

January 2021

Strategic regional water resource solutions: Accelerated gate one final decision for desalination

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1. Introduction

The purpose of this publication is to set out our final decision in respect of the desalination strategic regional water resource solution submitted for the accelerated gate one assessment by solution sponsor, Southern Water¹.

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

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 draft decisions on 1 December 2020 and closed on 31 December 2020. We have taken all relevant representations into account in making our final decisions in respect of the desalination solution.

2. Background

In the final determination of the most recent price review (PR19) we intervened to allow up to £469 million for nine companies to jointly investigate and develop strategic regional water resource solutions during 2020-25². This funding is for accelerating investigations and feasibility enabling solutions to be 'construction ready' in 2025-30. 17 strategic solutions were identified for the initial stages of this process including eleven source development options and six water transfer options.

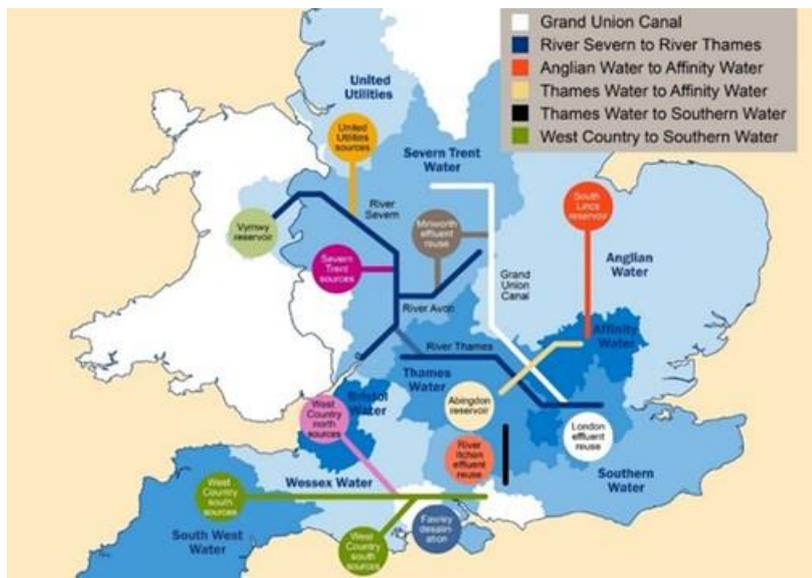
The strategic regional solutions pass through a gated process. The purpose of the gated process is to ensure at each gate that companies are progressing strategic water resource solutions for which funding was allocated at PR19, company costs incurred in doing so are efficient and that solutions merit continued investigation and development during the period 2020 to 2025. There are four gates in the 2020-25 period, the first two relating to design and investigations and the remaining two relating to planning activities.

Gate one activities relate to initial concept design and decision making. At this stage we recognise that solutions may be at different development points. Gate one is therefore regarded as a checkpoint in order to ensure progress is made and rectify any shortcomings prior to gate two. Gate two is a key decision point.

¹ Referred to in PR19 final determination as "Fawley desalination"

² See <https://www.ofwat.gov.uk/publication/pr19-final-determinations-strategic-regional-water-resource-solutions-appendix/>

Figure 2.1 Potential strategic regional water resource solutions



The PR19 total development allowance associated with each gate decision is split in the following proportions: gate one - 10%, gate two - 15%, gate three - 35%, gate four - 40%.

Decisions made at the gates are implemented through an end of period reconciliation mechanism, which was explained in our final determination.

Other solutions may be identified, for example during the development of regional plans, and these can enter the gated process based on RAPID's recommendations to us. They are subject to additional assessment to determine if there is a value in accelerating the solution's development to be 'construction ready' for the 2025-2030 period, whether it needs additional enhancement and regulatory support, and if it provides a similar or better cost / water resource benefit ratio compared to current solutions.

There are two tracks in the gated process.

- standard gates, where timings align with other water resource planning processes; and
- accelerated gates, for solutions that address Southern Water's need for large scale water resources, which occurs earlier than for other companies, in December 2027.

Figure 2.2 Gated process for potential strategic regional water resource solutions



3. Submission assessment process

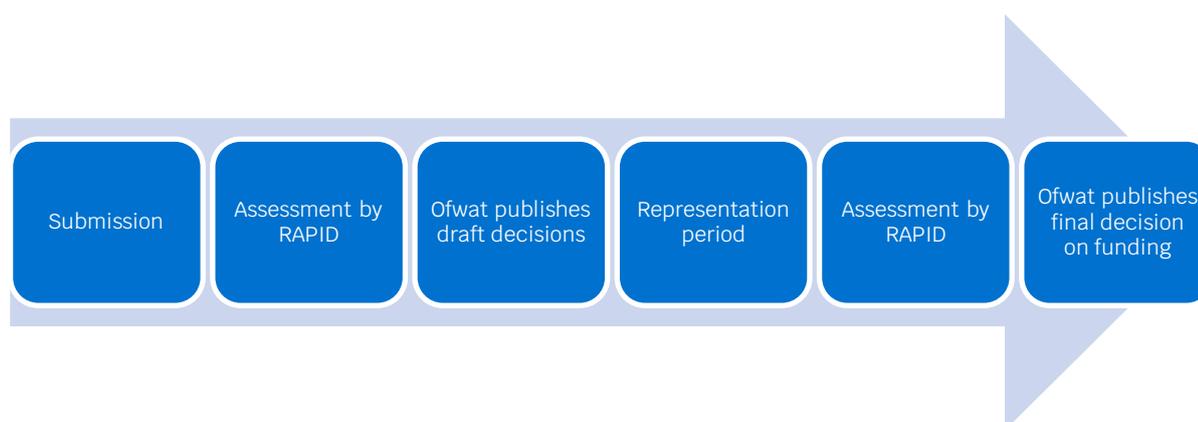
Solution sponsors are required to complete a submission template for each strategic regional water resource solution. The submission template seeks to establish the progress of potential solutions.

At gate one, we make the following decisions for each solution based on the assessment process overseen by RAPID:

- whether the solution should progress through the gated process to gate two;
- whether expenditure has been incurred efficiently and should be allowed in full and – if not – what proportion of expenditure should be allowed;
- if the solution submission is not of sufficient quality or does not demonstrate that sufficient work has been carried out, what level of delivery incentive penalty should apply and what proportion of the penalty can be mitigated through the remediation action plan;
- whether there should be any change to solution partnering arrangements (if requested);
- if new or alternative solution options should enter the gated process (if presented); and
- confirmation of gate two activities.

The assessment process takes place over a number of stages before final decisions are reached, as illustrated below.

Figure 3.1 Submission assessment process



4. Solution background

4.1 Solution summary

In its submission Southern Water presented three options for desalination:

- A1: 75Ml/d desalinated water direct to Testwood Water Supply Works (WSW) (base case);
- A2: 61Ml/d desalinated water direct to Testwood WSW; and
- D1: 40Ml/d of industrial water supplied to a large coastal industrial facility by desalination plant situated within the site boundary of the industrial facility.

Option A1 is the preferred strategy ‘base case’ option from the water resources management plan 2019 (WRMP19). Fawley is the identified location in the base case but Southern Water has identified the need to extend the search envelope for construction sites due to the number of land and marine environmental sensitivities.

Options A1 and A2 comprise seawater abstraction via an offshore submerged and screened intake; a pre-treatment stage; the main desalination plant; treated water conditioning; waste discharge; and transfer to Testwood WSW. It would be the largest seawater desalination system in the UK (the largest currently being a 10.8Ml/d seawater reverse osmosis plant owned and operated by Jersey Water); with the closest UK example being the brackish water desalination plant at Beckton, owned and operated by Thames Water.

Option D1 provides 40 Ml/d desalinated water for industrial use at a large coastal industrial facility. The existing 30 Ml/d supply to this facility is redirected and re-purposed for drinking water supply. The remainder of the flow is provided from recycled water.

Figure 4.1 Desalination schematic



4.2 Solution context

The Section 20 agreement with the Environment Agency sets out how Southern Water will use “all best endeavours” to implement the long-term solution for alternative water resource in order to address deficits arising from reductions in the volume of water that can be abstracted on the River Test and River Itchen, which are reflected in changes to abstraction licences made in March 2019.

The alternative water resource will enable the company to no longer require drought orders from the River Itchen and the Candover boreholes and only to require a drought order or permit from the River Test in extreme drought events (1 in 500 year drought severity).

Southern Water’s WRMP19 sets out the proposals to deliver alternative water resource to meet the Section 20 agreement which include: a 75MI/d desalination plant at Fawley (this solution); water efficiency and leakage reductions; new bulk supplies from Bournemouth Water (20MI/d) and Portsmouth Water (9MI/d); construction of Havant Thicket reservoir and a further 21MI/d bulk supply from Portsmouth Water; extensions to the existing water grid; and water quality schemes.

Two alternative solutions to desalination for meeting Southern Water’s needs are included in the accelerated gated process: water recycling and a raw water transfer from Havant Thicket.

The final solution for delivery may comprise one of these solutions or a combination of these solutions.

4.3 Solution key risks and issues

Southern Water has identified the following key risks associated with this solution:

- It may not be possible to gain the approvals required to locate the intake and outfall structures in The Solent.
- There are multiple environmental and spatial constraints affecting the pipeline corridor from the proposed Fawley site to Testwood creating a risk of objection during the planning process.
- Direction under Section 35 of the Planning Act 2008 might not be made to enable the solution to progress via the Development Consent Order (DCO) consenting process.
- The interaction between the DCO and Direct Procurement for Customers (DPC) is greater than currently assumed, which impacts on timescale for delivery.
- There are currently no sea water reverse osmosis membranes approved for use by DWI under Regulation 31 (materials in contact with potable water).
- There is a risk that customers do not consider water treated by desalination to be wholesome and acceptable.

5. Summary of representations received and our response

5.1 Representations received

We have received the following representations relevant to the desalination solution:

Table 5.1 Summary of representations

Representation from	Summary of key points pertinent to this solution
CCW	<p>CCW supported all draft decisions and recommendations made in respect of this solution.</p> <ul style="list-style-type: none"> • It highlighted the need to comply with the terms of section 20 agreement: “Local stakeholders and communities will wish to see progress being made to protect these precious habitats, and to ensure their water supply is both resilient and sustainable in the longer term. It is therefore important that Southern has a solution in place by the due date”. • It pointed out that, “Given the concerns over the location of the desalination plant and its environmental impacts, it is important that the company explores and assesses the possible mitigations that would support and help facilitate this

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	<p>potential solution going forward. We therefore agree that it should remain on the accelerated track. We support the setting of tight deadlines for the delivery of this work. We also support the challenge that Ofwat has made with regard to the level of expenditure claimed at gate one”.</p>
Salmon and Trout Conservation	<ul style="list-style-type: none"> • Stated that it found it difficult to give any meaningful comments with the very limited information shared publicly, and asked if there are plans for more information and data be made available to the public for future gates. • Stressed that it does not support any delays to the legal deadlines as these are essential for environmental protection.
Southern Water	<ul style="list-style-type: none"> • Considered the penalty of 10% in respect of progress on site selection to be: <ul style="list-style-type: none"> ○ unfair – it stated that the expectation of site selection was not a requirement stated in gate one expectations, and was not raised in any discussions with RAPID; ○ disproportionate – it stated that the draft decision applies one third of the maximum penalty of 30% “based on a single instance of not meeting expectations”. • Disagreed with cost efficiency decision; it said that: <ul style="list-style-type: none"> ○ decisions on efficiency were made ex-post with no prior guidance on costs and no questions asked by RAPID prior to submission; ○ overall, Southern Water has finished around 20% below the allowed gate one costs; ○ lack of guidance regarding definition of costs categories led Southern to include technical consultancy and assurance elements as programme management costs; ○ RAPID’s benchmarking was made on the basis of WCNS costs only (which Southern considered inappropriate), and Southern’s project was much more complex; ○ benchmarking on the basis of individual project components can lead to uneconomic outcomes; ○ modelling was necessary because development funding for desalination and recycling is not covered by base activities; and that the SRO process was the only source of funding available to enable delivery of physical water resource solutions in AMP8. Without this funding Southern would have to carry unfunded development work for activities they “otherwise should have been able to secure via the PR19 process, given that we had an approved WRMP19 and included the associated costs in our PR19 business plan”. <p>Southern also provided additional breakdown of project management costs to support its arguments.</p> • Stated that the draft decision incorrectly summarises clause 11 of the section 20 agreement (all best endeavours), and offered an alternative text. • On priority actions, it confirmed that it will address them as requested, and asked for clarifications on some points.

5.2 Our response

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

5.2.1 Section 20 agreement

Both CCW and Salmon and Trout Conservation strongly supported compliance with the terms of the agreement and compliance with the agreed deadlines.

We allowed funding in our final determination for solutions that are most likely to provide Southern Water with supplies by the end of 2027 in order to support Southern meeting its environmental obligations under its section 20 agreement.

In our draft decision, we identified that the currently planned construction timeline will not allow this solution to be operating by the end of 2027. Southern Water has indicated in its representation that it will take every opportunity to bring forward the delivery date and to recover the programme. We confirm in this final decision that we expect Southern Water's Board to provide effective oversight of its obligations under the section 20 agreement and to ensure that one or more of the solutions included in the gated process are in place and operating by the end of 2027. At gate two, we expect Southern Water's Board to provide assurance that it is satisfied that progress on solutions is commensurate with one or more solutions being in place and operating by the end of 2027.

As described in section 4.2, delivery of one or a combination of the solutions in the gated process is an important element of the proposals set out in Southern Water's WRMP19 to meet the section 20 agreement. There are, however, other elements that it will need to deliver to meet its obligations under the section 20 agreement, which are not part of the gated process. We have made minor amendments to our final decision to reflect that delivery of solution(s) in the gated process by the end of 2027 is only part of the overall delivery of Southern Water's obligations under the section 20 agreement.

Southern Water made representations regarding the operation of Clause 11 of the section 20 agreement. It should discuss these with the Environment Agency.

5.2.2 Availability of information

Salmon and Trout Conservation highlighted that the limited information shared publicly made it difficult to make meaningful comments. We have since discussed this with all owners of solutions funded in PR19 and clarify that we do not expect redactions to be made in future published submissions. We expect Southern Water to engage early with relevant stakeholders as well as customers affected to enable any issues to be resolved in a timely and transparent manner.

5.2.3 Penalty

Southern Water disputed the fairness of the penalty, while both CCW and Salmon and Trout Conservation supported the penalty decision.

In response to points made by Southern Water, we do not agree that the requirement relating to site selection was not identified as a gate one requirement. Although there is no express reference to site selection in the submission template, site selection is clearly an integral part of any project plan to deliver large scale infrastructure. It is an essential pre-cursor to commencing work for securing planning consent and necessary interests in land, and to other gated activities such as environmental assessment.

Southern Water is also incorrect in claiming that the penalty of 10% was determined on the single issue of site selection. Although this is clearly an important issue, as stated in our draft decision the submissions fell short in a number of other areas, the main ones being:

- The currently planned construction timeline will not allow the solution to be operating by the end of 2027.
- There is no information about why the timeline for delivery has slipped beyond 2027, and no plan for recovering the programme slip or proposed mitigation measures.
- A significant amount of work needs to be completed for the environmental assessments.
- There is limited evidence that membrane manufacturers have been engaged to resolve the Regulation 31 approval requirements.

We consider the imposition of a 10% penalty to be fair and proportionate for the reasons given above and are not changing this in our final decision. We note that Southern Water has the opportunity to avoid the penalty by completing all priority actions, and improving its future submissions by addressing actions and recommendations we have listed in each publication document.

5.2.4 Cost efficiency

Southern Water presented a number of arguments against the decision on cost efficiency.

We clarify that the activities required for gate one clearly included “Initial costing and estimating report supported by benchmarking evidence”. The importance of the appropriateness of expenditure and benchmarking was clearly stated in the final determination: “Any spend on activities outside the gate activities for these 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.”

In addition, the submission template for the accelerated gate one asked solution owners to: “Include a breakdown of costs against activities undertaken and evidence of efficiency of spend (such as benchmarking of costs or tenders)”.

In its submission, Southern Water did not present any benchmarking evidence to support its cost efficiency for any of the activities. In response to our query on cost efficiency evidence Southern Water referred us to Annex 19 which, it said, “sets out Southern Water’s approach to identifying the most efficient route for a range of expenditure types, including benchmarking of costs and use of market tenders”. This Annex describes Southern Water’s general approach to procuring services and allocating work common across solutions but does not present any benchmarking evidence.

In the absence of Southern Water’s own benchmarking evidence, the West Country Water Resources submission was the only other dataset available to us at the time. We note that Southern Water references that this solution benefitted from activities undertaken by the other accelerated solutions and the costs allocated to them. We expect accurate costs presented for the activities for each solution and would not expect cross-subsidising of individual solutions. In its representation Southern Water does not provide any further benchmarking evidence, any justification for why the expenditure was efficient, and how the spend presented was wholly appropriate to the gate activities. However, it further breaks down some of the costs and identifies that some elements of its expenditure that we queried was claimed in error. The identification of errors in cost allocations for one component (modelling) following our challenge raises concerns that there may be similar misallocation and reporting in relation to other cost categories.

The reallocation of costs to other categories then makes these components and others stand out as very large for nine months of investigation and feasibility work. It is unclear why over £500,000 was needed for legal advice on the early-stage development of the two solutions, nor how over £380,000 (following reallocation) was spent on assurance, given the progress and quality of the deliverables. We expect all professional fees (including legal and assurance costs) to relate directly and solely to gated activities and not to wider issues regarding the section 20 agreement and/or Southern Water’s WRMP updates. They must be fully itemised and evidenced.

Regardless of the funding mechanism activity is required to progress the solutions to be ‘construction ready’ and then delivered to meet agreed deadlines. It is unclear why new modelling software is necessary for this stage in the process, which is above and beyond what is already needed for submitting business cases in final WRMPs and business plans. Southern have several large scale investments proposed at PR19 (including the Hampshire grid) which would have required detailed behavioural water resource and hydraulic models to develop plans for and to deliver in the AMP. It is unclear why all these costs should be allocated to the two strategic solutions and gated process. These are modelling tools to deliver baseline company activities.

We have decided to leave our decision regarding efficiency of costs for modelling unchanged for the reasons given above.

Southern Water has explained that a significant proportion of £496,955 originally claimed in respect of programme management costs were in fact related to technical consultancy and assurance and that its programme management costs were comparable to those for WCNS. We therefore leave our decision to benchmark programme management costs unchanged.

As explained above, the overall costs incurred on consultancy and assurance are unevidenced and appear high when considering the stage of solution development reached by Southern Water at gate one. Therefore, we have not allowed any additional costs in respect to technical consultancy and assurance included in Southern Water's original submission as programme management. The overall result is that the efficiently incurred cost allowance remains the same as the draft decisions.

6. Solution assessment summary

Table 6.1 Final decision summary

Recommendation item	Desalination
Solution sponsors	Southern Water
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?	No
Delivery incentive penalty?	10%
Is there any change to partner arrangements?	NA
Is there a need for a remediation action plan?	Yes
<p>Funding is allowed for the solution to remain on the accelerated track.</p> <p>Efficient costs allowance for this solution is £1.937 million (of £2.720 million claimed).</p> <p>Delivery incentive penalty will not be applied if the company provides a remediation action plan by 31 March 2021 and all priority actions are satisfactorily addressed by 26 July 2021.</p> <p>Remediation issues are listed in the Appendix categorised as priority actions, actions and recommendations.</p>	

6.1 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 be allowed.

Southern Water proposes that RAPID decides at gate two which option/solution should be progressed further. We clarify that the recommendation for which solution(s) and option(s) should progress beyond gate two is for Southern Water to make, based on the outcome of the assessments completed by that stage. The role of RAPID is to endorse or challenge the recommendation based on the strength of evidence presented.

We are not changing the funding of this solution as proposed by Southern Water to facilitate the development of its proposed additional raw water transfer solution. This solution's total allowance and gate allowances remain the same as the final determination.

6.2 Evidence of efficient expenditure

Our assessment of the efficient costs as spent on gate one activities results in an allowance for this solution of £1.937 million (of £2.720 million claimed).

We have made two adjustments to the costs claimed and we explain our reasons for these adjustments below:

Table 6.2 Gate one cost adjustments

Activity	Claimed expenditure	Allowed expenditure	Adjustment
Water resources modelling and network analysis	£543,536	£132,000	£411,536
Mobilisation and programme management	£496,955	£125,000	£371,955
Total	£1,040,491	£257,000	£783,491

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.

We have identified two areas in particular where we consider expenditure to be inefficient or inappropriate based on the work that has been completed, these are programme management and modelling activities.

Water resources and network modelling and supply demand balance validation overlap with the company's base activities working on development of its next WRMP and regional plan. Southern Water does not clearly justify why additional work in these areas should be included in the accelerated gateway process. The funding for strategic regional water resource solutions was to accelerate the development of these specific solutions and not to fund updates to the tools to be used for future WRMPs or to identify issues or errors in the latest 2019 WRMP. These are baseline company activities and do not form part of this process.

The water resources modelling and network analysis costs for the West Country North Sources solution are only £132,000 compared to the £543,536 for Fawley desalination (£1.087 million shared between desalination and recycling). We note that the modelling costs for Fawley desalination are larger than the total costs for delivering the West Country North Sources joint solution submission (£499,000) and Southern Water's own new proposal (£150,000). Using the West Country North Sources modelling costs as an efficient benchmark we replace the Southern Water costs for this activity with this figure.

The costs for project set up, programme and project management appear very large for what is largely a desk study over a period of approximately nine months. The desalination share of joint mobilisation and programme management costs (£0.994 million) is £496,955. Southern Water made representations to the effect that its programme management costs were in fact comparable to those for West Country North sources because its figure of £496,955 included technical consultancy and assurance. We therefore replace these costs with the costs presented for project management in the West Country North Sources solution, £125,000. We have not challenged the shared project management costs nor the direct project management costs which total £59,129. The total efficient allowed costs for mobilisation, programme and project management for this solution is £184,129.

We have only made two adjustments but further observe that the submission includes limited evidence (such as benchmarking of costs or tenders) to demonstrate that expenditure incurred has been efficient. The list of activities undertaken does not include some key activities expected at this stage, such as an assessment of the potential risks to drinking water quality or customer engagement on acceptability of the different options and the membrane design approval process.

6.3 Completeness and quality of submission – delivery incentives

The aim of the assessment was to determine whether appropriate progress has been made towards delivery of the solution. We assessed to what extent the activity has been completed (completeness) and whether the evidence provided was reliable and consistent (quality). We recognise at this stage solutions may be at different development points and the assessment takes this into account.

In line with the guidance published to companies on 1 June 2020 (and updated on 7 September 2020) we made this assessment against the criteria of:

- solution design;
- costs and benefits;
- risk and programme management;
- consistency and context; and
- assurance and board engagement.

For each criterion we assessed whether or not the submission ‘Meets expectations’, ‘Falls short of meeting expectations in some areas’, ‘Falls short of meeting expectations in many areas’ or is ‘Unacceptable’ before concluding on an overall assessment as part of the gate one decision.

Our overall assessment for the solution submission is that it “Falls short in some areas”, as illustrated in Figure 6.1.

Figure 6.1 Assessment of completeness and quality

Overall:	Falls short in some areas
Completeness:	Falls short in some areas
Solution design:	Falls short in some areas
Costs and benefits:	Falls short in some areas
Risk & Prog. management:	Falls short in some areas
Consistency & context:	Falls short in some areas
Assurance & board engagement:	Falls short in some areas

We have decided to impose a potential delivery incentive penalty of 10%. This reflects that progress on this solution has not been sufficient at gate one in a number of key areas, in particular we are concerned that:

- The currently planned construction timeline will not allow the solution to be operating by the end of 2027, which is necessary to meet Southern Water’s obligations under the section 20 agreement.

- There is no information about why the timeline for delivery has slipped beyond 2027 and no plan for recovering the programme slip or proposed mitigation measures.
- Only one location for the desalination plant has been assessed, despite concerns that have been raised about the viability of the Fawley site.
- There is a significant amount of work that needs to be completed for the environmental assessments.
- There is limited evidence that membrane manufacturers have been engaged to resolve the Regulation 31 approval requirements.

The full delivery incentive penalty for Southern Water is conditional on whether or not it takes prompt action to address the issues we have identified with its submission. The company has the opportunity to mitigate the delivery incentive penalty by addressing the issues identified and listed in the Appendix that need to be completed by 26 July 2021 (“priority actions”). If the company addresses all of the priority actions satisfactorily by this date then the 10% delivery incentive penalty in respect of this solution will not apply. If the company fails to address one or more of the issues by this date then the 10% delivery incentive penalty in respect of this solution will apply in full. This is explained further in section 5.5 below.

As explained in our final determination, the largest penalty across a company’s suite of solutions will be applied to the company’s total gate one allowed efficient expenditure.

Further details of our assessment are provided below.

Completeness

Some elements of the submission are missing or are partially complete; for example, there is limited information relating to the configuration of the solution and options; there has been limited environmental assessments and no consideration of the ‘in-combination’ effects including environmental risks and potential mitigation; and there is no consideration of solution delay impacts.

Solution design

We have included in our assessment of solution design the solution description and technical information about the solution and its water resource benefits.

The solution design has not developed significantly since WRMP19. Three different capacity options for a desalination plant at the Fawley site have been assessed. Although comprehensive detail on the desalination processes has been considered, fundamental questions about where a desalination plant could be located have not been sufficiently addressed. Details of a site selection methodology have been presented but no alternative sites have been identified at this stage. This work should have been completed to enable full delivery of gate one activities as it is a critical element of the solution.

There is limited consideration about how the solution will be operated or maintained, in particular for Option D.1 which includes the partial water recycling component. The preferred operating regime is expected to have implications in terms of the design life, maintenance liabilities and whole life cost calculations.

The water resource benefits are set out in terms of how the desalination options will address the supply-demand balance. There is no water resource benefit assessment completed for Option D.1 and there is uncertainty expressed as to whether this option will develop further.

Evaluation of costs and benefits

Our assessment of the evaluation of costs and benefits considered information provided about the costs of the solution, the social, environmental and economic assessments and how the solution takes into account the carbon challenge.

The estimated development and capital costs have increased from £255 million to £802 million since WRMP19 was published in December 2019. Southern Water indicates this is due to greater clarity in the technical/delivery considerations and inclusion of optimism bias. The operating costs over the 60-year design period have been calculated as £608 million.

Southern Water describes its approach to estimating optimism bias (for capex and opex) and provides evidence that its approach has followed HM Treasury Green Book guidance. The approach to benchmarking, including selection of historic cost data for similar projects, is considered appropriate for a project of this type. Overall, the cost estimating approach described in the submission uses cost data sources and analysis methods that are appropriate for this stage of the solution development.

Carbon emissions estimates (embodied, operational and whole life carbon estimates) have been evaluated using appropriate approaches at this stage, but use inconsistent assumptions regarding flow utilisation.

High-level desk-based environmental assessments have been undertaken but more detailed environmental assessments and certainty of location of solution components are needed to assess the feasibility of options. There are concerns about potential longer-term environmental risk caused by the continued reliance on drought orders and permits beyond the timescale referred to in the section 20 agreement. All areas of environmental assessment need to be developed further.

We consider the analysis has a number of specific deficiencies including:

- There is limited evidence that membrane manufacturers have been engaged to resolve the Regulation 31 approval requirements.

- Inconsistent flow utilisation estimates, which undermine confidence that that option operating costs are correctly calculated for different operating scenarios and that option comparisons on the basis of cost per m³ are consistent.
- It is not clear which factors are included in the final out-turn cost adjustment and whether there is any double counting of allowance for cost uncertainty.
- It is not clear why 60 years has been used for opex and whole life cost calculations. It is noted that the Water Resources Planning Guideline (WRPG) recommends that costs are profiled over at least the next 80 years.
- No environmental or social benefits have been identified in the submission other than 'the provision of a secure water source'.
- Carbon values are inconsistent with those presented for West Country North Sources solution due to different flow utilisation estimates used in different part of the submission. The analysis of whole life carbon did not take into account the impact of future power grid decarbonisation.

Risk and programme management

Our assessment of risk and programme management has considered information relating to the outline project plan, planning considerations, key risks and mitigation measures, drinking water quality considerations and proposed gate two activities and outcomes

Our assessment is that risk and programme management falls short of meeting expectations in some areas.

Southern Water has stated that the delivery of the solution will not be by the end of 2027. However, it does not propose measures to bring it back on track.

The allowance for planning delays does not appear sufficient. This is a major risk given that the evidence suggests that a number of key stakeholders do not support the desalination options.

The programme sets out key milestones but does not provide clear identification of causes of delay or mitigation measures needed to bring the completion date forward. The speed of risk mitigation is concerning, in particular in relation to drinking water quality risks.

Clarity is lacking on plans for the regulation 15 assessment of raw water quality and availability of suitable reverse osmosis membranes approved under regulation 31.

Implications of this solution on the ongoing refurbishment at Testwood WSW should be identified and discussed with the Drinking Water Inspectorate.

Consistency and context

Our assessment of consistency and context has considered information relating to the interaction of the solution with other solutions, an explanation of how this solution will meet the requirements set out in the National Framework and regional plans and a comparison of the costs and benefits of this solution with those of other solutions. Information regarding stakeholder engagement has also been taken into account in our assessment.

Our assessment is that consistency and context falls short of meeting expectations in some areas.

The flow utilisation estimates used in both the operating cost and carbon estimates are different to the flow utilisation estimates produced by Southern Water's scenario modelling and this inconsistency has been confirmed by Southern Water in its response to queries raised by the assessment team.

The quality of stakeholder/customer engagement should be improved. The evidence presented is a high-level generic assessment copied across all of the Southern Water submissions (desalination, recycling and additional solution). Most of the evidence focuses on desalination as a general topic but there is no specific reference to stakeholder engagement regarding the Fawley site or options. More work is required to better understand customer acceptability and improve stakeholder engagement.

Assurance and Board engagement

The evidence provided relating to assurance is largely of sufficient detail and quality for this stage of the gated process. However, there is insufficient detail of assurance of allowed costs against the final determination allowed activities and of efficiency of costs.

The submission contains sufficient information on how the board was involved, including assurance statements and signed endorsements.

Information on future plans for board engagement would further improve future submissions.

We expect the Board to provide effective oversight of Southern Water's obligations under the section 20 agreement and to ensure that one or more solutions are in place and operating by the end of 2027. The volume of alternative water resource delivered by these solutions must be such that Southern Water no longer requires drought orders from the River Itchen and the Candover boreholes and only requires a drought order or permit from the River Test in extreme drought events (1 in 500 year drought severity) as provided for in the section 20 agreement.

Future plans for board engagement must provide for this oversight by the Board. We expect Board assurance for gate two to include a statement that the Board is satisfied that progress on solutions is commensurate with solutions being in place and operating by the end of 2027.

6.4 Proposed changes to partner arrangements

Southern Water is expecting to work independently in delivering the desalination option.

6.5 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 categorised the remediation issues 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 require remediation 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. All priority actions, actions and recommendations are listed in the Appendix.

We expect the solution sponsors to provide us with a remediation action plan by 31 March 2021 setting out how the priority actions identified will be resolved. If all priority actions are completed to a suitable quality by Monday, 26 July 2021, the delivery incentive penalty will not be applied. The full list of priority actions, 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 accelerated gate track.

For its accelerated gate two submission, we expect Southern Water to complete the activities listed in [PR19 final determinations: strategic regional water resources solutions appendix](#), as expanded on in relation to some activities in its gate one Submission Annex 20. Activities we consider to be of particular importance are listed as actions in the Appendix.

8. Incentives for gate two

Only Southern Water included proposals on incentives for gate two in its submission, which include maintaining the 30% maximum penalty and apportioning it equally across all assessment criteria.

In our view, assigning an equal percentage of penalty to each assessment criterion may not reflect the relative importance of the element being assessed and could detract from maintaining the focus on achieving outcomes. For the accelerated gate two, we therefore maintain the same arrangements for incentives as applied in the accelerated 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 an adequate progress, are of inadequate quality, or miss the submission deadline.

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'.

At gate two, we expect all solutions to achieve sufficient alignment in their development to support multi-solution decision making. For this reason, there will be no opportunity to remediate deficiencies identified at the assessment in order to defer penalties.

Appendix: Remediation issues

Priority actions – to be addressed by 26 July 2021		
No	Submission template section	Detail
1	2	Confirm whether or not the alternative site locations that have been considered in Annex 8 should be included as additional options for the desalination solution. Undertake urgent site selection in advance of gate two (including the development of a dedicated desalination facility on the site of the industrial customer (Option D.1)) to enable site specific assessments to progress as part of gate two investigations.
2	3	Consider whether your WRMP19 needs amending and if so how. Explain the reasoning for this in light of potential changes to your best case plan, delivery times and costs for the solution.
3	3	Provide information about why the timeline for delivery has slipped beyond 2027. Provide a plan for recovering the programme slip, including a revised plan which mitigation measures to deliver alternative water resource by end 2027. This should include: <ul style="list-style-type: none"> • the measures that are needed to meet 2027 timescale • more detail of pre-construction activities and critical path activities (such as DWI engagement on membranes approvals and site location confirmation) and decision points • a clear statement to confirm any missing information and the potential impact this could have on the programme • consideration of solution delay impacts with reference to having an operational solution by the end of 2027 details of regulator engagement and review points • clarification of the date of tender award. Different dates have been shown in different areas of the submission.
4	14	Provide more information on cost including identification of activities which should have been undertaken by gate one but have not been completed.
Actions – to be addressed in gate two submission		
Number	Submission template section	Detail
1	2	Provide a 'conceptual design report developed in consultation with all regulators, to meet gate two requirements and timescales. Include a recommendation for which solution should progress beyond gate two, based on the outcome of the assessments completed by that stage.
2	2 (and relates to many other sections)	Conclude site selection process as detailed in Annex 9.1 in consultation with the Environment Agency and Natural England, to meet gate two requirements and timescales. This should include the associated environmental, water resource and drinking water assessments, including consideration of a dedicated desalination facility on the industrial customer's site.

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3	2	<p>Provide a clear summary of the water resource benefit (DO) of each option including the conjunctive use benefits. The operational and utilisation assumptions for each benefit should be clear.</p> <p>The assumed drought scenario used to calculate the benefits should be made clear including why you appear to present these for a 1-in-200 year scenario whilst your emergency drought order level of service is 1-in-500 year. The output of a solution for a 1 in 500 year scenario will need to be calculated to support achieving the 1 in 500 year emergency drought order level of service.</p>
4	2	<p>Provide summaries of the further development of Strategic Environmental Assessment, Habitats Regulations Assessment, Water Framework Directive assessment, Natural Capital Assessment, Environmental Social and Economic Valuation and Environmental Net Gain, that have been discussed and agreed with the Environment Agency, Natural England and any other relevant regulators, to meet gate two requirements and timescales.</p>
5	2	<p>Provide more information about risks related to water quality. We expect to see substantial progress made towards an approved membrane for the non-industrial site related options.</p>
6	4	<p>Provide a summary of the potential impact that the desalination options could have on the supply-demand balance. This should also include the impact on any current options or programmes within the WRMP19 or AMP7</p>
7	5	<p>Testwood WSW site is currently the subject of a statutory legal instrument to carry out significant refurbishment works. Implications of this solution on the ongoing refurbishment at Testwood WSW should be identified and discussed with the Inspectorate.</p>
8	5	<p>Remineralisation and blending of desalinated supplies is necessary prior to distribution to reduce aggressivity and address customer concerns regarding taste and odour. We would expect that these issues are well understood and require suitable solution design to be addressed to mitigate these risks at the gate two submission.</p>
9	5	<p>Provide a programme of raw water sampling throughout the period, to enable appropriate siting and design of the plant.</p>
10	5	<p>Provide details of an 'Evidence Planning Strategy, which has been discussed and agreed with the Environment Agency and Natural England, to meet gate two requirements and timescales. Baseline methodologies and scopes to inform survey work needs to be agreed as a priority.</p>
11	6	<p>Undertake a procurement strategy assessment including DPC eligibility assessment and value for money analysis. Include in this assumptions with respect to who would operate the solution under both the DPC and traditional delivery model.</p>
12	8	<p>Provide more information about stakeholder engagement and the understanding of customer acceptability including</p> <ul style="list-style-type: none"> - for individual options and sub-options - on issues that could cause delay - how the views of vulnerable or harder to reach stakeholders and customers will be sought.

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13	9	<p>Develop a fuller risk assessment that explores the areas of uncertainty associated with this solution. This should include:</p> <ul style="list-style-type: none"> - A clearer relationship between mitigation measures and residual risks - Greater clarity on the scoring criteria applied - More direct read-across to the dashboard risks - Clarity on the status of risks that are mentioned elsewhere in the submission but not in the risk register such as the risk of a negative impact on agricultural productivity introduced in Annex 4.
14	12	<p>Future plans for board engagement must provide for effective oversight of Southern Water's obligations under the section 20 agreement and to ensure that one or more solutions are in place and operating by the end of 2027. We expect Board assurance for gate two to include a statement that the Board is satisfied that progress on solutions is commensurate with solutions being in place and operating by the end of 2027.</p>
15	14	<p>Provide total gate expenditure and activity breakdown costs in a common cost base. These costs should be presented in 2017-18 prices.</p>
Recommendations		
Number	Submission template section	Detail
1	4	<p>Please clarify what factors are included in the final out-turn cost adjustment included in the indirect capex estimates and whether there is any double counting of allowance for cost uncertainty included under the risk assessment and optimism bias assessment.</p>
2	4	<p>Correct the inconsistency confirmed in clarification response (SRN020 Western Grid Minimum Flows) to demonstrate that option operating costs are calculated correctly for different operating scenarios and therefore options are being compared consistently.</p>
3	4	<p>The estimated capex for desalination options has increased since WRMP19. Please clarify which cost components have increased and the reasons for the change</p>
4	4	<p>To aid comparison with other WRMP options provide the Average Incremental Costs (AIC). Please clarify why 60 years has been used for opex and whole life cost calculations. It is noted that the Water Resources Planning Guideline (WRPG) recommends that costs are profiled over at least the next 80 years.</p>
5	5	<p>Provide both operational carbon emissions and carbon intensity using the same throughputs as used for the opex and whole life cost per m3 presented in Annex 12 (i.e. as a whole life carbon per m3 or ML using the expected flows over 60 years). However, the expected flows used in both cost and carbon analysis should be consistent with the flows stated in Annex 7 Strategic Modelling. Include a clarification of whether operational carbon emissions calculations take into account the future decarbonisation of the power grid.</p>
6	7	<p>Provide further detail on the planning risks and the planned mitigation measures.</p>
7	12	<p>Provide information on future plans for board engagement to improve future submissions.</p>

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8	12	Provide information on future plans for board engagement and a compiled summary/log of assurance findings with actions taken.
9	14	Provide a breakdown of the costs to gate two that is consistent with the scheduled activities for gate two.

**Ofwat (The Water Services Regulation Authority)
is a non-ministerial government department.
We regulate the water sector in England and Wales.**

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