



**Thames to Affinity Transfer  
Strategic Regional Option -  
Strategic Environmental  
Assessment**

RAPID Gate 1 submission Annex B4

May 2021



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# **Thames to Affinity Transfer Strategic Regional Option - Strategic Environmental Assessment**

RAPID Gate 1 submission Annex B4

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# Contents

Executive summary	1
1 Introduction	3
1.1 Overview	3
1.2 T2AT Options	3
1.3 Methodology	3
1.4 Assumptions and Limitations	4
2 Scheme Description	6
2.1 Overview	6
2.2 Option descriptions	6
2.3 Updates to the scheme since WRSE undertook their review	9
3 WRSE Strategic Environmental Assessment Findings	11
3.1 Overview	11
3.2 Comparison of WRSE outputs	11
3.3 Sunnymeads 1	21
3.4 Maidenhead	<b>Error! Bookmark not defined.</b>
3.5 Teddington DRA	28
3.6 Sunnymeads 2a	31
3.7 Walton 2b	36
3.8 Lower Thames Reservoir Transfer 2a	39
3.9 Beckton Reuse Indirect	42
4 Additional assessment	47
4.1 Overview	47
4.2 Local level data	47
5 Conclusions	48
A WRSE output tables	50
B Additional local constraints	51
C. Datasets reviewed for the additional assessment	52

## Tables

Table 1 1: T2AT Options	3
Table 2 1: T2AT Gate 1 options	6
Table 2.2: Overview of the changes made to the options since WRSE assessment	9
Table 3.1: High-level mitigation measures	11
Table 3.2: Summary WRSE SEA outputs – Effects with no mitigation (pre-mitigation)	13
Table 3 3: Summary WRSE SEA outputs Residual effects (post mitigation)	17
Table 5.1: Summary of the potential benefits and adverse effects of the scheme	48
Table B.2: LWS and TPO within 200m of the T2AT options	<b>Error! Bookmark not defined.</b>
Table C.3: Additional local level data reviewed for SEA effects	52

## Figures

Figure 2.1: Map of the T2AT options	8
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# Executive summary

The Strategic Environmental Assessment (SEA) Annex supports the Environment Assessment Report (EAR) that accompanies the Gate 1 submission report to Regulators' Alliance for Progressing Infrastructure Development (RAPID) for the Thames to Affinity Transfer (T2AT) scheme. This Annex presents the findings of the SEA level option applied to the options for the T2AT options

**The content of this report is draft and relates to material [or data] which is still in the course of completion in travel to Gate 2 and should not be relied upon at this early stage of development. We continue to develop our thinking and our approach to the issues raised in the document in preparation for Gate 2.**

Water Resources South East (WRSE) undertook an SEA in January 2021, in line with the methodology in the WRSE Regional Plan Environmental Assessment Methodology Guidance, July 2020.

Based on the WRSE SEA outputs for residual effects (post mitigation), the seven distinct options are predicted to result in minor positive, neutral or minor negative effects across all the SEA objectives, with the following exceptions:

- Biodiversity: The assessment outputs vary in the construction phase only. The residual effects on biodiversity during construction are likely to be greater for Sunnymeads 1, Sunnymeads 2a, Walton 2b and Lower Thames Reservoir Transfer 2a options as a major residual effect is likely compared with a moderate effect on Maidenhead, Teddington DRA and Beckton Reuse Indirect options. No operational residual effects are expected on any of the options.
- Soil: There is a potential for the construction and operation of the WTW for Sunnymeads 1, Maidenhead, Teddington DRA and Beckton Reuse Indirect options to result in residual minor effects on soil. No residual effect on soil is expected from the construction or operation of Sunnymeads 2a, Walton 2b or Lower Thames Reservoir Transfer 2a options.
- Water: All options are likely to result in a residual operational effect on the objective of protecting and enhancing the quality of the water environment and water resources. The operation of Sunnymeads 1, Teddington DRA, Sunnymeads 2a, Lower Thames Reservoir Transfer 2a and Beckton Reuse Indirect options would result in a minor residual effect, while the operation of Maidenhead and Walton 2b options would result in a moderate residual effect on water. No construction residual effects are expected on any of the options.
- Climatic factors: The operation of Sunnymeads 1 and Teddington DRA options would likely result in a major residual effect on carbon emissions, while the operation of all the other options would likely result in a moderate residual effect on carbon emissions.

Additional assessment considering local level data has been undertaken in line with the methodology in the All Companies Working Group (ACWG) Water Resource Management Plan (WRMP) environmental assessment guidance and applicability with Strategic Resource Options (SRO), October 2020.

The local level data findings show that all options intersect or lie within 200m of a number of Local Wildlife Sites (LWS) or Tree Protection Orders (TPO). While direct loss may occur, the impact of the route on LWS and TPO will be reviewed at Gate 2 following the refinement of the routes and identification of mitigation to reduce the potential effects on these areas.

The WRSE findings and additional assessment show the potential residual impact of all options is similar. Overall, Lower Thames Reservoir Transfer 2a and Beckton Reuse Indirect options performed slightly better while Sunnymeads 1 and Walton 2b options performed slightly worse.

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# 1 Introduction

## 1.1 Overview

This annex supports the EAR that accompanies the Gate 1 submission report to RAPID for the T2AT. The annex presents the findings of a Strategic Environmental Assessment (SEA) applied to the options for the T2AT scheme.

## 1.2 T2AT Options

The outputs of the initial route options appraisal identified seven distinct options for transferring water from the Thames Water (TW) region to the Affinity Water (AFW) region. An eighth option, Mogden Reuse Indirect 3, is identical in terms of environmental assessment to Walton 2b and so has not been assessed separately. Throughout this report, the assessment applied to the Walton 2b option applies equally to Mogden Reuse Indirect 3. These options are shown in Table 1.1. Further details on the options are set out in Section 2: Scheme Description.

**Table 1 1: T2AT Options**

Option name	Description overview
Sunnymeads 1	Abstraction of raw water at the existing [REDACTED] and conveyance to a new Water Treatment Works (WTW) at the [REDACTED] Service Reservoir (SR) site. Available treated water storage capacity at the [REDACTED] site will be utilised for this option.
Maidenhead	Abstraction of raw water at a new [REDACTED] intake, conveyance to a new WTW at [REDACTED] SR, and utilisation of available storage capacity at the existing [REDACTED] SR.
Teddington Direct River Abstraction (DRA)	Abstraction of raw water at a new intake at [REDACTED], conveyance to a new WTW at [REDACTED], and utilisation of the available storage capacity at the existing [REDACTED] SR.
Sunnymeads 2a	Abstraction of raw water at the existing [REDACTED] and conveyance to a new WTW at [REDACTED] (2), near to the existing [REDACTED] WTW. The potable water is then conveyed to the existing [REDACTED] SR.
Walton 2b (and Mogden Reuse Indirect 3)	Abstraction of raw water at the existing [REDACTED] and conveyance to new [REDACTED] 2 WTW. The potable water is then conveyed to the existing [REDACTED] SR.
Lower Thames Reservoir Transfer 2a	Water from Thames Water's [REDACTED] and [REDACTED] is abstracted via a proposed connection into [REDACTED] the existing [REDACTED] WTW site. This raw water is then diverted to the proposed [REDACTED] 2 WTW. The potable water is subsequently conveyed to the existing [REDACTED] SR.
Beckton Reuse Indirect	Indirect transfer of reuse water from [REDACTED] works to a new WTW near [REDACTED]. The proposed abstraction point would be located on the [REDACTED] from the proposed Beckton Reuse option of the London Effluent Reuse SRO.

## 1.3 Methodology

### Overview assessment methodology

The group of water companies involved in developing SROs have been working together to increase consistency in approaches to SRO development across the country. To confirm the list of SEA criteria to be used in the SEA assessment for the SROs, a review of the SEA objectives of the water companies was undertaken to determine if a core set of scheme objectives could be developed. The draft WRMP 2019 guidance and its application to the SRO schemes was also considered. The recommended objectives were then reviewed against the Water Resources Planning Guidelines: Working Version for WRMP 2024. Further information on the

process undertaken to develop the SEA objectives is available in the *Strategic Environmental Assessment: Core Objective Identification document*<sup>1</sup>.

An option level assessment has been undertaken to assess concept design options against the SEA objectives. The SEA assessment was undertaken on 14 SEA objectives based on nine topics (biodiversity, flora and fauna; soil; water; air; climatic factors; landscape; historic environment; population and human health; material assets). For each option, an assessment of the potential impact of construction and operation of the option on each SEA criteria was undertaken. The SEA assessment also considered the assessment of residual effects from construction and operation following the identification of potential mitigation.

For the options previously assessed as part of the WRMP19, the assessment information was used as a basis for the SEA assessment work for the Gate 1 submission.

### Structure of the assessment

This document presents the SEA of the T2AT options. There are two parts to the SEA:

- a) **The WRSE SEA Findings.** The WRSE SEA has been undertaken in line with the methodology found in the WRSE Regional Plan Environmental Assessment Methodology Guidance, July 2020. The outputs of this assessment are described in Section 3 and output tables received from WRSE are contained in Appendix A.
- b) **Additional assessment.** Additional assessment, considering local level data which was not available at the time WRSE undertook the assessments. The additional assessment has been undertaken in-line with the methodology found in the ACWG WRMP environmental assessment guidance and applicability with SROs, October 2020. The outputs of this assessment are described in Section 4, the LWS and TPO identified within 200m of the options is presented in Appendix B and source of data reviewed is in Appendix C.

In all cases, the findings presented in this document follow the methodologies above and the principles of SEA. The core SEA objectives identified with the ACWG Company representatives were reviewed against current and upcoming relevant legislation, policies and other environmental assessments required for WRMPs that were not considered within WRMP19. Further information on the SEA methodology developed is available in the *Strategic Environmental Assessment: Core Objective Identification*<sup>2</sup> document.

This SEA does not include an in-combination assessment with other SROs, water company capital investments or third party development plans or projects. An in combination assessment would not be considered proportionate at this stage, due to the early stages of the plan, and the consequential lack of further design details on T2AT and other SROs available. The SEA will be reviewed at Gate 2 stage to include potential in combination effects.

## 1.4 Assumptions and Limitations

This SEA does not include an in-combination assessment with other SROs, water company capital investments or third party development plans or projects.

The WRSE outputs discussed in Section 3 do not include an assessment for the additional components described in Section 4.

<sup>1</sup> Mott MacDonald (2020) All Companies Working Group: Core Objective Identification. Revision 01C. October 2020. 29 pages.

<sup>2</sup> Mott MacDonald (2020) All Companies Working Group. Strategic Environmental Assessment: Core Objective Identification. 29 pages.

The WRSE outputs discussed in Section 3 do not take into consideration the additional regulatory assessments which have been completed for HRA and WFD as part of the Gate 1 submission to RAPID.

The assumptions made within the WRSE outputs discussed in Section 3 are based on assumptions and limitations as per the WRSE methodology and guidance described in the WRSE Regional Plan Environmental Assessment Methodology Guidance, July 2020.

Mitigation measures included in the WRSE outputs in Section 3 are presented in Table 3.1. The same mitigation measures have been included in Section 4.

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## 2 Scheme Description

### 2.1 Overview

The T2AT scheme is a prospective project with the objective of abstracting available raw water from the Thames Water catchment in west, south, and east London; treating it to potable water standards; and delivering to Affinity Water customers in the area to the north and north east of London. Potential sources of raw water are the River Thames (supported by the South East Strategic Reservoir Option (SESRO) and Severn Thames Transfer (STT) schemes) and reuse options within the London Reuse SRO scheme. Treated water would be delivered to an existing distribution hub, either the existing [REDACTED] Service Reservoir (SR) or a new SR near [REDACTED].

A full scheme description can be found in the Gate 1 submission report to RAPID, however a summary of the main aspects of the options are included below.

### 2.2 Option descriptions

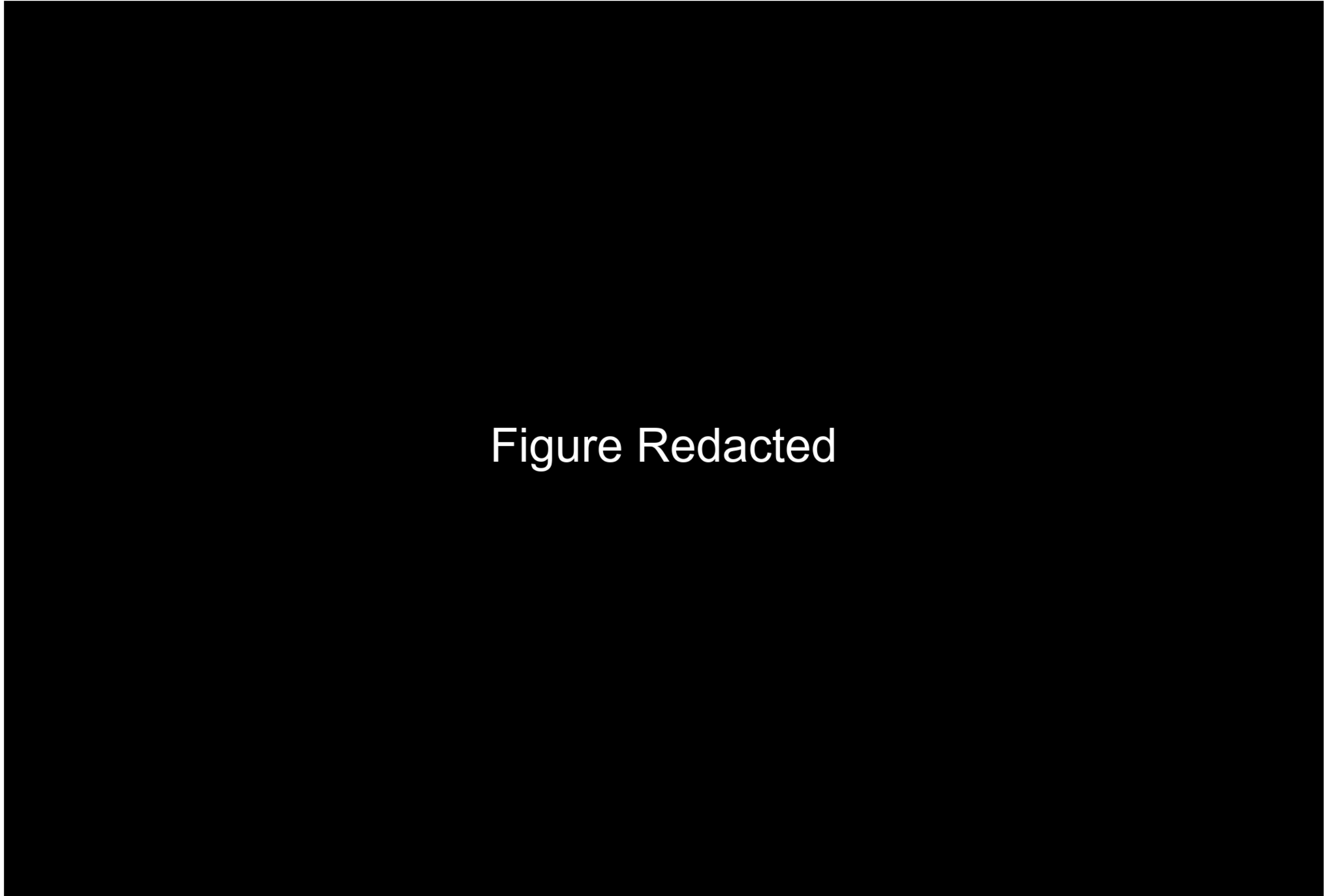
For Gate 1, there are seven distinct options for T2AT as described in Table 2.1. A map of the options is shown in Figure 2.1.

**Table 2 1: T2AT Gate 1 options**

Option name	Option description
Sunnymeads 1	<p>Abstraction of raw water at the existing [REDACTED] and conveyance to a new WTW at the existing [REDACTED] SR site. Available treated water storage capacity at the [REDACTED] site will be utilised for this option. 50MI/d and 100MI/d options.</p> <p>Interdependencies of the option with SESRO or STT Downstream network enhancement</p> <p>Indicative intake location: [REDACTED]</p> <p>Intake selection by option: Conventional screens</p>
Maidenhead	<p>Abstraction of raw water at a [REDACTED], conveyance to a new WTW at [REDACTED] SR, and utilisation of available storage capacity at the existing [REDACTED] SR. 50MI/d and 100MI/d options.</p> <p>Interdependencies of the option with SESRO or STT Downstream network enhancement.</p> <p>Indicative intake location: [REDACTED]</p> <p>Intake selection by option: Passive wedge wire screen intake within the river and a gravity pipe to an offset pumping station.</p>
Teddington DRA	<p>Abstraction of raw water at a new [REDACTED], conveyance to a new WTW at [REDACTED], and utilisation of the available storage capacity at the existing [REDACTED] SR. 50MI/d and 100MI/d options.</p> <p>Interdependencies of the option with London Reuse SRO Teddington Direct River Abstraction (DRA). Downstream network enhancement.</p> <p>Indicative intake location: [REDACTED]</p> <p>Intake selection by option: Passive wedge wire screen intake within the river and a gravity pipe to an offset pumping station</p>
Sunnymeads 2a	<p>Abstraction of raw water at the [REDACTED] intake and conveyance to a new WTW at [REDACTED] ( [REDACTED] 2), near to the existing [REDACTED] WTW. The potable water is then conveyed to the existing [REDACTED] SR. 50MI/d and 100MI/d options.</p> <p>Interdependencies of the option with SESRO or STT Downstream network enhancement.</p> <p>Indicative intake location: [REDACTED].</p> <p>Intake selection by option: Conventional screens.</p>

Option name	Option description
Walton 2b (and Mogden Reuse Indirect 3)	<p>Abstraction of raw water at the [REDACTED] intake and conveyance to new [REDACTED] 2 WTW. The potable water is then conveyed to the existing [REDACTED] SR 50MI/d and 100MI/d options.</p> <p>Interdependencies of the option with SESRO or STT. Downstream network enhancement.</p> <p>Another option, referred to as 'Mogden Reuse Indirect 3' comprises the same infrastructure as Walton 2b, but utilises water from the proposed London Reuse SRO (Mogden Reuse option). The environmental assessments for the alternative sources are covered by the source SROs; SESRO and STT for Walton 2b and London Effluent Reuse SRO for the Mogden Reuse Indirect 3 option. In this report, wherever Walton 2b is mentioned as an option, the associated narrative applies equally to the Mogden Reuse Indirect 3 option.</p> <p>Indicative intake location: [REDACTED].</p> <p>Intake selection by option: Conventional screens</p>
Lower Thames Reservoir Transfer 2a	<p>Water from Thames Water's [REDACTED] and [REDACTED] is abstracted via a proposed connection into [REDACTED] the existing [REDACTED] WTW site. This raw water is then diverted to the proposed [REDACTED] 2 WTW. The potable water is subsequently conveyed to the existing [REDACTED] SR. 50MI/d and 100MI/d options.</p> <p>Interdependencies of the option with SESRO. Downstream network enhancement</p> <p>Indicative intake location: [REDACTED].</p> <p>Intake selection by option: Proposed shaft into existing [REDACTED] tunnel, with supplementary works on the [REDACTED] to enable Thames Water to compensate for lost abstraction at [REDACTED].</p>
Beckton Reuse Indirect	<p>Indirect transfer of reuse water from [REDACTED] to a new WTW near [REDACTED]. The proposed abstraction point would be located on the [REDACTED] from the proposed Beckton Reuse option of the London Effluent Reuse SRO. 50MI/d and 100MI/d options.</p> <p>Another potential source for this option is water abstracted as part of the London Reuse SRO Teddington DRA option, which abstracts river water upstream of the effluent discharge from [REDACTED], and utilises the [REDACTED], which discharged in a similar location to the proposed Beckton Reuse Scheme</p> <p>Interdependencies of the option with the London Reuse SRO or London Reuse SRO [REDACTED] DRA option [REDACTED] within the London Reuse SRO. Downstream network enhancement.</p> <p>Indicative intake location: [REDACTED].</p> <p>Intake selection by option:</p> <ol style="list-style-type: none"><li>1. Passive wedge wire screen and gravity pipe to a pumping station or</li><li>2. A channel to an offset conventional screen and pumping station</li></ol>

**Figure 2.1: Map of the T2AT options**



### 2.3 Updates to the scheme since WRSE undertook their review

It should be noted that the WRSE assessment was undertaken on an earlier iteration of the options; further refinements have been made to the options since these were assessed by WRSE in order to optimise the options for Gate 1 submission. An overview of the changes made to the options are presented in Table 2.2. No significant changes were made to the routes assessed by WRSE.

Section 3 presents the WRSE SEA findings. While this Section presents the findings of the WRSE assessment undertaken on earlier versions of the options, the findings were reviewed against the optimised options. The differences in the assessment between the previous version of the options and the optimised versions for Gate 1 are listed at the end of each option section. As no significant changes were made to the routes assessed by WRSE, the WRSE metrics remain valid.

**Table 2.2: Overview of the changes made to the options since WRSE assessment**

Option name	Changes since WRSE assessment
Sunnymeads 1	<ul style="list-style-type: none"> <li>Optimised route limits the number of crossings of the motorway and adjacent A-roads – as a result of this the total pipeline length was reduced (near the proposed [REDACTED] 2 WTW).</li> <li>Pipeline carefully routed closer to field boundaries between the proposed [REDACTED] 2 and the existing [REDACTED] Service Reservoir to minimise the impact on land.</li> <li>The route [REDACTED] was amended for a slightly longer route which crosses the railway track and requires an additional river crossing. While this resulted in a small increase in pipe length, this change in the route means that it no longer routes through the town of [REDACTED].</li> </ul>
Maidenhead	<ul style="list-style-type: none"> <li>A longer section of the optimised route goes through the [REDACTED].</li> <li>Avoid an area of Grade 2 land ([REDACTED]).</li> </ul>
Teddington DRA	<ul style="list-style-type: none"> <li>First part of the route has been modified as a result of the change in the proposed abstraction location. This results in a slight increase in the length of the pipeline, and a short section of the optimised route running along [REDACTED].</li> <li>Short sections of the route located [REDACTED] have been amended to follow the roads where possible.</li> <li>Section of the route between [REDACTED] has also been optimised to follow the roads more closely.</li> <li>Section of the route between [REDACTED] Service Reservoir has moved to the south east therefore no longer adjacent to some ancient woodland.</li> </ul>
Sunnymeads 2a	<ul style="list-style-type: none"> <li>The option follows largely the same route as Sunnymeads 1. The only difference between the routes is that this option diverges east from Sunnymeads 1 near the proposed [REDACTED] 2 WTW for treatment before joining back. Refer to 'Sunnymeads 1' for the changes made to the route.</li> </ul>
Walton 2b (and Mogden Reuse Indirect 3)	<ul style="list-style-type: none"> <li>South of the [REDACTED] where the [REDACTED] meets with the [REDACTED], the optimised route would follow the [REDACTED] on its western side (instead of its eastern side). While the route would need to cross the [REDACTED] at that point, the optimised route avoids landfills sites, priority habitats, a [REDACTED], a golf course and green spaces. The optimised route also results in fewer motorway crossings.</li> <li>As the optimised route intercepts the Sunnymeads 1 route north of the [REDACTED] to the proposed [REDACTED] 2 WTW and then follows the same route to the existing [REDACTED] Service Reservoir, refer to 'Sunnymeads 1' for the changes made to that section of the Walton 2b route.</li> </ul>

Option name	Changes since WRSE assessment
Lower Thames Reservoir Transfer 2a	<ul style="list-style-type: none"><li>As the option conveys water from the [REDACTED] to the proposed [REDACTED] 2 WTW and from there follows the same route as the Sunnymeads 1 option, refer to 'Sunnymeads 1' for the changes made to that section of the Lower Thames Reservoir transfer 2a route</li></ul>
Beckton Reuse Indirect	<ul style="list-style-type: none"><li>South of the [REDACTED], the optimised pipeline runs on the west side of the A10 (instead of the east side of the A10) and passes through The Loyola Playground</li><li>The route crosses the [REDACTED] (instead of further along the [REDACTED] to the west of the new crossing) and routes through fields and the [REDACTED] to end at the proposed [REDACTED] WTW and Reservoir instead of along the [REDACTED]</li></ul>

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# 3 WRSE Strategic Environmental Assessment Findings

## 3.1 Overview

The WRSE SEA outputs for each pipeline option are summarised in Table 3.2 and Table 3.3 and discussed in the following sections. The full WRSE SEA outputs are presented in Appendix A.

For each option, the tables show ratings for Construction and Operation phases against each of the SEA objectives. Table 3.2 shows the ratings before any mitigation is applied and Table 3.3 shows the ratings after mitigation is applied. The applicable mitigation for each SEA objective is described in the following sections.

## 3.2 Comparison of WRSE outputs

The SEA assessment considered the potential impacts of construction and operation, before and after the implementation of high-level mitigation measures. The measures considered at this stage of the project are presented in Table 3.1.

It is important to note the high level mitigation measures considered for the assessment at Gate 1 represent mitigation that are likely to be implemented as they are standards/best practice measures. As the scheme progresses through to the next gates, more specific mitigation measures will be identified where needed.

**Table 3.1: High-level mitigation measures**

SEA topic	Recommended high-level mitigation measures
Biodiversity	<ul style="list-style-type: none"> <li>Minimise impacts and reinstatement /compensation of habitat.</li> <li>Future design will need to undertake ecology surveys.</li> <li>Undertake HRA AA to address uncertain effects</li> <li>Re-route the pipeline to avoid direct impacts on designated sites which the route passes through.</li> <li>Pollution prevention and control measures to reduce likelihood of contaminants entering waterbodies.</li> </ul>
Soil	<ul style="list-style-type: none"> <li>Ground will be reinstated where possible.</li> <li>Best practice techniques to be implemented when working within proximity to a landfill site.</li> <li>Pollution prevention and control measures to reduce likelihood of contaminants entering waterbodies</li> </ul>
Water	<ul style="list-style-type: none"> <li>Measures to reduce the impact on flooding.</li> <li>Pollution prevention and control measures to reduce likelihood of contaminants leaching through soil and entering groundwater</li> <li>Bedding material designed so as not to form preferential pathway for groundwater</li> <li>Monitor river levels during the operational phase to minimise effects.</li> <li>Undertake further WFD assessment</li> </ul>
Air	<ul style="list-style-type: none"> <li>Best practise measures to reduce impact on air quality.</li> </ul>
Climatic factors	<ul style="list-style-type: none"> <li>Investigate use of renewables for energy supply and use of materials with lower embodied carbon.</li> <li>Carbon footprint study to help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available</li> <li>Monitor river levels to avoid over-abstraction</li> </ul>
Landscape	<ul style="list-style-type: none"> <li>Minimise landscape disturbance</li> <li>Ground will be reinstated where possible</li> </ul>

SEA topic	Recommended high-level mitigation measures
Historic environment	<ul style="list-style-type: none"> <li>• Incorporate screening to reduce visual effects.</li> <li>• Minimise setting effects on historic assets</li> <li>• Re-route / directional drilling of the pipeline to avoid direct impacts on Listed Buildings and Registered Parks and Gardens.</li> <li>• Undertake Archaeology Watching Brief to reduced likelihood of impacts to buried archaeology</li> <li>• Further work to determine the significance of the effect depending on the presence / absence of buried archaeology</li> </ul>
Population and human health	<ul style="list-style-type: none"> <li>• Re-route pipeline around community assets if possible, and if not liaison with affected asset owners required.</li> <li>• Minimise effects from noise disturbance, severance, and amenity effects on the local community</li> <li>• Potential opportunities to enhance local areas when reinstating land</li> <li>• Opportunity to enhance public recreational spaces following reinstatement.</li> <li>• Diversions and best practice construction traffic management implemented to minimise effects</li> </ul>
Material and assets	<ul style="list-style-type: none"> <li>• Implement sustainable design measures to reduce the impact.</li> <li>• Source materials locally where possible.</li> <li>• Use of directional drilling where possible to minimise disruption</li> <li>• Minimise impacts on built assets and infrastructure.</li> <li>• Roads and cycle routes to be reinstated above the pipeline</li> <li>• Diversions and best practice construction traffic management implemented to minimise effects</li> </ul>

Based on the WRSE SEA outputs for residual effects (post mitigation), the options rated the same across the SEA objectives, with the following exceptions:

- Biodiversity: The assessment outputs vary in the construction phase only. The residual effects on biodiversity during construction are likely to be greater for Sunnymeads 1, Sunnymeads 2a, Walton 2b and Lower Thames Reservoir Transfer 2a options as a major residual effect is likely compared with a moderate effect on Maidenhead, Teddington DRA and Beckton Reuse Indirect options. No operational residual effects are expected on any of the options.
- Soil: There is a potential for the construction and operation of the WTW for Sunnymeads 1, Maidenhead, Teddington DRA and Beckton Reuse Indirect options to result in residual minor effects on soil. No residual effect on soil is expected from the construction or operation of Sunnymeads 2a, Walton 2b or Lower Thames Reservoir Transfer 2a options
- Water: All options are likely to result in a residual operational effect on the objective of protecting and enhancing the quality of the water environment and water resources. The operation of Sunnymeads 1, Teddington DRA, Sunnymeads 2a, Lower Thames Reservoir Transfer 2a and Beckton Reuse Indirect options would result in a minor residual effect, while the operation of Maidenhead and Walton 2b options would result in a moderate residual effect on water. No construction residual effects are expected on any of the options
- Climatic factors: The operation of Sunnymeads 1 and Teddington DRA options would likely result in a major residual effect on carbon emissions, while the operation of all the other options would likely result in a moderate residual effect on carbon emissions.

The performance of each option against the SEA objectives are reported in Section 3.3 to Section 3.9. The WRSE SEA findings are presented for each option, per pipeline route, WTW and treated water conveyance route (where it applies).

**Table 3.2: Summary WRSE SEA outputs – Effects with no mitigation (pre-mitigation)**

**Pre-mitigation**

SEA Topic	SEA Objective	Sunnymeads 1				WTW				Maidenhead							
		Pipeline		Operational		Construction		Operational		Pipeline		Operational					
		+	-	+	-	+	-	+	-	+	-	+	-				
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	0	0	-	0	0	0	---	0	0	0	-	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	0	-	0	-	0	---	0	0	0	-	0	-
<b>Water</b>	Increase resilience and reduce flood risk	0	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0
	Protect and enhance the quality of the water environment and water resources	0	-	0	-	0	-	0	0	0	-	0	--	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	--	0	0	0	-	0	0	0	---	0	0	0	-	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	---	0	-	0	-	0	-	0	--	0	-	0	-
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0	0	0	0	-	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	-
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	--	0	0	0	-	0	0	0	---	0	0	0	-	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	0	0	-	0	0	0	-	0	0	0	-	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0	0	---	0	0	0	-	0	0

**Pre-mitigation**

SEA Topic	SEA Objective	Teddington DRA				Sunnymeads 2a				Conveyance											
		Pipeline		WTW		Pipeline		WTW		Pipeline		WTW									
		Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects								
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	--	0	0	0	-	0	0	0	--	0	0	0	--	0	0	0	--	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	-	0	0	0	-	0	-	0	--	0	0	0	0	0	0	0	-	0	0
<b>Water</b>	Increase resilience and reduce flood risk	0	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	-	0	0
	Protect and enhance the quality of the water environment and water resources	0	-	0	-	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	--	0	0	0	-	0	0	0	--	0	0	0	-	0	0	0	--	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	--	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	--
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	-	0	-	0	0
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	--	0	0	0	-	0	0	0	--	0	0	0	-	0	0	0	--	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	0	0	-	0	0	0	--	0	0	0	-	0	0	0	--	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	--	0	-
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0	0	--	0	0	0	-	0	0	0	--	0	0



**Pre-mitigation**

SEA Topic	SEA Objective	Walton 2b								Lower Thames Reservoir Transfer 2a															
		Pipeline		WTW		Conveyance		Pipeline		WTW		Conveyance		Conveyance											
		Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects										
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	0	0	--	0	0	0	---	0	0	0	--	0	0	0	--	0	0	0	---	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	0	0	0	0	0	-	0	0	0	-	0	0	0	0	0	0	0	-	0	0
<b>Water</b>	Increase resilience and reduce flood risk	0	--	0	0	0	0	0	0	0	-	0	0	0	-	0	0	0	0	0	0	0	-	0	0
	Protect and enhance the quality of the water environment and water resources	0	-	0	--	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	--	0	0	0	-	0	0	0	--	0	0	0	--	0	0	0	-	0	0	0	--	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	--	0	-	0	-	0	-	0	--	0	-	0	-	0	-	0	-	0	-	0	--
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	0	0	-	0	-	0	-	0	0
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	--	0	0	0	-	0	0	0	--	0	0	0	--	0	0	0	-	0	0	0	--	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	0	0	-	0	0	0	--	0	0	0	--	0	0	0	-	0	0	0	--	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	-	0	-	0	-	0	-	0	--	0	-	0	-	0	-	0	-	0	-	0	--	0	-
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0	0	--	0	0	0	--	0	0	0	-	0	0	0	--	0	0



**Pre-mitigation**

SEA Topic	SEA Objective	Beckton Reuse Indirect							
		Pipeline				WTW			
		Construction Effects		Operational Effects		Construction Effects		Operational Effects	
		+	-	+	-	+	-	+	-
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	--	0	0	0	-	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	-	0	0	0	-	0	-
<b>Water</b>	Increase resilience and reduce flood risk	0	-	0	0	0	0	0	0
	Protect and enhance the quality of the water environment and water resources	0	--	0	0	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	--	0	0	0	-	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	--	0	-	0	-
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	0	-	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	0	0	-	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	--	0	-	0	-	0	-
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0



**Table 3.3: Summary WRSE SEA outputs – Residual effects (post mitigation)**

**Residual effects**

SEA Topic	SEA Objective	Sunnymeads 1				Maidenhead											
		Pipeline		WTW		Pipeline		WTW									
		Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects								
		+	-	+	-	+	-	+	-	+	-	+	-	+	-		
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	0	0	0	0	-	0	-	0	0	0	0	0	-	0	-
<b>Water</b>	Increase resilience and reduce flood risk	0	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0
	Protect and enhance the quality of the water environment and water resources	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	-
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
	Avoid negative effects on built assets and infrastructure	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0

**Residual effects**

SEA Topic	SEA Objective	Teddington DRA				Sunnymeads 2a				Conveyance											
		Pipeline		WTW		Pipeline		WTW		Pipeline		WTW									
		Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects								
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	0	0	0	0	-	0	-	0	-	0	0	0	0	0	0	0	0	0	0
<b>Water</b>	Increase resilience and reduce flood risk	0	-	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	-	0	0
	Protect and enhance the quality of the water environment and water resources	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	-	0	-	0	0
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
	Avoid negative effects on built assets and infrastructure	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0





**Residual effects**

SEA Topic	SEA Objective	Walton 2b						Lower Thames Reservoir Transfer 2a																	
		Pipeline		WTW		Conveyance		Pipeline		WTW		Conveyance													
		Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects	Construction Effects	Operational Effects												
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Water</b>	Increase resilience and reduce flood risk	0	-	0	0	0	0	0	0	0	-	0	0	0	-	0	0	0	0	0	0	0	-	0	0
	Protect and enhance the quality of the water environment and water resources	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-	0	-	0	0	0	-	0	0	0	-	0	-	0	-	0	0
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
	Avoid negative effects on built assets and infrastructure	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0	0	-	0	0



### Residual effects

SEA Topic	SEA Objective	Beckton Reuse Indirect							
		Pipeline				WTW			
		Construction Effects		Operational Effects		Construction Effects		Operational Effects	
		+	-	+	-	+	-	+	-
<b>Biodiversity, flora and fauna</b>	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	--	0	0	0	-	0	0
<b>Soil</b>	Protect and enhance the functionality, quantity and quality of soils	0	0	0	0	0	-	0	-
<b>Water</b>	Increase resilience and reduce flood risk	0	-	0	0	0	0	0	0
	Protect and enhance the quality of the water environment and water resources	0	0	0	0	0	0	0	0
	Deliver reliable and resilient water supplies	0	0	+	0	0	0	+	0
<b>Air</b>	Reduce and minimise air emissions	0	-	0	0	0	-	0	0
<b>Climatic Factors</b>	Reduce embodied and operational carbon emissions	0	-	0	--	0	-	0	-
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	0
<b>Landscape</b>	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	-
<b>Historic Environment</b>	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	0	-	0	0
<b>Population and Human Health</b>	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	0	0	-	0	0
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0
<b>Material Assets</b>	Minimise resource use and waste production	0	-	0	-	0	-	0	-
	Avoid negative effects on built assets and infrastructure	0	-	0	0	0	-	0	0

### 3.3 Sunnymeads 1

Abstraction of raw water at the [REDACTED] intake and conveyance to a new WTW at the existing [REDACTED] SR site. Available treated water storage capacity at the [REDACTED] site will be utilised for this option. 50Ml/d and 100Ml/d options.

#### Pipeline and Abstraction

##### Biodiversity, flora and fauna

The following sites are within [REDACTED] of the pipeline route: [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED] The [REDACTED] are

also within 500m of the proposed route. There are additional designated sites within 2000m. The construction of the option could result in major indirect negative effects on these sites. The pipeline would also pass through priority habitat and woodland. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **major negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. It is also recommended a Habitat Regulations Assessment (HRA) Appropriate Assessment (AA) is undertaken to address likely significant effects identified for the [REDACTED] SPA and Ramsar site and the uncertain effects identified for [REDACTED] Special Area of Conservation (SAC). No operational effects are expected. It is important to note that these HRA findings were identified at the time the SEA assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

##### Soil

The pipeline would be predominately located within Grade 3 agricultural land, non-agricultural land and urban land, however it does pass through areas of Grade 1 agricultural land. The pipeline would pass through three historic landfill sites. The construction activities would likely result in land disturbance (assessed as 'moderate negative'), however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **neutral residual effects**.

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely. Best practice methods for working in landfill sites would likely be implemented.

##### Water

The pipeline would predominately be located within a Flood Zone 1 (low risk of flooding), however would pass through areas of Flood Zones 2 and 3. The construction works could result in **minor negative residual effects** on flooding even if measures to reduce the impact on flooding would likely be implemented. As the pipeline would be located below the surface, negative effects of the operation of the pipeline are considered unlikely.

The construction of the pipeline could result in a minor negative effect on the water quality of nearby waterbodies due to the option being located in proximity to chalk rivers. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. As this option would require the abstraction of water from an existing intake, it has the potential to result in a minor negative effect on water flows, levels and quality during operation. While monitoring of the river levels

during operation would likely take place, **minor negative residual effects** of the operation of the pipeline remains likely. Water Framework Directive (WFD) screening assessment identified that no further WFD assessment is required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

As this option would likely increase capacity in the transfer of water across water companies, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies

### Air

The proposed pipeline passes through the Hillingdon Air Quality Management Area (AQMA), South Bucks AQMA and South Bucks District Council AQMA No 2. While the construction works could result in a minor negative effect on local air quality, best practice mitigation measures would be implemented, and the nature of the **minor negative residuals effects** would be temporary

### Climatic factors

Embodied carbon would be generated from materials used to construct the pipeline, construction activities and from the operation the pipeline. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative construction and major negative operational residual carbon emissions**. Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

Given the option proposes abstraction, the resilience of the local environment to climate change may be negatively affected (**minor negative residual effects** during operation). It is recommended the levels of the river are monitored to avoid over-abstraction.

### Landscape

The pipeline route would pass through the London Area Greenbelt. Temporary **minor negative residual effects** from construction are likely due to the excavation work. As the land would be reinstated following the construction works, the pipeline is unlikely to result in negative effects during operation.

### Historic Environment

The pipeline route would pass through a listed building [REDACTED] and through two conservation areas ([REDACTED]). There are several listed buildings, one scheduled monument and one registered parks and gardens ([REDACTED]) within 500m of the proposed route. The construction could result in a direct impact on a listed building. The construction works are likely to result in temporary **minor negative residual effects** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence / absence of buried archaeology.

### Population and Human Health

The proposed route passes through a church and religious grounds, and a playing field. There are also play spaces, playing fields, churches and religious grounds, schools, golf courses, country parks, sports facilities, allotments and other community facilities within 500m of the pipeline route. The construction works would likely result in a disruption to the local community and users of these community facilities and result in **minor negative residual effects**. This

section of the route will need to be reviewed during design development. Severance of public rights of way and impacts on a national cycle route are also likely during construction. Best practice mitigation measures would be implemented during construction, however **minor negative residual effects** would remain in place. The operation of the pipeline would not impact on the local community.

### Material Assets

The construction on a new pipeline would require the use of materials and energy consumption. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that **minor negative residual effects** during construction and operation will remain.

The proposed pipeline crosses major roads, railways and a national cycle route. The construction works are likely to result in a moderate temporary negative effect on these assets if closures are required, however diversions would be put in place where possible. As the land is expected to be reinstated following the completion of the construction works, the operation of the pipeline would not result in **minor negative residual effects** on built assets and infrastructure.

### Water Treatment Works – New [REDACTED] WTW

#### Biodiversity, flora and fauna

There are two SSSI sites within [REDACTED] of the new proposed WTW location which includes [REDACTED] SSSI and [REDACTED] SSSI/NNR. The construction phase could result in minor negative effects on these sites. The location of the new WTW would not directly impact on woodland or priority habitats, however there are areas of woodland and priority habitats within 500m of the site, therefore there is potential for indirect effects. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **minor negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. No operational effects are expected.

#### Soil

The WTW site would be located within Grade 3 agricultural land and would likely lead to the permanent loss of the land. The proposed location for the WTW is not located within authorised or historic landfill sites, however there is a historic landfill within 500m of the location.

Ground surrounding the site would be reinstated where possible, however it is likely the works would result in permanent loss of land. Best practice methods for working in landfill sites would likely be implemented. Pollution prevention and control measures to reduce likelihood of contaminants leaching through soil and entering groundwater would be implemented. However, construction and operation would likely result in **minor negative residual effects** on soils.

#### Water

The site for the new WTW would be located within Flood Zone 1, which means low risk of flooding. There may be an increase in the area of hardstanding associated with the WTW, however it would likely be minimal and is not anticipated to increase the risk of flooding during construction or operation (**neutral residual effects**).

No likely impacts on water quality, levels / flows anticipated given there would be no abstraction at the WTW site. The construction works could result in negative effects on nearby waterbodies during the construction phase. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. As no abstraction would take place at the WTW site, no impacts on water flows,

levels or quality are expected during operation. WFD screening assessment identified that no further WFD assessment is required.

The option would provide increased capacity for water treatment by providing a new WTWs, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies.

### Air

The proposed WTW site is not located within an AQMA. While best practice mitigation measures would likely be implemented during construction, temporary **minor negative residual effects** on local air quality remain likely. No operational impacts on local air quality are expected.

### Climatic factors

Embodied carbon would be generated from materials used to construct the WTW, construction activities and from the operation of the WTW. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor construction and operation carbon emissions**. Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

No effects are anticipated on the vulnerability to climate change as the water levels are not predicted to be significantly affected by the construction and operation of the WTW (**neutral residual effects**).

### Landscape

The proposed site for the WTW is located within the London Area Greenbelt. There is likely to be minor and temporary disturbance to the landscape during the construction works however disturbance would be minimised during the construction phase through the implementation of best practice methods (**minor negative residual effects**). The new WTW would likely comprise of above ground infrastructure and would result in permanent effect on the landscape. However, opportunities to incorporate screening to reduce the visual effects during operation would be embedded in the design; the consideration of embedded mitigation would result in **minor negative residual effects** during the operation of the WTW.

### Historic Environment

There is a listed building within [REDACTED] of the proposed WTW site. The construction works would likely to result in temporary **minor negative residual effects** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

### Population and Health

There is a county park and public park and garden within [REDACTED] of the proposed WTW site. There are schools, hospitals, allotments and play spaces within [REDACTED]. The construction activities are likely to result in temporary disturbance to the local community and users of these facilities. Best practice mitigation measures would be implemented to minimise the effects from noise and severance, however temporary **minor negative residual effects** on the community are likely.

The WTW is not expected to result in direct effects on recreation or tourism. There may be temporary severance of public rights of way and indirect effects on users of the county park and public park and garden within [REDACTED] during the construction phase, however these effects are

likely to be minor and temporary. Diversions and best practice construction traffic management would likely be implemented to minimise effects during construction, however some disruption likely to remain (**minor negative residual effects**).

### Material Assets

New infrastructure for the proposed WTW would require the use of materials, and energy during the construction and operation phases. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that **minor negative residual effects** during construction and operation would remain.

There is a major road located within 2000m of the proposed site. There is a potential for the construction works to result in a minor temporary negative effect on the road users from the increase of traffic on local roads during construction. Diversions and best practice construction traffic management would likely be implemented to minimise effects during construction, however some disruption would likely remain (**minor negative residual effects**).

#### 3.3.1 Review of the WRSE assessment based on the optimised Sunnymeads 1

As mentioned in Section 2.3, the WRSE assessment was undertaken on an earlier iteration of the options. Therefore, the WRSE assessment was reviewed against the optimised route that is being submitted for Gate 1. Differences were noted for:

- Soil: The optimised pipeline route would not pass through any historic landfill site
- Air: The optimised pipeline route would also go through the [REDACTED]
- Historic environment: The optimised pipeline route would not pass through a listed building therefore the construction of the route would not result in a direct impact on a listed building. The optimised pipeline route would only pass through [REDACTED] Conservation Area (and not through [REDACTED]) and there would not be scheduled monuments within 500m of the proposed route.

These differences in assessment are not considered to significantly change the outcomes of the WRSE assessment, although a number of environmental issues have been mitigated through the optimised design (routing). Similarly, the SEA metrics for this option, used as part of the WRSE Best Value Planning methodology, would not be materially changed by these refinements. The review of the optimised proposed location for the WTW against the WRSE assessment did not identify any differences.

### 3.4 Maidenhead

Abstraction of raw water at a new [REDACTED] intake, conveyance to a new WTW at [REDACTED] SR, and utilisation of available storage capacity at the existing [REDACTED] SR 50Ml/d and 100Ml/d options.

#### Pipeline and Abstraction

##### Biodiversity, flora and fauna

The [REDACTED] is within 500m of the proposed pipeline route. There are also other designated sites within 2000m of the proposed route, including [REDACTED]. Two LNRs would be located within 2000m of the route. The construction of the option could result in moderate indirect negative effects on these sites. The pipeline would also pass through priority habitat and woodland and ancient woodland. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be

put in place, the potential for **moderate negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. No operational effects are expected. It is also recommended a Habitat Regulations Assessment (HRA) Appropriate Assessment (AA) is undertaken to address uncertain effects identified for the [REDACTED] SAC. It is important to note that these HRA findings were identified at the time the SEA assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

### Soil

The pipeline would be predominately located within Grade 3 agricultural land, non-agricultural and urban land, however it does pass through areas of Grade 2 agricultural land. The pipeline would pass through a historic landfill site. The construction activities would likely result in land disturbance, however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **neutral residual effects**.

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely. Best practice methods for working in landfill sites would likely be implemented.

### Water

The pipeline would predominately be located within a Flood Zone 1 (low risk of flooding), however would pass through areas of Flood Zones 2 and 3. The construction works could result in **minor negative residual effects** on flooding even if measures to reduce the impact on flooding would likely be implemented. As the pipeline would be located below the surface, negative effects of the operation of the pipeline are considered unlikely.

The construction of the pipeline could result in a minor negative effect on the water quality of nearby waterbodies due to the option being located in proximity to chalk rivers. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. The option would require the abstraction of water at a new [REDACTED] intake which suggests the option could result in **moderate negative residual effects** on water flows, levels and quality during the operational phase. The route passes through SPZ1 and 2. There is potential for **minor negative residual** water quality impacts on nearby waterbodies, including on chalk rivers given proximity, during the construction phase. WFD screening assessment identified that further WFD assessment will be required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

As this option would likely increase capacity in the transfer of water across water companies, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies.

### Air

The proposed pipeline passes through the [REDACTED] AQMA. While the construction works could result in a moderate negative effect on local air quality, best practice mitigation measures would be implemented, and the nature of the **minor negative residual effect** would be temporary.

### Climatic factors

Embodied carbon would be generated from materials used to construct the pipeline, construction activities and from the operation of the pipeline. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative**



### **construction and moderate negative operational residual carbon emissions**

Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

Given the option proposes abstraction, the resilience of the local environment to climate change may be negatively affected (**minor negative residual effects** during operation). It is recommended the levels of the river are monitored to avoid over-abstraction.

### **Landscape**

The [REDACTED] AONB is located within 500m of the proposed pipeline route and the route would pass through the London Area Greenbelt. Temporary **minor negative residual effects** during construction are likely as excavation works would be required. However, as it is expected the land would be reinstated following the construction works, no operational impacts on landscape are anticipated.

### **Historic Environment**

The pipeline route passes through [REDACTED] and [REDACTED]. There are also listed buildings and scheduled monuments within 500m of the proposed route. The works would likely result in direct impacts on the [REDACTED] during the construction phase, and there is also potential for the construction phase to affect the setting of the other historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present (**minor negative residual effects**). Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

### **Population and Human Health**

There are allotments, churches and religious grounds, public parks or gardens, cemeteries, playing fields, play spaces, schools, a country park and other community facilities within 500m of the proposed pipeline route. The pipeline would also pass through golf courses. The construction works would likely result in a disruption to the local community and users of these community facilities. Severance of public rights of way and impacts on a national cycle route and golf course would likely take place during construction. Best practice mitigation measures would be implemented during construction, however **minor negative residual effects** would remain in place. The operation of the pipeline would not impact on the local community.

### **Material Assets**

The construction on a new pipeline would require the use of materials and energy consumption. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that a **residual minor negative effect during construction and operation** will remain.

The proposed pipeline crosses major roads, railways and a national cycle route. The construction works are likely to result in a temporary **minor negative residual effect** on these assets if closures are required, however diversions would be put in place where possible. As the land is expected to be reinstated following the completion of the construction works, the operation of the pipeline would not result in a negative effect on built assets and infrastructure.

### **Water Treatment Works** New [REDACTED] WTW

The proposed location for the WTW for this option is the same as the proposed WTW location for the Sunnymeads 1 option. Refer to Section 3.3 for the WRSE assessment findings.

### 3.4.1 Review of the WRSE assessment based on the optimised Maidenhead

As mentioned in Section 2.3, the WRSE assessment was undertaken on an earlier iteration of the options. Therefore, the WRSE assessment was reviewed against the optimised route that is being submitted for Gate 1. A difference was noted for:

- Biodiversity, flora and fauna: The optimised pipeline route would not pass through ancient woodland.

This difference in assessment is not considered to significantly change the outcomes of the WRSE assessment, although a number of environmental issues have been mitigated through the optimised design (routing). Similarly, the SEA metrics for this option, used as part of the WRSE Best Value Planning methodology, would not be materially changed by these refinements. The review of the optimised proposed location for the WTW against the WRSE assessment did not identify any differences.

## 3.5 Teddington DRA

Abstraction of raw water at a new intake at [REDACTED], conveyance to a new WTW at [REDACTED], and utilisation of the available storage capacity at the existing [REDACTED] SR. 50MI/d and 100MI/d options.

### Pipeline and Abstraction

#### Biodiversity, flora and fauna

Three SSSI ([REDACTED]) and five LNRs ([REDACTED]) are located within 500m of the proposed pipeline route. The construction of the option could result in moderate indirect negative effects on these designated sites. The pipeline would also pass through priority habitat and woodland, and would be adjacent to ancient woodland. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **moderate negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. It is also recommended an HRA AA is undertaken to address uncertain effects on South West London Waterbodies Ramsar. No operational effects are expected. It is important to note that these HRA findings were identified at the time the SEA assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

#### Soil

The pipeline would be predominately located within Grade 3 agricultural land, non-agricultural land and urban land, however it does pass through minor areas of Grade 1 agricultural land. The pipeline would pass through authorised and historic landfill sites. The construction activities would likely result in land disturbance, however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **neutral residual effects**.

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely. Best practice methods for working in landfill sites would likely be implemented.

#### Water

The pipeline would predominately be located within a Flood Zone 1 (low risk of flooding), however would pass through areas of Flood Zones 2 and 3. The construction works could result

in a **minor negative residual effect** on flooding even if measures to reduce the impact on flooding would likely be implemented. As the pipeline would be located below the surface, negative effects of the operation of the pipeline are considered unlikely.

The construction of the pipeline could result in a minor negative effect on the water quality of nearby waterbodies due to the option being located in proximity to chalk rivers. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. As this option would require the abstraction of water from an existing intake, it has the potential to result in a **minor negative residual effect** on water flows, levels and quality during operation. While monitoring of the river levels during operation would likely take place, a residual negative effect of the operation of the pipeline remains likely. WFD screening assessment identified that further WFD assessment is required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

As this option would likely increase capacity in the transfer of water across water companies, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies

### Air

The proposed pipeline passes through the [REDACTED] AQMA, [REDACTED] AQMA and [REDACTED] AQMA. While the construction works could result in a **minor negative residual effect** on local air quality, best practice mitigation measures would be implemented, and the nature of the negative effect would be temporary.

### Climatic factors

Embodied carbon would be generated from materials used to construct the pipeline, construction activities and from the operation of the pipeline. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative construction and major negative operational residual carbon emissions**. Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

Given the option proposes abstraction, the resilience of the local environment to climate change may be negatively affected (**minor negative residual effect**). It is recommended the levels of the river are monitored to avoid over-abstraction.

### Landscape

The pipeline route would pass through the London Area Greenbelt. Temporary **minor negative residual effects** from construction are likely due to the excavation work. As the land would be reinstated following the construction works, the pipeline is unlikely to result in negative effects during operation.

### Historic Environment

The proposed pipeline would pass through nine conservation areas ([REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]) and there are several listed buildings within 500m of the pipeline route. The construction works are likely to result in a temporary **minor negative residual effect** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.



### 3.6 Sunnymeads 2a

Abstraction of raw water at the [REDACTED] and conveyance to a new WTW at [REDACTED] ( [REDACTED] 2), near to the existing [REDACTED] WTW. The potable water is then conveyed to the existing [REDACTED] SR. 50MI/d and 100MI/d options.

#### Pipeline and Abstraction

#### **Biodiversity, flora and fauna; Water; Air; Landscape; Historic Environment; Climatic factors; Population and Human Health; Material Assets**

The outcome of the SEA assessment undertaken for these topics is exactly the same as the one undertaken for the Sunnymeads 1 option. Refer to Section 3.3.

#### **Soil**

The pipeline would be predominately located within Grade 3 agricultural land, non-agricultural land and urban land, however it does pass through minor areas of Grade 1 agricultural land. The pipeline would pass through historic and authorised landfill sites. The construction activities would likely result in land disturbance (assessed as 'moderate negative'), however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **minor negative residual effects**.

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely. Best practice methods for working in landfill sites would likely be implemented.

#### Water Treatment Works New [REDACTED] 2 WTW

#### **Biodiversity, flora and fauna**

There are no designated sites within 2000m of the proposed WTW location. The location of the new WTW would not directly impact on woodland or priority habitats, however there are areas of woodland and priority habitats within 500m of the site; therefore there is potential for the construction activities to result in indirect moderate negative effects on these areas. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **moderate negative residual effects** remains. It is also recommended an HRA AA is undertaken to address uncertain effects on [REDACTED] Ramsar. The [REDACTED] is hydrologically linked to [REDACTED] SPA/Ramsar approximately [REDACTED] downstream of the construction zone for the WTW. During construction of the WTW there is the potential for the water to be affected through direct pollution events, dust arisings and changes in sedimentation. Changes in water quality upstream from this Habitats Site, may influence the water quality within the site and therefore may affect the habitat quality and food availability for the qualifying wildfowl species. It is recommended that the outputs of future ecology surveys feed into the design development. No operational effects are expected. It is important to note that these HRA findings were identified at the time the SEA assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

#### **Soil**

The option is located within non-agricultural land. There are historic and authorised landfill sites within 500m of the option location. The construction and operation of the proposed WTW is not likely to result in negative effects on the soils (**neutral residual effect**).

## Water

The site for the proposed WTW is located within Flood Zone 1, which means low risk of flooding. There may be an increase in the area of hardstanding associated with the new WTW however it is likely to be minimal and therefore it is not anticipated the construction or operation of the WTW would increase the risk of flooding. There are areas of Flood Zone 2 and Flood Zone 3 within 500m of the proposed site.

No likely impacts on water quality, levels/flows are anticipated given there would be no abstraction at the WTW site. There is potential for water quality impacts on nearby waterbodies during the construction phase. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. As no abstraction would take place at the WTW site, no impacts on water flows, levels or quality are expected during operation. WFD screening assessment identified that no further WFD assessment is required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

The option would provide increased capacity for water treatment by providing a new WTW site, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies.

## Air

The proposed WTW is located within the [REDACTED] AQMA [REDACTED]. While best practice mitigation measures would be put in place during construction, the construction activities are likely to result in temporary **minor negative residual effects**. No operational impacts are expected.

## Climatic factors

Embodied carbon would be generated from materials used to construct the WTW, construction activities and from the operation of the WTW. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor construction and operation residual** carbon emissions. Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

No effects are anticipated on the vulnerability to climate change as the water levels are not predicted to be significantly affected by the construction and operation of the WTW.

## Landscape

The proposed site for the WTW is located within the London Area Greenbelt. There is likely to be minor and temporary disturbance to the landscape during the construction works (**minor negative residual effect**), however disturbance would be minimised during the construction phase through the implementation of best practice methods. The new WTW would likely comprise of above ground infrastructure and would result in permanent effect on the landscape. However, opportunities to incorporate screening to reduce the visual effects during operation would be embedded in the design; the consideration of embedded mitigation would result in a **minor negative residual effect** during the operation of the WTW.

## Historic Environment

The proposed location for the WTW is located within 500m of a conservation area ([REDACTED]) and listed buildings. The construction works are likely to result in a temporary **minor negative residual effect** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present.

Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

### Population and Human Health

There is a public park or garden within 500m of the proposed WTW site. There are schools, allotments, play spaces, playing fields, churches and religious grounds within 2000m. The construction activities are likely to result in temporary disturbance to the local community and users of these facilities. Best practice mitigation measures would be implemented to minimise the effects from noise and severance, however temporary **minor negative residual effects** on the community are likely.

The WTW is not expected to result in direct effects on recreation or tourism. There may be temporary severance of public rights of way and indirect effects on users of the public park and garden within 500m during the construction phase, however these effects are likely to be minor and temporary. Diversions and best practice construction traffic management would likely be implemented to minimise effects during construction, however some disruption likely to remain (**minor negative residual effects**).

### Material Assets

New infrastructure for the proposed WTW would require the use of materials, and energy during the construction and operation phases. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that a **minor negative residual effect during construction and operation** will remain.

There is a railway and national cycle route within 500m of the proposed site. There is a potential for the construction works to result in a temporary **minor negative residual effect** from the increase of traffic on local roads during construction. Diversions and best practice construction traffic management would likely be implemented to minimise effects during construction, however some disruption would likely remain.

Treated Water Conveyance [REDACTED] 2 to [REDACTED]

### Biodiversity, flora and fauna

The proposed pipeline would pass through the [REDACTED] SSSI, [REDACTED] SSSI and [REDACTED] LNR. Other designated sites, such as [REDACTED] SSSI and NNR and [REDACTED] would be within 500m of the pipeline route. There are also four other SSSIs and several ancient woodland sites within 2000m of the proposed route. The construction of the option could result in major negative effects on these sites. The pipeline would pass through woodland and priority habitat. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **major negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. It is also recommended an HRA AA is undertaken to address likely significant effects identified for the [REDACTED] SPA and Ramsar site; the works could affect a specific unit within the site known as [REDACTED], as a result of the release of sediments and pollution events caused by release of construction materials within the watercourse could potentially impact wintering numbers of waterfowl by reducing food availability. Operation is unlikely to result in adverse effects unless maintenance activities need to take place within designated sites. It is important to note that these HRA findings were identified at the time the SEA assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

## Soil

The pipeline would pass through Grade 3 agricultural land, non-agricultural and urban land. The pipeline would also pass through authorised and historic landfill sites. The construction activities would likely result in land disturbance (assessed as 'minor negative'), however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **neutral residual effects**

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely.

## Water

There are large areas of FZ2 and FZ3 along the pipeline route, which means there is potential for the construction works to increase the risk of flooding. Measures to reduce the impact on flooding during the construction phase will likely be implemented, however there is a potential **minor negative residual flood risk** likely to remain. As the pipeline would be located below the surface, negative effects of the operation of the pipeline are considered unlikely

The construction of the pipeline could result in a minor negative effect on the water quality of nearby waterbodies due to the option being located in proximity to chalk rivers. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. As this option would not require the abstraction of water, it is not expected to impact on water quality, levels or flows during operation. WFD screening assessment identified that no further WFD assessment is required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

As this option would likely increase capacity in the transfer of water across water companies, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies.

## Air

The proposed pipeline passes through the [REDACTED] AQMA. While the construction works could result in a **minor negative residual effect** on local air quality, best practice mitigation measures would be implemented, and the nature of the negative effect would be temporary.

## Climatic factors

Embodied carbon would be generated from materials used to construct the pipeline, construction activities and from the operation of the pipeline. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative construction and moderate negative operational residual carbon emissions**.

Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

The water levels in the surrounding environment are not predicted to be significantly affected by the proposed pipeline, therefore is considered unlikely to affect resilience of the local environment to climate change.

## Landscape

The pipeline route would pass through the London Area Greenbelt. Temporary **minor negative residual effects** from construction are likely due to the excavation work. As the land would be



reinstated following the construction works, the pipeline is unlikely to result in negative effects during operation.

### Historic Environment

The pipeline route would pass through a Grade II listed building and there are numerous listed buildings within 500m. The pipeline would also pass through a conservation area (██████████ Village). There is likely to be direct impacts on the Grade II listed building unless the route is reviewed or directional drilling is used, and the construction works are likely to result in a temporary **minor negative residual effect** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

### Population and Human Health

The proposed route passes through a golf course, public parks/gardens, allotments and a school. The pipeline would also be located within 500m of additional community facilities. The construction works would likely result in a disruption to the local community and users of these community facilities, resulting in a **minor negative residual effect**. This section of the design will need to be reviewed during design development.

Severance of public rights of way and impacts on a national cycle route, public parks/gardens and a golf course are also likely during construction and could result in disruption to recreation activities. Best practice mitigation measures would be implemented during construction, however **minor negative residual effects** would remain in place. The operation of the pipeline would not impact on the local community.

### Material Assets

The construction on a new pipeline would require the use of materials and energy consumption. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that a **minor negative residual effect during construction and operation** will remain.

The proposed pipeline crosses major roads, railways and a national cycle route. The construction works are likely to result in a temporary **minor negative residual effect** on these assets if closures are required, however diversions would be put in place where possible and the use of directional drilling should be considered where possible. As the land is expected to be reinstated following the completion of the construction works, the operation of the pipeline would not result in a negative effect on built assets and infrastructure.

### 3.6.1 Review of the WRSE assessment based on the optimised Sunnymeads 2a

As mentioned in Section 2.3, the WRSE assessment was undertaken on an earlier iteration of the options. Therefore, the WRSE assessment was reviewed against the optimised route that is being submitted for Gate 1. Differences were noted for:

- As per the differences noted on the optimised pipeline route from Sunnymeads 1:
  - Air: The optimised pipeline route would also go through the ██████████.

Historic environment: The optimised pipeline route would not pass through a listed building therefore the construction of the route would not result in a direct impact on a listed building. The optimised pipeline route would only pass through ██████████ Conservation Area (and not through ██████████ Conservation Area) and there would not be scheduled monuments within 500m of the proposed route.

- Soil: The optimised route would not pass through two historic landfill sites (instead of three [REDACTED]) and no authorised landfill site.
- Historic environment: The optimised pipeline route for the treated water conveyance ([REDACTED] 2 to [REDACTED]) would not pass through a listed building

These differences in assessment are not considered to significantly change the outcomes of the WRSE assessment, although a number of environmental issues have been mitigated through the optimised design (routing). Similarly, the SEA metrics for this option, used as part of the WRSE Best Value Planning methodology, would not be materially changed by these refinements. The review of the optimised proposed location for the WTW against the WRSE assessment did not identify any differences.

### 3.7 Walton 2b

Abstraction of raw water at the [REDACTED] and conveyance to new [REDACTED] 2 WTW. The potable water is then conveyed to the existing [REDACTED] SR 50MI/d and 100MI/d options. The assessment is the same for the Mogden Reuse Indirect 3 option.

#### Pipeline and Abstraction

##### Biodiversity, flora and fauna

The proposed pipeline passes through [REDACTED] SSSI and [REDACTED] [REDACTED] SPA and Ramsar. The following designated sites would be located within 500m of the proposed route: [REDACTED]

[REDACTED] Three LNRs ([REDACTED]) would be located within 500m of the route and additional designated sites would be present within 2000m of the pipeline. The construction of the option could result in major indirect negative effects on these sites. The pipeline would also pass through priority habitat and woodland, and ancient woodland would be located within 500m from the route. The route is adjacent to chalk rivers, however no abstraction impacts anticipated.

While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **major negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. It is also recommended an HRA AA is undertaken to address likely significant effects identified for the South West London Waterbodies SPA and Ramsar site. Given the proximity of the route to the [REDACTED] and River Thames which are likely to be hydrologically connected to the SPA site, there is potential for the construction phase to have negative effects on qualifying features of the SPA. The potential for construction related sediment being realised into the SPA, is more likely where works are proposed within its site boundaries as [REDACTED] a site of national importance for the SPA qualifying gadwall species. Works are also proposed within 0.2km of [REDACTED], part of the SPA and a SSSI listed as supporting nationally important numbers of shoveler. There is also some potential for noise and visual disturbance at these sites but this should be considered in the context of the existing motorways within the immediate vicinity of the proposed pipeline. Additionally, there is the possibility of disturbance and pollution affecting the qualifying species at multiple non-designated waterbodies along the route, that may nevertheless support the qualifying species. Further to this, the waste products of water treatment at the proposed new works at [REDACTED] 2 (if forming part of the option) might discharge into the [REDACTED] with the possibility for negative effects on the shoveler *Anas clypeata* and *Anas strepera* populations within the hydrologically connected SPA. No likely significant effects identified for [REDACTED]. It is important to note that these HRA findings were identified at the time the SEA

assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

### Soil

The pipeline would be predominately located within Grade 3, non-agricultural and urban land, however it does pass through areas of Grade 1 and Grade 2 agricultural land. The pipeline would pass through historic and authorised landfill sites. The construction activities would likely result in land disturbance (assessed as 'moderate negative'), however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **neutral residual effects**.

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely. Best practice methods for working in landfill sites would likely be implemented.

### Water

The proposed would be predominantly located within FZ1 (low risk of flooding), however sections of the route would be located within FZ2 and FZ3. The construction works could result in a **moderate negative residual effect** on flooding even if measures to reduce the impact on flooding would likely be implemented. As the pipeline would be located below the surface, negative effects of the operation of the pipeline on flooding are considered unlikely.

The construction of the pipeline could result in a minor negative effect on the water quality of nearby waterbodies due to the option being located in proximity to chalk rivers. However, as best practice construction measures would be implemented, the option is unlikely to result in residual construction effects on the water resources. The option would require the abstraction of water at the existing [REDACTED] intake which suggests the option could result in **moderate negative residual effects** on water flows, levels and quality during the operational phase. WFD screening assessment identified that further WFD assessment will be required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

Option would increase capacity in the transfer of water across water companies and therefore should result in **beneficial residual effects** on the resilience of water supplies.

### Air

The proposed pipeline is located within the [REDACTED] AQMA, [REDACTED] AQMA, S [REDACTED] AQMA [REDACTED], [REDACTED] AQMA and [REDACTED] AQMA. While the construction works could result in a moderate negative effect on local air quality, best practice mitigation measures would be implemented, and the nature of the **minor negative temporary residual effect** would be temporary.

### Climatic factors

Embodied carbon would be generated from materials used to construct the pipeline, construction activities and from the operation of the pipeline. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative construction and moderate negative operational residual carbon emissions**.

Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

Given the option proposes abstraction, the resilience of the local environment to climate change may be negatively affected (**minor negative residual effect**). It is recommended the levels of the river are monitored to avoid over-abstraction.

### Landscape

The pipeline route would pass through the London Area Greenbelt. Temporary **minor negative residual effects** from construction are likely due to the excavation work. As the land would be reinstated following the construction works, the pipeline is unlikely to result in negative effects during operation.

### Historic Environment

The pipeline route would pass through one listed building and one conservation area ( [REDACTED] ). There are also additional listed buildings within close proximity to the pipeline in addition to scheduled monuments and registered parks and gardens, and conservation areas within 500m of the proposed route. The construction could result in a direct impact on a listed building. The construction works are likely to result in a temporary **minor negative residual effect** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

### Population and Human Health

The proposed route passes through a church and religious grounds, playing field, golf course, country park, and public parks or gardens. The pipeline would be located within 500m of churches and religious grounds, allotments, playing fields, country parks and public parks and gardens, golf courses, schools, sports facilities, medical facilities, play spaces and other community facilities. The construction works would likely result in a disruption to the local community and users of these community facilities, resulting in a **minor negative residual effect**. This section of the route will need to be reviewed during design development.

Severance of public rights of way and impacts on a national cycle route are also likely during construction. Best practice mitigation measures would be implemented during construction, however **minor negative residual effects** would remain in place. The operation of the pipeline would not impact on the local community.

### Material Assets

The construction on a new pipeline would require the use of materials and energy consumption. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that a **minor negative residual effect during construction and operation** will remain.

The proposed pipeline crosses major roads, railways, a national trail and a national cycle route. The construction works are likely to result in a temporary **minor negative residual effect** on these assets if closures are required, however diversions would put in place where possible. As the land is expected to be reinstated following the completion of the construction works, the operation of the pipeline would not result in a negative effect on built assets and infrastructure.

### Water Treatment Works New [REDACTED] 2 WTW

The proposed location for the WTW for this option is the same as the proposed WTW location for the Sunnymeads 2a option. Refer to Section 3.6 for the WRSE assessment findings.

### Treated Water Conveyance [REDACTED] 2 to [REDACTED]

The proposed treated water conveyance route for this option is the same as the one proposed for the Sunnymeads 2a option. Refer to Section 3.6 for the WRSE assessment findings.

### 3.7.1 Review of the WRSE assessment based on the optimised Walton 2b

As mentioned in Section 2.3, the WRSE assessment was undertaken on an earlier iteration of the options. Therefore, the WRSE assessment was reviewed against the optimised route that is being submitted for Gate 1. Differences were noted for:

- Biodiversity, flora and fauna: The optimised pipeline route would not pass through [REDACTED] SSSI and [REDACTED] SPA and Ramsar. These sites would be located within 500m from the proposed route.
- Soil: The optimised pipeline route avoids authorised landfill sites and only passes through one historic landfill site ([REDACTED]).
- Air: The optimised pipeline route would also go through the [REDACTED] AQMA [REDACTED] and [REDACTED] AQMA [REDACTED].
- Historic environment: The optimised pipeline route would not pass through a listed building therefore the construction of the route would not result in a direct impact on a listed building
- As per the differences noted on the optimised pipeline route from [REDACTED] 2 to [REDACTED] for Sunnymeads 2a:

Historic environment: The optimised pipeline route for the treated water conveyance ([REDACTED] to [REDACTED]) would not pass through a listed building.

These differences in assessment are not considered to significantly change the outcomes of the WRSE assessment, although a number of environmental issues have been mitigated through the optimised design (routing). Similarly, the SEA metrics for this option, used as part of the WRSE Best Value Planning methodology, would not be materially changed by these refinements. The review of the optimised proposed location for the WTW against the WRSE assessment did not identify any differences.

### 3.8 Lower Thames Reservoir Transfer 2a

Water from Thames Water's [REDACTED] and [REDACTED] is abstracted via a proposed connection into [REDACTED] the existing [REDACTED] WTW site. This raw water is then diverted to the proposed [REDACTED] 2 WTW. The potable water is subsequently conveyed to the existing [REDACTED] SR 50MI/d and 100MI/d options

#### Pipeline and Abstraction

#### Biodiversity, flora and fauna

The following SSSIs and LNRs would be located within 500m of the proposed route which include [REDACTED]. The construction of the option could result in moderate indirect negative effects on these sites. The pipeline would also pass through priority habitat and woodland. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **moderate negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. It is also recommended an HRA AA is undertaken to address uncertain effects for the South West London Waterbodies SPA/Ramsar site. No operational effects are expected. It is important to note that these HRA findings were identified at the time the SEA assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

## Soil

The pipeline would be located within Grade 3 agricultural land, non-agricultural land and urban land. The pipeline would pass through historic landfill sites. The construction activities would likely result in land disturbance (assessed as 'minor negative'), however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **neutral residual effects**.

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely.

## Water

The proposed route would predominantly be located within FZ1 (low risk of flooding) however some sections of the route would pass through FZ2 and FZ3 areas. The construction works could result in a **minor negative residual effect** on flooding even if measures to reduce the impact on flooding would likely be implemented. As the pipeline would be located below the surface, negative effects of the operation of the pipeline are considered unlikely.

No likely impacts on water quality, levels/flows anticipated given no abstraction. There is potential for water quality impacts on nearby waterbodies, including on chalk rivers given proximity, during the construction phase.

The construction of the pipeline could result in a minor negative effect on the water quality of nearby waterbodies due to the option being located in proximity to chalk rivers. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. WFD screening assessment identified that further WFD assessment will not be required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

Option would increase capacity in the transfer of water across water companies and therefore should result in **beneficial residual effects** on the resilience of water supplies.

## Air

The proposed pipeline is located pass through the [REDACTED] AQMA, [REDACTED] AQMA and [REDACTED] AQMA. While the construction works could result in a moderate negative effect on local air quality, best practice mitigation measures would be implemented, and the nature of the **minor negative temporary residual effect** would be temporary.

## Climatic factors

Embodied carbon would be generated from materials used to construct the pipeline, construction activities and from the operation of the pipeline. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative construction and operational residual carbon emissions**. Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

The water levels in the surrounding environment are not predicted to be significantly affected by the proposed pipeline, therefore is considered unlikely to affect resilience of the local environment to climate change.

## Landscape

The pipeline route would pass through the London Area Greenbelt. Temporary **minor negative residual effects** from construction are likely due to the excavation work. As the land would be reinstated following the construction works, the pipeline is unlikely to result in negative effects during operation.

### Historic Environment

The pipeline route would pass through one listed building and a conservation area. There are also additional listed buildings and a registered park and garden within 500m of the proposed route. The construction could result in a direct impact on a listed building. The construction works are likely to result in a temporary **minor negative residual effect** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

### Population and Human Health

The proposed route would pass through playing fields, and churches and religious grounds. There are country parks, public parks or gardens, playing fields, play spaces, cemetery, churches and religious grounds, allotments, golf courses within 500m of the proposed pipeline route. The construction works would likely result in a disruption to the local community and users of these community facilities, resulting in a **minor negative residual effect**. This section of the design will need to be reviewed during design development. Severance of public rights of way and impacts on a national cycle route are also likely during construction. Best practice mitigation measures would be implemented during construction, however **minor negative residual effects** would remain in place. The operation of the pipeline would not impact on the local community.

### Material Assets

The construction on a new pipeline would require the use of materials and energy consumption. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that a **minor negative residual effect during construction and operation** will remain.

The proposed pipeline crosses major roads, railways and national cycling route. The construction works are likely to result in a temporary **minor negative residual effect** on these assets if closures are required, however diversions would be put in place where possible. As the land is expected to be reinstated following the completion of the construction works, the operation of the pipeline would not result in a negative effect on built assets and infrastructure.

#### Water Treatment Works – New [REDACTED] 2 WTW

The proposed location for the WTW for this option is the same as the proposed WTW location for the Sunnymeads 2a option. Refer to Section 3.6 for the WRSE assessment findings.

#### Treated Water Conveyance [REDACTED] 2 to [REDACTED]

The proposed treated water conveyance route for this option is the same as the one proposed for the Sunnymeads 2a option. Refer to Section 3.6 for the WRSE assessment findings.

### 3.8.1 Review of the WRSE assessment based on the optimised Lower Thames Reservoir Transfer 2a

As mentioned in Section 2.3, the WRSE assessment was undertaken on an earlier iteration of the options. Therefore, the WRSE assessment was reviewed against the optimised route that is being submitted for Gate 1. Differences were noted for:

- Historic environment: The optimised pipeline route would not pass through a listed building therefore the construction of the route would not result in a direct impact on a listed building. The optimised route would be located within 500m of several listed buildings and conservation areas; however no scheduled monument or registered park and garden would be located within 500m of the route.
- As per the differences noted on the optimised pipeline route from [REDACTED] 2 to [REDACTED] for Sunnymeads 2a:
  - Historic environment: The optimised pipeline route for the treated water conveyance ([REDACTED] 2 to [REDACTED]) would not pass through a listed building

These differences in assessment are not considered to significantly change the outcomes of the WRSE assessment, although a number of environmental issues have been mitigated through the optimised design (routing). Similarly, the SEA metrics for this option, used as part of the WRSE Best Value Planning methodology, would not be materially changed by these refinements. The review of the optimised proposed location for the WTW against the WRSE assessment did not identify any differences

### 3.9 Beckton Reuse Indirect

Indirect transfer of reuse water from [REDACTED] to a new WTW near [REDACTED]. The proposed abstraction point would be located on the [REDACTED] from the proposed Beckton Reuse scheme 50MI/d and 100MI/d options

#### Pipeline and Abstraction

##### Biodiversity, flora and fauna

There are three SSSIs within 500m of the proposed route which includes [REDACTED] SSSI, [REDACTED] SSSI, [REDACTED] SSSI. An additional SSSI is located within 2000m of the proposed route: [REDACTED] SSSI. [REDACTED] LNR is within 500m. The construction of the option could result in moderate indirect negative effects on these sites. The pipeline would also pass through priority habitat and woodland. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **moderate negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development. It is also recommended an HRA AA is undertaken to address uncertain effects for the [REDACTED] Ramsar site. No operational effects are expected. It is important to note that these HRA findings were identified at the time the SEA assessment was undertaken and represent preliminary results. Detailed Level 1 and Level 2 Habitats Regulations Assessment has been undertaken since on all T2AT options and the findings of the HRA are available in Annex B2.

##### Soil

The pipeline would be predominately located within Grade 3 agricultural land and would pass through areas of non-agricultural land and urban land. The pipeline would not pass through authorised or historic landfill sites. The construction activities would likely result in land disturbance (assessed as 'minor negative'), however the implementation of pollution prevention and control measures would reduce the likelihood of contaminants leaching through soil and entering groundwater, resulting in **neutral residual effects**

As it is expected the land would be reinstated following the construction of the pipeline, residual effects on the land during operation are unlikely

##### Water



The pipeline would predominately be located within a Flood Zone 1 (low risk of flooding), however would pass through areas of Flood Zones 2 and 3. The construction works could result in a **minor negative residual effect** on flooding even if measures to reduce the impact on flooding would likely be implemented. As the pipeline would be located below the surface, negative effects of the operation of the pipeline are considered unlikely.

The proposed route lies within nitrate vulnerable zones, SPZ1 and SPZ2, and crosses several watercourses. The construction of the pipeline could result in a moderate negative effect on the water quality. However, as best practice construction measures would be implemented, the option is **unlikely to result in residual construction effects** on the water resources. No effects on water resources are expected to take place during operation. WFD screening assessment identified that no further WFD assessment is required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

As this option would likely increase capacity in the transfer of water across water companies, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies.

### Air

The proposed pipeline passes through the [REDACTED] AQMA. While the construction works could result in a **minor negative residual effect** on local air quality, best practice mitigation measures would be implemented, and the nature of the negative effect would be temporary.

### Climatic factors

Embodied carbon would be generated from materials used to construct the pipeline, construction activities and from the operation of the pipeline. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative construction and moderate negative operational residual carbon emissions**.

Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

Given the option proposes abstraction, the resilience of the local environment to climate change may be negatively affected (**minor negative residual effect**). It is recommended the levels of the river are monitored to avoid over-abstraction.

### Landscape

The majority of the pipeline route would pass through the London Area Greenbelt. Temporary **minor negative residual effects** from construction are likely due to the excavation work. As the land would be reinstated following the construction works, the pipeline is unlikely to result in negative effects during operation.

### Historic Environment

The proposed pipeline route passes through a conservation area. There are several listed buildings and scheduled monuments within 500m of the proposed route. The construction works are likely to result in a temporary **minor negative residual effect** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

### Population and Human Health

The proposed route would be located within 500m of schools, sports facilities, golf courses, playing fields, cemeteries, allotments, churches and religious grounds, public parks or gardens and other community facilities. The construction works would likely result in a disruption to the local community and users of these community facilities, resulting in a **minor negative residual effect**. This section of the route will need to be reviewed during design development. Severance of public rights of way and impacts on a national cycle route are also likely during construction. Best practice mitigation measures would be implemented during construction, however **minor negative residual effects** would remain in place. The operation of the pipeline would not impact on the local community

### Material Assets

The construction on a new pipeline would require the use of materials and energy consumption. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on resources and waste, it is likely that a **minor negative residual effect during construction and operation** will remain.

The proposed pipeline crosses major roads, railways and a national cycle route. The construction works are likely to result in a temporary **minor negative residual effect** on these assets if closures are required, however diversions would put in place where possible. As the land is expected to be reinstated following the completion of the construction works, the operation of the pipeline would not result in a negative effect on built assets and infrastructure.

### Water Treatment Works New [REDACTED] WTW

#### Biodiversity, flora and fauna

There is one SSSI ([REDACTED] SSSI) within 500m of the proposed WTW site. [REDACTED] SSSI, [REDACTED] SSSI and [REDACTED] LNR are located within 2000m of the proposed site. The construction could result in minor negative effects on these sites. There is also woodland, ancient woodland and priority habitats within 500m of the site. While the implementation of best practice mitigation measures, to minimise the impact of construction activities and to reinstate/compensate the loss of habitats, would be put in place, the potential for **minor negative residual effects** remains. It is recommended that the outputs of future ecology surveys feed into the design development

#### Soil

The proposed WTW site would be located within Grade 3 agricultural land. There is no authorised or historic landfill sites within 500m of the proposed location. The works would likely result in permanent loss of land, however this is likely to be minor. Ground would be reinstated where possible, however **minor negative residual effects** are likely.

#### Water

The proposed WTW location would be located within a Flood Zone 1 (low risk of flooding), however there are areas of Flood Zone 2 and Flood Zone 3 within 500m of the proposed location. There may be an increase in the area of hardstanding associated as a result of the new WTW, however the increase is likely to be minimal and therefore the WTW is not anticipated to increase the risk of flooding (**neutral residual effect**).

The construction of the new WTW could result in a minor negative effect on the nearby waterbodies. No negative impact on water quality, levels or flows is anticipated as no abstraction would take place at this location. WFD screening assessment identified that no further WFD assessment is required. Detailed Level 1 and Level 2 WFD assessment has been undertaken since on T2AT options and the findings of the WFD are available in Annex B3.

As this option would provide increase capacity for water treatment by providing a new WTW site, this option is likely to result in a **beneficial residual effect** on the resilience of water supplies.

## Air

There is no AQMA within 2000m of the proposed WTW site. While the construction works could result in a **minor negative residual effect** on local air quality, best practice mitigation measures would be implemented, and the nature of the negative effect would be temporary

## Climatic factors

Embodied carbon would be generated from materials used to construct the WTW, construction activities and from the operation the WTW. The relative carbon scale identified that, relative to other WRSE Regional Plan options, the option would result in **minor negative construction and operational residual carbon emissions**. Recommended measures include investigating the use of renewables during construction and operation for energy supply and the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.

Given no water abstraction would take place in this location, the option would not have an effect on water levels, therefore unlikely to affect the resilience of the local environment to climate change.

## Landscape

The proposed WTW is located within the London Area Greenbelt. The construction works are likely to result in minor and temporary disturbance to the landscape. The new WTW site would likely have above ground infrastructure and therefore result in a permanent change to the landscape, however this would likely result in **minor negative residual effects**.

## Historic Environment

There are listed buildings within 500m of the proposed WTW site. There is also a conservation area, scheduled monument and registered park and garden within 2000m of the option location. The construction works are likely to result in a temporary **minor negative residual effect** on the setting of the historic assets. The excavation works required during construction also have the potential to negatively impact buried archaeology if present. Further work is required to determine the significance of the effect depending on the presence/absence of buried archaeology.

## Population and Human Health

There are no community facilities within 500m of the proposed WTW site, however there are schools, play spaces, sports facilities, public parks or gardens, churches and religious grounds, allotments, a golf course within 2000m of this location. There is potential for the local community and users of these community facilities to be affected during the construction phase, resulting in a **minor negative residual effect**. This option is not anticipated to result in direct effects on recreation or tourism. There may be severance of public rights of way and indirect effects on a national cycle route, however all effects would be minor and temporary. Best practice mitigation measures would be implemented during construction, however **minor negative residual effects** would remain in place.

## Material Assets

The new WTW would require the use of materials and energy consumption. While there is an opportunity to implement sustainable design measures to reduce the impact of the option on

resources and waste, it is likely that a **minor negative residual effect during construction and operation** will remain.

There are major roads and a national cycle route within 500m of the option location. There may be some disruption during the construction phase. However, this is likely to be minor and temporary (**minor negative residual effect**).

### 3.9.1 Review of the WRSE assessment based on the optimised Beckton Reuse Indirect

As mentioned in Section 2.3, the WRSE assessment was undertaken on an earlier iteration of the options. Therefore, the WRSE assessment was reviewed against the optimised route that is being submitted for Gate 1. Differences were noted for:

- Biodiversity, flora and fauna: The optimised pipeline route would also be located within 2000m of the [REDACTED] SSSI and it would not pass within 500m of a LNR
- Historic environment: The optimised pipeline route would be within 500m of several listed buildings, one scheduled monument one registered park and garden and one conservation area
- Biodiversity flora and fauna: There would only be two SSSIs located within 2000m of the optimised WTW location (instead of four - [REDACTED] SSSI; [REDACTED] SSSI) No LNR would be located within 2000m of the optimised location

These differences in assessment are not considered to significantly change the outcomes of the WRSE assessment, although a number of environmental issues have been mitigated through the optimised design (routing). Similarly, the SEA metrics for this option, used as part of the WRSE Best Value Planning methodology, would not be materially changed by these refinements.

## 4 Additional assessment

### 4.1 Overview

This Section provides additional assessment to supplement the WRSE outputs relating to SEA.

As mentioned in Section 1.3, an additional SEA assessment has been undertaken. The additional assessment considered local level data which was not available at the time WRSE undertook the assessments. The additional assessment has been undertaken in-line with the methodology found in the ACWG WRMP environmental assessment guidance and applicability with SROs, October 2020. The outputs of this assessment are presented below.

### 4.2 Local level data

The following locally designated areas have been reviewed for each of the pipeline options:

- Local Wildlife Sites (LWS) (or Sites of Importance for Nature Conservation (SINCs) or Sites of Nature Conservation Importance (SNCIs)) and County Wildlife Sites (CWS); and
- Tree Preservation Orders (TPO)

Other local information, such as conservation areas, formed part of the assessment undertaken by WRSE therefore is not covered in this Section.

Appendix B presents the additional constraints identified for each of the T2AT options. It details the LWS and TPO that intersect or lie within 200m of the options.

No data was available online or received from the Councils at the time of writing:

- LWS and CWS data: Chiltern Council, Runnymede Council, Windsor and Maidenhead Council, and Wycombe Council.
- TPO data: Chiltern Council, Epping Forest Council, Kingston Council, South Bucks Council, Three Rivers Council, Richmond Council, Windsor and Maidenhead Council, and Wycombe Council.

All Scheme options (Sunnymeads 1, Maidenhead, Teddington DRA, Sunnymeads 2a, Walton 2b, Lower Thames Reservoir Transfer 2a and Beckton Reuse Indirect) are located within 50m from TPO trees. As construction could impact on these trees, it is recommended that an arboricultural survey is undertaken on these TPO trees prior to the works starting on site, to identify appropriate measures are implemented during construction. The operation of the option is unlikely to impact on the trees.

- Sunnymeads 1 is located within 5 meters from 5 LWS/SINC/SNCIs.
- Maidenhead is located within 5 meters from 5 LWS/SINC/SNCIs
- Teddington DRA is located within 5 meters from 13 LWS/SINC/SNCIs.
- Sunnymeads 2a is located within 5 meters from 4 LWS/SINC/SNCIs.
- Walton 2b is within 5 meters from 14 LWS/SINC/SNCIs
- Lower Thames Reservoir Transfer 2a is located within 5 meters from 5 LWS/SINC/SNCIs
- Beckton Reuse Indirect 2a is located within 5 meters from 5 LWS/SINC/SNCIs.

Consultation should be undertaken with the appropriate councils regarding works within close proximity the protected wildlife sites to identify mitigation measures required.

## 5 Conclusions

A Strategic Environmental Assessment was undertaken by Water Resources South East in January 2021 on the T2AT options

Based on the WRSE SEA outputs for residual effects (post mitigation), the options are predicted to result in minor positive, neutral or minor negative effects across all the SEA objectives, with the following exceptions:

- **Biodiversity:** The assessment outputs vary in the construction phase only. The residual effects on biodiversity during construction are likely to be greater for Sunnymeads 1, Sunnymeads 2a, Walton 2b and Lower Thames Reservoir Transfer 2a options as a major residual effect is likely compared with a moderate effect on Maidenhead, Teddington DRA and Beckton Reuse Indirect options. No operational residual effects are expected on any of the options
- **Soil:** There is a potential for the construction and operation of the WTW for Sunnymeads 1, Maidenhead, Teddington DRA and Beckton Reuse Indirect options to result in residual minor effects on soil. No residual effect on soil is expected from the construction or operation of Sunnymeads 2a, Walton 2b or Lower Thames Reservoir Transfer 2a options.
- **Water:** All options are likely to result in a residual operational effect on the objective of protecting and enhancing the quality of the water environment and water resources. The operation of Sunnymeads 1, Teddington DRA, Sunnymeads 2a, Lower Thames Reservoir Transfer 2a and Beckton Reuse Indirect options would result in a minor residual effect, while the operation of Maidenhead and Walton 2b options would result in a moderate residual effect on water. No construction residual effects are expected on any of the options.
- **Climatic factors:** The operation of Sunnymeads 1 and Teddington DRA options would likely result in a major residual effect on carbon emissions, while the operation of all the other options would likely result in a moderate residual effect on carbon emissions

Additional assessment considering local level data has been undertaken in line with the methodology in the All Companies Working Group (ACWG) Water Resource Management Plan (WRMP) environmental assessment guidance and applicability with Strategic Resource Options (SRO), October 2020

The local level data findings show that all options intersect or lie within 200m of a number of LWS or TPO. While direct loss may occur, the impact of the route on LWS and TPO will be reviewed at Gate 2 following the refinement of the routes and identification of mitigation. However, mitigation can be put in place in order to reduce the potential effects on these areas.

The WRSE findings and additional assessment show the potential residual impact of all options is similar. Overall, Lower Thames Reservoir Transfer 2a and Beckton Reuse Indirect options performed slightly better while Sunnymeads 1 and Walton 2b options performed slightly worse.

A summary of the key potential benefits and adverse effects of the scheme is presented in Table 5.1

**Table 5.1: Summary of the potential benefits and adverse effects of the scheme**

Topic	Benefits	Adverse effects
Biodiversity, flora and fauna	None identified – however all options have an opportunity to protect and enhance biodiversity during operation	All options are located within 500m of designated sites and would intersect with priority habitats and woodlands

Topic	Benefits	Adverse effects
Soil	None identified	Sunnymeads 1, Teddington DRA, Sunnymeads 2a pass through areas of Grade 1 agricultural land while Maidenhead and Walton 2b pass through areas of Grade 2 agricultural land. Some of the options (Maidenhead, Teddington DRA, Sunnymeads 2a) intersect with historic and/or authorised landfills
Water	All options deliver reliable and resilient water supplies.	The majority of the routes for all options is located within Flood Zone 1, however passes through sections of flood zones 2 or 3 Potential adverse effects on the water quality of nearby waterbodies
Air	None identified	All options are likely to generate short-term vehicle emissions and dust from construction activities
Climatic factors	All options reduce vulnerability to climate change risks and hazards.	All options will likely result in greater energy use during operation.
Landscape	None identified	All options are located within the London Area Greenbelt. Maidenhead is located within 500m of the ████████ AONB.
Historic environment	None identified	All options lie within 500m of listed buildings, scheduled monuments and/or registered parks and gardens. The majority of the options (all options with the exception of Maidenhead) passes through conservation areas and Maidenhead intersect a registered park and garden
Population and human health	None identified	All options intersect a number of community facilities and are located within 500m of other community facilities
Material assets	None identified	All options intersect major roads and railways, while some options (all with the exception of Teddington DRA) also cross a national cycle route and/or a national trail

## A. WRSE output tables

The WRSE SEA outputs are available on [REDACTED]  
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## B. Additional local constraints

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## C. Datasets reviewed for the additional assessment

Additional local level data included in this assessment is listed in Table C.2.

**Table C.2: Additional local level data reviewed for SEA effects**

Topic theme/SEA directive topic	Additional data reviewed	Source
Landscape	Protected Trees in the Broxbourne District	<a href="http://mapping.broxbourne.gov.uk/geoexplorer/composer/#maps/10">http://mapping.broxbourne.gov.uk/geoexplorer/composer/#maps/10</a> (Accessed 24/02/21)
	Protected Trees in the Elmbridge District	<a href="http://emaps.elmbridge.gov.uk/ebc_simple.aspx?requesttype=parseTemplate&amp;template=PlanningPolicy_tmplt">http://emaps.elmbridge.gov.uk/ebc_simple.aspx?requesttype=parseTemplate&amp;template=PlanningPolicy_tmplt</a> (Accessed 24/02/21)
	Protected Trees in the Enfield District	<a href="http://www.planvu.co.uk/enfield/">http://www.planvu.co.uk/enfield/</a> (Accessed 24/02/21)
	Protected Trees in the Hillingdon District	<a href="https://bhillingdon.maps.arcgis.com/apps/View/index.html?appid=7b18f60872a94d38a0c9bf1aea032760">https://bhillingdon.maps.arcgis.com/apps/View/index.html?appid=7b18f60872a94d38a0c9bf1aea032760</a> (Accessed 24/02/21)
	Protected Trees in the Hounslow District	<a href="https://maps.hounslow.gov.uk/map/Aurora.svc/run?script=%5cAurora%5cFind_your_nearest_TP_O.AuroraScript%24&amp;nocache=2109679317&amp;resize=always">https://maps.hounslow.gov.uk/map/Aurora.svc/run?script=%5cAurora%5cFind_your_nearest_TP_O.AuroraScript%24&amp;nocache=2109679317&amp;resize=always</a> (Accessed 24/02/21)
	Protected Trees in the Runnymede District	<a href="http://maps.runnymede.gov.uk/website/maps/index.html">http://maps.runnymede.gov.uk/website/maps/index.html</a> (Accessed 24/02/21)
	Protected Trees in the Slough District	Slough Council
	Protected Trees in the Spelthorne District	<a href="https://my.spelthorne.gov.uk/constraints.aspx">https://my.spelthorne.gov.uk/constraints.aspx</a> (Accessed 24/02/21)
	Protected Trees in the Welwyn Hatfield District	<a href="https://gis.welhat.gov.uk/CommunityMaps/">https://gis.welhat.gov.uk/CommunityMaps/</a> (Accessed 24/02/21)
	Biodiversity	LWSs in the Broxbourne District
SNClS in the Elmbridge District		<a href="http://emaps.elmbridge.gov.uk/ebc_simple.aspx?requesttype=parseTemplate&amp;template=PlanningPolicy_tmplt">http://emaps.elmbridge.gov.uk/ebc_simple.aspx?requesttype=parseTemplate&amp;template=PlanningPolicy_tmplt</a> (Accessed 24/02/21)
SNClS in the Enfield District		<a href="http://www.planvu.co.uk/enfield/">http://www.planvu.co.uk/enfield/</a> (Accessed 24/02/21)
LWSs in the Epping Forest District		<a href="https://www.efdclocalplan.org/wp-content/uploads/2018/10/EB114B-Epping-Forest-District-Local-Plan-Submission-Version-Policies-Map-2017.pdf">https://www.efdclocalplan.org/wp-content/uploads/2018/10/EB114B-Epping-Forest-District-Local-Plan-Submission-Version-Policies-Map-2017.pdf</a> (Accessed 24/02/21)
SINClS in the Hillingdon District		Hillingdon Council
SINClS in the Hounslow District		<a href="https://maps.hounslow.gov.uk/map/aurora.svc/run?script=%5cAurora%5cLocal+Plan.AuroraScript%24&amp;nocache=1336503130&amp;resize=always">https://maps.hounslow.gov.uk/map/aurora.svc/run?script=%5cAurora%5cLocal+Plan.AuroraScript%24&amp;nocache=1336503130&amp;resize=always</a> (Accessed 24/02/21) & Hounslow Council
SINClS in the Kingston District		Kingston Council
SINClS in the Richmond District		Richmond Council
LWSs in the Slough District		Slough Council
LWSs in the South Bucks District		<a href="https://www.southbucks.gov.uk/planning/proposalsmap">https://www.southbucks.gov.uk/planning/proposalsmap</a> (Accessed 24/02/21)

Topic theme/SEA directive topic	Additional data reviewed	Source
	SNCIs in the Spelthorne District	<a href="https://my.spelthorne.gov.uk/constraints.aspx">https://my.spelthorne.gov.uk/constraints.aspx</a> (Accessed 24/02/21) & Spelthorne Council
	LWSs in the Three Rivers District	<a href="http://www.planvu.co.uk/trdc/">http://www.planvu.co.uk/trdc/</a> (Accessed 24/02/21) & Three Rivers Council
	SINCIs in the Welwyn Hatfield District	Welwyn Hatfield Council

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