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# Strategic regional water resource solutions: Preliminary feasibility assessment

Gate one submission for Thames Water to Southern Water Transfer

Date: 05 July 2021



from  
Southern  
Water 

# Glossary

Acronym	Terms to use / Definition
AA	Appropriate Assessment - under the Habitats Regulations
ACWG	All Company Working Group
AIC	Average Incremental Cost
AMP	Asset Management Plan
AONB	Area of Outstanding Natural Beauty
BBOWT	Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust
BNG	Biodiversity net gain
BNL	Biodiversity net loss
CAP	Competitively Appointed Provider
CCG	Customer Challenge Group – a regional CCG has been established by WRSE
CCW	Consumer Council for Water
CEB	Chemically Enhanced Backwash
CEC	Contaminants of Emerging Concern
CEMP	Construction and Environmental Management Plan
CO <sub>2</sub>	Carbon Dioxide
CPO	Compulsory Purchase Order
DAF	Dissolved Air Flootation
DCO	Development Consent Order – planning under the Planning Act 2008
Defra	Department for Environment, Food and Rural Affairs
DI	Ductile Iron
DO	Deployable Output
DPC	Direct Procurement for Customers
DWI	Drinking Water Inspectorate
DYAA	Dry Year Annual Average
EA	Environment Agency
EES	Thames Water's Engineering Estimating System
EIA	Environmental Impact Assessment
ENG	Environmental Net Gain
ERD	Energy Recovery Devices
FD	Ofwat Final Determination
FEPS	Final Effluent Pumping Station
GAC	Granular Activated Carbon
HE	Historic England
HIOWWT	Hampshire and Isle of Wight Wildlife Trust
HRA	Habitat Regulations Assessment
ICA	Instrumentation Control and Automation
INNS	Invasive Non-Native Species
IP	Infrastructure Provider
JV	Joint Venture
London Effluent Reuse SRO	London Effluent Reuse strategic resource option – this includes 4 schemes to Gate 1
LSI	Langelier Saturation Index
MI/d	Mega litres per day
NAU	National Appraisal Unit (made up of the EA and NE)
NC	Natural Capital
NE	Natural England
NPS	National Policy Statement - under the Planning Act 2008
NPV	Net Present Value

Acronym	Terms to use / Definition
NSIP	Nationally Significant Infrastructure Project - under the Planning Act 2008
OBC	Outline Business Case (DPC related)
PA2008	Planning Act 2008
PR19	Price Review 2019
PS	Pumping Station
RAPID	Regulatory Alliance for Progressing Infrastructure Development
RGF	Rapid Gravity Filtration
RQP	River Quality Planning
RW	Recycled Water (water treated from the AWRP)
SEA	Strategic Environmental Assessment
SESRO	South East Strategic Reservoir Option
SEW	South East Water
SRO	Strategic Resource Option
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STT	Severn Thames Transfer
STW	Sewage Treatment Works
T2ST	Thames to Southern Transfer
tCO <sub>2</sub> e	Carbon Dioxide equivalent (metric tons)
WBS	Work Breakdown Structure
WFD	Water Framework Directive
WRMP19	Water Resource Management Plan 2019
WRSE	Water Resources South East
WTW	Water Treatment Works

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# 1 Executive summary

- 1.1 The work undertaken to Gate 1 has confirmed that there are six feasible options to transfer water from Thames Water’s area to Southern Water’s Hampshire zones for the Thames to Southern Transfer (T2ST) Strategic Resource Option (SRO). These options are summarised in Table 1. There is no preferred option at this stage. Further work is required prior to Gate 2 to select a preferred option.
- 1.2 These proposed options all require a new source of water from Thames Water’s area. The source of water will be either the Severn Thames Transfer (STT) and/or South East Strategic Reservoir Option (SESRO) schemes and no other sources have currently been identified.
- 1.3 The required capacity of the scheme is dependent on the output from the Water Resources South East (WRSE) regional water resources plan. At this stage a range of 50MI/d, 80MI/d and 120MI/d capacities have been investigated for all six feasible options. This is higher than the 100MI/d capacity referenced in the Final Determination and has been proposed following consultation and agreement with the regional planning team. Following feedback received in April 2021 from WRSE, it was agreed that a larger 200MI/d capacity option should also be investigated and inputted into the regional modelling. This 200MI/d option is currently being developed for the six feasible options but has not been included into this report due to the timing of the WRSE feedback.

*Table 1: Summary of feasible options at Gate 1 for T2ST SRO*

Option	Description	Key components
1	Potable water transfer from SESRO or STT at Culham to Otterbourne.	New Water Treatment Works at Culham, 76.5km pipeline with additional 7.1km Kingsclere spur main and 8.9km Andover spur main.
2	Raw water transfer from SESRO or STT at Culham to Otterbourne.	76.5km pipeline with additional 7.1km Kingsclere spur main and 11km Andover spur main, additional treatment capacity at Otterbourne, Andover and Kingsclere.
3	Raw water transfer from new intake on the River Thames upstream of Reading to Otterbourne. Supported by STT or SESRO.	New river intake on the River Thames, 64.7 km of pipeline with additional 6.3km Kingsclere spur main and 16.3km Andover spur main, additional treatment capacity at Otterbourne, Andover and Kingsclere.
4	Potable water transfer from new intake on the River Thames upstream of Reading to Otterbourne. Supported by STT or SESRO.	New river intake and Water Treatment Works on the River Thames upstream of Reading, 64.7 km of pipeline with additional 6.3km Kingsclere spur main and 14.2km Andover spur main.
5	Raw water transfer from SESRO or STT at Culham to Testwood.	90.5 km of pipeline with additional 7.1km Kingsclere spur main and 8.9km Andover spur main, additional treatment capacity at Testwood, Andover and Kingsclere.
6	Raw water transfer from new intake on the River Thames upstream of Reading to Testwood.	New river intake on the River Thames, 76.7 km of pipeline with 6.3 km Kingsclere spur main, 16.3km Andover spur main, additional treatment capacity at Testwood, Andover and Kingsclere.

- 1.4 T2ST was not a preferred option in WRMP19 for either Thames Water or Southern Water and therefore the overall need, utilisation, deployable output (DO) and timing of the scheme is still to be confirmed by the ongoing regional modelling and WRMP24 work. The WRSE regional water resources plan is expected to be published for public consultation in early 2022 and will therefore be key to the decision-making for Gate 2 and beyond.
- 1.5 The combination of these environmental assessments and studies shows that positive benefits will likely result from operation of the T2ST scheme, but construction of the scheme will likely

result in some negative effects, mostly temporary, even with the application of mitigation measures.

- 1.6 An environmental assessment has been undertaken on the six options which has included a Habitats Regulations Assessment (HRA); a Water Framework Directive (WFD) Assessment; and an options level Strategic Environmental Assessment (SEA). In addition, the risk of spreading invasive non-native species (INNS) associated with the options has been investigated; Biodiversity Net Gain (BNG) and Natural Capital (NC) assessments have been undertaken; the wider benefits of the scheme have been reviewed; and opportunities for the six options to contribute to net zero carbon emission objectives were investigated. These assessments have identified a number of mitigations that would be required to be put in place, should the options be taken forward.
- 1.7 The preferred planning route is for the project to be defined as a Nationally Significant Infrastructure Project (NSIP) and therefore to be consented through a Development Consent Order (DCO) under the Planning Act 2008 (PA2008). However, the route to achieving a DCO is dependent on the preferred option and the DO of the scheme.
- 1.8 Direct Procurement for Customers (DPC) or a Collaboration Joint Venture (JV) have been identified as the most viable procurement approaches.
- 1.9 The earliest potential operational date for the proposed T2ST scheme is estimated to be 2036, although this is dependent on an available source for the transfer and Southern Water requiring the scheme to be available at this time.
- 1.10 Total Net Present Value (NPV) for these options range from £604m to £914m for the 50Ml/d capacity options and £968m to £1,308m for the 120Ml/d options. All estimates include costed risk and optimism bias.
- 1.11 The scheme is considered to be viable and there are no major barriers to scheme progression identified at this stage. The most significant risks to delivering the scheme are:
  - The interaction with the regional planning to confirm the overall need, timing, capacity and utilisation of the scheme. This is being mitigated through early and ongoing collaboration with the regional planning teams and other SROs.
  - The environmental impacts occur predominantly from the transfer passing through environmentally sensitive areas. There are options to mitigate impacts through review and refinement of proposed pipeline routes and construction techniques to explore opportunities.
- 1.12 The work to Gate 1 has been undertaken efficiently and effectively through close collaboration between Thames Water and Southern Water, by aligning the scope directly to the RAPID Gate 1 requirements and by competitive procurement of work packages. This has led to spending only 53% of the Gate 1 budget, therefore we are expecting to return £0.704m to customers. All spend is reported in 2017/18 base prices.
- 1.13 The Gate 1 submission has been assured by both Thames Water and Southern Water with external assurance by Jacobs for key aspects of the submission. Thames Water and Southern Water have both signed the Board Assurance Statement. It is noted that this option is in the early stages of development and delivery is more than 10 years in the future. The maturity of the information reflects this early stage development, and that it may change as the options are developed further.
- 1.14 It is recommended that the T2ST scheme proceeds to Gate 2 and all six feasible options summarised above are developed further to define a preferred option for Gate 2. Upon receipt of the outcomes from the draft regional plan, the overall need, timing and capacity of the scheme will be confirmed and a decision on whether the scheme should continue beyond Gate 2 can be made.

## 2 Solution description

### Outline of the solution including options and configurations

- 2.1 The aim of the T2ST project is to transfer water from the Thames Water area to Southern Water’s Hampshire area. There is not currently a surplus of supply within the Thames Water resource zones and therefore the transfer is dependent on the prior development and commissioning of an additional water resource option. These sources are the Severn Thames Transfer (STT) and/or South East Strategic Reservoir Option (SESRO). T2ST is therefore not expected to meet the short-term requirements for Southern Water.
- 2.2 Six options comprising two potable water options and four raw water transfers were identified during an Options Appraisal stage and taken forward into conceptual design. The feasible options are set out in Table 2.

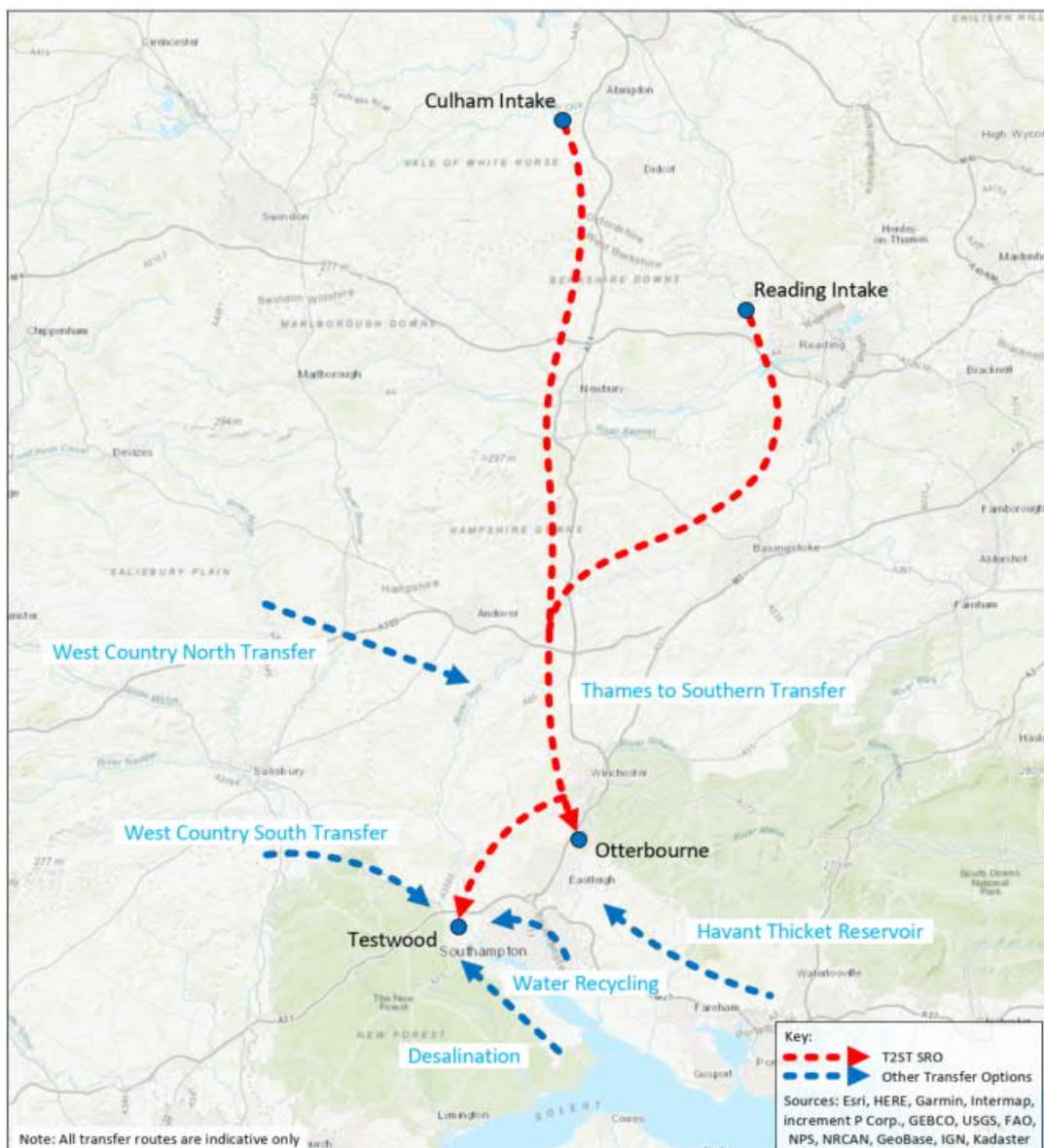
Table 2: T2ST feasible options (Options 1-6)

Option Ref:	Option Name	Option Description
Option 1	Potable water transfer from Culham to Otterbourne	<b>New Water Treatment Works at Culham, 76.5km pipeline with additional 7.1km Kingsclere spur main and 8.9km Andover spur main.</b> Transfer of potable water from the River Thames at Culham near Abingdon (new treatment works at Culham) to Otterbourne in Hampshire. Water provided from either SESRO and/or STT. This option also includes 10MI/d potable water offtakes to the Southern Water Andover and Kingsclere water resource zones.
Option 2	Raw water transfer from Culham to Otterbourne	<b>76.5km pipeline with additional 7.1km Kingsclere spur main and 11km Andover spur main, additional treatment capacity at Otterbourne, Andover and Kingsclere.</b> Transfer of raw water from the River Thames at Culham near Abingdon for treatment at expanded Otterbourne treatment works. This option also includes 10MI/d raw water offtakes to the Southern Water Andover and Kingsclere water resource zones, and new water treatment within Andover and Kingsclere.
Option 3	Raw water transfer from the River Thames at Reading to Otterbourne	<b>New river intake on the River Thames, 64.7 km of pipeline with additional 6.3km Kingsclere spur main and 16.3km Andover spur main, additional treatment capacity at Otterbourne, Andover and Kingsclere.</b> Transfer of raw water from the River Thames upstream of Reading for treatment at expanded Otterbourne treatment works. Water abstraction at Reading supported from either SESRO and/or STT. This option also includes raw water offtakes to the Southern Water Andover and Kingsclere water resource zones, and new water treatment within Andover and Kingsclere.
Option 4	Potable water transfer from the River Thames at Reading to Otterbourne	<b>New river intake upstream of Reading on the River Thames and Water Treatment Works , 64.7 km of pipeline with additional 6.3km Kingsclere spur main and 14.2km Andover spur main.</b> Transfer of potable water from River Thames upstream of Reading (including new treatment works) to Otterbourne in Hampshire. Water abstraction at Reading supported from either SESRO and/or STT. Includes 10MI/d potable water offtakes to the Southern Water Andover and Kingsclere water resource zones.
Option 5	Raw water transfer from Culham to Testwood	<b>90.5 km of pipeline with additional 7.1km Kingsclere spur main and 8.9km Andover spur main, additional treatment capacity at Testwood, Andover and Kingsclere.</b> Transfer of raw water from the River Thames at Culham near Abingdon to Testwood where the water will be treated. Water abstraction at Reading supported from either SESRO and/or STT. Includes 10MI/d raw water offtakes to the Southern Water Andover and Kingsclere water resource zones, and new water treatment within Andover and Kingsclere.
Option 6	Raw water transfer from the River Thames at Reading to Testwood	<b>New river intake on the River Thames, 76.7 km of pipeline with 6.3 km Kingsclere spur main, 16.3km Andover spur main, additional treatment capacity at Testwood, Andover and Kingsclere.</b> Transfer of raw water from the River Thames upstream of Reading to Testwood where the water will be treated. Water abstraction at Reading supported from either SESRO and/or STT. This option also includes 10MI/d raw water offtakes to the Southern Water Andover and Kingsclere water resource zones, and new water treatment within Andover and Kingsclere.

- 2.3 A key plan showing the location of the transfer options is provided in Figure 1.

- 2.4 The required capacity of the scheme is dependent on the output from the Water Resources South East (WRSE) regional water resources plan. At this stage a range of 50MI/d, 80MI/d and 120MI/d capacities have been investigated for all six feasible options for Gate 1. This is higher than the 100MI/d capacity referenced in the Final Determination and has been proposed following consultation and agreement with the regional planning team. Following feedback received in April 2021 from WRSE, it was agreed that a larger 200MI/d capacity option should also be investigated and inputted into the regional modelling. This 200MI/d option is currently being developed for all six feasible options but has not been included into this report due to the timing of the WRSE feedback.
- 2.5 All options include for a potential 10-20MI/d connection point to the South East Water Basingstoke supply zone, developed separately by South East Water. T2ST could also potentially support a new connection to the Thames Water Kennet Valley resource zone but this is also dependent on the WRSE Regional plan and has not been progressed during Gate 1.

Figure 1: Key Plan showing six feasible options for T2ST (Options 1-6)



## Costs and carbon

- 2.6 Cost and carbon figures are included in Section 10 along with the methodology utilised to generate these estimates.
- 2.7 Estimated costs to Gate 2 and for subsequent Gates are provided in Section 14.

## Resource benefit

- 2.8 The resource benefit provided by T2ST will depend on the determination of the scheme need, capacity and timing as a result of the WRSE Regional plan and WRMP24 strategic planning by Thames Water and Southern Water.

## Environmental and economics assessment

- 2.9 An environmental assessment has been undertaken for T2ST and is summarised in Section 5. The Gate 1 environmental assessment does not include an in-combination assessment with other SROs, water company capital investments or third party development plans or projects, due to a lack of knowledge, including certainty and timing. The assessment will be updated for Gate 2 to include potential in-combination effects.
- 2.10 Regulatory assessments undertaken included a HRA; a WFD Assessment; and a SEA level options assessment. The regulatory assessments are summarised in Section 5. An INNS assessment, a NC and BNG assessment, an assessment of wider benefits and an assessment of opportunities for net zero carbon contributions were also undertaken and are summarised in Section 5.
- 2.11 The assessment shows that while positive social benefits will likely result from operation of the scheme, construction of the scheme will likely result in some negative effects, even with mitigation applied.
- 2.12 Of the six options, it is likely that Options 1 and 2 will result in the fewest negative effects for HRA, SEA and INNS, but Options 3 and 4 would result in the least loss of NC and BNG habitats units. Options 5 and 6 result in additional impacts on designated sites and therefore have the most negative effects (see Section 5 for further details).
- 2.13 A number of mitigation measures have been identified that would be required to be put in place, should the options be taken forward, such as:
- Opportunities for directional drilling should be explored, in order to avoid or reduce likely effects on watercourses and designated sites. Further detailed assessments on the construction methods should be carried out to confirm reduced impact.
  - Proposed pipeline routes should be refined and re-routed in order to avoid entering designated sites (such as the Solent and Southampton Water Ramsar and Special Protection Area (SPA)) and to avoid sensitive community facilities.
  - For all options, there is the potential for enhancements to be applied during operation in relation to reinstating land alongside opportunities to achieve positive social benefits and demonstrate public value.

## Drinking water quality

- 2.14 To promote a consistent process of reviewing water quality risks between all SROs, an All Company Working Group (ACWG) framework and methodology was developed and has been used in the T2ST SRO which follows a source-to-tap water safety planning approach.
- 2.15 As part of the water quality assessment five water source scenarios have been established for T2ST. These comprise two water source scenarios for SESRO and three water source scenarios for STT. These include supply of source water from the River Thames, via SESRO at Culham and Reading, and supply of source water from the River Severn via the River Thames (STT SRO) via pipeline or canal conveyance, with and without planned indirect support from Minworth Sewage Treatment Works (STW). Further detail is provided in Section 5.

## Wider resilience benefits

- 2.16 The transfer would provide significant resilience benefits to the South East Region, improving connectivity within the region and maintaining reliable supplies to customers in extreme drought events. In addition to supporting Southern Water, T2ST could also potentially provide long term support to neighbouring water companies including Wessex Water and Portsmouth Water, depending on the outcome of the regional plan.

## Scheme interdependencies

- 2.17 The key interdependencies for this scheme are the required source for the transfer. However, there are also other potential solutions to the long-term water supply needs of the Hampshire supply area which will directly affect the ‘needs case’ for the scheme. These are summarised in Table 3.
- 2.18 Southern Water has an existing set of options inside and outside the SRO process to address the needs identified in WRMP19. It is anticipated that WRMP24 will identify new needs requiring additional infrastructure, which may impact on the need and timing of T2ST. Depending on the required T2ST option it is also likely that additional infrastructure works will be required to distribute treated water into the receiving network. These issues will be considered further during Gate 2 as information from WRMP24 and the WRSE regional plan becomes available.

*Table 3: Inter-related schemes affecting need and timing of T2ST*

Scheme	Description	Planned construction completion	Planning Stage
South East Strategic Reservoir Option (SESRO)	New reservoir development near Abingdon. Potential water source for T2ST	Earliest deployable output of 2036-37 dependent on option progressed	SRO Gate 1 July 2021
Severn to Thames Transfer. (STT)	Potential water source for T2ST	Earliest deployable output of 2033	SRO Gate 1 July 2021
Havant Thicket Reservoir	Treated water transfer from Havant Thicket reservoir to Gaters Mill	Southern Water WRMP19 option for potential construction within AMP7/8 by 2027.	SRO Gate 2 September 2021
Desalination	Desalination scheme with transfer to Southampton West Water resource zone	Southern Water WRMP19 option for potential construction within AMP7/8 by 2027.	SRO Gate 2 September 2021
Water Recycling	Water recycling scheme with transfer to Southampton West Water resource zone	Southern Water WRMP19 option for potential construction within AMP7/8 by 2027.	SRO Gate 2 September 2021
West Country South SRO	Potential transfer from South West Water to Southampton West water resource zone	Southern Water WRMP19 option	SRO Gate 1 July 2021
West Country North SRO	Potential transfer from Wessex Water to Southern Water Andover zone	Southern Water WRMP19 option	SRO Gate 1 July 2021
Southampton Link Main	New 45MI/d potable water main from Testwood to Otterbourne.	Southern Water WRMP19 option with planned construction by 2027	Non-SRO scheme Planning ongoing for submission in AMP7.
Otterbourne to Andover Link Main	25MI/d potable water main from Otterbourne to Andover.	Southern Water WRMP19 option with planned construction by 2027	Non-SRO scheme Planning ongoing for submission in AMP7.

## National and regional planning

- 2.19 All of the six feasible options with capacities of 50MI/d, 80MI/d and 120MI/d have been submitted to the WRSE regional planning team to be considered as part of the regional modelling. The outcome from the first phase of the WRSE Regional plan modelling is expected to be available in August 2021.

- 2.20 For Southern Water the preferred long-term supply solution will be driven by the regional supply demand balance as modelled within the regional plan and the costs and benefits of a number of competing strategic resource options, as included in Table 3.
- 2.21 Upon receipt of the outcomes from the draft regional plan, the overall need, timing and capacity of the scheme will be confirmed and a decision on whether the T2ST scheme should continue beyond Gate 2 can be made.

## 3 Outline project plan

- 3.1 This section of the report sets out a clear project-level plan for the key activities and outputs that need to be undertaken and achieved prior to each subsequent Gate.

### Introduction

- 3.2 The development of the scheme is currently on-track, having met all the requirements for the regional submissions to WRSE and the Gate 1 requirements for RAPID. The overall programme for delivery of the scheme, following RAPID's gated structure, is also proceeding to plan. There is no missing or delayed information that should have been collated or considered for Gate 1.
- 3.3 The T2ST project was not included in WRMP19 for either Thames Water or Southern Water and therefore the overall need, DO and timing of the scheme is still to be confirmed by the ongoing regional modelling and WRMP24 work. The WRSE regional water resources plan is due to be published for public consultation in early 2022, and therefore will be key to the decision-making for Gate 2 and beyond.

### Programme summary

- 3.4 As discussed in Section 2, there are currently six feasible options identified for delivery of the T2ST, each with transfer capacities ranging from 50MI/d to 120MI/d. The construction programme for these different options will vary, although the overarching programme for delivery of the options are broadly similar. The programme provided in this section is applicable to all of the proposed options recommended to proceed through Gate 1.
- 3.5 An outline scheme delivery programme is provided in Figure 2. The phasing of key activities and decision making is summarised in this programme. The assumptions and dependencies around this programme are provided below.
- 3.6 Based on this programme, assumptions and uncertainties, the earliest start date for construction mobilisation would be early 2031. A construction programme of 5 years has been assumed based on experience of similar transfer schemes, therefore the earliest possible DO date is early 2036. Critically, this assumes the source for the transfer is available for this date.
- 3.7 Dependent on the availability of a water source and the confirmed need for the scheme from the regional plan, it is considered likely that the construction of the scheme may be delayed beyond 2035 and therefore at Gate 2 there may be a need to reassess whether the project should continue through the RAPID gated process or diverge from the current programme.

### Assumptions and dependencies

- 3.8 The overall delivery of T2ST is dependent on a multitude of factors which have their own parallel programmes and have each been taken into account to develop the overall scheme delivery plan. These assumptions and dependencies are summarised in Table 4.

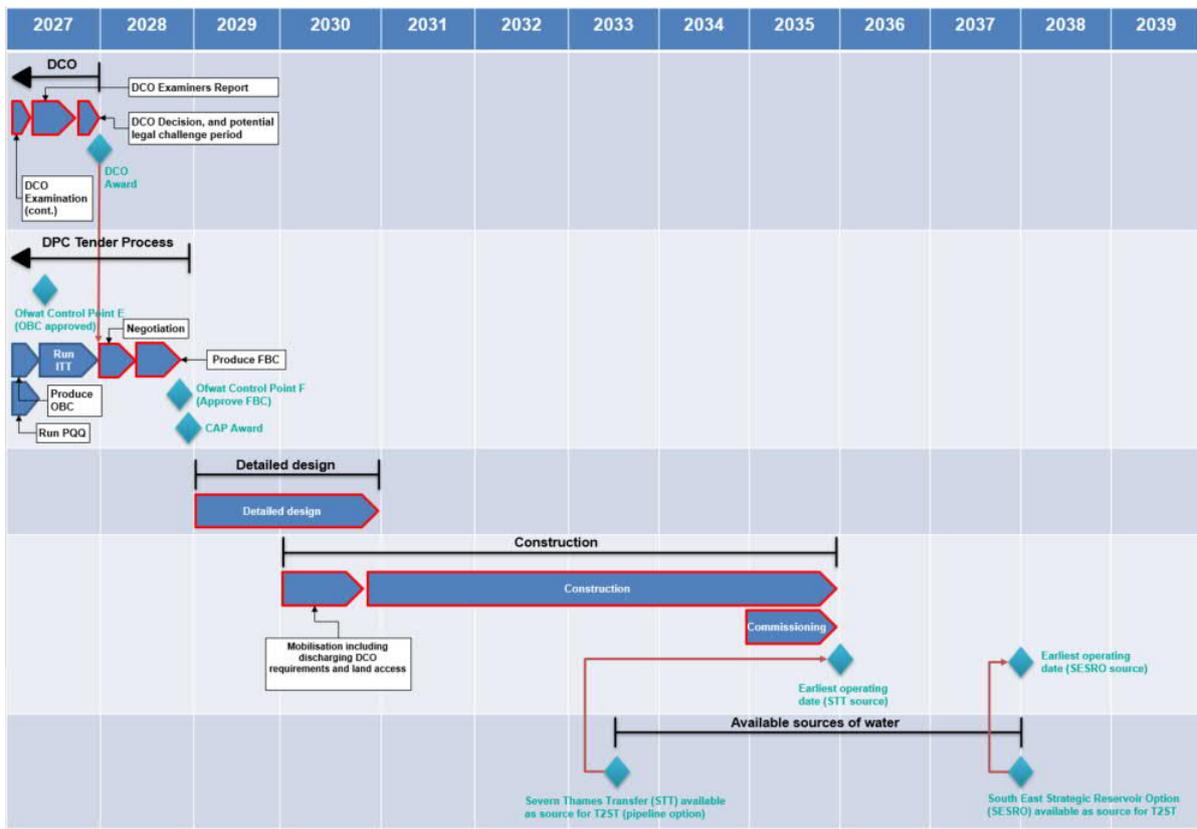
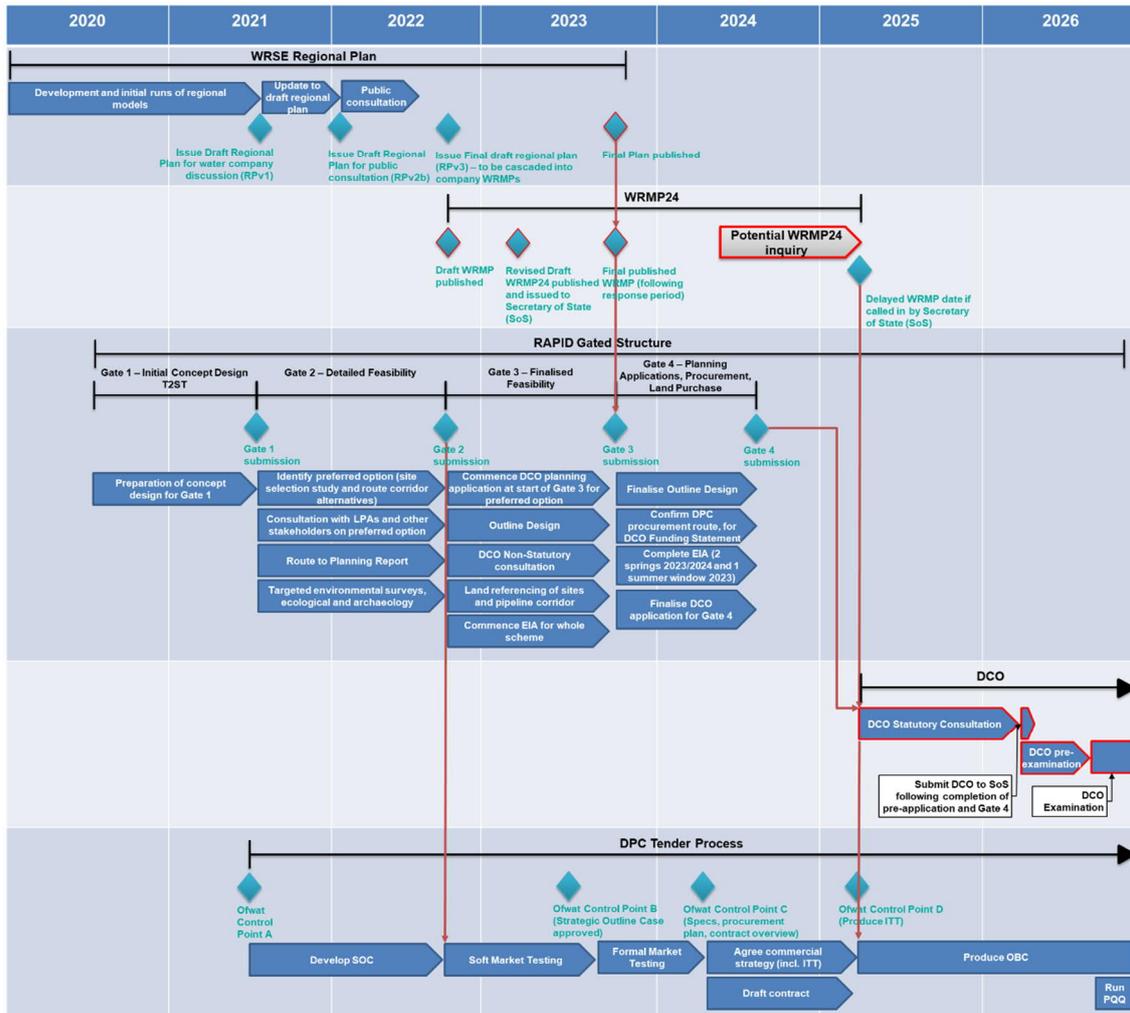
- 3.9 At this early stage of the SRO development it has been assumed that an application for DCO consent could not be submitted until the later date of March 2026 following publication of both the WRSE regional plan and WRMP24. It is further assumed that both WRSE and WRMP24 will fully support the T2ST transfer allowing the formal planning consent process to begin. Without support from WRSE and WRMP24, it is highly likely that planning work for T2ST would be placed on hold and the need for the transfer considered again as part of the next planning round for WRMP29.

*Table 4: Influences considered for scheme delivery*

<b>Influencing factors for scheme delivery</b>	<b>Potential impacts on scheme delivery</b>
Availability of sources	The T2ST scheme requires a new source of water in Thames Water’s western water resource zones. This new source of water is currently envisaged to be the STT or SESRO project. At present, 2033 is the earliest potential date for STT to be operational (although this will be 2034 if it is a canal) and the earliest operational date for SESRO is between 2036 and 2037 dependent on the option progressed. It is therefore highly likely that the development and construction of T2ST would be timed so that the completion of the project would tie-in with the availability of the required source.
WRSE Regional Plan	The delivery of T2ST is primarily dependent on whether a robust project ‘needs case’ can be established. To enable the scheme to obtain planning consent, the capacity and timing of the transfer must be fully supported by both the WRSE regional plan and Thames Water and Southern Water strategic planning for WRMP24. Hence it would not be appropriate to apply for DCO consent for T2ST until the outcome of both the WRSE regional plan and WRMP24 is published. The WRSE regional plan will be published in late 2023. WRMP24 may also be finalised and published by late 2023, but dependent on whether the company plans are subject to inquiry in which case publication may not occur until March 2025. Should an inquiry not take place then the programme could be reduced by approximately 1 year.
Thames Water’s and Southern Water’s Final WRMP24s	
RAPID Gated process for SROs	The SRO follows a fairly prescriptive path through the RAPID gated governance process and this influences the project development and programme, as the requirements of each gateway are pre-determined by RAPID.
Development Consent Order (DCO) process – see section 7	At present, our programme assumes that T2ST would be consented through a DCO, however there remains a consent route risk until the DO of the scheme is established through the regional plan and WRMP24. It is also assumed that a published WRMP24 is required prior to the commencement of formal DCO consultation, although pre-consultation studies and engagement would be commenced during earlier stages (post Gate 2).
Defra NPS on WR Infrastructure	The NPS will have a significant impact on T2ST if the T2ST proposal is an NSIP, whether that is through exceeding the designated thresholds, or if a Section 35 Direction is secured from the Secretary of State. The timing of the publication of this NPS is currently uncertain. For the purposes of future scheme programming, we currently assume that the NPS will be published and adopted ahead of the publication of the Final WRMP24, although clearly this is a risk, which would then complicate the scope of the future promotion of the scheme under a DCO.
Procurement Approach (e.g. Ofwat regulated DPC process)	The procurement approach (see Section 6) could have an impact on the scheme delivery, although at this stage a collaborative JV or late/very late DPC are no considered to have a material impact on the overall programme. Although highly uncertain at this stage, our longer-term programme assumes that a consented DCO application (post examination and Secretary of State’s decision) would be required prior to approval of the Final Business Case and consent to proceed to procurement of a Competitively Appointed Provider - CAP).

Figure 2: Outline scheme delivery plan for development of T2ST

# T2ST - Scheme Delivery Plan



# 4 Technical information

## Option configurations and operation

- 4.1 As a result of the Option Appraisal Stage for T2ST completed in December 2020, six feasible options were identified to take forward into the conceptual design stage:
- Option 1: Culham to Otterbourne - potable water transfer
  - Option 2: Culham to Otterbourne - raw water transfer
  - Option 3: Reading to Otterbourne - raw water transfer
  - Option 4: Reading to Otterbourne - potable water transfer
  - Option 5: Culham to Testwood - raw water transfer
  - Option 6: Reading to Testwood - raw water transfer
- 4.2 Details confirming the location and configuration of each option, including preliminary pipe route alignments, and outline locations of water supply works, pumping stations and storage tanks have been developed. Site locations and pipeline alignments are preliminary at this stage for Gate 1 and subject to further design development in Gate 2.
- 4.3 Through discussion and agreement with the WRSE regional planning team, 50MI/d, 80MI/d and 120MI/d scheme capacities have been considered for each of the six feasible options. Dependent on the outcome of the WRSE modelling, it is possible that a wider range of scheme capacities for T2ST may need to be developed in Gate 2. A 200MI/d capacity option is currently being considered by WRSE for all six feasible options but is not included in this report due to the timing of the WRSE feedback.
- 4.4 For Gate 1 it has also been agreed with Southern Water that 10MI/d spur connections from the T2ST pipeline should be included to supply the Kingsclere and Andover Water resource zones in Hampshire for all T2ST options. These connections have been sized on the basis that projected resource deficit within the combined Kingsclere and Andover zones in the 2020s is likely to be circa 20MI/d. In Gate 2 the size of the spur connections to Andover and Kingsclere will need to be reviewed against the output of WRSE modelling and the latest Southern Water strategic water resource planning position for the Hampshire region.
- 4.5 Thames Water has also identified a potential spur connection from the T2ST pipeline to provide support to the Kennet Valley Water Resource Zone. This spur connection has not been considered at this stage of the T2ST SRO for Gate 1 but may be a requirement in Gate 2 depending on the outcome of WRSE modelling and Thames Water strategic planning for WRMP24.
- 4.6 South East Water and WRSE have developed an option for a spur connection from the T2ST transfer main to supply Northgate service reservoir to the south of Basingstoke, at 10MI/d and 20MI/d capacity. Whilst this option has been identified and modelled by WRSE, the offtake has not currently been included as part of the T2ST SRO. Hence no consideration of this spur has been included as part of the T2ST conceptual design for Gate 1. Depending on the outcome of the WRSE modelling, further work on the South East Water spur may be required for Gate 2.
- 4.7 Utilisation of the T2ST is dependent on the outcome of the WRSE regional modelling, and will be determined during Gate 2. At this stage it is expected that the transfer would only be required in periods of extreme drought but increased utilisation of the transfer may be required to meet the longer term supply-demand balance of the Hampshire region depending on the implementation and timing of other schemes and future environmental destination targets. The utilisation of the transfer will also be dependent upon the required sweetening flow for the preferred option. A minimum flow rate of 30% maximum design capacity is likely to be

required to maintain operation of the transfer scheme water treatment works. Further work is required in Gate 2 to explore opportunities to utilise T2ST water within the Thames Water and Southern Water regions once the preferred option, capacity and operating scenarios have been further developed, including operation of the scheme at dry year annual average and peak periods, and emergency response scenarios.

## Design life and maintenance liabilities

- 4.8 The T2ST options comprise standard water treatment processes and water transmission infrastructure. Treatment processes include coagulation and flocculation; dissolved air flotation (DAF); rapid gravity filters (RGF); granular activated carbon (GAC) filters; Ozonation, Ultraviolet disinfection units; chlorine dosing, contact tanks and sludge thickening lamellas.
- 4.9 The transmission elements of the options include standard ductile iron/steel pipelines ranging in diameter from 800mm to 1100mm to PN16 pressure rating, standard 1.2 or 1.8m diameter micro-tunnelling or pipe-jacked sections at road, rail and river crossings, and industry standard buried concrete storage tanks and water pumping stations. Once identified, the design of the preferred option will be progressed for Gate 2 in accordance with standard industry design lives for civil, mechanical and electrical elements of the scheme.
- 4.10 Maintenance liabilities will depend on how the scheme is procured. As discussed in Section 6, a DPC procurement route or a Collaboration JV are considered a viable option in which case a third-party entity will undertake the detailed design, construction and operation of the scheme.
- 4.11 Maintenance requirements for the potable options will be business as usual for treated water assets given the standard water industry construction noted above. There is likely to be increased maintenance requirements associated with the raw water options compared to the potable options, due to the suspended solids content of the raw water and associated sedimentation risk within pipelines and storage tanks and potential growth or organic matter. These issues will be considered in more detail for Gate 2 as part of the final preferred option selection.
- 4.12 Design life for civil, mechanical and electrical assets for the T2ST has been determined in accordance with the ACWG methodology and included within the WRSE template.

## Costs and carbon

- 4.13 The approach to estimating the capex and opex costs for each option and associated embedded and operational carbon is provided in Section 10.

## Resource benefit assessment

- 4.14 The resource benefit provided by the T2ST will depend on the determination of the scheme need, capacity and timing as a result of the WRSE Regional plan and WRMP24 strategic planning by Thames Water and Southern Water.
- 4.15 This is discussed in Section 2, including the interdependency of the transfer with other strategic resource options.

## Data provided to WRSE

- 4.16 Cost and carbon values for all six feasible options, including the 50MI/d, 80MI/d and 120MI/d capacities, have been collated and provided to WRSE for inclusion within the WRSE Regional Plan modelling along with relevant GIS data. The six options are mutually exclusive.
- 4.17 Information was also provided to WRSE regarding the resilience metric of each option as described in Section 5. GIS information was also provided detailing the location of each option pipeline and surface assets, to inform the HRA, WFD and SEA assessments.

# 5 Environmental and drinking water quality considerations

## Overview

- 5.1 An environmental assessment has been undertaken on the six options which has included a HRA; a WFD Assessment; and a SEA level options assessment. In addition, the risk of spreading INNS associated with the options has been investigated; BNG and NC assessments have been undertaken; the wider benefits of the scheme have been reviewed; and opportunities for the six options to contribute to net zero carbon emission objectives were investigated.
- 5.2 WRSE undertook an initial stage environmental assessment for the Stage 1 HRA; the Stage 1 WFD Assessment; the SEA; and the BNG and NC assessments. At Gate 1, these assessments have been taken further by the SRO teams.
- 5.3 The Gate 1 environmental assessment does not include an in-combination assessment with other SROs, water company capital investments or third party development plans or projects, due to a lack of knowledge, including certainty and timing. The assessment will be reviewed for Gate 2 to include potential in-combination effects.

## Habitats regulations assessment

- 5.4 The HRA reports the findings of the full HRA Stage 2 / Appropriate Assessment (AA) undertaken at plan level for the six T2ST options and assesses the potential impacts of the options on UK's habitats sites.
- 5.5 The WRSE HRA Stage 1 assessment identified a number of potential 'likely significant effects', and a number of 'uncertain effects' for each of the options. The HRA Stage 2 AA concluded that all six options were also likely to result in a number of potential 'likely significant effects' however, all six options were identified as having 'no likely significant effects' (alone), after mitigation is implemented. This was dependant on the proposed route for Options 5 and 6 being altered to avoid intersecting the Solent and Southampton Water Ramsar and SPA sites and that trenchless construction would be required for all options to cross the River Lambourn Special Area of Conservation, and for Options 5 and 6 to cross the River Test.

## Water Framework Directive assessment

- 5.6 The Level 1 WFD assessment indicated that all options had one waterbody which required further assessment; Thames (Evenlode to Thame) – Options 1, 2 and 5; and Thames (Wallingford to Caversham) – Options 3, 4 and 6.
- 5.7 Level 2 WFD assessments were completed for these two waterbodies. The findings indicate that there are potentially precautionary WFD compliance risks associated with the operation of the new abstractions for all options. The potential hydrological effects could conflict with achieving WFD status objectives. This is particularly the case for Options 3, 4 and 6 where hydrology/river flow is an existing limiting factor. The potential biological effects, particularly on fish, requires further assessment.
- 5.8 For all options it has been assumed that another SRO (STT or SESRO) would be used in combination with T2ST to support water within the River Thames. This will help to reduce the impact on hydrological regime and therefore on the biological elements.

## Strategic environmental assessment

- 5.9 The SEA reports the findings of the WRSE SEA applied to the options. The SEA outputs for residual effects (post mitigation) has identified no major negative effects and the six pipeline options are predicted to result in similar effects across all the SEA objectives in construction and operation. The results highlighted that Options 1, 2 and 5 are predicted to result in greater residual effects on biodiversity during construction (due to impacts on Sites of Special Scientific Interest (SSSIs)). Options 3, 4 and 6 are predicted to result in greater residual effects on Population and Human Health during construction (due to impacts on a small number of community facilities).
- 5.10 Additional assessment was undertaken to consider the impacts of components of the schemes that were not included in the WRSE assessment. The output of the additional assessment shows that the components would result in some additional negative effects on some of the SEA objectives. Scheme components at Culham, Reading, Otterbourne and Testwood sites each resulted in additional effects for five SEA objectives. The Otterbourne site is required for Options 1, 2, 3 and 4. The Reading site is required for Options 3, 4 and 6, and the Testwood site is required for Options 5 and 6.
- 5.11 As such, the SEA concludes that none of the options result in major negative effects and, of the six options, Options 1 and 2 will result in the least negative effects.

## Invasive non-native species (INNS) risk assessment

- 5.12 The INNS risk assessment concludes that the risk of spreading INNS from one location to another was significantly lower for options which transferred raw water to a water treatment works, than options that may transfer to a lake receptor site. As such, it was concluded that risk of spreading INNS was highest for Options 5 and 6, which may transfer raw water to a lake, but this risk could be reduced considerably as the conceptual design is developed to include mitigation measures such as raw water screening and chemical dosing. At this stage of the T2ST option development it is assumed that all raw water transfers will transfer water directly to a water supply works. The potential use of storage at Testwood Lakes will be considered further in Gate 2. Further work on the need for pre-treatment measures for INNS will also be undertaken for Gate 2, once information on specific INNS risk is available.

## Biodiversity net gain and natural capital assessments

- 5.13 The outputs of the BNG assessments concluded that Options 1 and 2 result in the lowest percentage loss of biodiversity habitat units. Option 6 results in the highest percentage loss of biodiversity habitat units. Key habitat types contributing to this loss are grasslands and woodlands.
- 5.14 The outputs of the NC assessment concluded that Options 1 and 2 are likely to result in the least overall loss of NC stocks and Option 6 is likely to show the greatest overall loss of NC stocks. The NC stocks included in the assessment were orchards and top fruit and ancient woodland.
- 5.15 The ecosystem services assessment estimated that all options would result in a loss in value per year. Option 6 results in the highest loss in value of ecosystem services per year (at -£1,346.72). Options 3 and 4 result in the least loss in value of ecosystem services per year (at -£887.22). The ecosystem services that contributed to this loss were Carbon Storage and Natural Hazard Management. The ecosystem services assessment did note that the options present an opportunity to improve the existing habitats through post construction remediation and replacement of low value habitats with higher value habitats. The options also present an opportunity to plant new high value habitats within the Natural England habitat, Network Enhancement Zones.

- 5.16 The opportunities identified in the BNG/NC assessment have the potential to contribute to Government ambitions for environment net gain, such as the mandatory net gain in biodiversity through the planning system, requiring a 10% increase in biodiversity after development. This could take the form of habitat compensation, habitat creation and/or species relocation schemes.

## Benefits assessment

- 5.17 The opportunities identified in the NC assessment have the potential to contribute to Government ambitions for environment net gain. Any schemes would need to be taken forward based on a comprehensive understanding on the interaction between natural systems and social uses of land.
- 5.18 The wider social benefits of T2ST have been reviewed, and the benefits at regional, sub-regional and local levels have been identified and a number of best practice mitigation measures identified which could be implemented during construction to avoid or mitigate potential disruption and disturbance to communities. For all options, there is the potential for enhancements to be applied during operation in relation to reinstating land to achieve potential positive effects and public value.

## Assessment of opportunities for net zero carbon contributions

- 5.19 Contributing to net zero carbon emission objectives is an important aspiration and opportunities covering whole life (capital and operational) carbon have been investigated. The estimated capital and operational carbon impacts of the T2ST options highlight that the majority of the embedded and operational carbon sits within the construction and pumping associated with the transfer pipelines. These carbon numbers are provided in Section 10.
- 5.20 Some measures have been identified that the T2ST options could take to decarbonise and drive towards net zero. The decarbonisation measures suggested take into consideration the commitment made by water companies to be a net zero operational carbon sector by 2030 but also align to the carbon consideration requirements under Environment Agency (EA) Water Resources Planning Guideline.
- 5.21 An important part of turning some of the considerations into deliverable opportunities is to have a robust carbon management process embedded into the scheme development. Therefore, the key recommendations are:
- A clear carbon management process be embedded into the option development process to identify low carbon opportunities and track them through to implementation.
  - A detailed capital and whole life carbon baseline should be interrogated for asset and material level hotspots for the scheme to inform focus areas for decarbonisation activities.
  - A low carbon workshop be held to review the hotspots and prioritise the low carbon opportunities that need to be investigated further. This should include specific actions on who will be responsible for driving these emissions reductions activities and when they need to be undertaken in the design process.
  - Design principles to be developed incorporating some key activities and requirements to help decarbonise the scheme, this should include requirements to engage the broader supply chain and incorporate carbon into procurement and material specification criteria.
  - A regional systems approach taken to understand how the T2ST transfer options fit within other regional activities and projects to help develop a more integrated plan for development of renewables or residual offsetting schemes.

## Comparison between options and summary conclusions

- 5.22 The combination of these environmental assessments and studies shows that positive benefits will likely result from operation of the T2ST scheme through the scheme improving water transfer, water resource management and resilience of water supply and the scheme providing protection against future drought scenarios. Construction of the scheme will likely result in some negative effects, mostly temporary, even with the application of mitigation measures. The potential for permanent or long term effects on high value habitats and landscape features and cultural heritage assets will be further assessed for Gate 2.
- 5.23 Of the six options, it is likely that Options 1 and 2 will result in the fewest negative effects for HRA, SEA, INNS, NC and BNG, but Options 3 and 4 would result in the least loss in value of ecosystem services per year. Options 5 and 6 result in additional impacts on designated sites (affecting biodiversity) and therefore have the most negative effects.
- 5.24 A number of mitigation measures have been suggested that would be required to be put in place, including the adoption of trenchless technology at river crossings. Future work would also be closely linked with the requirements to achieve planning consent.
- 5.25 Costs for tunnelling beneath designated land at river crossings has been included in the scheme costings. An allowance for other potential mitigation measures has been allowed for within the risk budget for each option. Costs for mitigation will be further developed for Gate 2.

## Resilience assessment

- 5.26 In addition to provision of cost and carbon values for each of the six T2ST options through completion of the WRSE templates, information was also provided to meet the requirements of the WRSE resilience framework. The WRSE team scored each of the T2ST options against a defined number of resilience metrics, for example risk of scheme failure from extreme flooding events or power outage, and then reviewed at a workshop held with the T2ST team. The T2ST metric scores will be included as part of the WRSE Regional Plan investment model, as part of the option selection process. Further assessment of resilience will be undertaken for Gate 2 as part of the final selection process to identify the preferred T2ST option, including a review of potential risks against each WRSE resilience metric. At this stage of the design no significant difference in resilience has been established between the options for Gate 1.
- 5.27 All options comprise standard water industry infrastructure (treatment and conveyance) and through design development are expected to achieve acceptable levels of resilience. As an example the T2ST options were scored as a typical water industry asset for resilience metric R3 (risk of supply failure from physical hazards such as flooding) and metric R7 (risk of failure from exceptional events, such as regional power or communications outage).

## Initial drinking water quality considerations and risk assessments

- 5.28 Water quality risks were assessed following the ACWG methodology. Drinking water safety plans were provided by Thames Water and Southern Water for treatment works around the abstraction regions and receiving zones respectively, allowing risk profiles at both ends of the transfer to be created. Limiting hazards were also provided from the SESRO and STT SROs which allowed five water source scenarios with different risk profiles to be established as follows, with two water source scenarios for SESRO (A and B) and three water source scenarios for STT (C, D and E):
- A. Abstraction from SESRO – sourced from the River Thames at Culham at high flow;
  - B. Abstraction from the River Thames upstream of Reading – sourced from SESRO water released upstream;
  - C. Abstraction from the River Thames upstream of Reading or Culham – sourced from STT, with pipeline conveyance;

- D. Abstraction from the River Thames upstream of Reading or Culham – sourced from STT, with canal conveyance;
  - E. Abstraction from the River Thames upstream of Reading or Culham – sourced from STT (conveyance by pipeline or canal) with planned support from Minworth STW effluent.
- 5.29 Water abstracted from SESRO (source A) is expected to have a greater algae and soluble metal risk compared to the river abstraction upstream of Reading (source B), which is expected to have a greater insoluble metal and pesticide risk. Water source scenario C, D and E all rely on the Severn to Thames Transfer (STT). The STT water source is expected to have increased hydrocarbon and organics risks compared to the SESRO risks. The difference in source waters give rise to differing limiting hazards, in turn, requiring differing treatment processes to successfully mitigate and control the risks. Initial assessment indicates water source scenario E is expected to have the highest risk source due to the increased microbiological and bromate formation risks expected from planned support from Minworth STW effluent. Further work is planned for Gate 2 to better understand the water quality risks.
- 5.30 The locations of the treatment works at either the source of abstraction, or near to the receiving zones, can implement new risks. Many of the new risks come with the transfer of raw water such as the ecological risk of transferring INNS, biological growth in pipes which may lead to increased need of maintenance, and siltation in raw water mains and storage tanks. These risks are largely absent in potable water transfer as treatment has already been applied to remove solids and a chlorine residual is maintained to ensure wholesome water is provided to the customer. From a water quality and environmental perspective, potable water transfer is therefore considered preferable to raw water transfer.
- 5.31 Receiving zones have also been reviewed. Kingsclere Water Treatment Works (WTW) and Andover WTW are supplied by groundwater, which when blended with surface water from the T2ST SRO is likely to cause a change in risk profile. The network blending is likely to increase aesthetic risks such as taste and odour which may affect consumer acceptability.
- 5.32 As part of the ACWG methodology, a drinking water quality risk assessment has been created, which captures risks from catchment to customer.
- 5.33 The Drinking Water Inspectorate (DWI) has been consulted during the Gate 1 process to ensure all risks are being accounted for. Future water quality monitoring work will form part of Gate 2 to provide quantitative information, allowing a more detailed assessment on water quality.

## 6 Initial outline of procurement and operation strategy

- 6.1 This Section outlines the Gate 1 Procurement Strategy for the T2ST scheme. This strategy considers a range of potential procurement options for the scheme, including all varieties of the Direct Procurement for Customers (DPC) model. Due to the current early stage of scheme development, the strategy does not provide a definitive recommendation for a single procurement option, but does set out a preferred ‘direction-of-travel’ to take forward to Gate 2 for further development, and outlines appropriate justification for this.
- 6.2 This exercise followed three key stages:
1. Understand the scheme
  2. Develop the procurement options
  3. Appraise the scheme against different models

## Understand the scheme

6.3 The scheme was assessed against the HM Treasury Green Book risk criteria through the means of a series of workshops. The outputs of the two expert review workshops were used to develop an understanding of the overall risks, challenges, and uncertainties for the scheme. This enabled an understanding of the size of the scheme, the complexity, options and component parts of the scheme, and the risks associated with its delivery and operation. The output of this phase was a high-level assessment of key risks for T2ST, shown in Figure 3. Note this focuses on risks relating to the commercial approach for the scheme and further discussion on scheme risks and mitigations is included in Section 9.

## Develop the procurement options

6.4 This procurement strategy considers a broad range of possible procurement models for delivery and operation of the T2ST scheme. Models have been grouped under four broad categories:

- Typical current procurement models
- DPC models
- Collaboration Joint Venture (JV) models
- Infrastructure Provider (IP) models

6.5 For each of these models, we have mapped the risk allocation between parties, and compared this with the key risks as shown in Figure 3.

Figure 3: Alignment of the risk assessment outputs to the procurement model options

Risks	Typical current models	Early DPC	Late DPC	Very Late DPC	Split DPC	Collaboration JV	IP models
Regulatory risk*	Red						
Design outcome risk	Yellow						
Design buildability	Green		Planning dependent				
Planning risk	Yellow						
Supply chain risk	Green						
Build execution risk	Green						
Environmental risk (const)	Yellow						
Environmental risk (ops)	Green						
Corporate funding risk	Green						
Contractual risk	Yellow						
Operational risk	Green						
Reputational risk	Green						
Availability/perf. risk	Green	Pricing model dependent					
Demand risk	Green	Pricing model dependent					
Volume risk	Green	Pricing model dependent					
Maintenance risk	Green						
Technology risk	Green						
Residual value risk	Green	Contract dependent					

**Water company/ies** (Blue)

**Contractor / CAP / IP** (Grey)

**Collaboration model water company SPV** (Purple)

**Either of the above colours** (Diagonal lines)

\* **Regulatory Risk:** There is uncertainty around the ownership and use of scheme assets when arranged between the two water companies and (potentially) a CAP. For example, assets based in Thames Water’s catchment could solely be used to supply Southern Water customers. The inclusion of a treatment works would need a minimum flow (est. around 30% of design flow) through the pipeline to enable continuing function. This would require supply adjustments in Southern Water which may not offer the best value for money.

## Appraisal of the scheme against different procurement models

6.6 To assess the suitability of different procurement models, we have used the criteria set out by Ofwat for the assessment of DPC suitability (size, ‘discreteness’ and value-for-money), and adapted this for the other models considered. We have used a high-level commercial risk and pricing assessment, based on the risk assessment in Table 5 to provide some insight into the value-for-money of different models.

## Next steps

6.7 Key next steps to progress the procurement strategy towards Gate 2 include:

- Further development of the operational regime, including how often the transfer is likely to be used over-and-above minimum flow. This should have a particular focus on interactions between companies and interdependency on other SRO schemes

- More comprehensive, more detailed risk appraisal to gain a deeper understanding of the key technical, delivery and operational risks of the scheme, their mitigations, and whether they are best able to be managed by Thames Water and Southern Water individually or collaboratively, or transferred to the supply chain.
- Further investigation of the value-for-money analysis of different procurement models based on the above detailed risk appraisal, particularly focusing on supply chain capability during the operational phase. This should include scenario-testing to assess how well different models respond to different scenarios (e.g. drought conditions, scenarios where other SROs are delayed or don't deliver as expected, significant delays during construction).
- Market engagement with design, construction, equipment, operations, and finance providers will commence after Gate 2 once scheme 'go-ahead' is more certain. Light-touch, targeted early engagement around specific commercial aspects may be useful before Gate 2 – this will be determined as the scheme and procurement strategy develops.

## Anticipated operational utilisation and strategy

- 6.8 The utilisation of the T2ST scheme is dependent on the outcome of the WRSE regional modelling. Further work is required for Gate 2 to determine the operational strategy of the transfer following the outcome of the WRSE draft regional plan. The operation of an inter-company transfer reliant on other sources is expected to be complex and a residual risk area that will be investigated further for Gate 2.

Table 5: Assessment of Procurement Models for T2ST scheme

Procurement Models	Assessment of Procurement Models for T2ST	Rating
<b>Typical current models</b>	T2ST will require an estimated capital investment more than £100m. This value is unlikely to introduce significant balance sheet impacts for either Thames Water or Southern Water. It is foreseeable that the function of the pipelines may introduce some challenge in developing the inter-company regulatory, operational, and commercial arrangements to enable the supply of water from Thames Water's area to Southern Water, however, these arrangements are likely to be achievable.	Green
<b>Early DPC</b>	The workshop process agreed that there would need to be significant early involvement from water companies in the early stages of developing this project to enable planning consent. This would be particularly important for overcoming early stakeholder objections, land access/rights, environmental impacts, potential for public enquiry, early design feasibility, and managing public perceptions. Transferring planning risk to a CAP is likely to result in a significant risk premium, reducing value-for-money. It is unclear whether any better capability that the supply chain has over water companies at managing delivery and operational risks for a pipeline will be sufficient to offset the additional planning risk premium.	Amber
<b>Late/Very Late DPC</b>	This scheme favours a late DPC approach as this would mitigate many of the early planning challenges around such a project. Construction of new pipelines is recognised as a frequent event and well understood process, with a mature supply chain.	Green
<b>Split DPC</b>	Similar to the early DPC model, the split DPC model would require planning risk to be transferred to the CAP, which is likely to result in a significant risk premium, reducing value-for-money.	Amber
<b>Collaboration JV</b>	Collaboration between water companies through the creation of a Special Purpose Vehicle could 'compartmentalise' scheme risk investment risk and offer some financial protection. It will also enable capability of both water companies to be cooperatively applied, and the flexibility to involve the supply chain where appropriate, through the project life-cycle to overcome the early planning risks through to construction.	Green
<b>IP Model</b>	This would require a licensed service provider which, through the size of the scheme, would need regulatory endorsement. At this stage, there is no existing legal framework for the SRO schemes to be individually licensed, therefore this model is not considered feasible.	Red

Table 5 Key:

**Red:** Major challenges to the viability of the procurement model without obvious, straightforward solutions at this stage.

**Amber:** Minor challenges to the viability of the procurement model without obvious, straightforward solutions at this stage

**Green:** No significant challenges to the viability of the procurement model at this stage, or straightforward solutions to challenges are obvious

## 7 Planning considerations

7.1 This section sets out the initial considerations of the planning route to consent, risks, mitigation and proposed next steps.

### Summary of planning consent routes

7.2 Subject to the type and scale of development proposed under T2ST, and particularly the final DO of the scheme, the available planning consent routes are either:

- An application for Development Consent under the Planning Act 2008 (PA2008), as a Nationally Significant Infrastructure Project (NSIP); or
- An application for Planning Permission under the Town and Country Planning Act 1990 (as amended).

- 7.3 A raw water transfer development between river basins or water undertaker's areas in England will be an NSIP, and require an application for Development Consent, provided the scheme is above the DCO threshold of 80MI/d Annual Average Deployable Output (DYAA DO) in a 1 in 200 year drought.
- 7.4 A potable water transfer development, or a raw water transfer below 80 MI/d, will not automatically qualify as an NSIP. Instead, should a water undertaker wish to seek Development Consent for the scheme, it would be necessary to apply to the Secretary of State for a Direction under Section 35 of the PA2008 that the scheme is an NSIP, and thus that an application for Development Consent is required. Alternatively, it can seek planning permission for the scheme from the relevant local planning authorities.
- 7.5 Developments meeting NSIP thresholds must be the subject of an application for Development Consent. They cannot be consented any other way, as Section 160 of the PA2008 makes it an offence to carry out such development without first securing Development Consent.
- 7.6 The principal differences between the Development Consent and Planning Permission routes are that a DCO enables a number of separate consents to be secured in a single application, including compulsory acquisition powers (CPO), whereas Planning Permission has a more limited focus, leaving a number of separate consents to be required including any CPO.

## Preferred planning route

- 7.7 For the T2ST raw water transfer options at 80MI/d and 120MI/d, provided the DO equates to 80 MI/d dry year annual average (DYAA) in a 1 in 200 year drought, these options would automatically be an NSIP, and require an application for Development Consent.
- 7.8 For the raw water transfer options at 50MI/d, and the potable water transfer options, the preferred planning consent route would be an application to the Secretary of State for a direction under Section 35 of the PA2008 to make T2ST an NSIP. This direction would mean that an application for Development Consent is made for T2ST, not a planning application.
- 7.9 However, should a T2ST option ultimately be selected that falls below the NSIP thresholds, or for which a direction could not be secured from the Secretary of State, then an application for planning permission would instead be made. This would potentially affect the 50MI/d raw water transfer options and the potable water transfers. A planning application would need to be made to each of the 5 or 6 planning authorities in whose area the option was located, and each would need to approve their application. Given the scale and complexity of the planning applications required, this approach would present additional risks to the scheme in achieving consent and risks of delays to programme delivery.

## Planning risks and mitigation

- 7.10 Given the early stage of development of the T2ST scheme, it is considered that there are no identified significant planning risks that are not capable of being mitigated through ongoing technical and environmental assessment work.
- 7.11 The currently identified planning risks are all comparable to the stage of evolution of the T2ST proposals, and with continued technical and environmental feasibility work, including site and route options appraisal ahead of Gate 2, a number of the risks will be mitigated.
- 7.12 Mitigation of certain environmental risks will need to be prioritised as part of work ahead of Gate 2, particularly through engagement with the EA, Natural England and other key stakeholders. Subject to the outcome of that work, there is confidence at this stage that a T2ST scheme can be identified, assessed and promoted to successfully secure planning consent.

## Next planning steps

- 7.13 The current planning programme, for the DCO, is reflected in Section 3. The focus of planning work looking ahead to Gate 2 is to provide a detailed planning route to consent report, outlining a detailed planning programme and the necessary building blocks for a successful application for planning consent, including the documents necessary as part of an application for consent. Planning risks and mitigation will be reviewed and updated as part of this report. A focus on route and site selection will lead to a route and site selection methodology and outcomes shared with stakeholders to test and verify the assessment of potential route corridors and sites, enabling robust selection of a preferred route and sites. Alongside this, stakeholder engagement, particularly with relevant Local Planning Authorities and other consultees will be undertaken. The outcomes of this planning work will be subject to legal review and assurance ahead of Gate 2 submission.

# 8 Stakeholder engagement

- 8.1 This section of the report provides a summary of the engagement completed with stakeholders and customers to Gate 1 and outlines our plans to Gate 2.

## Stakeholder engagement

- 8.2 The T2ST was not included in Southern Water's or Thames Water's WRMP19 as a preferred option and therefore there was no specific engagement on this scheme for WRMP19. However, in principle there is support for sharing water resources subject to sufficient resources, compliance with water quality and environmental requirements, and responsiveness to local issues and concerns. Our work programme and engagement plan to Gate 1 was developed with this in mind.
- 8.3 Our engagement to Gate 1 has two parts. Firstly through engagement to inform the development of the South East regional plan to ensure stakeholders understand how the T2ST, and other SROs, fit within the strategic planning framework. Secondly, T2ST specific discussions which could potentially prevent, or substantially change, the development of the transfer scheme.

## Stakeholder engagement: regional approach and company-led discussions

- 8.4 WRSE has an on-going engagement and consultation programme to support the development of the regional plan. In 2020 this focused on the building blocks of the plan and in 2021 the focus has broadened to include feasible solutions and the approach to determine the best value plan, with consultation on the draft plan scheduled early in 2022. The T2ST is one of the solutions that will be considered in the regional plan and therefore it is important that stakeholders understand the overall planning process, the key decision points, and opportunities to contribute.
- 8.5 Stakeholders fed back that they wanted more information on the options under consideration. In response, WRSE hosted a series of workshops on the options, including the SROs that will be considered in the regional plan, in May 2021.
- 8.6 In addition, both Thames Water and Southern Water have established stakeholder forums which enable stakeholders to input to the development of the regional and company water resources plans:

- Thames Water hosts a quarterly Water Resource Forum jointly with Affinity Water.
- Southern Water holds biannual meetings as part of their Water for Life programme.

## Stakeholder engagement: targeted discussions

8.7 Up to Gate 1 T2ST scheme specific engagement has been two-fold:

- With the parent water companies, and other potential recipients of water; and
- With regulators to ensure legal and regulatory requirements are fully considered.

8.8 Discussions with Southern Water and Thames Water have focused on their respective water supply networks, current and planned infrastructure upgrades, and local intelligence to help shape potential locations of the intake, pipeline routes and connection into Southern Water’s grid to enable a shortlist of feasible options to be developed. There have also been discussions with South East Water to understand their potential future water needs and preferences for a water transfer.

8.9 Discussions with regulators have focused on legal and regulatory requirements which could potentially prevent the scheme progressing or substantially affect the design of the scheme. A summary of the engagement with regulators is presented in Table 6.

Table 6: Overview of regulatory engagement on T2ST to Gate 1

Stakeholder	Summary of the main points of interest	Summary of activity
<b>RAPID</b>	Responsible for overseeing the work to examine the SROs and for administering the regulatory process.	Discussions on the regulatory process, requirements, and outputs to ensure “no surprises” at Gate 1. Discussions were also held early in Gate 1 to share the approach on customer and stakeholder engagement, which was supported.
<b>Environment Agency (EA)</b>	Water quality and environmental assessments including the requirements of, and compliance with, the WFD and the 25 year Environment Plan.	Monthly progress meetings since September 2020 to facilitate collaborative working and ensure timely discussions. Topics discussed include option identification and screening assessments and environmental and water quality monitoring plans. Draft outputs have been shared to ensure the expectations of the NAU are met and there are no surprises at Gate 1.  <i>In January 2021 NE advised that they did not have sufficient resources to participate in these meetings but would endeavour to comment on specific outputs.</i>
<b>Natural England (NE)</b>	Legal and regulatory requirements with respect to the natural environment plus opportunities for landscape and environmental enhancement.	
<b>Drinking Water Inspectorate (DWI)</b>	Compliance with drinking water quality legislation and ensuring water quality risks are properly assessed and evaluated.	Meetings have been held to consider the scheme, discuss the drinking water quality risk assessment methodology, the monitoring programme, and the potential risks to drinking water quality and supply issues. There have also been discussions on the monitoring required to Gate 2.
<b>Customer Challenge Group (CCG) / Consumer Council for Water (CCW)</b>	Protection of customer interests ensuring plans and schemes are developed with customer engagement and input.	WRSE Regional CCG group, with representation of CCW, has been actively engaged in the WRSE customer research programme to ensure the activity is well designed and executed.
<b>Historic England (HE)</b>	Protection of the historic environment. It is noted that HE is not a regulatory but a statutory consultee.	An introductory meeting has been held to introduce the scheme, share high level assessments and discuss future engagement.

## Stakeholder engagement: planned activity to Gate 2

8.10 Planned activity for Gate 2 includes continued engagement, in collaboration with WRSE and via the company’s established forums, to ensure discussions on schemes, including SROs, are anchored in the context of regional planning.

8.11 We will continue engagement with regulators to ensure legal and regulatory issues are fully addressed including:

- RAPID on the programme of work and the delivery of outputs to sufficient quality and time.
  - EA, NE and DWI on the programme of technical studies enabling discussion at a formative stage.
  - The regional CCG, which includes representation of CCW, (or equivalent) to seek input to customer engagement work.
- 8.12 We will also extend the engagement to seek input to the early design of the scheme including the identification of issues and risks and to seek opportunities for partnership working and wider potential benefits:
- Local authorities, planning teams and waste planners, and the Lead Local Flood Authorities to identify issues and opportunities for collaborative planning at an early stage.
  - HE and County Archaeologists to assist with assessment of cultural and historic environment aspects, the route corridor and routine work.
  - North Wessex Downs AONB to discuss the scheme and planning consent.
  - Network Rail and Highways England to discuss the feasibility of crossings.
  - Landowners including the Ministry of Defence, Crown Estates and National Trust.
  - Wildlife Trusts – BBOWT and HIOWWT and County and District ecologists to discuss the potential transfer routes and potential impact on managed and locally designated sites.
- 8.13 A community engagement plan will be prepared to enable timely consultation on construction and relevant operational issues. This will be implemented at an appropriate time in the scheme lifecycle.

## Customer engagement

- 8.14 We participated in a research programme coordinated by WRSE, in collaboration with other SROs and involving nine water companies, to examine customers' understanding of water resources and the need for regional solutions. This coordinated approach ensured feedback was comparable across regions and solutions, and was cost efficient. We sought feedback on the scope and the approach from a coalition of representatives from the participating water company's CCGs, CCW and RAPID. The programme comprised three parts: an evidence review, qualitative research and quantitative research.
- 8.15 Exploratory work looking at the six feasible options for the T2ST was undertaken with the 'Customer Action Group', an existing panel of consumers set up for Southern Water's Water for Life programme. These customers are well informed about the planning challenges and some of the strategic resource options. At this stage high level information was shared to seek feedback on customer's concerns around the potential routes to inform further work to Gate 2.

## Customer engagement: summary of feedback

- 8.16 The research provided evidence on customers' understanding of the need for regional water resource solutions and support, in principle, for sharing water resources. It has also provided useful information to guide future research in terms of the type of information customers want to see, the importance of framing the discussions, and how the scheme fits within a wider plan.
- 8.17 The main findings of the research were:
- Proposals to share water between regions are seen in a positive light by customers with recognition that collaborative planning and options can be efficient and fairer. A learning point for Gate 2 is that when seeking views on specific SROs, customers need to consider them in the context of regional planning and other options and schemes.

- Customers have firmly established views on the priority of transfer options: less favoured than both demand options and supply options such as reservoirs, which customers feel bring added value to the community. Customers are less willing to see water transferred out of their region if the recipients are more wasteful.
- Customers are more willing to support water transfers when there is a lower potential impact on themselves. Customers are less willing to support water transferred out of their region if the recipients (companies and customers) are more wasteful. This is helpful to guide the assurances that will need to accompany widespread plans to share water across regions.
- In general, transfers via river or canal are considered to be more appealing than pipeline options because they are perceived by customers to have wider benefits and fewer negative impacts over the functional aspect of simply transferring water between locations.
- Customers main concerns about transfers include cost, disruption from construction, environmental impacts, energy use and lack of benefits to local communities.

8.18 Initial feedback from customers on the transfers felt the WRSE planning works well to enhance the collaboration between Thames Water and Southern Water, which leaves customers feeling more open towards the plans. Customers need us to provide reassurance around the cost impacts and logistics of transferring to multiple locations. An additional consideration is around hydroelectricity as this is a good fit with sustainability.

## Customer engagement: activity to Gate 2

- 8.19 The next phase of research will focus on scheme-specific details including the choices around the combinations of sources and proposed transfer routes. It will also include water quality specifically addressing customer issues and concerns around a potential change in water source. The research will be framed within the strategic planning context and how a solution fits within a range of resource options. This is in line with best practice from CCW, and insight from the research to date.
- 8.20 We plan to expand the deliberative panel of customers and future consumers, which will be represented from across the South East – including Thames Water and Southern Water. This will allow us to gather views from the supplier as well as the recipient company and deep dive into scheme specific issues.

# 9 Key risks and mitigation measures

- 9.1 This section of the report provides an assessment of the key risks to the solution’s planned progress to completion. This includes:
- Risks to costs and benefits, programmes of work, dependencies, assumptions, potential regulatory barriers, guidance or changes required for the solution to progress.
  - The output of a risk assessment exercise showing the original and residual risk scores following mitigation.
- 9.2 The risks reported in this section are consistent with those reported through the RAPID quarterly reporting process. All of these risks are actively managed and have proposed mitigation measures in place.

## Risk management

- 9.3 Risk management is undertaken as a standard activity by the Programme Manager and governed by the Programme Management Board. This approach will continue post Gate 1.

9.4 The overall approach to risk and opportunity management on this programme is to minimise the likelihood and impact of risks occurring, to maximise the value and likelihood of opportunities being realised now or in the future by the programme partners and to ensure that all realised risks are tracked and managed through a proactive issue management process.

## Cost and scheme delivery risk

9.5 Risk has been considered in two ways for Gate 1:

- Costed Risk Register: the ACWG Costed Risk methodology has been adopted to record risks that have the potential to have a material impact on the overall cost to deliver the scheme. This is discussed further in Section 10. The outputs from the costed risk register have been built into the scheme cost estimates and analysis of cost optimism bias. This includes construction risks.
- Scheme Delivery Risk Register: The key risks from the programme risk register are shown in Table 7. This is consistent with the version shared with RAPID, through the quarterly reporting process. Note that there is a larger project risk register and only the risks identified as ‘amber’ post mitigation have been included in this table. There are no ‘red’ risks identified and all ‘amber risks’ are stable and have active mitigations in place.

Key to Table 7:

Green	No risks and progress is going to plan
Amber	There is a risk that is impeding/could impede progress but there is a plan to manage it
Red	There is a risk that is impeding/could impede the progress of the scheme, and there is no plan to manage this

Table 7: Summary of key risks from scheme delivery risk register

Category	Risk description	Impact rating pre-mitigation	Mitigation	Impact rating post-mitigation	Trend at Gate 1
Programme	It is expected that the transfer would be supplied by water from either SESRO or STT. Without parallel development of new sources, the transfer would not be viable. There is a risk that other sources are competing for this source of water and therefore there will be insufficient sources to develop the scheme.		This is being mitigated by working closely with the regional planning group (WRSE) to ensure the wider options are modelled and the need for the scheme and sources of water are confirmed.		Stable
Programme	Delays to WRSE regional plan programme. The overall need for the T2ST scheme, the capacity of the proposed scheme, and the timing of the schemes are all heavily reliant on the outputs from the regional plan. The assessment of key technical elements is also dependent on WRSE delivering on time. There is a risk that all projects may not be completed in time to feed into the WRSE programme, or the outputs from the WRSE modelling is delayed, therefore impacting the decision making for this SRO.		This will be mitigated through close collaboration with WRSE and the ongoing support from the SRO team, Thames Water and Southern Water resources to support as required.		Stable
Programme	Programme for planning (DCO) and potential DPC procurement route do not align with the RAPID gated structure. T2ST requires a new source of water to Thames Water's area. It is currently anticipated that this source will not be available until at least 2033 (STT) or 2036-37 dependent on the option progressed (SESRO). There is therefore a risk that the RAPID requirement to be 'construction ready' in AMP8 does not align with the actual requirements for the scheme and availability of water sources.		This is being mitigated by continuing regular dialogue with RAPID to openly discuss the overall need for the scheme and the requirements for future RAPID gates.		Stable
Environment and social	Environmental impacts from proposed pipeline routes. Potential impacts from the pipelines entering designated sites (such as the Solent and Southampton Water Ramsar and SPA); passing over SSSI water courses; and affecting sensitive community facilities.		This is being mitigated through the environmental and engineering workstreams working closely together to explore opportunities to avoid or reduce likely effects on local environmental and social receptors. The SRO team is working closely with stakeholders such as the EA and NE.		Stable
Procurement	Procurement: the agreed procurement approach for Gate 1 involved using the Thames Water existing consultancy frameworks. Due to time constraints, no 'joint frameworks' specific to this SRO are planned for initial Gate 2 procurement. There is a risk that this is not deemed to be OJ EU compliant.		A set of procurement guidelines is currently being developed which will include a clear plan for how procurement will be dealt with going forwards for this SRO. This could include for procurement transition to a 'joint framework' approach during Gate 2 to ensure compliance with UCR regulations (OJEU).		Stable
Planning	Planning risks for new options. The new intake location near the River Thames has increased planning, land and environmental risks due to the potential need to develop green field land.		This is being mitigated through early planning advice in relation to DCO and other planning processes to inform the pipeline route and infrastructure locations.		Stable
Stakeholder	Delays due to stakeholder concerns. The transfer is likely to have a substantial impact on local communities as well environmental impacts on environmentally sensitive areas. There is a risk that as yet unknown stakeholder concerns cause delays to the overall development of the project.		The mitigation is continued and regular engagement with stakeholders and the adoption of a formal stakeholder management plan for both Gate 1 and Gate 2.		Stable
Commercial	How the partners will trade the resource (pricing) has not been agreed or discussed in any detail at this early stage. Likewise, ownership and the operation of any new assets, which are subject to confirmation on the procurement approach (e.g. DPC or Collaboration JV).		Thames Water and Southern Water are jointly investigating potential commercial setups for delivery of the SRO (Section 6) and this work will be furthered in Gate 2. Initial discussions on trading/pricing will take place after Gate 2 once the need and utilisation of the scheme have been confirmed.		Stable

## 10 Option cost/benefits comparison

10.1 This section of the report provides an initial comparison of the solution’s costs and benefits for the options identified for Gate 1.

### Costs and carbon methodology

10.2 Quantities for the six T2ST options, including pipeline length and diameter, tunnelled lengths for road, rail and river crossings, pumping station power capacities, break pressure tank capacities, and water treatment processes were developed using Thames Water’s Engineering Estimating System (EES) and reviewed for alignment against Southern Water’s cost and carbon models. Embedded carbon and operational carbon values for each option are provided in Table 8.

Table 8: Summary of Embedded and Operational Carbon values

	Option 1 – Culham to Otterbourne Potable			Option 2 – Culham to Otterbourne Raw			Option 3 – Reading to Otterbourne Raw		
<b>Option benefit MI/d</b>	50	80	120	50	80	120	50	80	120
<b>Embedded Carbon (tCO2e)</b>	88,268	110,876	124,327	120,829	129,573	143,253	106,525	118,095	133,918
<b>Operational Carbon (kgCO2e/MI)</b>	20.17	18.11	14.27	20.17	18.11	14.26	19.72	16.99	13.39
	Option 4 – Reading to Otterbourne Potable			Option 5 – Culham to Testwood Raw			Option 6 – Reading to Testwood Raw		
<b>Option benefit MI/d</b>	50	80	120	50	80	120	50	80	120
<b>Embedded Carbon (tCO2e)</b>	87,633	98,282	112,343	134,484	144,444	158,872	120,161	132,966	149,537
<b>Operational Carbon (kgCO2e/MI)</b>	18.69	15.95	12.58	20.17	18.11	14.28	19.72	16.99	13.39

### Whole life costing

10.3 Whole life costing for the six T2ST options are presented in Table 9. The whole life cost analysis has been undertaken in accordance with the ACWG methodology over an 80 year appraisal period. Discount rates and associated discount factors used align with Table 7 of the HM Treasury Green Book (2020). This analysis has shown that Total NPV ranges from £604m to £914m for the 50MI/d capacity options and £968m to £1,308m for the 120MI/d options. It should be noted that these costs enable comparison between options, but do not take account of the holistic costs of the scheme, as they exclude the required raw water source and hence should not be used for decision making in isolation.

10.4 The cost estimates show that at this early stage of the T2ST scheme development the two potable options, Culham to Otterbourne (Option 1) and Reading to Otterbourne (Option 4), have the lowest total NPV value. This is due to the increased number of new water treatment works required for the raw water options, where new water treatment works are required at the end of the transfers i.e. Otterbourne/Testwood and Kingsclere and Andover. Only one treatment works is required for the potable options at the point of abstraction. Option 4 (Reading to

Otterbourne) has the lowest NPV and AIC value (at both 100% utilisation and 30% minimum flow) due to the reduced transfer distance compared to Culham to Otterbourne, and therefore represents the best value option to customers. Options 5 (Culham to Testwood) and 6 (Reading to Testwood) have the highest NPV value due to the longer transfer lengths compared to the Otterbourne options.

10.5 Costed risk and optimism bias will continue to be reviewed in Gate 2 and updated in line with the latest cost estimates.

10.6 The outline scheme delivery plan is provided in Section 3.

Table 9: Summary of NPV analysis for T2ST options

	Option 1 – Culham to Otterbourne Potable			Option 2 – Culham to Otterbourne Raw			Option 3 – Reading to Otterbourne Raw		
Option benefit Ml/d	50	80	120	50	80	120	50	80	120
<b>Total Planning period benefit NPV (Ml)</b>	433,679	693,887	1,040,831	433,679	693,887	1,040,831	433,679	693,887	1,040,831
<b>Capex NPV (£'000)</b>	559,349	622,346	714,407	701,904	766,442	861,043	628,446	704,760	797,782
<b>Opex NPV (£'000s)</b>	132,674	229,939	358,654	146,170	242,951	371,180	127,918	222,604	350,415
<b>Total NPV (£'000s)</b>	692,023	852,285	1,073,061	848,074	1,009,392	1,232,223	756,363	927,364	1,148,198
<b>AIC at 100% utilisation (p/m3)</b>	160	123	103	196	145	118	174	134	110
<b>AIC at 30% utilisation (p/m3) *</b>	143	103	82	179	126	97	161	116	90
	Option 4 – Reading to Otterbourne Potable			Option 5 – Culham to Testwood Raw			Option 6 – Reading to Testwood Raw		
Option benefit Ml/d	50	80	120	50	80	120	50	80	120
<b>Total Planning period benefit NPV (Ml)</b>	433,679	693,887	1,040,831	433,679	693,887	1,040,831	433,679	693,887	1,040,831
<b>Capex NPV (£'000)</b>	476,114	546,711	632,160	765,675	835,484	934,061	692,217	773,802	870,800
<b>Opex NPV (£'000s)</b>	128,350	208,441	336,283	148,498	245,536	373,844	130,246	225,189	353,080
<b>Total NPV (£'000s)</b>	604,464	755,153	968,442	914,173	1,081,020	1,307,905	822,463	998,991	1,223,879
<b>AIC at 100% utilisation (p/m3)</b>	139	109	93	211	156	126	190	144	118
<b>AIC at 30% utilisation (p/m3)*</b>	126	91	73	195	136	105	176	126	98

\* Minimum assumed baseflow for T2ST options is 30%

## Cost benchmarking

10.7 The capex costs for a sample option have been benchmarked against independent cost intelligence including Southern Water cost information. The capex costs for the option were found to be within 8% of the average benchmark costs, and hence deemed acceptable and reasonable for this stage of the project.

## Environmental impacts and benefits

10.8 The plan level HRA concluded that all six options were identified as having ‘no likely significant effects’ (alone), after mitigation is implemented. This was dependant on the proposed route for Options 5 and 6 being altered to avoid intersecting the Solent and Southampton Water Ramsar and SPA sites, so as to avoid any likely significant effects on these sites. In addition, the HRA specified that trenchless construction would be required for all

options to cross the River Lambourn Special Area of Conservation, and for Options 5 and 6 to cross the River Test, so as to avoid likely significant effects on these sites.

- 10.9 The Level 2 WFD assessment findings indicate that there are potentially precautionary WFD compliance risks associated with the operation of the new abstractions for all options. The potential hydrological effects could conflict with achieving WFD status objectives. This is particularly the case for Options 3, 4 and 6 where hydrology/river flow is an existing limiting factor. The potential biological effects, particularly on fish, would require further assessment. For all options it has been assumed that another SRO would be used in combination with this option to support the water to the River Thames. This will help to reduce the impact on the hydrological regime and therefore on the biological elements.
- 10.10 The options level SEA outputs for residual effects (post mitigation), identify no major negative effects. The six pipeline options are predicted to result in similar positive, neutral or negative effects across all the SEA objectives in construction and operation. The results highlighted that Options 1, 2 and 5 are predicted to result in greater residual effects on Biodiversity during construction (due to impacts on SSSIs). Options 3, 4 and 6 are predicted to result in greater residual effects on Population and Human Health during construction (due to impacts on a small number of community facilities).

## Resilience

- 10.11 As detailed in Section 5, the WRSE regional modelling team scored each of the T2ST options against a defined number of resilience metrics using the WRSE defined methodology for resilience. These metrics were reviewed at a workshop held with the T2ST team. At this stage of the design no significant difference in resilience has been established between the considered options for Gate 1. Further assessment of resilience will be undertaken during Gate 2 as part of the final selection process to identify the preferred T2ST option, including a review of potential risks against each WRSE resilience metric.

## Resource benefit

- 10.12 The resource benefit provided by the T2ST will depend on the determination of the scheme need, capacity and timing as a result of the WRSE Regional Plan and WRMP24 strategic planning by Thames Water and Southern Water. These issues are covered in Section 2, including the interdependency of the T2ST transfer with other strategic resource options; and uncertainty around the long term water resource need for the Hampshire region including future demand growth and environmental ambition targets to protect the environment.

## Summary of leading alternatives

- 10.13 There are a number of potential solutions to the long-term water supply needs of the Hampshire supply area, which will directly affect the scheme need case for T2ST. Further information is provided in Section 2. These include potential transfers from Havant Thicket Reservoir to Gaters Mill, Southern Water desalination and water recycling SROs, and potential water transfers to Hampshire from the West Country South and West Country North SROs.

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# 11 Impacts on current plan

- 11.1 This section of the report identifies impacts of the proposed solution on Thames Water's and Southern Water's current Water Resources Management Plans (WRMPs).
- 11.2 A Thames to Southern Transfer scheme was assessed as part of Southern Water's WRMP19 options appraisal process to resolve the large immediate supply-demand deficit that the company faced following sustainability reductions implemented in South Hampshire.
- 11.3 The proposal was similar to this SRO scheme and was deemed a feasible option, however it was excluded from the final options selection process because it could not be delivered in time to resolve the deficit by 2027 as required by the Section 20 Agreement between Southern Water and the EA. Since WRMP19, T2ST options have been further developed as part of this SRO to Gate 1. Six options, comprising potable and raw water transfers, have been identified as set out in Section 2. The options have developed to include transfers to Otterbourne and Testwood WTW, with spur connections to the Kingsclere and Andover water resource zones. In Gate 2 there is also potential for the T2ST options to include further connections to South East Water and Thames Water's Kennet Valley depending on the outcome of the WRSE Regional modelling.
- 11.4 Southern Water's supply-demand strategy in the next 10 years (to 2030) is focussed on removing the supply-demand deficit as set out in the WRMP19. This SRO scheme has the potential to provide a solution to a longer-term supply-demand deficit in Southern Water's Western supply area (covering Hampshire and the Isle of Wight) which could be required to address sustainability reductions needed to achieve a long-term environmental destination and to provide greater drought resilience in the area.
- 11.5 Furthermore, it could also support transfers from Southern Water to neighbouring water companies (e.g. Wessex Water, Portsmouth Water and Bournemouth Water) who may also be subject to sustainability reductions to achieve a long-term environmental destination. The profile and magnitude of sustainability reductions over time to achieve the long-term destination, which will be subject to sensitivity testing and discussions with the regulators, will influence the scale and timing of future supply-demand deficits and selection of options. The transfer could provide a long-term strategic solution to maintaining water supplies and improving the 1:500 year drought resilience of companies within the region.
- 11.6 Due to the long lead-in time of the T2ST scheme (estimated to be at least 2036), it would not impact the near-term supply-demand demand schemes which Southern Water is delivering to meet the requirements of the Section 20 Agreement. As T2ST needs to be supported by SESRO and/or STT, it may bring forward the date of STT from Thames Water's WRMP19 date of 2080's. This is to be confirmed by the regional plan.
- 11.7 Following submission of WRMP19, WRSE is further developing the needs case as part of the regional plan<sup>1</sup>.

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<sup>1</sup> <https://wrse.uk.engagementhq.com/future-water-requirements-for-south-east-england>

## 12 Board statement and assurance

- 12.1 This section of the report provides a summary of the external assurance completed as evidence of quality of data and approaches and is supported by an approved Board statement from both Southern Water and Thames Water.
- 12.2 We confirm that this submission has been prepared in accordance with the following RAPID assessment criteria:
- **Robustness:** all planned Gate 1 activities have been completed and reported on in this Gate 1 submission with appropriate evidence. Clear activities and outcomes for Gate 2 have been set out (Section 15) and key risks and mitigation measures have been reported (Section 9).
  - **Consistency:** all work has been undertaken following national policy, guidance and agreed methodologies and is consistent with other plans and SROs. This has included ACWG and WRSE methodologies to ensure consistency across the SROs. This has been ensured through a robust assurance approach described below.
  - **Uncertainty:** assumptions, key risks and mitigation measures have been reported on for delivery of the scheme (Sections 3 and 9) and our costing methodology has included for optimism bias and costed risk, appropriate to the stage of the scheme’s development (Section 10).

### Assurance approach

- 12.3 The risk-based assurance approach is consistent with that documented in the individual companies “Statements of reporting risks, strengths, and weaknesses”<sup>2 3</sup> and “Final Assurance plans for 2020-21” and is based on a shared understanding of the three lines of assurance model shown in Figure 4.
- 12.4 This structure is designed to provide challenge and Board oversight to the assurance approach and is consistent with the assurance requirements laid out in Ofwat’s Company Monitoring Framework<sup>4</sup> and RAPID guidance<sup>5</sup>.
- 12.5 This approach provides an effective programme of assurance which considers areas that we know are of prime importance to our customers and regulators; or may have a significant financial value, alongside the likelihood or reporting issues. Areas of higher risk receive three lines of assurance while other areas, where the risk is lower, may be targeted with first and second line only. A detailed risk assessment was completed and the components requiring third party (independent external) assurance were incorporated into a Request for Quote, which was approved by both Assurance Leads, and issued via the Thames Water procurement route on behalf of both companies.
- 12.6 Jacobs were appointed as our joint external assurers. The assurance process was designed to ensure that feedback from Jacobs was addressed prior to the issue of their final assurance report.

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<sup>2</sup> Thames Water: <https://www.thameswater.co.uk/media-library/home/about-us/investors/our-results/current-reports/statement-of-reporting-risks-strengths-and-weaknesses.pdf>

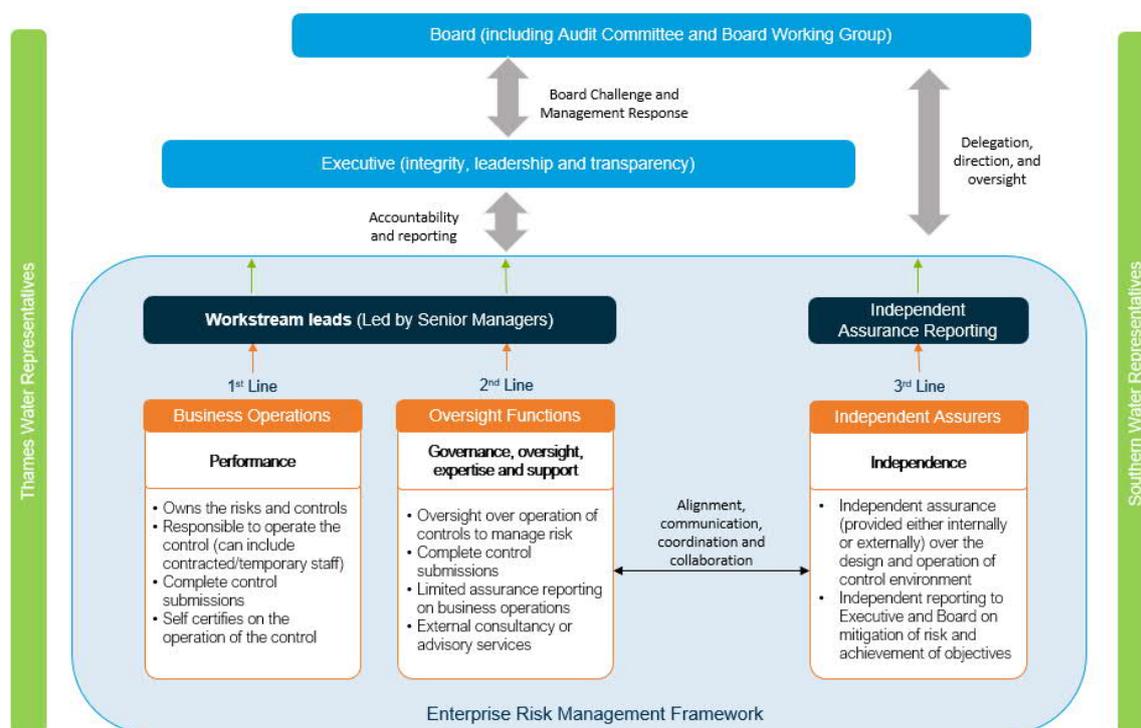
<sup>3</sup> Southern Water: [5353\\_risksstrengthweaknesses\\_2020\\_final.pdf](https://www.southernwater.co.uk/media-library/home/about-us/investors/our-results/current-reports/statement-of-reporting-risks-strengths-and-weaknesses_2020_final.pdf) (southernwater.co.uk)

<sup>4</sup> The latest iteration of Ofwat’s Company Monitoring Framework can be found on their website through the following link: <http://www.ofwat.gov.uk/publication/company-monitoring-framework-final-position/>

<sup>5</sup> RAPID - Ofwat

12.7 Our approach was augmented by experience that the companies gained through the PR19 assurance process and the sharing of best practice (e.g., the use of an independent information declaration form developed by Thames Water, and the Southern Water risk assessment framework), together with the accelerated Gate 1 learnings.

Figure 4: Our risk assessment and assurance approach



## Items to highlight and any points for future gates

- 12.8 Our third party assurers have provided assurance that our submission meet the requirements of Gate 1. Additionally, they have confirmed that all material issues raised during the assurance process were addressed.
- 12.9 We constantly look to improve our assurance approach and will conduct a “lessons learnt” exercise before we finalise our assurance approach for Gate 2.
- 12.10 There were no variances between the views of the respective Thames Water and Southern Water Boards and the same Board Assurance Statement has been signed by both parties.
- 12.11 Thames Water as water resource provider and Southern Water as water resource recipient have different roles within this submission and have worked closely together to produce a submission that represents both parties’ roles.

## Board Assurance Statements

- 12.12 Please see the covering letter where the signed Board Assurance Statement is provided.
- 12.13 The Boards were consulted regularly throughout this assurance process and the results of assurance work were made available to the Boards of both companies.

## 13 Solution or partner changes

- 13.1 This section of the report identifies any changes in solution partner (other water company) or solution substitutions.

### Proposed solution or partner changes

- 13.2 There are currently no proposed changes to the T2ST scheme solution partner organisations, with Thames Water and Southern Water proposing to continue to work together to progress the scheme development through to Gate 2. There are no proposals for a solution substitution.

### Other potential beneficiaries

- 13.3 As described in Section 2, there is the potential for a spur to South East Water from the main Thames to Southern transfer route. The concept design of the spur itself has been developed separately by South East Water and no costs to Gate 1 have been incurred for this spur on this SRO. It is proposed that the T2ST SRO team continues to collaborate with South East Water on the need and development of this spur towards Gate 2 but South East Water will continue to develop this separately to the main SRO development.
- 13.4 As described in Section 4, Thames Water has also identified a potential spur connection from the T2ST pipeline to provide support to the Kennet Valley Water Resource Zone which will be looked at further prior to Gate 2.

### Partner changes for Gate 3 delivery

- 13.5 If the recommendation at Gate 2 is for the South East Water spur to be developed as part of the option then the potential for South East Water becoming a partner to the T2ST SRO will be reviewed. This will have no material impact on the proposed Gate 2 costs.

## 14 Efficient spend of gate allowance

- 14.1 This section of the report provides a breakdown of costs against activities undertaken up to Gate 1 and evidence of the efficiency of spend (such as benchmarking of costs or tenders).
- 14.2 The forecast spend to Gate 2 is also presented, which should be read in conjunction with the planned activities and outcomes documented in Section 15.
- 14.3 We confirm that our Gate 1 expenditure has been assured by Jacobs - our external assurance providers.

### Gate 1

- 14.4 The Final Determination allowance for T2ST was £15m, split equally between Thames Water and Southern Water, with a 10% allocation to Gate 1 equating to £1.5m (£0.75m per water company<sup>6</sup>).
- 14.5 The total spend to Gate 1 is estimated to be £796,000, representing 53% of the Final Determination Gate 1 allowance and a total saving of £704,000 which is likely to be returned to

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<sup>6</sup> Table 3.2 p9 PR 19 Final Determination Strategic regional water resource solutions appendix

customers if not required at a later gate. These costs have been split equally between Thames Water and Southern Water.

- 14.6 All activities planned for Gate 1 have been completed.
- 14.7 The work has built on work undertaken for WRMP19 and has not included any WRMP24 business as usual activities.
- 14.8 For accurate comparison with the Final Determination allowance, as requested by RAPID, actual costs are deflated back to a 2017/18 cost base using Thames Water's Internal Business Plan deflationary factors, based upon the CPIH (November 2019 dataset) index.
- 14.9 A summary of all costs estimated to be incurred across the different technical workstreams to Gate 1 is provided in Table 10. The percentage spend on each work package has been benchmarked against a selection of other relevant SROs and found to be consistent with other SROs.
- 14.10 Efficient spend has been ensured through:
- Collaborative working between partner companies to ensure no duplication in effort or costs, for example agreement of consistent methodologies with the ACWG and on combined environmental and resilience metrics across other SROs with WRSE;
  - Ensuring alignment between the RAPID Gate 1 requirements, the work breakdown structure (WBS) and the work packages initiated;
  - Agreement of a standardised procurement process across SROs, including combined procurement of work packages where possible;
  - The application of competitive procurement approaches, where possible, utilising established procurement routes which have demonstrated value for money (e.g. existing professional services frameworks with competitively tendered rates);
  - Benchmarking of direct award packages based on experience of undertaking similar packages of work on other SROs and as part of water company business as usual activities;
  - Efficient packaging of work with clear scopes, defined deliverables and agreed programmes;
  - Robust change control processes and delivery to budget.

Table 10: Summary of estimated Gate 1 costs compared by work package (2017/18 base costs)

WBS	Work Package	Estimated Total Outturn Cost to Gate 1 (£k)	Percentage of total spend (%)
1	Environmental / EIA studies	103	13%
2	Environmental monitoring (water quality, environmental and river investigations)	174	22%
3	Engineering studies	244	31%
4	Water resources analysis	0	0%
5	Procurement / commercial	20	2%
6	Legal support	0	0%
7	Planning	21	3%
8	Stakeholder Engagement	11	1%
9	Stakeholder costs, third parties	68	9%
10	Programme Management	104	13%
11	Reporting and Assurance	50	6%
	<b>TOTAL</b>	<b>796</b>	<b>100%</b>

14.11 We have applied three key principles to ensure efficient procurement of the support services required for the Gate 1 submission:

- Agreement of a standardised procurement process across SROs;
- Application of competitive procurement approaches, wherever possible;
- Procurement across SROs, for aligned work packages, (e.g. water quality and in-river investigations) to ensure consistency and value.

14.12 Wherever practical, a procurement exercise was undertaken to ensure competitive costs and high-quality technical output. In total, 78% of the total value of work packages awarded were competitively tendered through mini-competition.

## Gate 2

14.13 The total FD allowance for Gate 2 is £2.25m (15% of total allowance). An estimate for Gate 2 spend has been compiled based on a bottom up estimate of all of the required activities for Gate 2. This assumes the six options recommended in this report are screened down to a single preferred option in the early work for Gate 2. If more than one option is taken through to detailed feasibility and included in the revised concept design report then there is a risk that the costs to Gate 2 could be higher. However, the costs to develop more than one option are considered to be relatively small as much of the options will have similar requirements that do not require repetition of the same activities. The Gate 1 work package leads have estimated the costs for these activities based on the level of effort and actual costs for Gate 1. The estimated expenditure for Gate 2 is £2.204m (in 2017/18 base costs) and we are confident that the planned activities can be undertaken within the Gate 2 allowance.

14.14 No detailed estimates have been developed for Gates 3 and 4 but at this stage we believe the FD allowances will be sufficient.

# 15 Proposed Gate 2 activities and outcomes

## Breakdown of Gate 2 activities and outcomes

- 15.1 All proposed activities and outcomes for Gate 2 align directly with the RAPID Final Determination requirements for Gate 2 and follow on from the work packages undertaken for Gate 1. The proposed Gate 2 activities sit within a broader framework of twelve workstreams and build on the work undertaken to Gate 1 to support detailed feasibility, concept design and multi-solution decision making.
- 15.2 The outcome of the Gate 2 activities is anticipated to deliver all of RAPID's requirements without any quality or delay penalties and will provide greater certainty of scheme delivery with a single preferred option, greater cost certainty and reduced project risks.
- 15.3 A summary of the proposed Gate 2 outcomes, workstreams and key activities is provided in Table 11.
- 15.4 These activities will mitigate the key risks identified in Section 9 in order to confirm the viability of the scheme and increase confidence in the cost estimates.
- 15.5 The critical path activities relate to developing the feasibility level design of a preferred option following feedback from the draft regional plan. These critical path activities will be started immediately after Gate 1.
- 15.6 There will be some water quality monitoring and environmental surveys that will be started prior to Gate 2 but will continue after Gate 2, should the scheme progress beyond Gate 2.

Table 11: Final Determination Gate 2 activities mapped to T2ST work breakdown structure

Proposed Gate 2 Outcomes	Workstream	Key activities
Detailed feasibility, concept design and multi-solution decision making	1. Environmental / EIA Studies 3. Engineering Studies and Surveys	<ul style="list-style-type: none"> <li>Develop feasibility level design and appraise options to determine preferred option and route corridor.</li> <li>Identify site locations for key infrastructure.</li> <li>Assess outputs from WRSE regional plan to identify transfer needs from the Thames Water area to Southern Water area and the wider South East area.</li> </ul>
Detailed feasibility and data collection (with increased certainty) in a concept design report	1. Environmental / EIA Studies 2. Environmental Monitoring 3. Engineering Studies and Surveys	<ul style="list-style-type: none"> <li>Further desk-based data collection.</li> <li>Undertake site walkovers of key infrastructure locations and crossings.</li> <li>Undertake further aquatic ecology surveys and water quality and algae sampling and monitoring.</li> </ul>
Develop procurement strategy including assessment for potential direct procurement for customers' delivery.	5. Commercial Analysis 6. Legal Support	<ul style="list-style-type: none"> <li>Further develop all potential procurement options.</li> <li>Identify preferred procurement approach and next steps beyond Gate 2.</li> </ul>
Pre-planning application activity plan (land referencing, field surveys, environmental permitting plans)	1. Environmental / EIA Studies 7. Planning 8. Land	<ul style="list-style-type: none"> <li>Develop planning strategy and programme for preferred option.</li> <li>Undertake consultation and stakeholder engagement (interaction with Local Planning Authorities and key consultees).</li> <li>Develop high-level emerging need statement for T2ST and scoping of necessary alternatives required by planning policy.</li> </ul>
Full comparison of solutions' costs and benefits as tested in regional or national modelling with consideration of inter-regional options and systems impacts	1. Environmental / EIA Studies 3. Engineering Studies	<ul style="list-style-type: none"> <li>Assess outputs from draft regional plan to confirm overall 'needs case', transfer capacity and likely timing of delivery.</li> <li>Undertake revised cost and carbon estimates for all options.</li> </ul>
Identification of mutually exclusive solutions	3. Engineering Studies 4. Water Resource Analysis	<ul style="list-style-type: none"> <li>Confirm preferred source for T2ST based on outcome from draft regional plan.</li> <li>Confirm system connections into Southern Water's Hampshire Zones.</li> </ul>
External assurance of data and approaches supported by Board statement	12. Reporting and Assurance	<ul style="list-style-type: none"> <li>Undertake external assurance of data and approaches supported by Board statement.</li> </ul>
Updated regional stakeholder engagement including customer preference studies	7. Planning 8. Land 9. Stakeholder and Customer Engagement	<ul style="list-style-type: none"> <li>Undertake ongoing technical engagement with regulators (EA, NE, DWI)</li> <li>Progress customer preference studies with regional planning team and parent water companies.</li> </ul>
Details of efficient spend to gate submission on gate two activities, including a breakdown of costs against activities and evidence of efficiency of spend (benchmarking or tenders) and assurance	11. Programme Management 12. Reporting and Assurance	<ul style="list-style-type: none"> <li>Programme Manager to closely monitor scope, spend and risks.</li> <li>Reporting of all spend against budget to ensure FD allowance is not exceeded and efficiency of spend can be demonstrated.</li> </ul>
Assessment of key risks to identify potential regulatory barriers, guidance or changes required for the solution to progress	11. Programme Management 12. Reporting and Assurance	<ul style="list-style-type: none"> <li>Continuously monitor, report and mitigate all cost and scheme delivery risks.</li> <li>Engage with regulators, including RAPID, on an ongoing basis to Gate 2.</li> </ul>
Identify impacts of solution on current supply-demand balance delivery plan with simple comparison to current programme solutions.	4. Water Resource Analysis	<ul style="list-style-type: none"> <li>Assess outputs of draft regional plan to understand implications for T2ST scheme development.</li> <li>Liaise with other SROs (particularly SESRO and STT as potential sources) and other schemes to confirm the need, timing, capacity and utilisation of T2ST.</li> </ul>
Identification of any changes in solution partner (other water company) or solution substitutions	11. Programme Management	<ul style="list-style-type: none"> <li>Work with South East Water to confirm if spur is required and, if so, how Thames Water and Southern Water will work with South East Water.</li> </ul>
Develop solution programme plan to determine the activities that need to be undertaken prior to each subsequent gate	11. Programme Management	<ul style="list-style-type: none"> <li>Confirm preferred procurement approach and key activities to set up procurement vehicle.</li> <li>Prepare an updated and more detailed option-specific programme for overall scheme delivery.</li> </ul>
Proposals for gate three activity and outcomes, and penalty scale, assessment criteria and contributions	11. Programme Management	<ul style="list-style-type: none"> <li>Identify detailed workstreams, activities and work packages to develop the scheme beyond Gate 2.</li> </ul>

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## Gate 2 penalty assessment criteria

15.7 No changes to the proposed penalty assessment criteria are proposed for Gate 2.

## Assessment of solution delay impacts

15.8 The project is currently on schedule to meet the programme requirements of Gate 2.

15.9 As set out in Section 3, the T2ST SRO requires a new source to the Thames Water area. This new source is most likely to be the STT and/or SESRO SROs and the earliest deployable outputs are 2033 and 2036-37 respectively, dependent on the options progressed. As the scheme is dependent on the outputs from the regional plan and the company WRMPs, the work prior to 2025 is unlikely to be on the critical path for delivery of the scheme. As such any delays at this stage are unlikely to have any significant impact on the overall delivery of the scheme.

15.10 The key risk and mitigations are discussed in Section 9. The main risk for delay in delivering to Gate 2 relates to the interaction with the regional modelling. The regional modelling is required to confirm the need for the scheme in relation to other competing sources of water and interaction with other Southern Water schemes. All submissions to the regional planning teams have been undertaken on time and we have included future activities in our proposed Gate 2 programme.

15.11 At this stage we do not anticipate any solution delay impacts for the delivery of Gate 2.

# 16 Conclusions and recommendations

## Conclusions

16.1 The work undertaken to Gate 1 has confirmed that there are six feasible options to transfer water from Thames Water's area to Southern Water's Hampshire zones. These options are:

- Raw and potable water transfers from Culham to Otterbourne WTW (Options 1 and 2);
- Raw and potable water transfers from the River Thames at Reading to Otterbourne WTW and (Options 3 and 4); and
- Raw water transfers from Culham to Testwood WTW and Reading to Testwood WTW (Options 5 and 6).

16.2 These proposed options all require a new source. The source of water will be either the STT and/or SESRO schemes.

16.3 The capacity of the transfer is to be confirmed following confirmation from the WRSE regional modelling. At present a range of 50MI/d to 120MI/d has been investigated. Following early feedback from WRSE's regional modelling, a larger 200MI/d capacity transfer is also currently being investigated for all six feasible options and this will be reported on for Gate 2.

16.4 The earliest potential operational date for the proposed T2ST scheme is estimated to be 2036, although this is dependent on the available source of water for the transfer. The earliest potential available date for STT is currently 2033 and SESRO is between 2036 and 2037 dependent on the SESRO option progressed. Therefore if SESRO was the required source then the project could be delayed until at least 2037.

- 16.5 There are no major barriers to scheme progression. The most significant risks to delivering the scheme are:
- The interaction with the regional planning to confirm the overall need, timing, capacity and utilisation of the scheme at an early stage to progress the most viable scheme design. This is being mitigated through early and ongoing collaboration with the regional planning teams and other SROs.
  - The environmental impacts from the transfer passing through environmentally sensitive areas. This is being mitigated through review of proposed pipeline routes and construction techniques to explore opportunities to avoid or reduce likely effects.
- 16.6 The work to Gate 1 has been undertaken efficiently and effectively through close collaboration between Thames Water and Southern Water and other SRO teams, by aligning the scope directly to the RAPID Gate 1 requirements, by competitive procurement of work packages and with robust project management. This has led to spending 53% of the overall Gate 1 budget, therefore we are expecting to return £0.704m to customers.

## Recommendations

- 16.7 It is recommended that the T2ST scheme proceeds to Gate 2.
- 16.8 Upon receipt of the outcomes from the draft regional plan, the overall need, timing and capacity of the scheme will be confirmed and a decision on whether the scheme should continue beyond Gate 2 can be made. The feedback from the draft regional plan will also be utilised to further screen the six constrained options with the aim of identifying a single preferred option for Gate 2.