

Regulators' Alliance for Progressing  
Infrastructure Development

December 2021



# Strategic regional water resource solutions: Standard gate one final decision for Vyrnwy Aqueduct



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## 1. Introduction

The purpose of this publication is to set out our final decision in respect of the Vyrnwy Aqueduct strategic regional water resource solution submitted for the standard gate one assessment by solution sponsor United Utilities<sup>1</sup>. The solution includes two options to maintain supply to customers whilst Lake Vyrnwy supports the River Severn to River Thames transfer. Further information concerning the background and context of the United Utilities Vyrnwy Aqueduct can be found in the Vyrnwy Aqueduct publication document on the United Utilities website<sup>2</sup>.

This publication should be read in conjunction with the final decision letter issued to the solution sponsor. Both this document and final decision letter have been published on our website today.

The assessment process is overseen by RAPID, with input from the partner regulators Ofwat, the Environment Agency and the Drinking Water Inspectorate. The Environment Agency together with Natural England and, where a solution impacts Wales, Natural Resources Wales, have reviewed the environmental sections of the submissions, and have provided feedback to RAPID. The Consumer Council for Water provided input to the assessment on customer engagement.

The solution sponsors and other interested parties had the opportunity to respond to the draft decision during the representation period, which followed the publication of the draft decisions on 14 September 2021. We have taken all relevant representations into account in making our final decision.

We would like to thank United Utilities for the level of engagement, collaboration and innovation that they have exhibited during this stage in the gated process.

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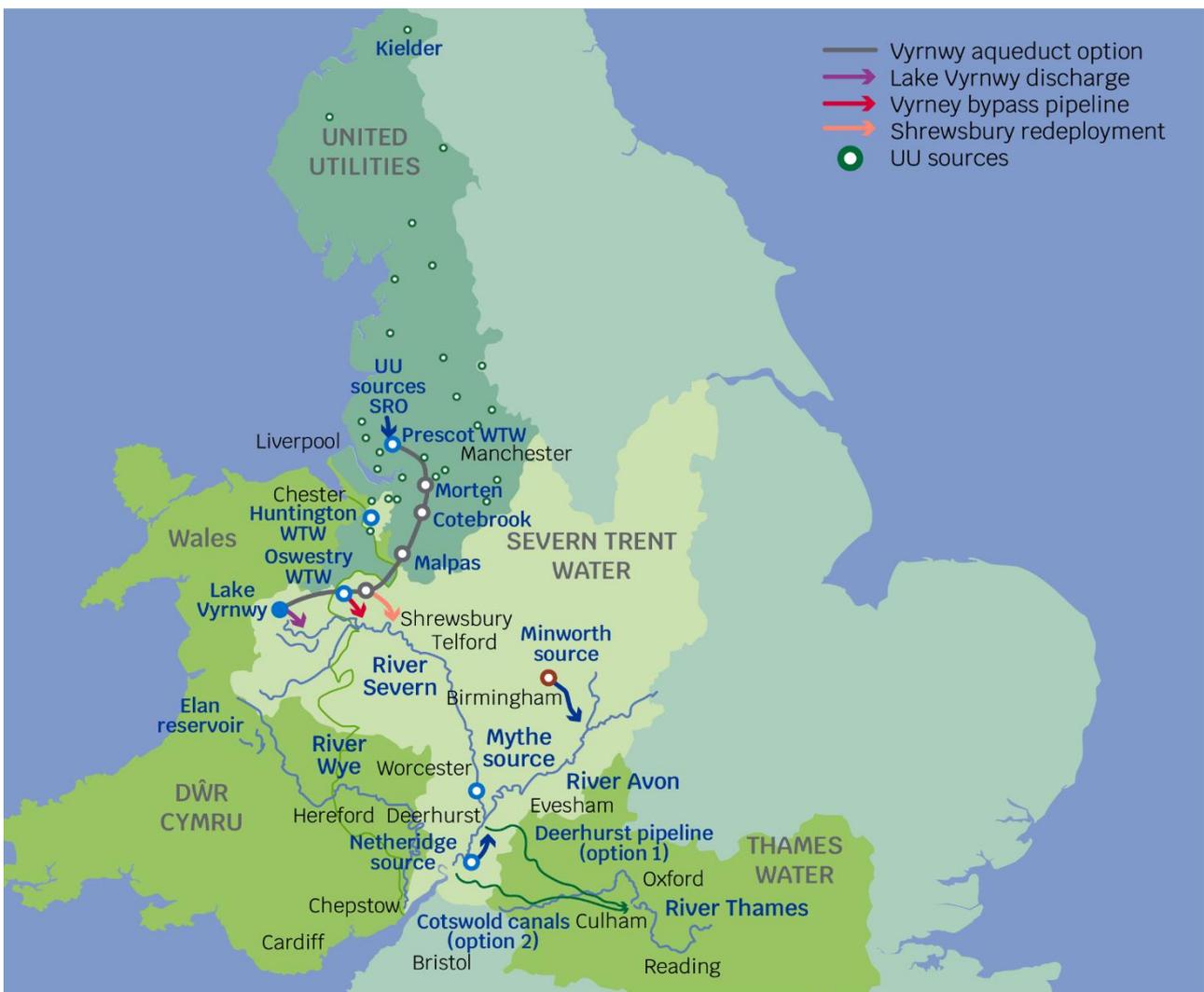
<sup>1</sup> Referred to in PR19 final determination as “Vyrnwy aqueduct”

<sup>2</sup> [https://www.unitedutilities.com/globalassets/z\\_corporate-site/about-us-pdfs/vyrnwy-aqueduct-sros/va0002---preliminary-feasibility-assessment.pdf](https://www.unitedutilities.com/globalassets/z_corporate-site/about-us-pdfs/vyrnwy-aqueduct-sros/va0002---preliminary-feasibility-assessment.pdf)

## 2. Solution summary

The purpose of the Vyrnwy Aqueduct solution is to maintain supplies to customers supplied directly from the aqueduct, if United Utilities were to stop or reduce their abstraction from Lake Vyrnwy to facilitate a transfer of raw water. For transfer volumes greater than 50 Ml/d enabling works are required on the Vyrnwy Aqueduct, which forms the scope of the Vyrnwy Aqueduct solution. This solution is to support the Severn Thames Transfer solution. The offsetting of the transfer volume released from Lake Vyrnwy is addressed by the United Utilities Sources solution.

Figure 1 Vyrnwy Aqueduct solution schematic



United Utilities have selected 2 options that will enable transfer volumes over 50 Ml/d and up to 180 Ml/d. These are:

- Option A - Norton to Oswestry WTW
- Option B - Huntington to Cotebrook

Option A requires pumping treated water up the Vyrnwy Aqueduct to Oswestry WTW (in reverse of normal flow direction), through a new bypass into a new blending option (that mixes both the treated water and raw water from Lake Vyrnwy) for treatment through Oswestry WTW, before gravitating back down the remaining lines of the aqueduct to supply customers.

Option A has four sub options for different water transfer volumes, as additional enabling works are progressively required to scale up in volume from 51 Ml/d to 75 Ml/d, 76 Ml/d to 135 Ml/d, 136 Ml/d to 150 Ml/d and finally up to 180 Ml/d.

Option B consists of a new pumping station and pipeline from Huntington connecting into Cotebrook, which is part of the Vyrnwy Aqueduct. Water will then be gravity fed from Cotebrook to feed customers off the Vyrnwy Aqueduct. The maximum transfer allowed under gravity flow with this option is 75 Ml/d, although it may be possible to increase to 180 Ml/d through additional pumping to Oswestry WTW. The options have been developed to maintain a minimum production flow at Oswestry WTW of 110 Ml/d, to meet design specifications and to maintain water quality.

## 3. Summary of representations

### 3.1 Representations received

We have received the following representations relevant to Vyrnwy Aqueduct.

**Table 1 Summary of representations**

Representation from	Summary of representation
GARD	<p><b>Transparency of cost estimates</b> GARD cites concerns over a lack of transparency in solution cost estimates generally, requesting further detail to the level that was included in the Fens reservoir gate one report.</p> <p><b>Deployable output and stochastic flow data</b> GARD is also concerned about a lack of transparency in deployable output (DO) assessments, suggesting the evidence should be made available for scrutiny of the assumptions, data, and outputs of the modelling.</p> <p>GARD have concerns over the reliability of stochastic river flow data, such as: inaccurate weather data for groundwater-dominated catchments; the stochastic weather base period not containing any long duration droughts; the base period excluding weather since 1997; and the geological difference in catchments not being reflected in the generated Thames and Severn flows.</p> <p><b>Carbon costing</b> GARD asserts that the gate one reports are poor on the subject of carbon costing of strategic options and have shortcomings in the data presented.</p> <p><b>Supporting solutions</b> Considered it is unnecessary and confusing to have separate reports for River Severn to River Thames Transfer (STT) and its supporting solutions, which results in there being no clear picture of overall deployable outputs (DO) and costs of the solutions and sub options and suggested combining these into a single solution.</p> <p>Suggested that consideration should be given to an enhanced first phase of water resource supply support, by combining the unsupported transfer (phase 1) with Mythe (phase 2) and bringing in Vyrnwy regulation (phase 3) to a level that requires minimal new source development for United Utilities. This could be implemented rapidly and would 'buy time' while the actual future</p>

	<p>need and the effects of climate change can be observed, and facilitate early relief of chalk stream over-abstraction.</p> <p>GARD are also disappointed that the gate one report has no tabulation of the costs and deployable outputs for each phase of the development shown in Table 2-2 of the STT submission document and for the total cost and deployable output after each phase is commissioned. GARD propose that RAPID requires the water companies to provide this information in time for inclusion in RAPID’ s recommendation reports for Ofwat and for review by stakeholders in the "representation period’ .</p> <p><b>Water resource benefit</b></p> <p>Disagreed that Lake Vyrnwy releases (and thus Vyrnwy Aqueduct enabling works designed operational limits) should be limited to 180 Ml/d, as this assumes the reservoir is operated as a continuous direct supply. GARD state that as regulation releases are required for only part of the year, even in severe droughts, Vyrnwy reservoir has the storage capacity to support much larger regulation releases than 180 Ml/d. GARD request RAPID recommend that releases of up to 400 Ml/d are considered in gate two .</p> <p>Disagreed with limitations of 75 Ml/d direct releases to River Vyrnwy (which would also impact on the capacity sub-options of Vyrnwy Aqueduct), which has been set due to impact on Salmonid spans and juveniles. GARD have provided their own flow analysis to support their request that regulation releases up to 400 Ml/d should be considered direct into the River Vyrnwy.</p>
<p><b>United Utilities</b></p>	<p>Supported the draft decision and welcomed the actions provided for gate two, but raised the specific points below:</p> <p><b>Costs</b></p> <p>Provided revised final gate one costs, which were £69,705 lower than their previously submitted costs, primarily due to lower than anticipated environmental regulator costs.</p> <p>Requested access to gate one underspend as a contingency measure, noting that if not used it would return these funds to customers.</p> <p><b>Actions and Recommendations</b></p> <p>Indicated that its initial assessment shows that VA SRO is "somewhat less suitable for DPC", because the works are likely to involve modification to existing UU assets and integration with the effective operation of the UU supply system.</p>

## 3.2 Our Response

We have taken the representations into account in our final decisions and set out below our response to the key points and issues raised.

### 3.2.1 Transparency in cost estimates

We do not consider information about solution costs to be material to gate one decisions. Gate one is a checkpoint and is the first opportunity to check the progress made by solution owners on investigations and development of solutions in the gated process. At gate one, all solutions were expected to progress to gate two and continue to receive ring-fenced funding unless there was a clear reason why they should not.

Solution costs will be considered further from gate two onwards and in regional plans and water resource management plans. We will provide companies with guidance on presenting and publishing solution costs in their gate two submissions.

### 3.2.2 Deployable Output assessments and stochastic flow data

We consider that the work completed on the DO assessment is sufficient for gate one. The water companies will continue to develop the solutions and evidence surrounding them. Guidance will be provided on our expectations for a more detailed examination of deployable output at gate two. The use of stochastic flow data reflects the requirement to test droughts larger than those observed in the historic record, such as drought events with 1:500 year return periods. Solutions generation of stochastic flow data is expected to follow Water Resource Planning Guidelines Supplementary Guidance: Planning to be resilient to a 1 in 500 drought (England), and Supplementary Guidance: Stochastics. We will pass on the specific points raised to solution owners for consideration as they develop their deployable output assessments further. We will pass on the specific points raised to solution owners for consideration as they develop their deployable output assessments further.

### 3.2.3 Carbon costing

Gate one assessment of solution submissions took account of the fact that assessments of the carbon implications of the solution would inevitably contain a significant degree of uncertainty given the stage of solution development. We consider that the level of information presented on carbon was sufficient for gate one. Solution development to gate two should follow the Water Resources Planning Guidelines for WRMP24 section 8.3.2 which states expectations for accounting for and reducing greenhouse gas emissions. The design should consider; build nothing, build less, build clever and build efficiently throughout the development of the solution, with offsetting only as a last resort. We expect all direct

mitigations to be included in the solution costs. The solution should also be considered by the water company within their wider carbon plans.

We will require any carbon assessment annexes to be published alongside the submission at gate two.

### **3.2.4 Supporting solutions**

We have decided that Vyrnwy Aqueduct and other supporting solutions should continue to be developed separately to STT. As the gated process advances, these supporting solutions may also provide resilience benefits to their own regions, to other solutions or to other regions beyond those served by STT. Linking supporting solutions development, and their ability to progress through the Gated Process, exclusively to STT, could hinder investigation of these alternate configurations and their benefits.

We consider the phasing of supporting solutions of STT should be determined by the solutions' utilisation assessments under future extreme drought, climate change and demand scenarios. RAPID will set out expectations for detailed utilisation assessments in its gate two guidance, and has included specific actions and recommendations in respect of these. This includes incorporating the cost and water resource benefit of supporting solutions, including the Vyrnwy Aqueduct solution, into phasing decisions.

### **3.2.5 Water resource benefit**

The solution's water resource benefit calculation was assessed as sufficient for gate one. The water companies will continue to develop the water resource modelling and yield assessments and evidence surrounding them; considering drought, climate change, environmental and demand scenarios. We will provide guidance for further detailed water resource benefit investigations at gate two.

In response to GARD's comment that a release from Vyrnwy greater than 180 Ml/d should be considered, which would also influence the range of capacities tested in this Vyrnwy Aqueduct solution, the capacities of options considered within the RAPID process were developed by solution owners taking into account feasibility, environmental assessments and water availability under abstraction licence limits, in order to progress delivery of water resource management plans at WRMP19. We expect that any larger capacity options would be identified and assessed through the regional and company planning process at WRMP24 and an update provided on option capacities at gate two.

The 75Ml/d release restrictions to Afon Vyrnwy have been set by the solution owners, based on their investigations to date, and further work needs to be undertaken to assess the in-combination impacts on the Afon Vyrnwy of STT releases, reservoir compensation releases and releases for River Severn regulation.

### **3.2.6 Gate one actions and recommendations**

We agree that there should be further investigation into DPC suitability as the solution progresses and develops through gate two.

### **3.2.7 Utilisation of gate one underspend at gate two**

Some solution owners raised concerns in their representations regarding whether gate two allowances would be sufficient for completion of gate two activities and suggested that gate one underspend should be carried forward to gate two. The percentage allocations to each gate in our Final Determination at PR19 were inherently imprecise and were based on our understanding of likely profile of activities to be carried out in progressing the development and investigation of solutions taking into account companies' proposals in this respect. We now have an improved understanding of the activities to be carried out at gate two and consider that it will be beneficial to allow funding allowance that has not been used at gate one to be made available to solution owners for carrying out gate two activities.

We have therefore decided to merge gate one and gate two allowances for this solution. This will allow any underspend on gate one activities to be used for gate two activities. We will continue to scrutinise expenditure to ensure that it is appropriate and efficient. Companies remain responsible for management of cost risk to meet gate requirements.

## 4. Solution assessment summary

Table 2 Final decision summary

Recommendation item	Vyrnwy Aqueduct
Solution sponsors	United Utilities
Should further funding be allowed for the solution to progress to gate two?	Yes
Is there evidence all expenditure is efficient and should be allowed?	Yes
Delivery incentive penalty?	No
Is there any change to partner arrangements?	Yes
Is there a need for a remediation action plan?	No
Changes to partner arrangements are detailed in Section 3.	

### 4.1 Solution progression and funding to gate two

The evidence suggests that the solution is a potentially valuable way of supplying water to customers. Based on our assessment of the potential solution costs and benefits we have concluded that the solution should progress through the gated process to gate two, and that further funding should be allowed.

We are combining the funding of this solution with the United Utilities Sources solution as proposed by United Utilities to enable efficiencies in work and reporting. This solution's total allowance and gate allowances has been amended from the final determination. The total maximum development allowance for the new combined solution for all gates is £21,900,000. The name for the new solution will be North West Transfer.

We have decided to merge the gate one and gate two allowances. This results in a total allowance of £3.84m being available at gate two. Companies remain responsible for management of cost risk to meet gate requirements.

### 4.2 Evidence of efficient expenditure

The PR19 final determination specified that any expenditure on activities outside the gate activities for the identified solutions (or solutions that transfer in) will be considered as inefficient and be returned to customers. We will consider whether gate activity is efficient by considering the relevance, timeliness, completeness, and quality of the submission which should be supported by benchmarking and assurance.

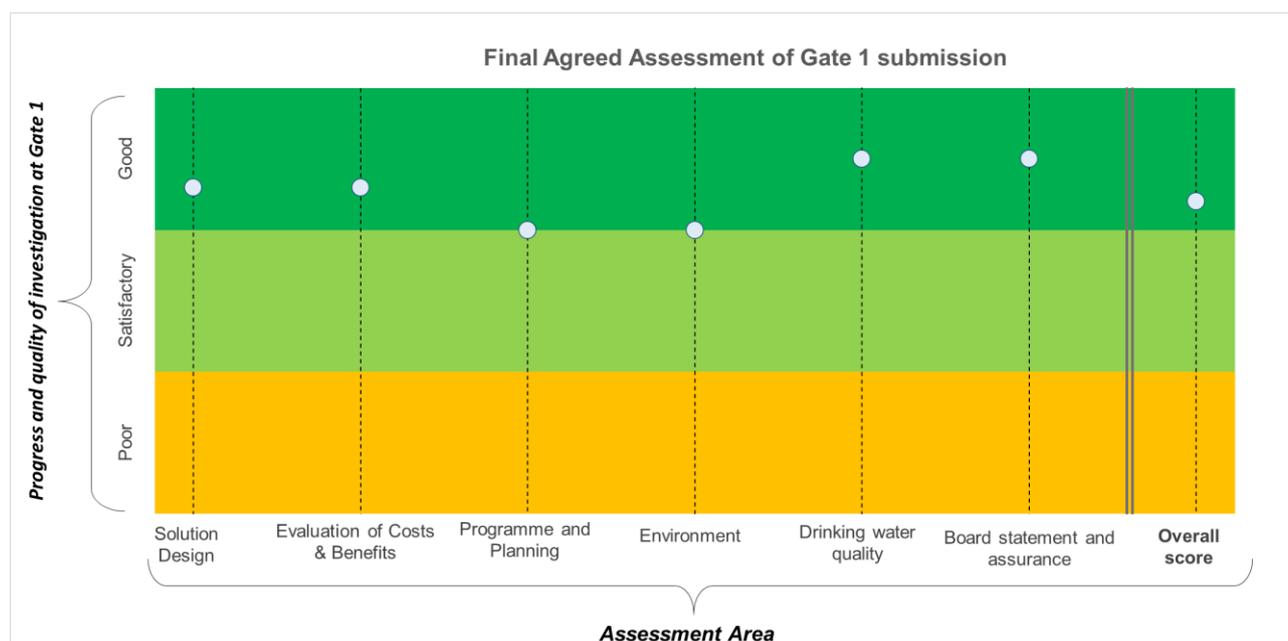
Our assessment of the efficient costs as spent on gate one activities results in an allowance for this solution of £1.02m (of £1.02m claimed). This is the final reconciled spend.

## 4.3 Quality of submission

The aim of the assessment was to determine whether appropriate progress has been made towards delivery of the solution. We recognise at this stage solutions may be at different development points and the assessment takes this into account.

Figure 2 shows our assessment of the work completed on the solution, which was presented in the submission. Our assessment was made against the criteria of robustness, consistency and uncertainty to grade each area of the submission as good, satisfactory or poor in accordance with [our guidance published on 22 February 2021](#). We also assessed the Board assurance provided.

**Figure 2 Submission assessment**



Our overall assessment for the solution submission is that it is good (meets expectations). However, there remain some specific assessment elements where the submission fell short of expectations, which are detailed in the remainder of Section 2.

### 4.3.1 Solution Design

Our assessment of the solution design considered the quality of the evidence provided on the initial solution and options; the anticipated operational utilisation of solutions; the interaction of the solution with other proposed water resource solutions and stakeholder and

customer engagement. The assessment also considered whether information was provided on the context of the solution's place within company, regional and national plans.

We consider that the progress and quality of the investigation completed by United Utilities in developing the solution design at gate one has been good. The submission fell short of expectations in some areas, including the need for a more detailed understanding of utilisation of the solution. As a key theme for gate two, the solution should also progress engagement with specific solution-related stakeholders, beyond those associated with the Regional Groups.

### **4.3.2 Evaluation of Costs & Benefits**

Our assessment of the evaluation of costs and benefits considered the quality of the information provided on initial solution costs; the societal, environmental and economic cost and benefits, water resource benefits and wider resilience benefits. The assessment also considered whether evidence was provided on how the solution delivers a best value outcome for customers and the environment.

We consider that United Utilities' evaluation of the costs and benefits of the solution for gate one has been good. The submission still fell short of expectations on some specific elements, including the development of a best value discussion comparing the options of this solution.

### **4.3.3 Programme and Planning**

Our assessment of the programme and planning considered whether United Utilities presented a programme with key milestones and whether its delivery is on track. The assessment also considered the quality of the information provided on risks and issues to solution progression, the procurement and planning route strategy and subsequent gate activities with outcomes, penalty assessment criteria and incentives.

We consider that United Utilities' evaluation of the programme and planning of the solution for gate one has been satisfactory. The submission falls short of expectations in some areas, including a need to provide more detailed evidence to support the programme plans and identified milestones. Additionally, in the assessment of procurement model, given the range of options, the submission should have more clearly evidenced how the Direct Procurement for Customers (DPC) assessment may be affected and whether some options may be more suitable for DPC than others.

### **4.3.4 Environment**

Our assessment of environment considered the initial environmental assessment; the identification of environmental risks and an outline of potential mitigation measures; the

detailed programme of work used to address environmental assessment requirements and the initial outline of how the solution will take into account the carbon commitments.

We consider that United Utilities' evaluation of the environmental elements of the solution for gate one has been satisfactory. The submission falls short of expectations in some areas due to the level of detail on some environmental risks associated with the solution. Key themes for gate two should be to further identify and understand environmental risks, along with associated mitigation measures, and to work with the National Appraisal Unit to develop a more detailed environmental assessment programme.

#### **4.3.5 Drinking water quality**

Our assessment of drinking water quality considered drinking water quality and risk assessments; evidence that the solution has been discussed with the drinking water quality team and a plan for future work to develop Drinking Water Safety Plans (DWSPs).

We consider that the information provided in this submission on drinking water quality risks, stakeholder engagement and DWSPs for gate one was good. We expect to see further development of DWSPs, water quality monitoring, including for emerging contaminants, and wider stakeholder engagement with ongoing dialogue with the respective water quality teams in gate two.

#### **4.3.6 Board Statement and assurance**

The evidence provided relating to assurance has been assessed as good. United Utilities has provided a Board statement that indicates:

- its support of submission recommendations for solution / option progression;
- it is satisfied that progress on the solution is commensurate with the solution being construction ready for 2025–30;
- it is satisfied the work carried out to date is of sufficient scope, detail and quality as would be expected for a large infrastructure project of this nature at this stage; and
- that expenditure has been incurred on activities that are appropriate for gate one and is efficient.

This statement is accompanied by an explanation of the approach to assurance and a description of the evidence and information that the Board has relied on in giving the statement.

## 5. Proposed changes to partner arrangements

United Utilities propose to amalgamate the Vyrnwy Aqueduct solution with the United Utilities Sources solution to form a new single solution. This is due to the two solutions being intrinsically interdependent, with either solution becoming unfeasible if they both do not progress. The amalgamation will also bring working and reporting efficiencies.

The solutions both have one sole solution sponsor, United Utilities, under which the same team works on both solutions. Therefore, the proposal reflects a simple combining of work programmes under this team and solution sponsor.

The new solution's total allowance and gate allowances will be formed by combining the two solutions' total allowances and gate allowances from the Final Determination. The Final Determination's total allowance and gate allowances have been amended to reflect this.

We accept the reasoning behind the proposal to amalgamate the two solutions and agree that this takes place for gate two. The total allowance for the new combined solution will be £3,285,000 for gate two (and £21,900,000 across all gates). The name for the new solution will be North West Transfer.

## 6. Actions and recommendations

Where the submission has not been assessed as ‘meeting expectations’ we have provided feedback on where we will seek remediation of the issues. We have also identified specific steps that solution owners should take in preparing for gate two.

We have categorised these remediation issues and steps into priority actions, actions and recommendations.

Priority actions are those that should have been completed at gate one and must now be addressed on a short timescale in order to make sure the solutions stay on track. They require urgent remediation in full and for this reason directly relate to the assessment of delivery incentives set out in this publication. The response to the priority actions will determine whether a delivery incentive is imposed; and the extent to which the delivery incentives can be mitigated by the solution sponsors. If all priority actions are satisfactorily completed then the penalty will not be imposed. If one or more of priority actions are not satisfactorily completed then the whole of the penalty will be imposed.

We have also identified actions that should be addressed in full in the gate two submission. The response to these actions will influence the assessment of the gate two submission.

Recommendations are issues where additional information or clarification could improve the quality of future submissions.

No priority actions have been identified for Vyrnwy Aqueduct, therefore we do not require the solution sponsors to provide us with a remediation action plan. The full list of other actions and recommendations can be found in the appendix.

## 7. Gate two activities

The solution will continue to be funded to gate two as part of the standard gate track.

For its gate two submission, we expect United Utilities to complete the activities listed in [PR19 final determinations: strategic regional water resources solutions appendix](#) as expanded on in Section 15 of its gate one submission.

## 8. Incentives for gate two

For gate two we maintain the same arrangements for incentives as applied in gate one – that is, a maximum penalty of 30% of company’s total efficient gate funding that could be applied to solutions that have not made adequate progress, where work is of inadequate quality, or the submission deadline is missed.

Penalties will be determined on a case by case basis taking into account:

- the level of completeness and the overall quality of the work carried out in investigating and developing the solution based on the evidence summarised in the submission;
- the evidence and justification provided where aspects of the work carried out fall short of expectations; and
- the impact on the decisions and delivery of solutions, including the extent to which deficiencies adversely impact customers.

Penalties will be applied through the PR24 reconciliation mechanism, as described in ‘[PR19 final determinations: Strategic water resource solutions](#)’.

There will be no opportunity to remediate deficiencies identified at the assessment in order to defer penalties.

## Appendix: Actions and recommendations

<b>Actions – to be addressed in gate two submission</b>		
<b>Number</b>	<b>Section</b>	<b>Detail</b>
1	Solution Design	Ensure that further detailed utilisation calculations are undertaken early in gate two in order to feed into the Environmental Impact Assessment (EIA).
2	Programme and Planning	Provide further detailed evidence to support programme plans and identify key milestones.
3	Programme and Planning	Continue to develop assessment of Direct Procurement for Customers (DPC), including detailed assessment of suitability against technical criteria. More clearly evidence the suitability and impact of the solution on DPC assessment.
<b>Recommendations</b>		
<b>Number</b>	<b>Section</b>	<b>Detail</b>
1	Solution Design	Develop and align utilisation with other strategic resource solutions (especially River Severn to River Thames transfer options) and with Water Resources South East modelling outputs.
2	Solution Design	For the gate two stakeholder plan, ensure those that live around Lake Vyrnwy are included in the engagement process.
3	Evaluation of Costs and Benefits	Develop the best value assessment between solutions' sub-options, and link into discussions of best value of this and other enabling solutions for dependant solutions (particularly Severn Thames Transfer).
4	Programme and Planning	Develop the programme plan to demonstrate management of interactions with other solutions (particularly River Severn to River Thames transfer options)
5	Environment	The main submission document needs to be clear on the methodologies and/or frameworks used to calculate, manage and mitigate GHG emissions. Clearly state how approach to carbon management is helping to deliver on WaterUK 2030 net zero route map and is aligned with the sector's ambition on carbon.



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