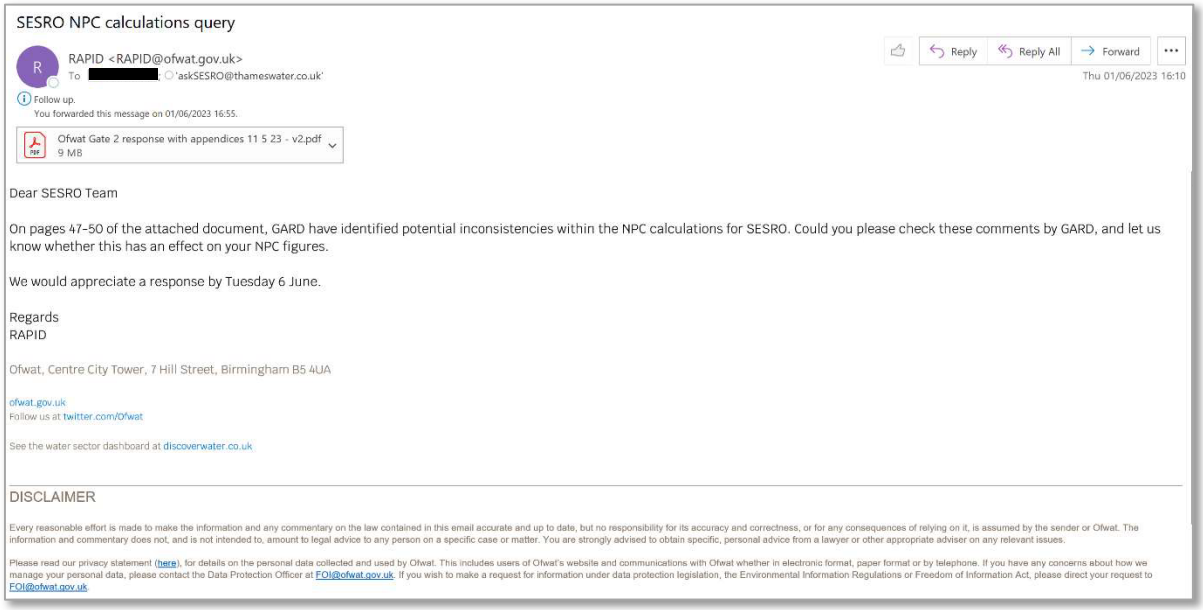
Gate two query process

Strategic solution(s)	South East Strategic Reservoir Option (SESRO)
Query number	N/A
Date sent to company	01/06/23
Response due by	13/06/23

Query

This information is provided in response to a request from RAPID, regarding representations made to them by the Group Against Reservoir Development (GARD) on RAPID's draft assessment report on the SESRO Gate 2 submission.



SESRO NPC calculations query

RAPID <RAPID@ofwat.gov.uk>
To [redacted] 'askSESRO@thameswater.co.uk'

Reply | Reply All | Forward
Thu 01/06/2023 16:10

Follow up.
You forwarded this message on 01/06/2023 16:55.

Ofwat Gate 2 response with appendices 11 5 23 - v2.pdf
9 MB

Dear SESRO Team

On pages 47-50 of the attached document, GARD have identified potential inconsistencies within the NPC calculations for SESRO. Could you please check these comments by GARD, and let us know whether this has an effect on your NPC figures.

We would appreciate a response by Tuesday 6 June.

Regards
RAPID

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Pages 47 – 50 of the representation covers a series of issues, as follows:

1. Cost transparency, particularly errors in the calculation of the NPC figures presented in Thames Water's tables;

2. Errors in the calculation of costs;

3. Issues with the calculation of "true total costs" for all SROs.

The last of these three issues is not addressed in this response, as it remains a methodological issue to be addressed by RAPID and Ofwat, as required.

Solution owner response

This response has been written in line with the requirements of the RAPID Gate 2 Guidance and to comply with the regulatory process pursuant to Thames Water's and Affinity Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented in the Gate 2 documents be taken forward, Thames Water's and Affinity Water's will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This response should be read with those duties in mind.

Cost Transparency

Thames Water has made every effort to provide information requested by stakeholders in a timely and transparent manner. We have published all of our regulatory requirements within the required timescales. Where additional information has been requested by stakeholders, we believe that this has been provided in a timely and transparent manner.

We received a number of requests from GARD for additional information on our draft WRMP, including for a request on the 15th January to provide a worked example of the calculations of the financing costs for the SESRO 100Mm3 option. The worked example was provided on the 14th April which was in advance of the 30th April extended deadline Thames Water provided GARD to submit their response to our draft WRMP and the 11th May requirement from RAPID for all stakeholder representations to the SRO Gate 2 draft decisions.

Errors in the calculation of costs

Issue 1: "Thames Water did not include depreciation on Costed Risk in their SESRO NPC calculation"

We appreciate that the cost information available to stakeholders may be confusing, due to the number of different plans and documents available at the same time. We apologise if this has caused confusion, but it is not symptomatic of inconsistencies or errors. There are necessary differences between the data presented by WRSE or in the draft WRMPs and that presented at gate 2 by the

SRO submissions. This is not intended to confuse or reduce data transprency but is largely a function of slight methodological differences between these three sources.

The NPC calculations presented at gate 2 were derived using the methodology prescribed by the Water Resource Planning Guidelines. A template was developed by the Environment Agency, to populate the contents of Table 5a/5b, which was then provided to RAPID as part of the gate 2 submission. The approach taken for gate 2 is aligned to the EA water Resource planning guideline.

We have not been made aware of any assurance failures in the application of this methodology by either RAPID or the Environment Agency. It is worth noting that this template does not explicitly require the inclusion of depreciation on costed risk to derive the indicative NPC values; the prescribed methodology issued by the EA for completing these tables doesn't explicitly articulate how risk should be treated.

However, in the draft WRMP, risk has been depreciated over 100 years. This is slightly different to the approach taken within the numbers in our gate 2 report. This is due to a slight difference in approach between the SRO team, in completing the tables as requested by RAPID and the EA, and the approach taken by WRSE and the WRMP team in appraising the options against alternatives for the strategic plans. The approach adopted by the SESRO SRO team is consistent with that applied for all other Thames Water SROs in submitting the data tables for gate 2.

However, the critical issue that should be noted is that the NPC values presented at gate 2 are not used as a principal data source in comparing between options in the derivation of the WRSE and WRMP plans. They are provided to enable very simple comparison between options, but take no account of either the timing of implementation or the utilisation of those options over the WRMP planning period. It is for this reason, that the WRSE investment modelling system, as used to derive the Best Value Plan, uses the original capex, opex, costed risk and optimism bias data for all of the possible options to derive accurate net present cost information which is subsequenly used to compare between alternative investment programmes.

In the WRSE investment model, capex is transformed into an annuitized cash requirement. The cashflow requirements entailed by capital expenditure are split into net book value (expenditure, including depreciation at a rate determined by asset class, which also determines the rate of 'repeat' capex, e.g. the need to replace pumps every 20 years across a 250-year reservoir asset life), and return on capital (either through debt or equity, using an overall WACC figure). This total is averaged across the asset's life, and it is this annuitized

figure which the investment model considers when optimising programmes. This annuitization simplifies the option appraisal process by meaning that annuitized capex can be added to opex when considering the total monetary requirement in each year (this total requirement is discounted subject to green book guidance). In the WRSE modelling and hence explicitly built into the best value planning methodology, costed risk is included in the depreciated assets (unlike non-depreciated land and planning).

Therefore, although there may be disagreement on the exact methodology used to derive the indicative NPC values used in the gate 2 report, these will be immaterial to the choice of options within the WRMP.

Proposed corrective action for gate 2	None required
Justification	The data provided at gate 2 complies with the required methodology for gate 2 and for the provision of data into WRSE and WRMP24.

Issue 2: "…the clearest deficiency in the NPC methodology when used to evaluate projects with a long life, is that it just cuts off after 80 years…"

The NPC calculations presented at gate 2 were derived using the methodology prescribed by the Water Resource Planning Guidelines. A template was developed by the Environment Agency, to populate the contents of Table 5a/5b, which was then provided to RAPID as part of the gate 2 submission. The approach taken for gate 2 is aligned to the EA water Resource planning guideline. However, as noted for issue 1, these NPC values presented at gate 2 are not used as a principal data source in comparing between options in the derivation of the WRSE and WRMP plans.

The appraisal of option costs by WRSE is undertaken using a consistent methodology and appraisal period based upon the capital and operating costs of each option over the appraisal timeline, in accordance with the requirements of the Environment Agency's Water Resources Planning Guidelines. This is known as the EBSD method.

The EBSD method of capex cost annuitisation is recommended in the guidance specifically to take into account asset costs and benefits that will occur beyond the WRMP planning horizon. This assessment over a common appraisal period makes the assessment of assets of different lifespans comparable, by annuitising costs across the entire life of each asset. This is the method used for option comparison for the WRMP.

Proposed corrective action for gate 2	None required

Justification	The data provided at gate 2 complies with the required methodology for gate 2 and for the provision of data into WRSE and WRMP24.

Issue 3: "Another bias in the NPC calculation, which acts to favour Reservoir options over other SROs, arises because longer construction period and later operation start date."

The operational costs of an option are assumed to start once it has been commissioned. Operational costs before this date are largely negligible and hence not taken into account in the comparison between options.

To the second point raised, regarding when capex costs and associated depreciation is applied to assess programme level NPC, the key point of note is that the gate 2 NPC data is not used by WRSE or by the WRMP to make comparative assessments between options. This is done within the WRSE Investment Model.

Within the WRSE investment modelling approach, any asset can be selected in any year from the earliest start date defined, hence any option could be commissioned the same year as SESRO is in the plan, and the relative costs of both would have been calculated in a consistent way by the model, and appraised in parallel with exactly the same operation start date.

To add a level of details to this, the WRSE Investment Model begins annuitised capex payments from the start of selection (*i.e. at the start of the planning period when the need to implement an option is decided*), not the start of operation. This would mean it is preferable to have a short construction period. Options with a long construction period must incur the annuitised capex for the whole construction period (and at lower discount factors) before realising the DO benefit.

Therefore, the apparent bias to SESRO due to longer construction periods, as identified by GARD's representation on gate 2, are in fact quite the opposite; the WRSE investment modelling methodology would actually result in costs being incurred for an option with a longer construction period prior to any DO benefit actually being realised, thereby making this option look less favourable then options with shorter construction periods.

Proposed corrective action for gate 2	None required

Justification	The data provided at gate 2 complies with the required methodology for gate 2 and for the provision of data into WRSE and WRMP24.

Issue 4: "The start year for discounting the 80-year time frame for Abingdon is 2022-23. In contrast, the start date for STT is 2024-25."

As noted above, the NPC calculations presented at gate 2 were derived using the methodology prescribed by the Water Resource Planning Guidelines. A template was developed by the Environment Agency, to populate the contents of Table 5a/5b, which was then provided to RAPID as part of the gate 2 submission. They are provided to enable very simple comparison between options, but take no account of either the timing of implementation or the utilisation of those options over the WRMP planning period.

Such timing issues are addressed in the WRSE investment modelling system, which uses a whole hoizon optimisation approach to ensure that the optimal combination and timing of options is selected across the plan period. The exact timing and utilisation of the options in the WRSE programme determines the NPC for the plan as a whole, which enables the selection of the best value combination. The WRSE investment modelling system does not use the gate 2 NPC data as a base dataset for comparison between options.

Proposed corrective action for gate 2	None required
Justification	The data provided at gate 2 complies with the required methodology for gate 2 and for the provision of data into WRSE and WRMP24.

Issue 5: "Abingdon Reservoir plans do not appear to have been worked on for many years. Specifically, the cost estimates appear to be based upon high level work done several years ago. We anticipate an increase in these costs analogous to the increase in the Thames Tideway Tunnel, when costs doubled from £2bn to £4bn when detailed work was done after the project was approved."

At Gate 1, estimates of base Capex and Opex were derived following the guidance given in the ACWG cost consistency method. The capital cost estimates were primarily based on refinement of those developed for previous WRMP submissions. The WRMP09 cost estimate was developed as a 'bottom-up' contractor's estimate, and this same cost estimate has been reviewed, refined and utilised for Gate 1. This means that the costs provided at Gate 1 (as per previous WRMP option costings) were based upon a high degree of detail, being

based upon a contractor's bottom-estimate and outline construction phase programme. Additionally, the costed risk register was updated to reflect the Gate 1 design and environmental appraisal, to provide an updated estimate of the P50 risk. Optimism Bias was calculated alongside the costed risk analysis, as detailed in the ACWG Cost Consistency Methodology, resulting in a scaled back Optimism Bias figure. In combination, therefore, due to this maturity of the scheme, the SESRO costs at Gate 1 already reflect a high degree of engineering and risk definition compared to other water resource options.

At Gate 1, we undertook an independent cost benchmarking exercise on the capex costs. Jacobs were requested to prepare an independent Capex cost benchmark against the notional solutions for the South East Strategic Reservoir Option (SESRO) Strategic Resource Option (SRO) in support of the RAPID Gate 1 submission. The cost benchmark is based upon the reference design and quantities prepare by Jacobs in 2009. The Capex benchmark was primarily undertaken by Bam who have reviewed the unit rates for the civils aspects of the project. Some of the larger M&E elements were benchmarked by ChandlerKBS using UK Water Company data, adjusted to the South East region. Over 70% of the principal items associated with the scheme were benchmarked. Overall, a variance of just over 5% was found between the SESRO base capex estimate and the benchmark position. The same approach to the bottom-up cost estimate has been used at Gate 1 and Gate 2, and therefore the benchmarking carried out at Gate 1 is still considered applicable to the Gate 2 cost estimate. Further review is planned to take place at the next stage of design development, to inform Gate 3.

At Gate 2, the engineering design and costs for the SESRO scheme were reviewed and refined. As defined in SESRO Gate 2, Supporting Document A-2, a number of changes were applied to the cost build-up to provide the latest estimates. As well as updating quantity estimates for key components of the 150Mm3 scheme, the quantities for the other SESRO size variants have been estimated for all cost items.

Overall, at Gate 2, these changes resulted in an increase in the base capital cost for the SESRO variants following updates to quantity estimates. The changes are summarised in Gate 2, Supporting Document A-2, amounting to an increase of between ~6% and ~8% for the single phase variants. The key risks within the Quantitative Costed Risk Assessment were revisited with expert judgement used to estimate the likelihood of occurrence and the potential minimum and maximum cost impact.

Therefore, the costs have not varied on SESRO due to the maturity and detail in the original estimate. However, this estimate has been reviewed and updated regularly throughout the process to ensure that the base scope, associated

quantities, costed risk and optimism bias all reflect the latest design iteration of the project.

However, notwithstanding the confidence we have in our current cost estimate, to help validate our approach we have consulted with Portsmouth Water regarding the cost estimation for their Havant Thicket Reservoir. There were a number of documented changes that they experienced in estimated costs between concept design stage and contract award and we felt it was relevant to understand these to determine if they were relavant for SESRO. They did experience some upward cost drivers that we cannot accurately account for (such as unforseen and very high inflationary pressures) but our discussions with Portsmouth Water enable us to have confidence that the critical upward cost drivers they experienced should be adequately mitigated for SESRO. The maturity of our estimate is consistent with the current stage of the project (Option stage), which is also reflected in our approach to Costed Risk and Optimism Bias at this stage.

Therefore, we do not envisage that the costs will excalate significantly beyond the current estimate, largely due to the maturity and level of detail of the original estimate supported by the regular review and cost benchmarking exercises that have been carried out. Costs will continue to be reviewed and refined as we approach RAPID Gate 3.

Proposed corrective action for gate 2	None required
Justification	The cost estimate provided at gate 2 is robust and appropriate for the current stage of scheme design.

Overall conclusions

We do not believe that the comments made by GARD have a material effect on the NPC figures for SESRO, as presented at gate 2. Therefore, we do not think any changes are required. However, we do accept that there may be philosophical differences of opinion regarding the exact NPC methodology applied and would seek clarification from RAPID on the methodology and template(s) to be followed for gate 3 to address any such issues.

However, as stressed throughout this response, the critical issue is that the NPC values presented at gate 2 are not used as a principal data source in comparing between options in the derivation of the WRSE and WRMP plans. They are provided to enable very simple comparison between options, but take no account of either the timing of implementation or the utilisation of those options over the WRMP planning period. It is for this reason, that the WRSE

investment modelling system, as used to derive the Best Value Plan, uses the original capex, opex, costed risk and optimism bias data for all of the possible options to derive accurate net present cost information which is subsequenly used to compare between alternative investment programmes.

Therefore, we recognise that there may be disagreement over the exact methodology used to derive the indicative NPC values used in the gate 2 report, but these are immaterial to the choice of options within the WRMP.

If you require any further information or clarification on any of the preceding matters, please let us know.

Date of response to RAPID	13/06/23
Strategic solution contact / responsible person	[redacted] AskSESRO@thameswater.co.uk