Gate two query process

Strategic solution(s)	London reuse
Query number	LOR006
Date sent to company	15/12/2022
Response due by	19/12/2022

Query

1. Please provide more information for the carbon assessment:

- A discussion on how a focus on carbon has helped to mitigate the solution costs.
- A discussion on the range and impact of uncertainties and a plan to mitigate them.

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 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 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.

A discussion on how a focus on carbon has helped to mitigate the solution costs.

Through the Gate 2 stage the design development has considered and assessed both embodied and operational carbon impacts. This has directly influenced the design and hence costs. For example for the Teddington DRA option we reduced the diameter of the conveyance tunnel from Mogden to Teddington from 3.5m diameter to 1.8m diameter between Gate 1 and Gate 2, thus reducing the embodied carbon impact from the scheme. (*see Annex A5, Cost & Carbon report Teddington DRA, section 6; The journey from Gate 1 to Gate 2*)

Work at Gate 2 examined the frequency and duration of scheme operation and included the development of a stand-by mode of operation for schemes. This included developing the hydraulic profiles through the proposed treatment stages and conveyances with a focus on developing the solutions to be efficient, thereby reducing operational carbon impacts (*see paragraphs 3.30 to 3.33 of the Gate 2 report*). Furthermore, full information of the design evolution of schemes is contained in each concept design report (*see annex A1-A4*).

The Capex, Opex, Costed Risk, OB and Carbon values were calculated and reported in the requirements set-out by Water Resources South-East (WRSE) for investment plan modelling. Carbon, cost, costed risk, and optimism bias were all calculated using methods set out in All Company working Group (ACWG). Carbon values are considered in the modelling as an integral component of the options and decision making takes account of the varying carbon impacts between options (*see paragraph 6.53 to 6.58 of the Gate 2 report*). The WRSE investment modelling approach also accounts for the social cost of carbon emissions in its calculation of net present value, and so in finding 'least cost' solutions the impact of carbon emissions on society is considered. This incorporates factors such as decarbonisation of the grid.

Our Gate 2 report, paragraph 6.58 and Table 6-2 summarises potential carbon mitigation and reduction approaches and is aligned to the '*ACWG Carbon Ambition: SRO low capital carbon alternatives'*, published by the ACWG in December 2022. It identifies key capital carbon hotspots (and chemicals) for the types of SROs being considered. We have aligned mitigation approaches in Table 6-2 with those of the ACWG identified carbon hotspots for 'Desalination and Reuse SROs' for embodied and operational carbon emissions.

A discussion on the range and impact of uncertainties and a plan to mitigate them.

At this early stage of the project definition process the range and impact of uncertainty is acknowledged and whilst some scope requirements are largely fixed, there remains the opportunity and there is still sufficient optioneering time to 'design out' further embodied carbon.

In Gate 3, optioneering will be undertaken for the proposed solution that will include further process and hydraulic assessment, chemical usage and power usage to derive operational Carbon alongside optioneering of the physical infrastructure requirements and consequential embodied carbon. Assessment in optioneering will include a TOTEX assessment approach including Carbon and follow the PAS 2080 strategy set out at Gate 2. This will maximise alignment with the Water UK Net Zero 2030 Routemap by following the emissions hierarchy when deciding which approach to prioritise to mitigate emissions.

Key uncertainty to be addressed at Gate 3 is minimum flow in stand-by mode, we shall be assessing process and hydraulic design to achieve the required plant reliability with a focus on achieving least flow throughput to reduce operational carbon impact during stand-by mode. This will include assessing minimum pass forward flow through the conveyance in this operational phase.

If you require any further information please contact the strategic solution contact below

Date of response to RAPID	19/12/2022
Strategic solution contact / responsible person	[redacted]