Assets and Assurance Director) a summary paper which included high level approach and strategy was approved by the Board.</p> <p>In addition to the above external assurance and consultancy was sought in areas of</p>	<p>We have updated our WRMP and included a new Section 1.4 covering our Board Assurance</p>

Area of issue	NWL Response	Change Required
<p>description of the quality assurance of the plan. For the final plan we expect to see assurance that the company Board are satisfied that the plan represents the most cost effective and sustainable long term solution.</p>	<p>highest risk. Edge Analytics were used to calculate the population and property forecasts which is key data underpinning much of the plan.</p> <p>PwC were our principal external assurance provider and were engaged to provide the principal assurance over our WRMPs, their scope included:</p> <ul style="list-style-type: none"> <li>▪ Gaining an understanding of the overall approach to the production of the WRMPs;</li> <li>▪ Gaining an understanding of the detailed underlying processes and assumptions made which were then used to prepare the WRMPs;</li> <li>▪ Tracing a sample of these non-financial and investment data points to a mix of source documentation and the outputs of detailed calculations and models;</li> <li>▪ Testing a sample of inputs into the calculations and models by tracing these back to source systems and documentation;</li> <li>▪ Performing a critical strategic assessment of the WRMPs, specifically assessing their content against the requirements and guidance published by Defra and the Environment Agency; and</li> <li>▪ Assessing the extent to which the data in the WRMPs has been accurately extracted into the Water Resource Market Information data tables.</li> </ul> <p>Any recommendations made have been incorporated into the plan.</p> <p><b>Board Assurance Statement</b></p> <p>We have included NWL Board’s “Board Assurance Statement” which is reproduced below:</p> <p><i>Having reviewed the draft final WRMPs, the Northumbrian Water Limited Board makes the following statement:</i></p> <ul style="list-style-type: none"> <li>▪ <i>The Board is satisfied the plan represents the most cost effective and sustainable long term solution;</i></li> <li>▪ <i>The Board believes it has sufficiently collaborated with customers, partners and regulators to develop a strong understanding of future needs, explore every option, and build consensus on delivery plans;</i></li> <li>▪ <i>The Board confirms the integrity of the risk assessment process put in place by</i></li> </ul>	

Area of issue	NWL Response	Change Required
	<p><i>the company for all of its water supplies;</i></p> <ul style="list-style-type: none"> <li>▪ <i>The Board is satisfied that the WRMPs take account of all statutory drinking water quality obligations, and plans to meet all drinking water quality legislation in full; and</i></li> </ul> <p><i>The Board confirms that Northumbrian Water complies with its duties on drinking water quality matters in its broader resilience and resource planning arrangements.</i></p>	
<p><b>With a significant surplus Northumbrian Water has the potential to play a significant national and regional role in the future.</b></p>		
<p>While the draft plan includes a discussion of opportunities to trade water it is unclear how the Water UK national project has informed their plan and consideration of these options. This should be clarified in the final plan.</p>	<p>The primary aim of the WaterUK project was to develop a strategy and framework for the long-term planning of water resources at a national level, and in doing so to assess the long-term water needs and the available options to meet them. The project considered droughts worse than those within the historic record and worse than current levels of service plan for. It looked ahead 50 years and undertook new modelling of droughts, assessed climate change impacts and provided conclusions on the national scale resilience of water supplies.</p> <p>The study concluded that:</p> <ol style="list-style-type: none"> <li>i. there is a significant and growing risk arising from drought, climate change, population growth and sustainability reductions;</li> <li>ii. there is a strong case for government to promote a consistent national minimum level of resilience for water resources;</li> <li>iii. there is an economic benefit of increased resilience because the investment needed to increase resilience is ‘modest’ compared to the potential reactive costs to drought and flood;</li> <li>iv. companies should continue to seek a twin-track approach which includes demand management and supply enhancement including transfers between companies; and</li> <li>v. there is a strong case for ‘adaptive planning’ to support company WRMPs. While individual companies will need to make investment in the next 25 year planning period, nationally, 2040 and 2065 were identified as key points in time to make investment.</li> </ol>	<p>We have included a new section (2.5) in our WRMP that is in line with our response.</p>



Area of issue	NWL Response	Change Required
	<p>The report considered NW within a group called the North East. The report concluded that this group is currently running a large surplus and is highly unlikely to experience significant drought detriment. Our WRMP19 continues to support this. Indeed, the Kielder WRZ deployable output is infrastructure and licence constrained and not resource constrained. We believe that Kielder Reservoir can be used to improve the resilience of other water companies. Kielder water can easily be transferred to the south of our WRZ using the existing Tyne Tees Transfer (TTT). Our ability to move Kielder water within our area means that water can then be exported into the northern WRZs of neighbouring water companies which by substitution, would then free up water to trade further south. We are a lead water company in Water Resources North and have confirmed through this group and through our Water Resources Market Information data published on our website, that we have water to trade to increase the resilience of other water companies. We updated our WRMP to include a dedicated section on the WaterUK project.</p>	
<p>The company is part of the recently formed 'Water Resources North' regional group which aims to further promote collaborative working on water resources in the north of England. We welcome this and expect the group to help shape future water resources management plans.</p>	<p>Noted.</p>	<p>No change required.</p>

## 2.4 The Water Forums Response

Area of issue	NWL Response	Change Required
<b>Overall Plan</b>		
It would be useful to have a shorter, summary version that is in a more user-friendly format and uses language that is accessible for more customers.	We have prepared a new non-technical summary of our WRMP. We believe it is now in a more user friendly format, with info graphics and uses language that is more accessible for our customers.	Publish the new non-technical summary along side the updated WRMP.
<b>The WRMP should clearly tie into the company's long-term strategy and its emerging PR19 business plan</b>		
It would be helpful for the plan to include more emphasis on: <ul style="list-style-type: none"> <li>▪ acknowledging the PR19 resilience narrative;</li> <li>▪ their thinking on innovation, e.g. efficiency, leakage and metering; and</li> <li>▪ the work done with neighbours and stakeholders, both inside and outside the industry.</li> </ul>	We have updated the WRMP to include more of our PR19 Business Plan narrative covering resilience, innovation and customer engagement.	We have updated Sections 1.3 and 1.4 of our WRMP in line with our response.

## 2.5 Mr R. Curruthers

Area of issue	NWL Response	Change Required
Fully support the decision to not compulsory meter customers.	Noted.	No change required.
Fully support the involvement in Water Resources North. Would	We will feedback this comment to WRN at the next meeting.	No change

Area of issue	NWL Response	Change Required
query why this group doesn't seem to involve Scottish water?		required.
The demand section makes reference to places in Essex which could be confusing.	This was because our water efficiency schemes have been run as one project albeit covering our northern and southern regions. However, we agree this is confusing and so references to the Essex area have been removed from the WRMP.	We have amended Table 4.6 in the WRMP.