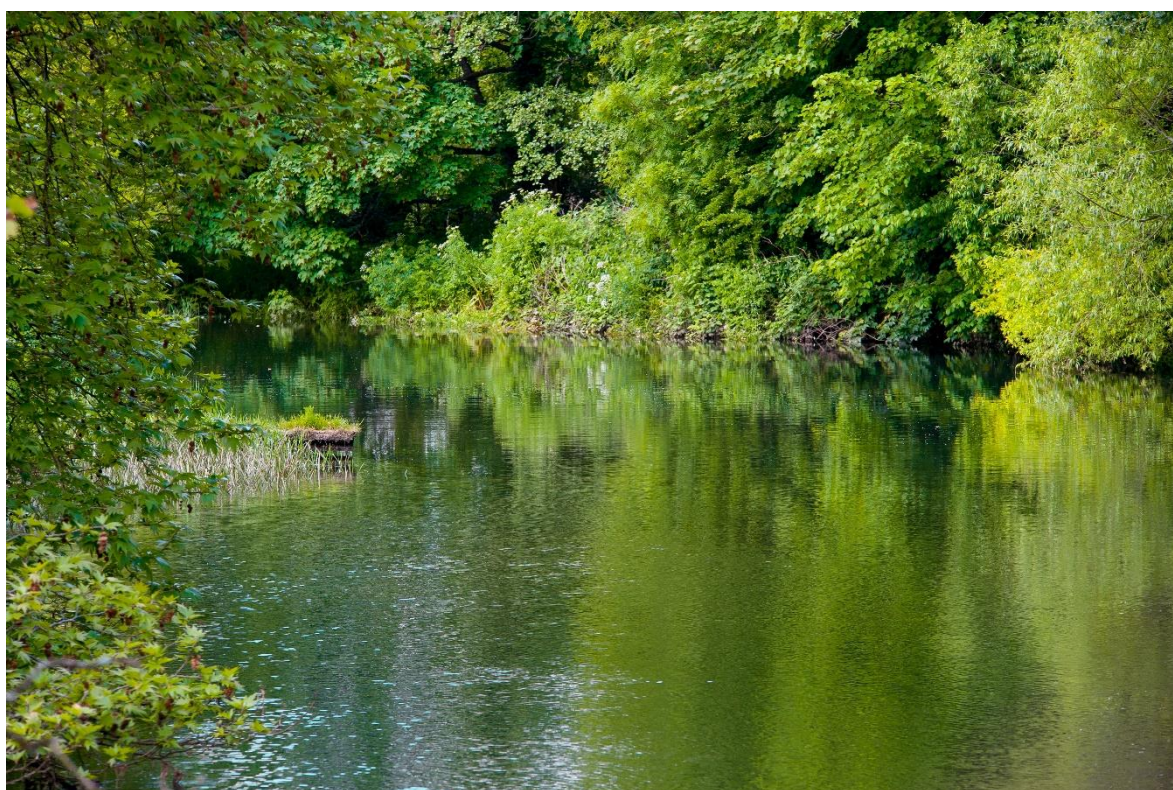


Strategic Regional Water Resource Solutions: Annex B3 Water Framework Directive (WFD) Assessment

Standard Gate Two Submission for Thames to Southern Transfer (T2ST)

Date: November 2022



Notice

Position Statement

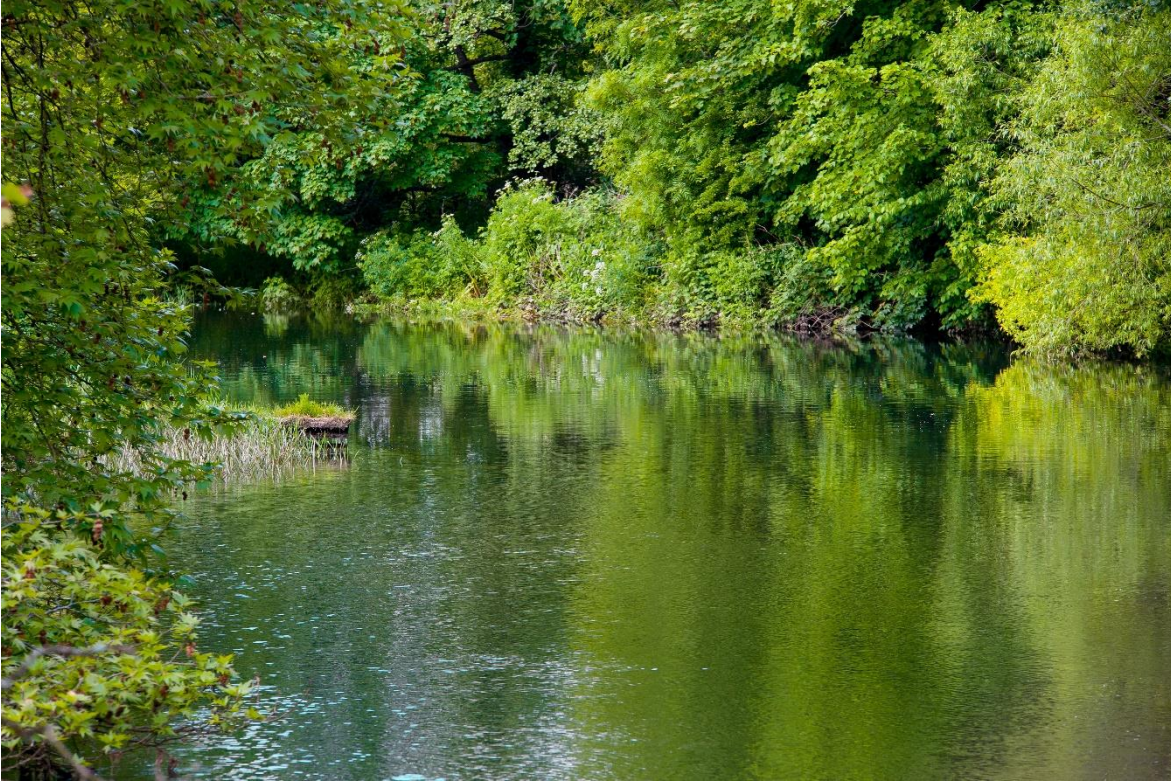
- *This document has been produced as the part of the process set out by RAPID for the development of the Strategic Resource Options (SROs). This is a regulatory gated process allowing there to be control and appropriate scrutiny on the activities that are undertaken by the water companies to investigate and develop efficient solutions on behalf of customers to meet future drought resilience challenges.*
- *This report forms part of suite of documents that make up the 'Gate 2 submission.' That submission details all the work undertaken by Thames Water and Southern Water in the ongoing development of the proposed SROs. The intention of this stage is to provide RAPID with an update on the concept design, feasibility, cost estimates and programme for the schemes, allowing decisions to be made on their progress and future funding requirements.*
- *Should a scheme be selected and confirmed in the Thames Water and Southern Water final Water Resources Management Plans, in most cases it would need to enter a separate process to gain permission to build and run the final solution. That could be through either the Town and Country Planning Act 1990 or the Planning Act 2008 development consent order process. Both options require the designs to be fully appraised, and in most cases an environmental statement to be produced. Where required that statement sets out the likely environmental impacts and what mitigation is required.*
- *Community and stakeholder engagement is crucial to the development of the SROs. Some 'high level' activity has been undertaken to date. Much more detailed community engagement and formal consultation is required on all the schemes at the appropriate point. Before applying for permission Thames Water and Southern Water will need to demonstrate that they have presented information about the proposals to the community, gathered feedback and considered the views of stakeholders. We will have regard to that feedback and, where possible, make changes to the designs as a result.*
- *The SROs are at a very early stage of development, despite some options having been considered for several years. The details set out in the Gate 2 documents are still at a formative stage and consideration should be given to that when reviewing the proposals. They are for the purposes of allocating further funding not seeking permission.*

Disclaimer

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

Thames to Southern Transfer
Water Framework Directive (WFD) Assessment
T2ST-G2-REP-09 (Annex B3)

November 2022



THAMES TO SOUTHERN TRANSFER (T2ST)

Annex B3 Water Framework Directive (WFD) Assessment

Atkins Ref: T2ST-G2-REP-09 (Annex B3)

November 2022

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Glossary

Acronym	Definition
ACWG	All Company Working Group
BPT	Break pressure tanks
CEMP	Construction Environmental Management Plan
EAR	Environmental Assessment Report
GWDTE	Groundwater Dependent Terrestrial Ecosystems
HRA	Habitats Regulations Assessment
INNS	Invasive Non-Native Species
IROPI	imperative reasons for overriding public interest
PS	Pumping Station
RAPID	Regulators' Alliance for Progressing Infrastructure Development
SEA	Strategic Environmental Assessment
SESRO	South East Strategic Reservoir Option
SPZ	Source protection zone
SRO	Strategic Resource Option
STT	Severn Thames Transfer
T2ST	Thames to Southern Transfer
UKWIR	UK Water Industry Research
WRMP24	Water Resources Management Plan 2024
WRSE	Water Resources South East
WSR	Water supply reservoir
WTW	Water Treatment Works
ZoI	Zone of Influence

Executive summary

This report presents the findings of the Level 1 and Level 2 Water Framework Directive (WFD) Assessment undertaken at plan level for Gate 2 for the Thames to Southern Transfer (T2ST) Strategic Resource Option (SRO). Potential impacts on the water environment from pipeline route options have been assessed and summarised.

Both indirect and direct effects of potential impact have been explored to ensure assessment captures the additional upstream and downstream consequences of certain option specific activities.

For Option B the Gate 2 Level 1 WFD assessment indicated that 16 out of 24 waterbodies could be screened out as not requiring further assessment.

The Option B Gate 2 Level 2 WFD assessment has been completed for the remaining eight waterbodies that were screened in. The Level 2 assessment considers that the scheme will have a direct impact on WFD supporting conditions as part of the scheme in one waterbody (River Test Chalk). The findings indicate that there are potential WFD compliance risks associated with the operation of the scheme, due to the works taking place adjacent to and potentially within the River Test SSSI and Groundwater Dependent Terrestrial Ecosystem (GWDTE) and East Aston Common SSSI & GWDTE. Further design detail and mitigation is required to ensure that there is no risk of WFD deterioration to the waterbodies due to the construction and presence of the scheme. Mitigation might include returning groundwater abstracted during temporary construction dewatering back into the ground to help maintain groundwater levels, or additional measures, such as gravel beds and clay stanks, to minimise the disruption to groundwater flow paths from the presence of the pipeline.

For Option C the Gate 2 Level 1 WFD assessment indicated that 16 out of 24 waterbodies could be screened out as not requiring further assessment.

The Option C Gate 2 Level 2 WFD assessment has been completed for the remaining eight waterbodies that were screened in. The Level 2 assessment considers that the scheme will have a direct impact on WFD supporting conditions as part of the scheme in one waterbody (River Test Chalk). The findings indicate that there are potential WFD compliance risks associated with the operation of the scheme, due to the works taking place adjacent to and potentially within the River Test SSSI & GWDTE, East Aston Common SSSI & GWDTE and Bere Mill Meadows SSSI & GWDTE. Further design detail and mitigation is required to ensure that there is no risk of WFD deterioration to the waterbodies due to the construction and presence of the scheme. Mitigation might include returning groundwater abstracted during temporary construction dewatering back into the ground to help maintain groundwater levels, or additional measures, such as gravel beds and clay stanks, to minimise the disruption to groundwater flow paths from the presence of the pipeline.

This Water Framework Directive Assessment, undertaken at plan level, finds that if mitigation measures suggested are followed that no adverse, permanent impacts on the water environment will occur as a result of the implementation of Option B or Option C. A distinguishing factor between the two options is the number of expected crossings of rivers, and roads within 500m of sensitive groundwater features (for example Option C has an additional crossing of the River Test and is located close to an additional GWDTE, Bere Mill Meadows SSSI).

A WFD cumulative effects assessment was undertaken on both route options B and C. The assessment found that cumulative WFD effects were likely during operation from other SROs

(South East Strategic Reservoir Option (SESRO) and Severn to Thames Transfer (STT)), but cumulative effects during construction were unlikely. These effects were identified given the potential for changes in flow and water quality in the River Thames, from SESRO, STT and T2ST. Since T2ST cannot be considered as an option without the use of either SESRO or STT, the in-combination assessment in the River Thames water body is integrated into this assessment. No construction cumulative effects were identified. T2ST is not identified to have any construction or operational related cumulative effects with other water company schemes, or other projects under Local Development Frameworks and Planning Applications.

Further WFD assessment will be required beyond Gate 2 and for future planning/consent applications, to improve the confidence and certainty of WFD risks outlined in the Gate 2 WFD Level 2 assessments and to update the assessment as design progresses.

Areas for further assessment include:

- Hydroecological risk assessments into the impact of construction dewatering on groundwater levels, and potential implications on watercourses and GWDTE of Kennet and Lambourn Floodplains SSSI, Kennet Valley Alderwoods SSSI, River Test SSSI, East Aston Common SSSI and Bere Mill Meadows SSSI;
- If dewatering is discharged to surface watercourses to help maintain flow, there is the potential for short term impacts on water quality. Water quality analysis is required to understand the relative quality of groundwater and surface water in these areas and identify the significance of any changes in water quality in the watercourses;
- Detailed hydrological assessment of the impacts of changes in groundwater levels due to construction dewatering on flow in the Chalk streams and GWDTE which it supports;
- Consideration of pipejack or micro tunnel crossings for the more sensitive ordinary watercourses; and
- Additional groundwater investigation to understand groundwater levels across the route and how they interact with the pipeline during operation of the scheme. Further investigation should consider where groundwater levels are likely to be intersect with the pipeline, calculation of whether the pipeline could form a barrier to groundwater flow (and potential to increase flood risk), and identification of additional mitigation if required.

Proposed mitigation measures for reducing option impact have also been included as part of the WFD assessment (as set out in Table 4.3 and Table 4.6) and the implementation of this mitigation will determine the overall WFD assessment result. Mitigation measures should also include standard best practice dewatering methods and standard best practice water pollution control measures. Consideration of mitigation measures will be subject to further developments in the optioneering for the routes.

1 Introduction

1.1 Overview

This Annex supports the Environmental Assessment Report (EAR) that accompanies the Gate 2 submission to the Regulators' Alliance for Progressing Infrastructure Development (RAPID) for the Thames to Southern Transfer (T2ST). This Annex presents the findings of a Strategic Environmental Assessment (SEA) applied to Options B and C for the Gate 2 T2ST pipeline route options.

1.2 Gate 2 Thames to Southern Transfer Options

The assessment presented here develops work undertaken at Gate 1. The assessments undertaken at Gate 1 were applied to six options for transferring water between the Thames Water Region and the Southern Water Region.

Route and site selection undertaken at Gate 2 has identified two options for the T2ST SRO, with 3 possible capacities of 50MI/d, 80MI/d and 120MI/d, transferring potable water from land to the west of A34 near Drayton in Oxfordshire in the Thames Water region to the existing Yew Hill Water Supply Reservoir (WSR) near Winchester in the Southern Water region. These options have been developed based on series of criteria that consider engineering, environmental, social, and planning constraints. The route for each option has been identified within a wider corridor that meets a majority of the criteria and therefore the pipeline can avoid a large number of environmental designations and communities along its route. These options are listed below and further detailed in Section 2.

- Option B – Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester); and
- Option C – Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester).

Option C is a variation of option B. The majority of the route is common to both, with the only difference being the central section of the route to the south of Newbury which goes west of the A34 in Option B, and east of the A34 in Option C.

Full details of the route and site selection undertaken at Gate 2 is included in the Route and Site Selection Annex A2, which also details the discounted options.

2 Summary scheme description

2.1 Overview

The T2ST route begins at a new WTW at the intake location to be located on existing agricultural land to the west of A34 near Drayton in Oxfordshire in the Thames Water region and ends at the existing Yew Hill WSR near Winchester in the Southern Water region. The transfer scheme has 3 possible capacities of 50MI/d, 80MI/d and 120MI/d and includes a number of intermediate break pressure tanks and pumping stations to allow hydraulic transfer of the water between the new WTW at the intake location and Yew Hill WSR. In practice T2ST will either be supplied by either the Severn to Thames Transfer SRO (STT) or the South East Strategic Reservoir Option (SESRO).

A full scheme description can be found in the RAPID Gate 2 Report and in Annex A3 the Concept Design Report, however a summary of the main aspects of the options are included below.

The transfer route between the new WTW at the intake location and Yew Hill WSR is approximately 80-85km in length.

The majority of the pipeline installed will be 1000 to 1100mm diameter at maximum capacity of 120MI/d which will be installed primarily using open cut excavation. The pipeline route passes predominantly through open rural countryside, crossing a number of roads, rivers and railways. To provide sufficient working space to construct the pipeline a temporary working easement will be required, typically up to 40m wide depending on the final design depth of the pipeline. During construction the topsoil within the easement would be stripped back and stored locally within the easement, followed by excavation of the pipe trench which would be approximately 1.8m wide x 2.2m deep, to allow minimum cover of 900mm above the pipe and 300mm pipe bedding under the pipeline, for a 1000mm diameter pipeline.

Smaller diameter connection pipelines are also required in two locations, to the existing water supply network at Beacon Hill WSR and Micheldever WSR, as detailed in the sections below.

There are expected to be several major road, rail and river crossings located along the preliminary pipeline routes which are anticipated to require trenchless technology. Through consultation with Thames Water and Southern Water it has been assumed at concept design stage that all expected trenchless crossings will comprise a single tunnelled crossing, using pipe jacking and micro tunnelling. Launch and reception shafts would be constructed either side of the surface feature and a concrete tunnel section then constructed between the two shafts.

Pipejack or micro tunnel crossings will be required to cross existing railways, motorways, A roads and B Roads. Other minor road crossings will be installed using open cut methods and temporary road closure.

Pipejack or micro tunnel crossings will also be required to cross main watercourses. Crossings for ordinary watercourses will be installed using open cut methods and temporary culverts.

Full details of the crossings lengths and locations can be found in Annex A3, the Concept Design Report.

There are two options within the T2ST SRO for transferring water from the new WTW site at the intake location to the west of A34 near Drayton to the existing Yew Hill WSR near Winchester as described below:

- Option B - Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester), with a total pipeline length including spur connections of 93.8km; and
- Option C - Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester), with a total pipeline length including spur connections of 94.2km.

Option C is a variation of option B. The majority of the route is common to both, with the only difference being the central section of the route to the south of Newbury which goes west of the A34 in Option B, and east of the A34 in Option C.

A schematic of the Options B and C is provided in Figure 2.1 which shows indicative locations for the WTW, pipe route corridors and connection points to the existing water network.

Figure 2.1: Schematic of preferred T2ST options B and C



Each route can be split into 4 sections as discussed in the below sections.

2.2 Option B - Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester)

2.2.1 Option B Section 1 – Water Treatment Works to BS3

This section is approximately 18.0km in length.

2no. Pipe jack crossings will be required along this section including the Didcot to Swindon railway line and the A417. The following above ground assets are located within this section:

- BS1 Water Treatment Works (WTW) and Pumping Station (PS) - 120MI/d, approx. land area 300m x 150m;
- BS2 Break Pressure Tank (BPT) – 5MI/d, approx. land area 75 x 55m; and
- BS3 PS and BPT - 5MI/d, approx. land area 80 x 80m.

2.2.2 Option B Section 2 – BS3 to north of the River Enbourne

This section is approximately 19.6km in length.

8no. Pipe jack crossings will be required along this section including B4494, M4, Winterbourne Road, River Lambourn, B4000, A4, Wick Wood, and River Kennet & Newbury railway line (including the Kennet and Avon Canal). There are no above ground assets required within this section.

2.2.3 Option B Section 3 – River Enbourne, west of the A34 to River Test

This section is approximately 32.1km in length.

The route includes a 250mm diameter pipeline connection to an existing tank at Beacon Hill, approximately 1.8km in length.

The route also includes a 700mm diameter pipeline connection to the existing Micheldever WSR, approximately 7km in length.

9no. Pipe jack crossings will be required along this section including River Enbourne, A343, Bourne Rivulet/B3048, Andover railway line, B3400, A303 (1), A303 (2), B3048 and the River Test.

The following assets are located within this section:

- BS4 PS and BPT – Options 1, 2 and 3 (only one location required, but currently reviewing 3 options) – 5MI/d, approx. land area 80 x 80m;
- BS5 BPT – 5MI/d, approx. land area 75 x 55m;
- Beacon Hill WSR – existing asset, not part of this assessment;
- Micheldever WSR - existing asset, not part of this assessment; and
- BS6 PS, approx. size 65 x 40m.

2.2.4 Option B Section 4 – River Test to Yew Hill WSR

This section is approximately 24.1km in length.

6no. Pipe jack crossings will be required along this section including A303, River Dever, A30, A272, B3049, and A3090.

The route includes a connection to the existing Crabwood WSR.

The route ends with a connection to the existing Yew Hill WSR.

There are no above ground assets proposed for this section.

2.2.5 Option B summary

Table 2.1 summarises the proposed works for Option B.

Table 2.1: Option B scheme description summary

Section	Pipe length	New assets	Trenchless crossings of natural features
Section 1 – Water Treatment Works to BS3	18.0km	BS1 WTW and PS BS2 BPT BS3 PS and BPT	None
Section 2 –BS3 to north of the River Enbourne	19.6km	None	River Lambourn Wick Wood River Kennet
Section 3 – River Enbourne, west of A34 to River Test	32.1km	BS4 PS and BPT BS5 BPT BS6 PS	River Enbourne Bourne Rivulet River Test
Section 4 – River Test to Yew Hill WSR	24.1km	None	River Dever

2.3 Option C - Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester)

2.3.1 Option C Section 1 –Water Treatment Works to CS3

As per option B.

This section is approximately 18.0km in length.

2no. Pipe jack crossings will be required along this section including the Didcot to Swindon railway line and the A417.

The following assets are located within this section:

- CS1 WTW and PS - 120Ml/d, approx. land area 300m x 150m;
- CS2 BPT – 5Ml/d, approx. land area 75 x 55m; and
- CS3 PS and BPT - 5Ml/d, approx. land area 80 x 80m.

2.3.2 Option C Section 2 – CS3 to north of the River Enbourne

As per option B.

This section is approximately 19.6km in length.

8no. Pipe jack crossings will be required along this section including B4494, M4, Winterbourne Road, River Lambourn, B4000, A4, Wick Wood, and River Kennet & Newbury railway line (including the Kennet and Avon Canal).

There are no above ground assets required within this section.

2.3.3 Option C Section 3 – River Enbourne, east of the A34 to River Test

This section is approximately 32.5km in length.

The route includes a 250mm diameter pipeline connection to an existing tank at Beacon Hill, approximately 4.2km in length.

The route also includes a 700mm diameter pipeline connection to the existing Micheldever WSR, approximately 9.2km in length.

15No. Pipe jack or micro tunnel crossings will be required along this section including, River Enbourne, A34 (1), A343, Penwood Road, Woodland (1), Hopping Common and B4640,

Woodland (2), A34 (2), Whitchurch railway line, B3400, River Test (1), A34 (3), River Test (2), B3048, A303 (1), A303 (2).

The following assets are located within this section:

- CS4 PS and BPT – 5Ml/d, approx. land area 80 x 80m;
- Beacon Hill WSR – existing asset, not part of this assessment;
- Micheldever WSR - existing asset, not part of this assessment; and
- CS5 PS, approx. land area 65 x 40m.

2.3.4 Option C Section 4 – River Test to Yew Hill WSR

As per option B.

This section is approximately 24.1km in length.

6no. Pipe jack crossings will be required along this section including A303, River Dever, A30, A272, B3049, and A3090.

The route includes a connection to the existing Crabwood WSR.

The route ends with a connection to the existing Yew Hill WSR.

There are no above ground assets proposed for this section.

2.3.5 Option C summary

Table 2.1 summarises the proposed works for Option C.

Table 2.2: Option C scheme description summary

Section	Pipe length	New assets	Trenchless crossings of natural features
Section 1 – Water Treatment Works to CS3	18.0km	CS1 WTW and PS CS2 BPT CS3 PS and BPT	None
Section 2 – CS3 to River Enbourne	19.6km	None	River Lambourn Wick Wood River Kennet
Section 3 – River Enbourne, east of the A34 to River Test	32.5km	CS4 PS and BPT CS5 PS	River Enbourne Woodland and Hopping Common Woodland (west of Burghclere) River Test (two crossings required)
Section 4 – River Test to Yew Hill WSR	24.1km	None	River Dever

2.4 Asset description

The below sections describe the new assets to be installed as part of the SRO and list the equipment expected to be associated with them.

2.4.1 BS1/CS1 WTW and PS

The WTW is to be located at the north end of both corridor options B and C. Raw water will enter the screening and treatment processing before entering the option pipelines. The waste

water by-product of the treatment process will be sent for treatment to a local sewage treatment works. The WTW has approximately a 45,000m² area and will contain the following equipment

- Waste and sludge handling
- Ozone contact tanks
- Granular Activated Carbon (GAC) Plant
- UV plant
- Rapid Gravity Filter (RGF) plant
- Chlorine contact tank
- Dissolved Air Flotation (DAF) plant
- Flocculation tank
- Welfare
- Chemical storage
- Treated water storage
- Pumping station

It should be noted that at the time of writing no formal plans of the WTW has been issued. It is unknown at this point where equipment will be located on the site. An area has been identified with an approximate boundary for the location of the WTW and will be assessed against flood risk and other environmental impacts.

2.4.2 BS2/CS2 BPT, BS5 BPT

The area size of the BPT is approximately 4,125m² and only includes a 5MI storage tank and access roads.

2.4.3 BS3/CS3 PS and BPT, BS4 PS and BPT and CS4 PS and BPT

For each of the PS and BPT assets, the PS and BPT are located on one site with area size approximately 6,400m² and includes the following equipment:

- HV/LV transformer x2
- Surge tanks
- Standby generator
- Pumping station
- 5MI Storage tanks

2.4.4 BS6/CS5 PS

The PS area size is approximately 2,600m² and includes the following equipment.

- HV/LV transformer
- Surge tanks
- Standby generator
- Pumping station

2.5 Programme assumptions

The draft Water Resources South East (WRSE) regional plan sets out the overall need for T2ST and this feeds into the relevant Water Resource Management Plans (WRMPs) from both Thames Water and Southern Water. The draft WRSE regional plan has determined a need for a T2ST scheme of up to 120MI/d by 2040-2053 depending on the scenario in the adaptive plan. Therefore, at this stage, it is envisaged the project will not be operational until at least 2040.

3 Methodology

3.1 Approach

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 is the UK legislation that imposes legal requirements to protect and improve the water environment (including rivers, coasts, estuaries, lakes, ground waters and canals).

The WFD requires all waterbodies (both surface and groundwater) to achieve ‘good status’. The Directive also requires that waterbodies experience no deterioration in status. Good status is a function of good ecological status (biological, physico-chemical and hydromorphological elements and specific pollutants) and good chemical status (Priority Substances and Priority Hazardous Substances).

The All Company Working Group (ACWG) developed a consistent framework for undertaking WFD assessments for SROs to demonstrate that options would not cause deterioration in status of any WFD waterbodies. The assessment considers mitigation that would need to be put in place to protect waterbody status. The assessment also considers any potential for impediment or improvement relating to WFD future objectives.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact screening. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment for Level 2, with reference to baseline WFD classification and measures data as outlined in the RBMP.

3.2 Level 1

The Level 1 WFD assessment is used as an initial high-level assessment of the impacts associated with various option activities. Each waterbody identified as potentially affected by the project option is assessed against a list of possible activities, each with a predetermined impacts on the water environment. This allows the assessor to identify each of the activities that occur within a particular waterbody and evaluate the high level risk which could potentially occur in each. The impact scoring used is set out below:

Table 3.1: WFD assessment impact scoring

Level 1 assessment	Impact	Impact Score	Description
Waterbody passes Level 1 WFD assessment	Very beneficial	-2	Impacts that, taken on their own, have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody
	Beneficial	-1	Impacts that, when taken on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements
	No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
	Low	1	Impacts that, when taken on their own, have the potential to lead to a minor localised, short-term and fully reversible effects on one or more of the quality elements but would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Waterbody requires level 2 WFD assessment	Medium	2	Impacts that, when taken on their own, have the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.
	High	3	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Potential for high impact on preventing target WFD objectives from being achieved.

At the end of the Level 1 assessment, any waterbodies where adverse impacts at a waterbody scale could potentially occur (i.e. any waterbody where a score of either 2 or 3 has been assigned) are put forward for a more detailed Level 2 assessment.

3.3 Level 2

The second stage of WFD assessment has been completed for T2ST SRO options that were screened in at Level 1, following the steps:

- Waterbody scale detailed assessment of impacts to each WFD quality element for each activity proposed as part of an SRO option;
- Assessment of data confidence level and design certainty – confidence levels are assigned for each assessment, based on professional judgement of the quality and availability of both physical data and design information about the option at the time of assessment (*note, confidence/certainty are expected to be low/medium at Gate 2 assessment and will increase over time*). Where the confidence levels are medium or low, the requirements for further data or design information in order to raise this confidence level for future gates will be listed;
- Identification of further mitigation needs;
- Assessment of impacts after mitigation (scoring on a 6-point scale); and
- Identification of activities to improve certainty of assessment outcomes.

3.4 Consultation

Engagement during Gate 2 has focused on development of the pipeline route corridor and location of above ground infrastructure.

Regular engagement has been undertaken with the National Appraisal Unit (NAU) during Gate 2. Key areas of engagement include NAU feedback on risks of options that involved raw water transfers. NAU provided some data on environmental constraints to inform the route and site selection process, as well as providing feedback on the shortlisted options, recognising there remained challenges with all options. NAU did not indicate that the preferred routes were not feasible and provided information on the expected mitigation, for example, for crossing watercourses.

Engagement with the NAU has helped refine the options to potable transfers. Information and feedback provided by NAU has informed route and site selection, helping to avoid sensitive areas. Mitigation suggestions provided by NAU have been included in the design and environmental assessments. Constraints and location-specific challenges flagged by NAU have been identified as areas for further work.

Stakeholder engagement activity with other stakeholders is described in the Gate 2 Report.

3.5 Assumptions and limitations

This assessment has been undertaken assuming the maximum transfer capacity of 120Ml/d.

Information provided by third parties, including publicly available information and databases, is considered correct at the time of assessment (June 2022). Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this report, and the undertaking of the proposed works. Changes since the date of assessment, such as additional designated sites, will be taken into account in future assessments.

The limitations and assumptions in Table 3.2 have been applied to the WFD assessment at Gate 2 to apply a consistent proportionate approach for the level of design development and supporting technical data and analysis. As the project continues through the stages of design development, a precautionary approach has been exercised because of residual uncertainty.

Table 3.2: Limitations and assumptions applied to Gate 2 WFD assessment

Topic	Description of assumption
Abstraction location	<p>Abstraction to supply water for the scheme will be via SESRO, which will abstract water from the River Thames or STT which will supply additional flow to the River Thames.</p> <p>This assessment has considered the impact of the additional abstraction required to feed SESRO in order to support the T2ST scheme on flow in the River Thames. It has also considered the potential impacts of the T2ST scheme on water quality in the reservoir and therefore any change to the impact of SESRO discharges to the River Thames. However, this assessment does not consider the impact of the main SESRO scheme. This will be reported in the SESRO WFD and EAR reports.</p> <p>For the STT option, it is assumed that sufficient flow will be provided by STT such that the abstraction required for T2ST will lead to no net change from baseline flows in the River Thames. Consideration of the changes in water quality in the River Thames from the STT is not assessed and will be reported in the STT WFD and EAR reports. This assessment assumes that STT will not lead to changes in baseline conditions for this waterbody.</p>
Study area	The geographical extent of the WFD assessment has been limited to waterbodies between the start point of the transfer and the existing Yew Hill WSR near Winchester.
Design	The design assumptions are as set out in the Summary scheme description (Section 2).
Pipelines watercourse crossing	Assessment assumes pipelines will be underground (pipejack or micro tunnel crossings beneath any main rivers). At this time it is assumed ordinary watercourse crossings will be constructed below the bed of the watercourse and will use temporary culverts or pumps to allow for installation. Due to the temporary nature of these works and the size of the watercourses affected these are not considered to constitute a WFD risk. The works will require permitting through the appropriate authority and it is assumed any site specific mitigation needed will be identified and implemented through that process.
Pipelines	Where pipelines have the potential to be installed below groundwater level, the pipeline bedding material is assumed to be permeable, to promote the movement of groundwater across the pipeline (i.e. the pipeline will not form a substantial barrier to groundwater flow). Clay stanks will also be used to minimise the potential for groundwater to flow along the line of the pipe, and therefore forming a preferential flow path.
WFD baseline data	The ACWG approach uses WFD 2015 baseline data, as the current officially reported baseline for the 2015-2021 Cycle 2 RBMP ¹ . The RBMPs are in the process of being updated, and it is anticipated that 2019 WFD baseline data will become the 'new' baseline for Cycle 3. To make sure of consistency with the legal baseline, the 2015 data has been used at Gate 2, but it is acknowledged that this is likely to need to be updated once the final RBMPs are published. Changes in baseline data between 2015-2019 have been reviewed and are presented in Appendix A.
Data confidence	This assessment is based on the design information and baseline WFD data available at the time of writing. Further investigations and data collection are required in some areas to ensure the potential implications of the construction of the scheme are understood and can be mitigated. This assessment should also be reviewed and updated as more design information becomes available.

¹ River Basin Management Plan 2015 (Cycle 2): available online at <https://www.gov.uk/government/collections/river-basin-management-plans-2015>

4 WFD Assessment

4.1 Option B assessment

4.1.1 Level 1 findings

A total of 24 WFD river and groundwater bodies were identified as requiring assessment at Level 1. Of these, the Level 1 WFD assessment indicated that 16 of the 24 waterbodies could be screened out as not requiring further assessment. Eight of the 24 waterbodies assessed were identified as requiring Level 2 assessments.

Table 4.1 presents a key to explain colour-coding for whether waterbodies were screened in or out of further assessment. Table 4.2 provides a summary of the Level 1 WFD assessment for the scheme across the 24 WFD river and groundwater bodies that were identified.

The Level 2 WFD Assessment is presented in Section 4.2 of this report.

Table 4.1: Level 1 WFD screening colour coding summary

Green – Passes Level 1 WFD, no further assessment
Amber – Level 1 WFD score >1, screened in for Level 2

Table 4.2: Option B Level 1 results

WFD waterbody	Screening outcome	Comment
GB106039030334 (Thames, Evenlode to Thame)	Amber	Abstraction from the River Thames in high flow events as part of SESRO. T2ST scheme to abstract additional volume as part of transfer. Or Abstraction from the River Thames will be balanced by a discharge into the River Thames upstream from STT.
GB106039023360 (Cow Common Brook and Portobello Ditch)	Green	BS1 WTW and PS and main transfer pipeline route
GB106039023660 (Ginge Brook and Mill Brook)	Green	Main transfer pipeline route
GB106039023600 (Mill Brook and Bradfords Brook system, Wallingford)	Green	Main transfer pipeline route
GB106039023300 (Pang)	Green	BS2 BPT and BS3 PS and BPT, main transfer pipeline route
GB106039023210 (Winterbourne)	Green	Main transfer pipeline route
GB106039023220 (Lambourn, Source to Newbury)	Amber	Main transfer pipeline route. River crossing 440m from Lambourn and Kennet Floodplain SSSI
GB106039023174 (Middle Kennet, Hungerford to Newbury)	Amber	Main transfer pipeline route, river crossing of River Kennet, Kennet & Avon Canal and railway line
GB106039017280 (Enborne, Source to downstream A34)	Green	BS4 PS and BPT, main transfer pipeline route
GB106039017210 (Penwood Stream)	Green	Main transfer pipeline route
GB107042022710 (Test Upper)	Green	BS5 BPT and main transfer pipeline route
GB107042022720 (Bourne Rivulet)	Green	Main transfer pipeline route
GB107042022700 (Test – Bourne Rivulet to conf Dever)	Amber	BS6 PS and main transfer pipeline route River crossing in River Test and East Aston Common SSSI's (0m). Road crossing within 500m of River Test SSSI (350m)

WFD waterbody	Screening outcome	Comment
GB107042022810 (Anton – Upper)	Green	Existing Micheldever WSR and new BS6 PS and main transfer pipeline route.
GB107042022770 (Dever)	Yellow	Main transfer pipeline route. River crossing in River Test SSSI (0m)
GB107042022740 (Sombourne Stream)	Green	Main transfer pipeline route
GB107042022730 (Nun's Walk Stream)	Green	Existing Crabwood WSR and main transfer pipeline route
GB107042016310 (Monk's Brook)	Green	Main transfer pipeline route
GB107042022580 (Itchen)	Green	Existing Yew Hill WSR, and main transfer pipeline route
GB40601G601000 (Vale of White Horse Chalk, GW)	Green	Main transfer pipeline route
GB40601G600900 (Berkshire Downs Chalk, GW)	Yellow	BS2 BPT and BS3 PS and BPT and main transfer pipeline route. River Lambourn and River Kennet crossings within 500m of SSSI's / sensitive GW features
GB40602G601600 (Thatcham Tertiaries, GW)	Yellow	Main transfer pipeline route
GB40701G501200 (River Test Chalk, GW)	Yellow	BS5 BPT, BS6 PS and main transfer pipeline route. River Test, River Dever and B3048 crossings within 500m of SSSI's / sensitive GW features
GB40701G505000 (River Itchen Chalk, GW)	Green	Main transfer pipeline route and existing Yew Hill WSR.

4.1.1.1 Thames (Evenlode to Thame) waterbody

The Thames (Evenlode to Thame) waterbody has been included in this assessment as it is the source of water for this transfer option. For this assessment it is assumed that the water will be supplied to the new WTW at the intake location either as part of the SESRO scheme, or a connection from the STT scheme prior to discharge to the River Thames.

For the SESRO option, it is recognised that water quality modelling, hydraulic modelling and WFD assessments have been undertaken for the proposed SESRO which detail exact abstraction volumes, conditions and water quality changes. From these assessments it has been clarified that water will be abstracted from the Thames during high flow events and stored in SESRO reservoir for later discharge to the Thames in low flow events as well as to supply other SRO's such as T2ST. The inclusion of the T2ST scheme will lead to the requirement to abstract water from the Thames for a few additional days a year over and above that for the SESRO scheme only.

This T2ST WFD assessment has considered the additional implications of the T2ST scheme on the volume of water abstracted from the River Thames to support this scheme. It has also considered the implications of the additional water abstraction and discharged for T2ST on the overall water quality in the reservoir and therefore, any possible additional changes in water quality when SESRO is discharging into the River Thames.

It is important to note that this assessment deals only with the additional changes caused by the T2ST scheme. Since the T2ST option can not be operated without a corresponding option to support flow in the River Thames, this assessment on the Thames (Evenlode to Thame) waterbody is based on the baseline of SESRO in operation, rather than current baseline conditions. For impacts of SESRO against current baseline this assessment should be read in conjunction with the SESRO WFD assessment.

For the STT option, water for T2ST would be taken from a direct connection to the STT pipeline before STT discharge to the River Thames at Culham. Therefore, the STT connection to T2ST

would have no impact on flows within the River Thames and hence is not considered in this WFD assessment.

4.1.1.2 Impacts of river and road crossings

As summarised in Table 4.2, the seven other waterbodies to be assessed at Level 2 include SSSI sites within 500m of proposed river crossings. These sites are also identified as Groundwater Dependent Terrestrial Ecosystems (GWDTE) which are likely to be supported by groundwater flow. These sites are therefore sensitive to impacts on groundwater flow and quality as a result of below ground structures and associated dewatering processes which come as a result of shafts, pipejacking and micro tunnelling activities involved in rail, road and river crossings. The extent of the impacts was discussed in the Level 2 assessment.

All other waterbodies have been scoped out based on the assumptions:

- All major river crossings will be carried out using pipejacking or microtunnelling and impacts of construction on these watercourses will be minimised;
- Pipeline bedding material will be such that it facilitates the movement of groundwater around the pipeline. If required, Land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk.

4.1.2 Level 2 findings

The Level 2 WFD assessment continued the evaluation of the eight waterbodies identified in the Level 1 assessment. A high level summary of the results are provided in Table 4.3. The full details of the assessment can be found in Appendix B.

4.1.2.1 Thames (Evenlode to Thame)

This assessment assumes water will be sourced from SESRO to supply the T2ST transfer (as mentioned in Section 4.1.1.1). Hydraulic modelling has been carried out under the SESRO SRO project which shows that a few days of additional abstraction from the River Thames into SESRO are required to support the T2ST scheme. This abstraction will take place during high flows in the River Thames and is assessed to have a negligible impact over the abstraction for the SESRO scheme.

Initially, concerns were raised over the potential impacts taking water from SESRO could have on water quality within the reservoir, something which could lead to further downstream consequences when water is discharged back into the Thames by SESRO in low flow periods. Water quality and flow modelling carried out as part of the SESRO project, suggests that there would be negligible impact on water quality in the reservoir and in the River Thames as a result of the support of the T2ST scheme. Therefore, the Level 2 assessment has shown negligible water quality impacts over those of the SESRO scheme. Please see the SESRO option WFD assessment for the impact of the remainder of the SESRO scheme on the Thames (Evenlode to Thame) waterbody. Main findings of the Level 2 assessment are summarised below:

- Negligible additional impact on flow and velocity due to additional abstraction for supporting the T2ST scheme.
- Negligible impact on water quality in the water body due to the changes in water quality in SESRO caused by the additional T2ST scheme support.

4.1.2.2 Surface water impacts of river and road crossings

Four waterbodies, Lambourn (Source to Newbury), Middle Kennet (Hungerford to Newbury), Test (Bourne Rivulet to conf Dever) and Dever; were carried forward to Level 2 to assess the surface water impacts of several river and road crossings which occur close to or within

designated sites which are directly linked to the watercourse channel (such as floodplains etc). The sites identified are the Kennet and Lambourn Floodplains SSSI & GWDTE, Kennet Valley Alderwoods SSSI & GWDTE, River Test SSSI & GWDTE and East Aston Common SSSI & GWDTE. The main findings are summarised below:

- Discharge of water collected as part of dewatering activity could temporarily influence groundwater levels, and therefore river flows into the rivers (Lambourn, Kennet, Test and Dever). This could result in temporary and localised changes in flow velocity and volume. While these are assumed to have temporary impact on the rivers, the implications of these changes on the SSSI sites, and associated biology, needs further investigation. A hydroecology study is recommended to identify likely influence of dewatering on groundwater levels and river flow, and a review of potential ecological impacts of these changes.
- If dewatering is discharged to surface watercourses to help maintain flow, there is the potential for short term impacts on water quality. Further work needed to understand the relative quality of groundwater and surface water in these areas, to ensure groundwater discharge does not have an adverse impact on water quality and therefore biology in the watercourses.

4.1.2.3 Groundwater impacts of river and road crossings

Two groundwater bodies, Berkshire Downs Chalk and River Test Chalk are located beneath the three SSSI sites set out in Section 4.1.2.2. These sites are classified as GWDTE by the EA and are likely to depend on groundwater levels/flow. These two groundwater bodies were carried forward to the Level 2 assessment due to potential impacts on the GWDTE as a result of the construction of the proposed river and road crossings. These groundwater bodies were assessed to determine the impacts changes in groundwater levels, flow and quality will have on the sensitive features and their WFD status. The main findings are summarised below:

- Dewatering during construction could leading to a reduction in groundwater levels beneath the SSSI sites. These temporary changes to flow and level of groundwater could impact GWDTE's.
- The permanent presence of the pipeline will only lead to minor localised changes in water levels due to embedded mitigation (permeable pipeline bedding material to allow groundwater to pass around the pipeline, use of clay stanks to ensure pipeline does not provide a longitudinal preferential flow path). Further investigation is needed to identify where groundwater levels are likely to be intersect with the pipeline, calculate whether the pipeline could form a barrier to groundwater flow (and potential to increase flood risk), and identify additional mitigation if required.
- Several chalk rivers cross these waterbodies and flow could be reduced temporarily in these watercourses due to construction of the scheme.

In addition, a third groundwater body, Thatcham Tertiaries, was included in the Level 2 assessments due to the potential for impacts on drinking water protected areas, as the scheme crosses several source protection zones (SPZ) for public water supply.

Table 4.3: WFD Level 2 assessment summary

No.	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
1	GB106039030334	Thames, Evenlode to Thame	Medium	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Further information about how much additional abstraction will be required for the T2ST scheme.	No	No	0	Fish and eel screening at new intake Minimisation of changes to hydrological regime through adjustment of abstraction conditions. Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	0
2	GB106039023220	Lambourn, Source to Newbury	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of dewatering on flow in the watercourse Further information about option crossing	No	No	1	Any dewatering needed for the construction will be discharged to the river to help maintain flow	1

No.	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
					of the River Lambourn.					
3	GB106039023174	(Middle Kennet, Hungerford to Newbury)	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses Further information about option crossing of the River Lambourn.	No	No	1	Any dewatering needed for the construction will be discharged to the river to help maintain flow. If shafts needed for river crossing these should be located outside of the SSSI/SAC boundary, where possible. Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1
4	GB107042022700	Test – Bourne Rivulet to conf Dever	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses	No	No	1	If shafts for river crossing, these should be located outside of the SSSI boundary, where possible.	1

No.	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
					Further information about option crossing of the River Test and potential implications on SSSIs.					
5	GB107042022770	Dever	Low	Medium	<p>Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme</p> <p>Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses</p> <p>Further information about option crossing of the River Dever and potential implications on SSSI.</p>	No	No	1	If shafts are required for river crossing, these should be located outside of the SSSI boundary, where possible.	1
6	GB40601G600900	Berkshire Downs Chalk	Low	Medium	<p>Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme</p> <p>Detailed hydrological assessment of the impacts of dewatering on flow in the watercourses</p>	No	No	1	<p>Dewatering discharge to surface water courses to maintain flow.</p> <p>Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where</p>	1

No.	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
					Further information about option impacts on SSSI sites.				groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. If shafts are required, they are to be sealed to ensure minimal groundwater egress after construction, where possible. Dewatering to be discharged to local watercourse to help maintain flow.	
7	GB40602G601600	Thatcham Tertiaries	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme	No	No	1	Dewatering discharge to surface water courses to maintain flow. Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater	1

No.	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
									potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater.	
8	GB40701G501200	River Test Chalk	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme A hydroecology study is recommended to identify likely influence of dewatering on groundwater levels and river flow, and a review of potential ecological impacts of these changes. Consideration of where additional mitigation is required including potential use recharge trenches to return water to the ground and minimise the impact of construction.	Uncertain	Uncertain	2	Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. If shafts are required for river crossings these should be located outside of the SSSI boundary, where possible. Shafts to be sealed to ensure minimal	1

No.	Waterbody ID Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
				Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option impacts on SSSI sites.				groundwater egress after construction, where possible.	

4.2 Option C assessment

4.2.1 Level 1 findings

A total of 24 WFD river and groundwater bodies were identified as requiring assessment at Level 1. Of these, the Level 1 WFD assessment indicated that 16 of the 24 waterbodies could be screened out as not requiring further assessment. Eight of the 24 waterbodies assessed were identified as requiring Level 2 assessments.

Table 4.4 presents a key to explain colour-coding for whether waterbodies were screened in or out of further assessment. Table 4.5 provides a summary of the Level 1 WFD assessment for the scheme across the 24 WFD river and groundwater bodies that were identified.

The Level 2 WFD Assessment is presented in Section 4.2 of this report.

Table 4.4: Level 1 WFD screening colour coding summary

Green – Passes Level 1 WFD, no further assessment
Amber – Level 1 WFD score >1, screened in for Level 2

Table 4.5: Option C Level 1 results

WFD waterbody	Screening outcome	Comment
GB106039030334 (Thames, Evenlode to Thame)	Amber	Abstraction from the Thames in high flow events as part of SESRO – T2ST scheme to abstract additional volume as part of transfer. Or Abstraction from the River Thames will be balanced by a discharge into the River Thames upstream from STT.
GB106039023360 (Cow Common Brook and Portobello Ditch)	Green	CS1 WTW and PS and main transfer pipeline route
GB106039023660 (Ginge Brook and Mill Brook)	Green	Main transfer pipeline route
GB106039023600 (Mill Brook and Bradfords Brook system, Wallingford)	Green	Main transfer pipeline route
GB106039023300 (Pang)	Green	CS2 BPT and CS3 PS and BPT, main transfer pipeline route
GB106039023210 (Winterbourne)	Green	Main transfer pipeline route
GB106039023220 (Lambourn, Source to Newbury)	Amber	River crossing within 500m of Lambourn and Kennet Floodplain SSSI (440m)
GB106039023174 (Middle Kennet, Hungerford to Newbury)	Amber	Main transfer pipeline route, river crossing of River Kennet, Kennet & Avon Canal and railway line
GB106039017280 (Enborne, Source to downstream A34)	Green	BS4 PS and BPT, main transfer pipeline route
GB106039017210 (Penwood Stream)	Green	Main transfer pipeline route
GB106039017310 (Enborne, downstream A34 to Burghclere Brook)	Green	Main transfer pipeline route
GB106039017230 (Earlstone Stream and Burghclere Brook, source to Enborne)	Green	Main transfer pipeline route
GB107042022710 (Test, Upper)	Amber	CS4 PS and BPT. Main transfer pipeline route. River crossing in River Test SSSI (0m)
GB107042022700 (Test – Bourne Rivulet to conf Dever)	Amber	CS5 PS and existing Micheldever WSR. Transfer pipeline route. River crossing in River Test and East Aston Common SSSI's (0m)

WFD waterbody	Screening outcome	Comment
		Road crossing within 500m of River Test SSSI (350m)
GB107042022770 (Dever)		Main transfer pipeline route. River crossing in River Test SSSI (0m)
GB107042022740 (Sombourne Stream)		Main transfer pipeline route
GB107042022730 (Nun's Walk Stream)		Existing Crabwood WSR. Main transfer pipeline route
GB107042016310 (Monk's Brook)		Main transfer pipeline route
GB107042022580 (Itchen)		Existing Yew Hill WSR, and main transfer pipeline route
GB40601G601000 (Vale of White Horse Chalk)		Main transfer pipeline route
GB40601G600900 (Berkshire Downs Chalk)		Main transfer pipeline route. River Lambourn and River Kennet crossings within 500m of SSSI's / sensitive GW features
GB40602G601600 (Thatcham Tertiaries)		Main transfer pipeline route
GB40701G501200 (River Test Chalk)		Main transfer pipeline route. River Test, River Dever and B3048 crossings within 500m of SSSI's / sensitive GW features
GB40701G505000 (River Itchen Chalk)		Main transfer pipeline route

4.2.1.1 Thames (Evenlode to Thame) waterbody

As for Option B, the Thames (Evenlode to Thame) waterbody has been included in this assessment as it is the source of water for this transfer option. For this assessment it is assumed that the water will be supplied to the new WTW at the intake location either as part of the SESRO scheme, or a connection from the STT scheme prior to discharge to the River Thames. The implications on this waterbody are the same as for Option B (see Section 4.1.1.1).

4.2.1.2 Impacts of river and road crossings

As summarised in Table 4.5, the seven other waterbodies to be assessed at Level 2 include SSSI sites within 500m of proposed river crossings. These sites which are also identified as GWDTE which are likely to be supported by groundwater flow. These sites are therefore sensitive to impacts on groundwater flow and quality as a result of below ground structures and associated dewatering processes which come as a result of shafts, pipejacking and micro tunnelling activities involved in road and river crossings. The extent of the impacts was discussed in the Level 2 assessment.

All other waterbodies have been scoped out based on the assumptions:

- All major river crossings will be carried out using pipejacking or microtunnelling and impacts of construction on these watercourses will be minimised;
- Pipeline bedding material will be such that it facilitates the movement of groundwater around the pipeline. If required, Land drainage will be provided on the upgradient side of the scheme such that they will not cause an increase in groundwater flooding risk.

4.2.2 Level 2 findings

The Level 2 WFD assessment continued the evaluation of the eight waterbodies identified in the Level 1 assessment. A summary of the results are provided in Table 4.6. The full details of the assessment can be found in Appendix B.

4.2.2.1 Thames (Evenlode to Thame)

Impacts associated with the new proposed intake and abstraction from the Thames, have been assessed as part of the investigations for SESRO. As it has been proposed that water will be sourced from SESRO to supply the T2ST transfer (as mentioned in Section 4.1.1.1) evaluating the impacts of sourcing water via the reservoir for this reason was required. The impacts on this waterbody are the same as those for the Option B route (see Section 4.1.2.1). Main findings of the Level 2 assessment are summarised as:

- Negligible additional impact on flow and velocity due to additional abstraction for supporting the T2ST scheme.
- Negligible impact on water quality in the water body due to the changes in water quality in SESRO caused by the additional T2ST scheme support.

4.2.2.2 Surface water impacts of river and road crossings

Five waterbodies, Lambourn (Source to Newbury), Middle Kennet (Hungerford to Newbury), Test (Upper), Test (Bourne Rivulet to conf Dever) and Dever were carried forward to Level 2 to assess the surface water impacts of several river, rail and road crossings which occur close to or within designated sites which are directly linked to the watercourse channel (such as floodplains etc). The sites identified are the Kennet and Lambourn Floodplains SSSI & GWDTE, Kennet Valley Alderwoods SSSI & GWDTE, River Test SSSI & GWDTE, Bere Mill Meadows SSSI & GWDTE and East Aston Common SSSI & GWDTE. The main findings are summarised below:

- Discharge of water collected as part of dewatering activity could temporarily influence groundwater levels, and therefore river flows into the rivers (Lambourn, Kennet, Test and Dever). This could result in temporary and localised changes in flow velocity and volume. While these are assumed to have temporary impact on the rivers, the implications of these changes on the SSSI sites, and associated biology, needs further investigation. A hydroecology study is recommended to identify likely influence of dewatering on groundwater levels and river flow, and a review of potential ecological impacts of these changes.
- If dewatering is discharged to surface water courses to help maintain flow, there is the potential for short term impacts on water quality. Further work needed to understand the relative quality of groundwater and surface water in these areas to ensure groundwater discharge does not have an adverse impact on water quality and therefore biology in the watercourses.

4.2.2.3 Ground water impacts of river and road crossings

Two groundwater bodies, Berkshire Downs Chalk and River Test Chalk are located beneath the three SSSI sites set out in Section 4.2.2.2. These sites are classified as GWDTE by the EA and are likely to depend on groundwater levels/flow. These two groundwater bodies were carried forward to the Level 2 assessment due to potential impacts on the GWDTE as a result of the construction of the proposed river and road crossings. These groundwater bodies were assessed to determine the impacts changes in groundwater levels, flow and quality will have on the sensitive features and their WFD status. The main findings are summarised below:

- Dewatering during construction could leading to a reduction in groundwater levels beneath the SSSI sites. These temporary changes to flow and level of groundwater could impact GWDTE's.
- The permanent presence of the pipeline will only lead to minor localised changes in water levels due to embedded mitigation (permeable pipeline bedding material to allow groundwater to pass around the pipeline, use of clay stanks to ensure pipeline does not

provide a longitudinal preferential flow path). Further investigation is needed to identify where groundwater levels are likely to be intersect with the pipeline, calculate whether the pipeline could form a barrier to groundwater flow (and potential to increase flood risk), and identify additional mitigation if required.

- Several chalk rivers cross these waterbodies and flow could be reduced temporarily in these watercourses due to construction of the scheme.

Table 4.6: WFD Level 2 assessment summary

No	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
1	GB106039030334	Thames, Evenlode to Thame	Medium	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Further information about how the option will be operated	No	No	0	Fish and eel screening at new intake Minimisation of changes to hydrological regime through adjustment of abstraction conditions. Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	0
2	GB106039023220	Lambourn, Source to Newbury	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of dewatering on flow in the watercourses, and potential influence on SSSIs Further information about option crossing	No	No	1	Any dewatering needed for the construction will be discharged to the river to help maintain flow.	1

No	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
					of the River Lambourn.					
3	GB106039023174	Middle Kennet, Hungerford to Newbury	Low	Medium	<p>Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme</p> <p>Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses</p> <p>Further information about option crossing of the River Lambourn.</p>	No	No	1	<p>Any dewatering needed for the construction will be discharged to the river to help maintain flow</p> <p>If shafts needed for river crossing these should be located outside of the SSSI/SAC boundary, where possible.</p> <p>Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.</p>	1
4	GB107042022710	Test, Upper	Low	Medium	<p>Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme</p> <p>Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses</p>	No	No	1	<p>If shafts needed for river crossing these should be located outside of the SSSI boundary, where possible.</p> <p>Assumes crossing of river will be by pipejack or micro tunnel crossings.</p> <p>Provision for de-chlorination of pipeline water when draining down</p>	1

No	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
					Further information about option crossing of the River Test and potential implications on SSSIs.				pipeline before discharge to watercourse.	
5	GB107042022700	Test – Bourne Rivulet to conf Dever	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of dewatering on flow in the watercourses, and potential influence on SSSIs Further information about option crossing of the River Test and potential implications on SSSIs.	No	No	1	If shafts are required for river crossing, these should be located outside of the SSSI boundary, where possible.	1
6	GB107042022770	Dever	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of	No	No	1	If shafts are required for river crossing, these should be located outside of the SSSI boundary, where possible.	1

No	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
					dewatering on flow in the watercourses, and potential influence on SSSIs Further information about option crossing of the River Dever and potential implications on SSSI.					
7	GB40601G600900	Berkshire Downs Chalk	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme Detailed hydrological assessment of the impacts of dewatering on flow in the watercourses Further information about option impacts on SSSI sites.	No	No	1	Dewatering discharge to surface water courses to maintain flow. Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. If shafts are required for river or road crossings these should be sealed to ensure minimal groundwater egress	1

No	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
									after construction, where possible. Dewatering to be discharged to local watercourse to help maintain flow.	
8	GB40701G501200	River Test Chalk	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme A hydroecology study is recommended to identify likely influence of dewatering on groundwater levels and river flow, and a review of potential ecological impacts of these changes. Consideration of where additional mitigation is required including potential use recharge trenches to return water to the ground and minimise the impact of construction.	Uncertain	Uncertain	2	Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. If shafts required for river crossings these should be located outside of the SSSI boundary, where possible. Shafts to be sealed to ensure minimal groundwater egress after construction, where possible.	1

No	Waterbody ID	Waterbody Name	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Deterioration between status classes	Compromises waterbody objectives	Pre mitigation impact score	Suggested mitigation	Potential post mitigation impact score
					Further information about option impacts on SSSI sites.					

4.3 Cumulative effects

The following plans, programmes and projects have been considered within the cumulative effects assessment:

- Other Strategic Resource Options (SROs);
- Other water company schemes;
- Local Development Frameworks;
- Relevant planning applications; and
- NSIP/DCOs (none identified as relevant within the study area).

As such, the following projects or plans have been considered for T2ST WFD cumulative effects assessment:

- SESRO;
- STT;
- Southampton Link Main and Andover Link Main schemes (Southern Water);
- Winchester District Local Plan Part 1 – Joint Core Strategy Policy WT2 - Strategic Housing Allocation – North Winchester;
- Winchester District Local Plan Part 1 – Joint Core Strategy Policy WT3 - Bushfield Camp Employment Site;
- Vale of White Horse District Local Plan 2031 Part 2 Core Policy 15b: Harwell Campus - Harwell Campus Comprehensive Development Framework;
- Test Valley Borough - The land is not currently allocated in the Local Plan but is being promoted for residential development; and
- Vale of White Horse District Council (planning application: P22/V0599/O).

Due to uncertainties in design, planning and operation of the schemes reported in this cumulative assessment, an in-combination assessment of all identified plans, programmes and projects is not appropriate for this stage of assessment and will need to be addressed at future gates and for which additional mitigation may be required. It is expected that a in-combination assessment of SROs will be undertaken at a regional scale by WRSE.

As per the programme assumptions in Section 2.5, the draft WRSE regional plan has determined a need for a T2ST scheme of up to 120Ml/d by 2040-2053 depending on the scenario in the adaptive plan. Therefore, at this stage, it is envisaged the project will not be operational until at least 2040.

It should be noted that the WFD cumulative effects assessment applies to both route corridors B and C and effects are anticipated to be similar. Therefore, the assessment below covers both routes.

Table 4.7 details the likely WFD cumulative effects that may occur for Options B and C.

Examples of cumulative construction effects that were considered include:

- Construction of multiple below ground structures in the same waterbody;
- Construction of river intakes and outfalls in the same waterbody; and
- Construction of new storage reservoir in line with a watercourse.

Examples of cumulative operation effects that were considered include:

- Operation of multiple surface water abstractions in the same waterbody;
- Operation of multiple discharges in the same waterbody; and

- Conveyance of water via a watercourse.

Table 4.7: WFD cumulative effects assessment for Options B and C

Project or plan	Cumulative construction effects	Cumulative operation effects
SESRO	No cumulative construction impacts are anticipated from the combination of SESRO, STT and T2ST.	SESRO or STT is required in order to support flow in the River Thames. Therefore, this assessment on the River Thames waterbody has included potential cumulative impacts of the three schemes as an integral part of the assessment.
STT	SESRO and T2ST are likely to be constructed on a similar programme, therefore construction could take place in the River Thames waterbodies, Cow Common Brook and Portobello Ditch (GB106039023360) and Construction of new below ground structures for T2ST (pipeline installation) and the reservoir construction, watercourse realignments and the new intake installation) associated with SESRO, within the River Thames waterbodies, Cow Common Brook and Portobello Ditch (GB106039023360) and Ginge Brook and Mill Brook (GB106039023660) waterbodies could occur at the same time. The T2ST works within these water bodies are minor and are not expected to lead to an increased risk of deterioration over that already identified in the SESRO WFD assessment.	T2ST relies upon SESRO or STT and thus the River Thames for the source water that is to be transferred. Sourcing water from the Thames is reliant upon available flow volumes and velocities, which are planned to be maintained by either the STT or SESRO option in periods of drought. Therefore, any operational effects are as highlighted in the STT or SERSO assessment. This T2ST WFD assessment assesses the additional operational impact on the River Thames as an intrinsic part of the scheme. No additional cumulative operational effects have been identified.
Southampton Link Main and Andover Link Main schemes (Southern Water)	No cumulative effects arising from construction are anticipated since the timeline for construction of this Southern Water option is prior to the start of construction for T2ST.	To be considered and assessed within the Southern Water WRMP24.
Winchester District Local Plan Part 1 – Joint Core Strategy Policy WT2 - Strategic Housing Allocation – North Winchester	This housing allocation has not been considered in the WFD cumulative assessment due to the nature of construction activities associated with development and the planning conditions that would need to be met; both of which are anticipated to minimise impact on water environment.	
Winchester District Local Plan Part 1 – Joint Core Strategy Policy WT3 - Bushfield Camp Employment Site	This employment site has not been considered in the WFD cumulative assessment due to the nature of construction activities associated with development and the planning conditions that would need to be met; both of which are anticipated to minimise impact on water environment.	
Vale of White Horse District Local Plan 2031 Part 2 Core Policy 15b: Harwell Campus - Harwell Campus Comprehensive Development Framework	Land has been made available at Harwell Campus for research, innovation and economic development to accommodate at least 3,500 net additional jobs. This land is approximately 1km to the east of the proposed route corridors for B and C and within the boundary of the existing campus site. Plans for Harwell expect it to be completed by 2031, therefore, there is a potential overlap if T2ST is constructed in the early 2030s. No cumulative effects are anticipated as the proposed development	No operational cumulative effects are anticipated, as activities associated with development that could impact water environment are anticipated to be construction related only.

Project or plan	Cumulative construction effects	Cumulative operation effects
	framework's assumed below ground construction activity is not anticipated to have an adverse effect on the water environment.	
Test Valley Borough - The land is not currently allocated in the Local Plan but is being promoted for residential development	Land has been allocated for up to 1100 houses, the Strategic Housing and Economic Land Availability Assessment (SHELAA) indicates that if development takes place, it could extend over 15 years. No cumulative effects are anticipated due to the nature of construction activities associated with development and the planning conditions that would need to be met; both of which are anticipated to minimise impact on water environment .	No operational cumulative effects are anticipated, as activities associated with development that could impact water environment are anticipated to be construction related only.
Vale of White Horse District Council (planning application: P22/V0599/O)	No cumulative effects arising from construction are anticipated since the timeline for construction of this planning application is prior to the start of construction for T2ST.	No operational cumulative effects are anticipated, as activities associated with development that could impact water environment are anticipated to be construction related only.

In summary, it has been identified that T2ST has the potential to result in WFD cumulative effects during operation of other SROs (South East Strategic Reservoir Option (SESRO) and Severn to Thames Transfer (STT)), but cumulative effects during construction were unlikely. These effects were identified given the potential for changes in flow and water quality in the River Thames, from SESRO, STT and T2ST. Since T2ST cannot be considered as an option without the use of either SESRO or STT, the in-combination assessment in the River Thames water body is integrated into this assessment. No construction cumulative effects were identified.

T2ST is not identified to have any construction or operational related cumulative effects with other water company schemes, or other projects under Local Development Frameworks and Planning Applications.

5 Summary and next steps

For Option B the Gate 2 Level 1 WFD assessment indicated that 16 out of 24 waterbodies could be screened out as not requiring further assessment.

The Option B Gate 2 Level 2 WFD assessment has been completed for the remaining eight waterbodies that were screened in. The Level 2 assessment considers that the scheme will have a direct impact on WFD supporting conditions as part of the scheme in one waterbody (River Test Chalk). The findings indicate that there are potential WFD compliance risks associated with the operation of the scheme, due to the works taking place adjacent to and potentially within the River Test SSSI & GWDTE and East Aston Common SSSI & GWDTE. Further design detail and mitigation is required to ensure that there is no risk of deterioration to the sites due to the construction of the scheme, and by mitigation such as returning groundwater abstracted during temporary construction dewatering back into the ground to help maintain groundwater levels.

For Option C the Gate 2 Level 1 WFD assessment indicated that 16 out of 24 waterbodies could be screened out as not requiring further assessment.

The Option C Gate 2 Level 2 WFD assessment has been completed for the remaining eight waterbodies that were screened in. The Level 2 assessment considers that the scheme will have a direct impact on WFD supporting conditions as part of the scheme in one waterbody (River Test Chalk). The findings indicate that there are potential WFD compliance risks associated with the operation of the scheme, due to the works taking place adjacent to and potentially within the River Test SSSI & GWDTE, East Aston Common SSSI & GWDTE and Bere Mill Meadows SSSI & GWDTE. Further design detail and mitigation is required to ensure that there is no risk of deterioration to the sites due to the construction of the scheme, and by mitigation such as returning groundwater abstracted during temporary construction dewatering back into the ground to help maintain groundwater levels.

This Water Framework Directive Assessment, undertaken at plan level, finds that if mitigation measures suggested are followed that no adverse, permanent impacts on the water environment will occur as a result of the implementation of Option B and Option C. A distinguishing factor between the two options is the number of crossings of rivers and roads within 500m of sensitive groundwater features (Option C has an additional crossing of the River Test and is located close to an additional GWDTE, Bere Mill Meadows SSSI).

A WFD cumulative effects assessment was undertaken on both route options B and C. The assessment found that cumulative WFD effects were likely during operation from other SROs (South East Strategic Reservoir Option (SESRO) and Severn to Thames Transfer (STT)), but cumulative effects during construction were unlikely. These effects were identified given the potential for changes in flow and water quality in the River Thames, from SESRO, STT and T2ST. Since T2ST cannot be considered as an option without the use of either SESRO or STT, the in-combination assessment in the River Thames water body is integrated into this assessment. No construction cumulative effects were identified. T2ST is not identified to have any construction or operational related cumulative effects with other water company schemes, or other projects under Local Development Frameworks and Planning Applications.

Further WFD assessment will be required beyond Gate 2 and for future planning/consent applications, to improve the confidence and certainty of WFD risks outlined in the Gate 2 WFD Level 2 assessments and to update the assessment as design progresses.

Areas for further assessment include:

- Hydroecological risk assessments into the impact of construction dewatering on groundwater levels, and potential implications on watercourses and GWDTE of Kennet and Lambourn Floodplains SSSI, Kennet Valley Alderwoods SSSI, River Test SSSI, East Aston Common SSSI and Bere Mill Meadows SSSI;
- If dewatering is discharged to surface watercourses to help maintain flow, there is the potential for short term impacts on water quality. Water quality analysis is required to understand the relative quality of groundwater and surface water in these areas and identify the significance of any changes in water quality in the watercourses;
- Detailed hydrological assessment of the impacts of changes in groundwater levels due to construction dewatering on flow in the Chalk streams and GWDTE which it supports;
- Additional groundwater investigation to understand groundwater levels across the route and how they interact with the pipeline during operation of the scheme. Further investigation should consider where groundwater levels are likely to be intersect with the pipeline, calculation of whether the pipeline could form a barrier to groundwater flow (and potential to increase flood risk), and identification of additional mitigation if required; and
- Consideration of pipejack or micro tunnel crossings for the more sensitive ordinary watercourses.

Proposed mitigation measures for reducing option impact have also been included as part of the WFD assessment (as set out in Table 4.3 and Table 4.6) and the implementation of this mitigation will determine the overall WFD assessment result. Mitigation measures should also include standard best practice dewatering methods and standard best practice water pollution control measures. Consideration of mitigation measures will be subject to further developments in the optioneering for the routes.

A. Level 1 output sheets

Table A.2: Option B Level 1 Summary

Impacted Waterbody ID	Impacted Waterbody Name	Waterbody type	Overall waterbody Classification	Overall waterbody Objective	Number of activities assessed	Count of activities scoring major benefit score (-2)	Count of activities scoring minor benefit score (-1)	Count of activities scoring minimal impact score (0)	Count of activities scoring minor local impact score (1)	Count of activities scoring medium impact score (2)	Count of activities scoring high impact score (3)	Level 1 max score	Level 1 mean score	Carry through to level 2 assessment?
GB106039030334	Thames (Evenlode to Thame)	River	Moderate in 2015	Moderate by 2015	10	0	0	3	6	0	1	3	0.90	YES
GB106039023360	Cow Common Brook and Portobello Ditch	River	Poor in 2015	Good by 2027	8	0	0	3	5	0	0	1	0.63	NO
GB106039023660	Ginge Brook and Mill Brook	River	Moderate in 2015	Moderate by 2015	6	0	0	1	5	0	0	1	0.83	NO
GB106039023600	Mill Brook and Bradfords Brook system, Wallingford	River	Poor in 2015	Good by 2027	4	0	0	2	2	0	0	1	0.50	NO
GB106039023300	Pang	River	Good in 2015	Good by 2015	8	0	0	4	4	0	0	1	0.50	NO
GB106039023210	Winterbourne	River	Moderate in 2015	Good by 2027	6	0	0	2	4	0	0	1	0.67	NO
GB106039023220	Lambourn (Source to Newbury)	River	Moderate in 2015	Good by 2027	8	0	0	1	5	2	0	2	1.13	YES
GB106039023174	Middle Kennet (Hungerford to Newbury)	River	Moderate in 2015	Good by 2021	8	0	0	1	5	2	0	2	1.13	YES
GB106039017280	Enborne (Source to downstream A34)	River	Moderate in 2015	Good by 2027	8	0	0	3	5	0	0	1	0.63	NO
GB106039017210	Penwood Stream	River	Moderate in 2015	Good by 2027	6	0	0	2	4	0	0	1	0.67	NO
GB107042022710	Test (Upper)	River	Good in 2015	Good by 2015	8	0	0	4	4	0	0	1	0.50	NO
GB107042022720	Bourne Rivulet	River	Moderate in 2015	Good by 2027	6	0	0	1	5	0	0	1	0.83	NO
GB107042022700	Test - Bourne Rivulet to conf Dever	River	Good in 2015	Good by 2015	10	0	0	3	5	2	0	2	0.90	YES
GB107042022810	Anton - Upper	River	Good in 2015	Good by 2015	6	0	0	4	2	0	0	1	0.33	NO
GB107042022770	Dever	River	Good in 2015	Good by 2015	8	0	0	1	5	2	0	2	1.13	YES
GB107042022740	Sombourne Stream	River	Good in 2015	Good by 2015	6	0	0	2	4	0	0	1	0.67	NO
GB107042022730	Nun's Walk Stream	River	Moderate in 2015	Good by 2021	8	0	0	4	4	0	0	1	0.50	NO
GB107042016310	Monks Brook	River	Moderate in 2015	Good by 2027	6	0	0	2	4	0	0	1	0.67	NO
GB107042022580	Itchen	River	Good in 2015	Good by 2015	7	0	0	4	3	0	0	1	0.43	NO
GB40601G601000	Vale of White Horse Chalk	GroundWater	Poor in 2015	Poor in 2015	8	0	0	4	4	0	0	1	0.50	NO
GB40601G600900	Berkshire Downs Chalk	GroundWater	Poor in 2015	Poor in 2015	11	0	0	4	5	2	0	2	0.82	YES
GB40602G601600	Thatcham Tertiaries	GroundWater	Good in 2015	Good in 2015	8	0	0	2	4	2	0	2	1.00	YES
GB40701G501200	River Test Chalk	GroundWater	Poor in 2015	Poor in 2015	11	0	0	4	5	2	0	2	0.82	YES
GB40701G505000	River Itchen Chalk	GroundWater	Poor in 2015	Poor in 2015	8	0	0	4	4	0	0	1	0.50	NO

Table 4.0: Option 1 Level 1 Assessment

Component	Activity	Construction, Operation or Decommissioning	Assumptions / Mitigations assumed to be in place	Comments	Score	Threats (Excluded or Present)	Low Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority	High Common Mode and High Priority		
						Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present	Excluded or Present
Management	Completion of taskbook and content.	Construction	None	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Radio ground	Construction of radio ground structures (shielding with wall associated building - see table 4.0.1 - see also table 4.0.1)	Construction	Shielding will be achieved for radio ground structures and associated buildings to reduce radiation levels as far as is reasonably practicable.	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Radio ground	Presence of non-essential structures (building/shielding wall with antenna ground plane) within 10m of antenna ground plane	Operation	Plasma heating system will be used for the majority of the time during the mission. This will ensure that the radiation levels are kept as low as reasonably practicable.	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Radio ground	Construction of radio ground structures (shielding with wall associated building - see table 4.0.1 - see also table 4.0.1)	Construction	Shielding will be achieved for radio ground structures and associated buildings to reduce radiation levels as far as is reasonably practicable.	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Radio ground	Presence of non-essential structures (building/shielding wall with antenna ground plane) within 10m of antenna ground plane	Operation	Plasma heating system will be used for the majority of the time during the mission. This will ensure that the radiation levels are kept as low as reasonably practicable.	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Management	Completion of taskbook and content.	Construction	None	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Radio ground	Construction of radio ground structures (shielding with wall associated building - see table 4.0.1 - see also table 4.0.1)	Construction	Shielding will be achieved for radio ground structures and associated buildings to reduce radiation levels as far as is reasonably practicable.	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Radio ground	Presence of non-essential structures (building/shielding wall with antenna ground plane) within 10m of antenna ground plane	Operation	Plasma heating system will be used for the majority of the time during the mission. This will ensure that the radiation levels are kept as low as reasonably practicable.	None	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Level 1 Assessment	Level 2 Assessment	Level 3 Assessment
High	High	High
Medium	Medium	Medium
Low	Low	Low

The maximum impact score for each activity is determined by the activity, together with any mitigation measures assumed to be in place. Any activities that require a Level 2 assessment will be identified in this table, and the data will be provided.



Table A.2: Option C Level 1 summary

Option	Impacted Waterbody ID	Impacted Waterbody Name	Waterbody type	Overall waterbody Classification	Overall waterbody Objective	Number of activities assessed	Count of activities scoring major benefit score (-2)	Count of activities scoring minor benefit score (-1)	Count of activities scoring minimal impact score (0)	Count of activities scoring minor local impact score (1)	Count of activities scoring medium impact score (2)	Count of activities scoring high impact score (3)	Level 1 max score	Level 1 mean score	Carry through to level 2 assessment?
	GB106039030334	Thames (Evenlode to Thame)	River	Moderate in 2015	Moderate by 2015	11	0	0	4	6	0	1	3	0.82	YES
	GB106039023360	Cow Common Brook and Portobello Ditch	River	Poor in 2015	Good by 2027	9	0	0	3	6	0	0	1	0.67	NO
	GB106039023660	Ginge Brook and Mill Brook	River	Moderate in 2015	Moderate by 2015	6	0	0	1	5	0	0	1	0.83	NO
	GB106039023600	Mill Brook and Bradfords Brook system, Wallingford	River	Poor in 2015	Good by 2027	4	0	0	2	2	0	0	1	0.50	NO
	GB106039023300	Pang	River	Good in 2015	Good by 2015	9	0	0	4	5	0	0	1	0.56	NO
	GB106039023210	Winterbourne	River	Moderate in 2015	Good by 2027	6	0	0	2	4	0	0	1	0.67	NO
	GB106039023220	Lambourn (Source to Newbury)	River	Moderate in 2015	Good by 2027	8	0	0	1	5	2	0	2	1.13	YES
	GB106039023174	Middle Kennet (Hungerford to Newbury)	River	Moderate in 2015	Good by 2021	8	0	0	1	5	2	0	2	1.13	YES
	GB106039017280	Enborne (Source to downstream A34)	River	Moderate in 2015	Good by 2027	9	0	0	3	6	0	0	1	0.67	NO
	GB106039017210	Penwood Stream	River	Moderate in 2015	Good by 2027	6	0	0	2	4	0	0	1	0.67	NO
	GB106039017310	Enborne (downstream A34 to Burghclere Brook)	River	Moderate in 2015	Moderate by 2015	6	0	0	2	4	0	0	1	0.67	NO
	GB106039017230	Earlstone Stream and Burghclere Brook (source to Enborne)	River	Poor in 2015	Good by 2027	4	0	0	2	2	0	0	1	0.50	NO
	GB107042022710	Test (Upper)	River	Good in 2015	Good by 2015	12	0	0	4	6	2	0	2	0.83	YES
	GB107042022700	Test - Bourne Rivulet to conf Dever	River	Good in 2015	Good by 2015	11	0	0	3	6	2	0	2	0.91	YES
	GB107042022770	Dever	River	Good in 2015	Good by 2015	8	0	0	1	5	2	0	2	1.13	YES
	GB107042022740	Sombourne Stream	River	Good in 2015	Good by 2015	6	0	0	2	4	0	0	1	0.67	NO
	GB107042022730	Nun's Walk Stream	River	Moderate in 2015	Good by 2021	8	0	0	4	4	0	0	1	0.50	NO
	GB107042016310	Monks Brook	River	Moderate in 2015	Good by 2027	6	0	0	2	4	0	0	1	0.67	NO
	GB107042022580	Itchen	River	Good in 2015	Good by 2015	7	0	0	4	3	0	0	1	0.43	NO
	GB40601G601000	Vale of White Horse Chalk	GroundWaterBody	Poor in 2015	Poor in 2015	9	0	0	4	5	0	0	1	0.56	NO
	GB40601G600900	Berkshire Downs Chalk	GroundWaterBody	Poor in 2015	Poor in 2015	12	0	0	4	6	2	0	2	0.83	YES
	GB40602G601600	Thatcham Tertiaries	GroundWaterBody	Good in 2015	Good in 2015	6	0	0	2	4	0	0	1	0.67	NO
	GB40701G501200	River Test Chalk	GroundWaterBody	Poor in 2015	Poor in 2015	12	0	0	4	6	2	0	2	0.83	YES
	GB40701G505000	River Itchen Chalk	GroundWaterBody	Poor in 2015	Poor in 2015	8	0	0	4	4	0	0	1	0.50	NO

B. Level 2 output sheets

Waterbody ID	Level 2 sheet created?	Waterbody Name	Maximum Level 2 Impact score	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Mitigation measures	Post mitigation impact score	Deterioration between status classes	Impediments to Good Ecological Status (GES) or Good Ecological Potential (GEP)	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030334	TRUE	Thames (Evenlode to Thame)	0	Medium	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Further information about how the option will be operated	Fish and eel screening at new intake Minimisation of changes to hydrological regime through adjustment of abstraction conditions. Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	0	No	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB106039023220	TRUE	Lambourn (Source to Newbury)	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary dewatering abstraction on flow in the watercourses, and potential influence on SSSIs, with focus on impacts on biology Further information about option.	Any dewatering needed for the construction will be discharged to the river to help maintain flow If shafts needed for river crossing these should be located outside of the SSSI/SAC Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB106039023174	TRUE	Middle Kennet (Hungerford to Newbury)	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses Further information about option crossing of the River Lambourn.	Any dewatering needed for the construction will be discharged to the river to help maintain flow If shafts needed for river crossing these should be located outside of the SSSI/SAC Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022700	TRUE	Test - Bourne Rivulet to conf Dever	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses, and potential influence on SSSIs Further information about option.	If shafts needed for river crossing these should be located outside of the SSSI Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022770	TRUE	Dever	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses, and potential influence on SSSIs Further information about option.	If shafts needed for river crossing these should be located outside of the SSSI Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB406016600900	TRUE	Berkshire Downs Chalk	1	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses Further information about option.	Dewatering discharge to surface water courses to maintain flow. Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. Shafts to be sealed to ensure minimal groundwater egress after construction Dewatering to be discharged to local watercourse to help maintain flow	1	No	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB407016501200	TRUE	River Test Chalk	2	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme. Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses Further information about option.	Further investigation into impact on groundwater levels of dewatering for construction and consideration of requirement to return water to the ground (through recharge trenches) to help minimise the impact of construction, if required. Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. If shafts needed for river crossing these should be located outside of the SSSI Shafts to be sealed to ensure minimal groundwater egress after construction	1	Uncertain	No	Uncertain	No	Assumed major river crossings will be carried out using HDD or pipejacking Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB406026601600	TRUE	Thatcham Tertiaries	1	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme Further information about option.	Dewatering discharge to surface water courses to maintain flow. Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater.	1	No	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows

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Option	TST Option 8	Go to the table at bottom of the page
Waterbody ID	GB106039023220	
Waterbody name	Lambourn (Source to Newbury)	
Waterbody type	River	
Hydromorphological designation	Not Designated A/NMWB	
Overall status	Moderate	
Overall status objective	Good by 2027	

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact score	Data confidence	Design certainty	Does the component comply with WFD objectives (post mitigation)			Mitigation applied	Post mitigation impact score	Activity					New or increased surface water abstraction					
								Degradation between status classes	Impediment to GES/GEF	Compromises water body objectives			Construction, Operation or Decommissioning activity	Below ground structures (shaft/retaining wall) with associated dewatering	Maintenance of pipe lines (including draining pipeline)	New pipe lines involving watercourse crossings with no in channel modifications							
Biological quality elements	Fish		Moderate in 2015	Good by 2021	1	Low	Medium	No	No	No	1	Change in water quality due to discharge of groundwater to a surface water body	Changes in flow velocity and volume (increase or decrease)	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Noise and vibration	Change in water quality due to new or changes to existing discharge of surface water into surface water body	Change in INNS present in surface water body	Changes in sedimentation deposition	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream			
	Invertebrates	Guidance document available	High in 2015	Good by 2015	1	Low	Medium	No	No	No	1	Any dewatering needed for the construction will be discharged to the river to help maintain flow If shafts needed for river crossing these should be located outside of the SSSI	Short term variations in temperature possible, however, this is short term and will be small volumes compared to river flow, therefore impact expected to be negligible	Dewatering is assumed to be discharged into River Lambourn in low quantities to help maintain flow in the river. However, the River Lambourn (which is a SSSI and SAC in its own right) crossing occurs within 500m downstream (440m) of the Kennet and Lambourn Floodplain SSSI which is also classified as a GNDTS. As this forms part of the riparian zone of the river, any dewatering during construction of the below ground structures (shafts) for the crossing of the river, could impact on the flow and velocity in the river, and the morphology, between the site and the shafts (downstream). This could lead to temporary localised changes in flow velocity and volume that could have a minor temporary impact on fish and biology associated with river and associated floodplain.	Draining of pipelines for maintenance reasons is likely to lead to no measurable impacts to biology, due to its infrequent and short term nature	Possibility of INNS transfer during draining operations, but this is a potable water pipeline and it is assumed that INNS would be removed during the treatment process	Localised changes to sediment deposition patterns expected to have minimal effect on biology at waterbody scale as a result of localised changes to sedimentation. Minimal effect on biology	New pipelines and associated below ground structures unlikely to have significant risk on the hydromorphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation. Minimal effect on biology					
	Macrophytes and Phytobenthos Combined	Calculator available	Moderate in 2015	Good by 2027	1	Low	Medium	No	No	No	1	Short term variations in temperature possible, however, this is short term and will be small volumes compared to river flow, therefore impact expected to be negligible	Minor changes in flow due to dewatering for the crossing of the river. Any dewatering will be discharged into the watercourse to help maintain flow, but there could be minor localised temporary impacts on flow and velocity during the construction period	Minor changes in flow due to discharge of water from pipelines for draining will be minor and short term, and not significant at a waterbody scale	Draining of pipelines for maintenance reasons is likely to lead to no measurable impacts to sedimentation, due to its infrequent and short term nature	Localised changes to sediment deposition patterns expected to have minimal effect on biology at waterbody scale as a result of localised changes to sedimentation. Minimal effect on biology	New pipelines and associated below ground structures unlikely to have significant risk on the hydromorphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation. Minimal effect on biology						
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	High by 2027	1	Low	Medium	No	No	No	1								Localised changes to sediment deposition patterns expected to have minimal effect at waterbody scale as a result of localised changes to sedimentation	New pipelines and associated below ground structures unlikely to have significant risk on the hydromorphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation			
	Morphology		Supports Good in 2015	No data available	1	Low	Medium	No	No	No	1	Changes in flow and velocity as a result of new crossing assumed to have minimal impact on river morphology							Localised changes to sediment deposition patterns expected to have minimal effect at waterbody scale as a result of localised changes to sedimentation	New pipelines and associated below ground structures unlikely to have significant risk on the hydromorphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation			
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	High by 2015	1	Low	Medium	No	No	No	1												
	Dissolved oxygen	Numerical limits for classes	Good in 2015	High by 2015	1	Low	Medium	No	No	No	1												
	pH		High in 2015	Good by 2015	1	Low	Medium	No	No	No	1												
	Phosphate	Calculator available	Good in 2015	High by 2027	1	Low	Medium	No	No	No	1												
	Temperature	Numerical limits for classes	High in 2015	Good by 2015	1	Low	Medium	No	No	No	1	Short term changes to water quality possible which may lead to temporary changes in water quality parameters. Further assessment is required to determine the impact.											
Priority hazardous substances	Cadmium and its Compounds	EQS directive	Good in 2015	Good	1	Low	Medium	No	No	No	1												
	Lead and its Compounds	EQS directive	Good in 2015	Good	1	Low	Medium	No	No	No	1												
Priority substances	Nickel and its Compounds	EQS directive	Good in 2015	Good	1	Low	Medium	No	No	No	1												
	Copper		High in 2015	High	1	Low	Medium	No	No	No	1												
Other chemicals	Zinc		High in 2015	High	1	Low	Medium	No	No	No	1												

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RNAG/PoM/NMWB	id	Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Semi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme? (Y/N/No)	Impact score assessment	Data confidence	Design certainty	Does the component comply with WFD objectives			Mitigation applied	Post mitigation impact score (2 to 3)	Below ground structures (shaft/retaining wall) with associated dewatering	New or increased surface water abstraction					
									Assists attainment of water body objectives	Impediment to GES/GEF	Compromises water body objectives									
Reasons for Not Achieving Good (R)		486491 Phosphate	Agriculture and rural land management	Pollution from rural areas	No															
Reasons for Not Achieving Good (R)		486493 Phosphate	Agriculture and rural land management	Pollution from rural areas	No															
Reasons for Not Achieving Good (R)		486492 Phosphate	Water Industry	Pollution from waste water	No															
Reasons for Not Achieving Good (R)		478976 Mitigation Measures Assessment	Local and Central Government	Physical modifications	No															
Reasons for Not Achieving Good (R)		520064 Total Phosphorus	No sector responsible		No															
Reasons for Not Achieving Good (R)		520072 Phyttoplankton	No sector responsible		No															

Note: Merge columns if activity appears multiple times

Option	T2/T3 Option B	Go to RNAG/PeM table at bottom of the page
Waterbody ID	GB106039023174	
Waterbody name	Middle Kennet (Hungerford to Newbury)	
Waterbody type	River	
Hydro-morphological designation	Not Designated A/NMWB	
Overall status	Moderate	
Overall status objective	Good by 2021	

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact score	Data confidence	Design certainty	Does the component comply with WFD objectives (post mitigation)			Mitigation applied	Permitting/impact score	Comment on the impact of 'Below ground structures (shaft/retaining wall) with associated dewatering' on each element	Comment on the impact of 'Below ground structures (shaft/retaining wall) with associated dewatering' on each element	Comment on the impact of 'Maintenance of pipe lines (including draining pipeline)' on each element	Comment on the impact of 'Maintenance of pipe lines (including draining pipeline)' on each element	Comment on the impact of 'Maintenance of pipe lines (including draining pipeline)' on each element	Comment on the impact of 'Maintenance of pipe lines (including draining pipeline)' on each element	Comment on the impact of 'Maintenance of pipe lines (including draining pipeline)' on each element	Comment on the impact of 'New pipe lines involving watercourse crossings with no in-channel modifications' on each element	Comment on the impact of 'New pipe lines involving watercourse crossings with no in-channel modifications' on each element	
								Assists attainment of water body objectives	Impediment to GES/GEF	Complies water body objectives												
Biological quality elements	Fish		Moderate in 2015	Good by 2021	1	Low	Medium	No	No	No	1	Short term variations in temperature possible, however, this is short term and will be small volumes compared to river flow, therefore impact expected to be negligible.	Dewatering is assumed to be discharged into River Kennet in low quantities to help maintain flow in the river. However, the River Kennet (which is a SSSI in its own right) crossing occurs within 500m downstream (450m) of the Kennet valley Alderwood SSSI and a section of the Kennet valley Alderwood SSSI and a section of the Kennet valley Alderwood SSSI which are also classified as GWDTS. Any dewatering during construction of the below ground structures (such as shafts) for the crossing of the river, could impact on groundwater levels and the flow and velocity in the river, and the morphology, between the site and the shafts (downstream). This could lead to temporary localised changes in flow velocity and volume that could have a minor temporary impact on fish and biology associated with river and associated floodplain.	Draining of pipelines for maintenance reasons is likely to lead to no measurable impacts to biology, due to its infrequent and short term nature					Possibility of INGS transfer during draining operation, but this is a potable water pipeline and it is assumed that INGS would be removed during the treatment process	Localised changes to sediment deposition patterns expected to have minimal effect on biology at waterbody scale as a result of new watercourse crossings	New pipelines and associated below ground structures unlikely to have significant risk on the hydro-morphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation. Minimal effect on biology	
	Invertebrates	Guidance document available	High in 2015	Good by 2015	1	Low	Medium	No	No	No	1	Any dewatering needed for the construction will be discharged to the river to help maintain flow									Localised changes to sediment deposition patterns expected to have minimal effect on biology at waterbody scale as a result of new watercourse crossings	New pipelines and associated below ground structures unlikely to have significant risk on the hydro-morphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation. Minimal effect on biology
	Macrophytes and Phyto-benthos Combined	Calculator available	Moderate in 2014	No data available	1	Low	Medium	No	No	No	1	Short term variations in temperature possible, however, this is short term and will be small volumes compared to river flow, therefore impact expected to be negligible.									Localised changes to sediment deposition patterns expected to have minimal effect on biology at waterbody scale as a result of new watercourse crossings	New pipelines and associated below ground structures unlikely to have significant risk on the hydro-morphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation. Minimal effect on biology
Hydro-morphological Supporting Elements	Hydrological Regime		Does Not Support Good in 2015	Supports Good by 2021	1	Low	Medium	No	No	No	1	Minor changes in flow due to dewatering for the crossing of the river. Any dewatering will be discharged into the watercourse to help maintain flow, but there could be minor localised temporary impacts on flow and velocity during the construction period	Minor changes in flow due to discharge of water from pipelines for draining will be minor and short term, and not significant at a waterbody scale.								Localised changes to sediment deposition patterns expected to have minimal effect at waterbody scale as a result of new watercourse crossings	New pipelines and associated below ground structures unlikely to have significant risk on the hydro-morphology of the river / WB but potential for localised short term variations in morphology as a result of localised changes to sedimentation
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	High by 2015	1	Low	Medium	No	No	No	1											
	Dissolved oxygen	Numerical limits for classes	Good in 2015	High by 2015	1	Low	Medium	No	No	No	1											
	pH		High in 2015	Good by 2015	1	Low	Medium	No	No	No	1											
	Phosphate	Calculator available	Good in 2015	High by 2027	1	Low	Medium	No	No	No	1	Short term changes to water quality possible which may lead to temporary changes in water quality parameters. Further assessment is required to determine the impact.										
	Temperature	Numerical limits for classes	High in 2015	Good by 2015	1	Low	Medium	No	No	No	1											
	Iron		High in 2015	High	1	Low	Medium	No	No	No	1											
	Triclosan		High in 2015	High	1	Low	Medium	No	No	No	1											

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RNAG/PeM/HRM/WM	id	Relevant WFD Quality Element (RNAG) / Measure category 1 (PeM)	Category (RNAG)/Lead organisation (PeM)	National Semi Header (RNAG) / Title (PeM)	Is this measure potential impacted by the scheme? (Yes/No)	Impact score assessment	Data confidence	Design certainty	Does the component comply with WFD objectives			Mitigation applied	Post mitigation impact score (1-2 to 5)
									Assists attainment of water body objectives	Impediment to GES/GEF	Complies water body objectives		
Reasons for Not Achieving Good (RNAG)		S31450	Macrophytes and Phyto-benthos Combined	Water Industry	Population from waste water	No							
Reasons for Not Achieving Good (RNAG)		S31451	Macrophytes and Phyto-benthos Combined	Agriculture and rural land management	Population from rural areas	No							

Option	T25T Option 8	Go to RNAG/PoM table at bottom of the page
Waterbody ID	GB107042022770	
Waterbody name	Dever	
Waterbody type	River	
Hydromorphological designation	Not Designated A/HMWB	
Overall status	Good	
Overall status objective	Good by 2015	

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact score	Data confidence	Design certainty	Does the component comply with WFD objectives (post mitigation)			Mitigation applied	Post mitigation impact score	Comment of the impact of 'Change in water quality due to discharge of groundwater to a surface water body' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Noise and vibration' on each element	Comment of the impact of 'Change in water quality due to new or changes to existing discharge of surface water into surface water body' on each element	Comment of the impact of 'Change in INNS present in surface water body' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream' on each element
								Identification between status classes	Impediments to GES/GEF	Compromises water body objectives											
Biological quality elements	Invertebrates	Guidance document available	High in 2015	Good by 2015	1	Low	Medium	No	No	No	1	If shafts needed for river crossing these should be located outside of the SSSI	Short term variations in temperature possible, however, this is short term and will be small volumes compared to river flow, therefore impact expected to be negligible	Dewatering is assumed to be discharged into River Dever in low quantities to help maintain flow in the river. However, the River Dever crossing occurs within the River Test SSSI which is also designated as a GWOTE. Loss of habitat will be considered in the HRA assessment. If relevant, any dewatering during construction of the below ground structures (shafts) for the crossing of the river, could impact on the flow and velocity in the river, and the morphology, between the site and the shafts (downstream). This could lead to temporary localised changes in flow velocity and volume that could have a minor temporary impact on fish and biology associated with river and associated floodplain. Further investigation needed to understand potential impacts	Draining of pipelines for maintenance reasons is likely to lead to no measurable impacts to biology, as pipeline contains potable water	Possibility of INNS transfer during draining operation, but this is a potable water pipeline and it is assumed that INNS would be removed during the treatment process	Watercourse crossing will be beneath the river (HDD or pipejacking) therefore no change in sedimentation expected	New pipelines and associated below ground structures unlikely to have significant risk on the hydromorphology of the river / WB as they will pass beneath the river and shafts likely to be set back from the watercourse.			
	Macrophytes and Phytobenthos Combined	Calculator available	Good in 2015	Good by 2015	1	Low	Medium	No	No	No	1	If shafts needed for river crossing these should be located outside of the SSSI									
Hydromorphological Supporting Elements	Hydrological Regime		Supports Good in 2015	Supports Good by 2015	1	Low	Medium	No	No	No	1		Short term temporary impacts on flow and velocity from dewatering for the construction of below ground works for the river crossing. Assumed dewatering discharged to river to help maintain flow but a temporary localised reduction in flow and velocity possible upstream of the discharge point.	Minor changes in flow due to discharge of water from pipelines for draining will be minor and short term, and not significant at a waterbody scale.							
	Morphology		Supports Good in 2015	No data available	1	Low	Medium	No	No	No	1		No impact anticipated on morphology								
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	High by 2015	1	Low	Medium	No	No	No	1		Short term changes to water quality possible which may lead to changes in water quality parameters. Further assessment is required to determine this change								
	Dissolved oxygen	Numerical limits for classes	High in 2015	High by 2015	1	Low	Medium	No	No	No	1										
	pH		High in 2015	Good by 2015	1	Low	Medium	No	No	No	1										
	Phosphate	Calculator available	High in 2015	High by 2015	1	Low	Medium	No	No	No	1										
	Temperature	Numerical limits for classes	High in 2015	Good by 2015	1	Low	Medium	No	No	No	1										
Priority substances	Benzene	EQS directive	Good in 2015	Good	0	Low	Medium	No	No	No	0		No impact anticipated on priority substances or specific pollutants								
	Lead and its Compounds	EQS directive	Good in 2015	Good	0	Low	Medium	No	No	No	0										
	Nickel and its Compounds	EQS directive	Good in 2015	Good	0	Low	Medium	No	No	No	0										
Specific pollutants	Copper		High in 2015	High	0	Low	Medium	No	No	No	0										
	Iron		High in 2015	High	0	Low	Medium	No	No	No	0										
	Toluene		High in 2015	High	0	Low	Medium	No	No	No	0										

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RNAG/PoM/HRMM	id	Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Swmi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme?	Impact score assessment	Data confidence	Design certainty	Does the component comply with WFD objectives			Mitigation applied	Post mitigation impact score (2 to 3)
									Assists attainment of water body objectives	Impediment to GES/GEF	Compromises water body objectives		
None													

Note: Merge columns if activity appears multiple times

Option	T2ST Option B
Waterbody ID	GB40601G600900
Waterbody name	Berkshire Downs Chalk (GW)
Waterbody type	Groundwater body
Overall status	Poor
Overall status objective	Good by 2027

Activity		Below ground structures (shaft/retaining wall) with associated dewatering			
Construction, Operation or Decommissioning		Construction		Operation	
Potential impacts of asset (following consideration of embedded mitigation)		Change in groundwater levels by temporary dewatering	Disturbing or mobilising existing poor quality groundwater by temporary dewatering	Creating or altering of pathways along which existing poor quality groundwater can migrate	Changes in groundwater levels due to presence of shafts and pipeline
Quantitative effects		✓	X	X	✓
Chemical effects		X	✓	✓	X
Mitigation applied	Post mitigation impact score	Comment of the impact of 'Change in groundwater levels by temporary dewatering' on each element	Comment of the impact of 'Disturbing or mobilising existing poor quality groundwater by temporary dewatering' on each element	Comment of the impact of 'Creating or altering of pathways along which existing poor quality groundwater can migrate' on each element	Comment of the impact of 'Changes in groundwater levels due to presence of shafts and pipeline' on each element
	1	Pipeline will cross the River Lambourn and River Kennet which are both fed by the Chalk aquifer. Likely that temporary dewatering will be required for construction of shafts and pipelines beneath the river. Dewatering will lead to reduced groundwater level and in turn reduced river flows. Potential for temporary short term changes to flow in River Lambourn and River Kennet. Dewatering discharge to the rivers to help maintain flow but minor localised change in flow likely upstream of discharge location.			Pipeline crossing the River Lambourn and Kennet will be installed by pipejacking or HDD so no long term impact on groundwater levels expected.
	1	Dewatering discharge to surface water courses to maintain flow. Use of Clay Stanks in pipeline route where groundwater potentially encountered.	Kennet & Lambourn Floodplain SSSI located 440m upstream of the River Lambourn crossing. The Kennet & Lambourn floodplain is primarily marsh and grassland and an environment for a species of whorl snail. As the site is within 500m of the crossing it is assumed there will be localised and temporary changes in groundwater that could impact on the GWDE. The Kennet Valley Alderwoods SAC is located approximately 100m from crossing of River Kennet. Short term temporary impacts on groundwater levels are possible due to dewatering, but are unlikely to impact in the integrity of the site.		Pipeline crossing the River Lambourn and Kennet will be installed by pipejacking or HDD so no long term impact on groundwater levels expected. Where pipeline cross near to the Kennet Valley Alderwoods SAC, if groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on groundwater levels expected.
	0		No measurable change from saline intrusions assumed.		No measurable change from saline intrusions assumed.
	1		Minimal change in water balance assumed, due to short term temporary nature of the works		If groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on water balance expected.
	1		Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where HDD or pipejacking required, shafts may be required. These shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.	
	1	Any shafts to be sealed to ensure minimal groundwater egress after construction			
	1				
	0		No change anticipated	No change anticipated	
	1		Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where HDD or pipejacking required, shafts may be required. These shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.	
	0		Works unlikely to lead to a change in input of pollution to the groundwater		
	0		Works unlikely to lead to a long term change in the trend in this waterbody		Works unlikely to lead to a long term change in the trend in this waterbody

WFD status Component	WFD quality element	Method of checking compliance	WFD Classification	WFD Objective	Impact score	Data confidence	Design certainty	Deterioration between status classes	Impediments to GES/GEF	Compromises water body objectives
Quantitative Status elements	Quantitative Dependent surface water body status	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No
	Quantitative GWDE test	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No
	Quantitative saline intrusion	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No
	Quantitative water balance	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No
Chemical Status elements	Chemical dependent surface water body status	guidance document available	Good	Good by 2027	1	Low	Medium	No	No	No
	Chemical Drinking Water Protected Area	guidance document available	Poor	Good by 2027	1	Low	Medium	No	No	No
	Chemical GWDEs test	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No
	Chemical Saline Intrusion	guidance document available	Good	Good by 2027	0	Low	Medium	No	No	No
	General Chemical Test	guidance document available	Poor	Good by 2015	1	Low	Medium	No	No	No
Supporting elements	Prevent and Limit Objective	guidance document available	-	Good by 2015	0	Low	Medium	No	No	No
	Trend Assessment	guidance document available	Upward trend	Good by 2027	0	Low	Medium	No	No	No

Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Swmi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme? (Yes/No)	Impact score assessment	Data confidence	Design certainty	Does the component comply		Mitigation applied	Post mitigation impact score (-2 to 3)
							Assists attainment of water body objectives	Compromises water body objectives		
Chemical Drinking Water Protected	Agriculture and rural land management	Pollution from rural areas	No							
Trend Assessment	Agriculture and rural land management	Pollution from rural areas	No							
General Chemical Test	Agriculture and rural land management	Pollution from rural areas	No							

Note: Merge columns if activity appears multiple times

Option	T2ST Option B
Waterbody ID	GB40701G501200
Waterbody name	River Test Chalk (GW)
Waterbody type	Ground Waterbody
Overall status	Poor
Overall status objective	Poor by 2015

Activity	Below ground structures (shaft/retaining wall) with associated dewatering		
Construction, Operation or Decommissioning activity	Construction		Operation
Potential impacts of asset (following consideration of embedded mitigation)	Change in groundwater levels by temporary dewatering	Disturbing or mobilising existing poor quality groundwater by temporary dewatering	Changes in groundwater levels due to presence of shafts and pipeline
Quantitative effects	✓	✓	✓
Chemical effects	✓	✓	✓

WFD status Component	WFD quality element	Method of checking compliance	WFD Classification	WFD Objective	Impact score	Data confidence	Design certainty	Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score	Change in groundwater levels by temporary dewatering	Disturbing or mobilising existing poor quality groundwater by temporary dewatering	Creating or altering of pathways along which existing poor quality groundwater can migrate	Changes in groundwater levels due to presence of shafts and pipeline	
Quantitative Status elements	Quantitative Dependent surface water body status	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No	Further investigation into impact on groundwater levels of dewatering for construction and consideration of requirement to return water to the ground (through recharge trenches) to help minimise the impact of construction, if required. Use of Clay Stanks in pipeline route where groundwater potentially encountered. If shafts needed for river crossing these should be located outside of the SSSI	1	Crossing of the Bourne Rivulet, River Test and River Dever occur in this waterbody. Potential for dewatering to lead to short term temporarily reduce groundwater levels and therefore flow in the watercourses. Dewatering discharge to the rivers to help maintain flow but minor localised change in flow likely upstream of discharge location.			Pipeline crossing the River Test and Dever will be installed by pipejacking or HDD so no long term impact on groundwater levels expected.	
	Quantitative GWDTE test	guidance document available	Good	Good by 2015	2	Low	Medium	Uncertain	No	Uncertain		1	Two new river crossings of the River Test and River Dever and a road crossing of the B3048 within 500m of GWDTE's. River Test and River Dever crossing locations are beneath the River Test SSSI GWDTE (and could be partially with the site) and the River Test Crossing also within the East Aston Common SSSI. Dewatering for construction could lead to a reduction in groundwater levels at these sites, and although short term and temporary this could lead to significant temporary effects. There would also be a direct loss of habitat for both crossings as they are within SSSI sites, but this is not considered in this assessment. Drainage from the trench and from the shafts is assumed to be discharged into the river to help maintain flows. The timing of the recharge may be different to the timing of natural groundwater discharge. However, the additional discharge from the extended area of the trenches/shafts. Impacts are currently unclear and further investigation required.			Pipeline crossing the River Test and Dever assumed to be installed by pipejacking or HDD so no long term impact on groundwater levels expected. Where pipeline cross River Test SSSI and East Ashton Common, if groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on groundwater levels expected.	
	Quantitative saline intrusion	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	No measurable change from saline intrusions anticipated.				No measurable change from saline intrusions anticipated.
	Quantitative water balance	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No		1	Overall impact on water balance likely to be minor and temporary with no long term reduction in groundwater flows expected from this works.				If groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on water balance expected.
Chemical Status elements	Chemical dependent surface water body status	guidance document available	Good	Good by 2027	1	Low	Medium	No	No	No	Shafts to be sealed to ensure minimal groundwater egress after construction	1		Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where HDD or pipejacking required, shafts may be required. There shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.		
	Chemical Drinking Water Protected Area	guidance document available	Poor	Good by 2027	1	Low	Medium	No	No	No		1					
	Chemical GWDTEs test	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No		1					
	Chemical Saline Intrusion	guidance document available	Good	Good by 2027	0	Low	Medium	No	No	No		0	No change anticipated.	No change anticipated.			
	General Chemical Test	guidance document available	Poor	Good by 2015	1	Low	Medium	No	No	No		1		Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where HDD or pipejacking required, shafts may be required. There shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.		
Supporting elements	Prevent and Limit Objective	guidance document available	-	Good by 2015	0	Low	Medium	No	No	No	0	0		Works unlikely to lead to a change in input of pollution to the groundwater		Potential changes to chemical status assumed localised and low risk	
	Trend Assessment	guidance document available	Upward trend	Good by 2027	0	Low	Medium	No	No	No	0	0	Potential changes to chemical status assumed localised and low risk			Potential changes to chemical status assumed localised and low risk	

Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Swmi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme? (Yes/No)	Impact score assessment	Data confidence	Design certainty	Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score (-2 to 3)	Change in groundwater levels by temporary dewatering
Trend Assessment	Domestic General Public	Pollution from towns, cities and transport	No									
Trend Assessment	Agriculture and rural land management	Pollution from rural areas	No									
Chemical Drinking Water Protected	Agriculture and rural land management	Pollution from rural areas	No									
General Chemical Test	Agriculture and rural land management	Pollution from rural areas	No									
Quantitative Dependent Surface Water Industry	Water Industry	Changes to the natural flow and levels of water	Yes	0	Low	Medium	No	No	No	Assumed mitigation associated with below ground structures (i.e., Managing aquifer recharge and GW discharge to SW etc. will be in place) Subject to further assessment	0	Temporary dewatering for construction could lead to temporary reductions in flow. However with appropriate mitigation this is not likely to impede measures to improve flow/ water balance
Quantitative Water Balance	Water Industry	Changes to the natural flow and levels of water	Yes	0	Low	Medium	No	No	No		0	

Option	T2ST Option B
Waterbody ID	GB40602G601600
Waterbody name	Thatcham Tertiaries GW
Waterbody type	Ground Waterbody
Overall status	Good
Overall status objective	Good by 2015

Activity	Below ground structures (shaft/retaining wall) with associated dewatering			
Construction, Operation or	Construction		Operation	
Potential Impacts of asset (following consideration of embedded mitigation)	Change in groundwater levels by temporary dewatering	Disturbing or mobilising existing poor quality groundwater by temporary dewatering	Creating or altering of pathways along which existing poor quality groundwater can migrate	Changes in groundwater levels due to presence of shafts and pipeline
Quantitative effects	✓	X	X	✓
Chemical effects	X	✓	✓	X

WFD status Component	WFD quality element	Method of checking compliance	WFD Classification	WFD Objective	Impact score	Data confidence	Design certainty	Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score	Comment of the impact of 'Change in groundwater levels by temporary dewatering' on each element			
Quantitative Status elements	Quantitative Dependent surface water body status	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No	Dewatering discharge to surface water courses to maintain flow. Use of Clay Stanks in pipeline route where groundwater potentially encountered.	1	No major river crossings in the groundwater body. Minor watercourses which are crossed are expected to be constructed using pumps to transfer water while the pipeline is installed on the river bed. Minimal changes in flow expected, and will be temporary and short term and not significant at a waterbody scale.			No major river crossings in the groundwater body. Minor water crossings not expected to lead to changes in groundwater levels
	Quantitative GWDTE test	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	Pipeline will pass within 500m (430m) from the Avery's Pightle SSSI which is a GWDTE. This meadow habitat citation states that the soils are generally poorly drained, seasonally waterlogged loams and clays. No impact is anticipated at this site, from the presence of the pipeline			Pipeline will pass within 500m (430m) from the Avery's Pightle SSSI which is a GWDTE. This meadow habitat citation states that the soils are generally poorly drained, seasonally waterlogged loams and clays. No impact is anticipated at this site, from the presence of the pipeline
	Quantitative saline intrusion	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	No measurable change from saline intrusions given shallow depth of proposed works			No measurable change from saline intrusions given shallow depth of proposed works
	Quantitative water balance	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No		1	Several SPZs extend across this waterbody. However, no measurable change in water balance assumed given shallow depth and temporary nature of proposed works			If groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on groundwater balance expected.
Chemical Status elements	Chemical dependent surface water body status	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	No measurable impact anticipated	No measurable impact anticipated		
	Chemical Drinking Water Protected Area	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	No measurable impact anticipated	No measurable impact anticipated		
	Chemical GWDTEs test	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	No measurable impact anticipated	No measurable impact anticipated		
	Chemical Saline Intrusion	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	No measurable impact anticipated	No measurable impact anticipated		
	General Chemical Test	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	Several SPZs extend across this waterbody. However, no measurable impact anticipated	No measurable impact anticipated		
Supporting elements	Prevent and Limit Objective	guidance document available	Active		0	Low	Medium	No	No	No		0	No measurable impact anticipated	No measurable impact anticipated		
	Trend Assessment	guidance document available	No trend		0	Low	Medium	No	No	No		0	No measurable change anticipated	No measurable impact anticipated		no measurable impact anticipated

Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Swmi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme? (Yes/No)	Impact score assessment	Data confidence	Design certainty	Does the component comply			Mitigation applied	Post mitigation impact score (-2 to 3)
							Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives		
None	None										

Note: Merge columns if activity appears multiple times

Strategic Resource Option surface water assessment for:
Is a groundwater assessment required?

T2ST Option B
Yes

Waterbody ID	Waterbody name	Waterbody type	Maximum Impact score level 1	Maximum Impact score level 2	Maximum post mitigation impact score level 2	Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Assists attainment of water body objectives
GB106039030334	Thames (Evenlode to Thame)	River	3	0	0	No	No	No	No
GB106039023360	Cow Common Brook and Portobello Ditch	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB106039023660	Ginge Brook and Mill Brook	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB106039023600	Mill Brook and Bradfords Brook system, Wallingford	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB106039023300	Pang	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB106039023210	Winterbourne	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB106039023220	Lambourn (Source to Newbury)	River	2	1	1	No	No	No	No
GB106039023174	Middle Kennet (Hungerford to Newbury)	River	2	1	1	No	No	No	No
GB106039017280	Enborne (Source to downstream A34)	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB106039017210	Penwood Stream	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB107042022710	Test (Upper)	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB107042022720	Bourne Rivulet	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB107042022700	Test - Bourne Rivulet to conf Dever	River	2	1	1	No	No	No	No
GB107042022810	Anton - Upper	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB107042022770	Dever	River	2	1	1	No	No	No	No
GB107042022740	Sombourne Stream	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB107042022730	Nun's Walk Stream	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB107042016310	Monks Brook	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB107042022580	Itchen	River	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB40601G601000	Vale of White Horse Chalk	GroundWaterBody	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB40601G600900	Berkshire Downs Chalk	GroundWaterBody	2	1	1	No	No	No	No
GB40602G601600	Thatcham Tertiaries	GroundWaterBody	2	1	1	No	No	No	No
GB40701G501200	River Test Chalk	GroundWaterBody	2	2	1	Uncertain	No	Uncertain	No
GB40701G505000	River Itchen Chalk	GroundWaterBody	1	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required	Level 2 assessment not required
GB40602G601600	Thatcham Tertiaries	GroundWaterBody	2	1	1	No	No	No	No

Option C - Level 2 Summary

Waterbody ID	Level 2 sheet created?	Waterbody Name	Maximum Level 2 Impact score	Confidence in WFD data	Confidence in option design	Requirements to improve confidence	Mitigation measures	Post mitigation impact score	Deterioration between status classes	Impediments to Good Ecological Status (GES) or Good Ecological Potential (GEP)	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030334	TRUE	Thames (Evenlode to Thame)	0	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Further information about how much additional abstraction will be required for the TZST scheme	Fish and eel screening at new intake Minimisation of changes to hydrological regime through adjustment of abstraction conditions. Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	0	No	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB106039023220	TRUE	Lambourn (Source to Newbury)	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option crossing of the River Lambourn.	Any dewatering needed for the construction will be discharged to the river to help maintain flow Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022710	TRUE	Test Upper	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option crossing of the River Test and potential implications on SSSIs.	Ensure below ground shaft for river crossing is outside the SSSI boundary Assumes crossing of river will be by pipejack or micro tunnel crossings Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022700	TRUE	Test - Bourne Rivulet to conf Dever	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option crossing of the River Test and potential implications on SSSIs.	Ensure below ground shaft for river crossing is outside the SSSI boundary Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022770	TRUE	Dever	1	Low	Medium	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option crossing of the River Dever and potential implications on SSSI.	Place shafts for pipejack or micro tunnel crossings outside of the SSSI areas Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	1	No	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB40601G600900	TRUE	Berkshire Downs Chalk	1	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option impacts on SSSI sites.	Dewatering discharge to surface water courses to maintain flow. Use of Clay Stanks in pipeline route where groundwater potentially encountered. Shafts to be sealed to ensure minimal groundwater egress after construction Dewatering to be discharged to local watercourse to help maintain flow	1	No	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB40701G501200	TRUE	River Test Chalk	2	Low	Medium	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme Investigation in potential contaminated land which could be affected by dewatering for river, road or railway crossings. Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option impacts on SSSI sites.	Further investigation into impact on groundwater levels of dewatering for construction and consideration of requirement to return water to the ground (through recharge trenches) to help minimise the impact of construction, if required. Use of Clay Stanks in pipeline route where groundwater potentially encountered. If possible shafts for river crossings should be moved outside of the SSSI sites Shafts to be sealed to ensure minimal groundwater egress after construction	1	Uncertain	No	Uncertain	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows

Option	T2ST Option C	Go to RNAG/PoM table at bottom of the page
Waterbody ID	GB106039030334	
Waterbody name	Thames (Evenlode to Thame)	
Waterbody type	River	
Hydromorphological designation	not designated artificial or heavily modified	
Overall status	Moderate in 2015	
Overall status objective	Moderate by 2015	

Activity	New surface water abstraction			
	New or increased surface water abstraction	New or increased surface water abstraction	New or increased surface water abstraction	New or increased surface water abstraction
Construction, Operation or Decommissioning activity	Operation	Operation	Operation	Operation
Potential impacts of asset (following consideration of embedded mitigation)	Changes to channel footprint	Changes in flow velocity and volume (increase or decrease)	Changes in sedimentation deposition	Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream
Biological Effects	✓	✓	✓	✓
Hydromorphological supporting elements	✓	✓	✓	✓
Physicochemical Effects	✓	✓	✓	✓
Chemical effects	X	X	X	X

WFD status Component	WFD quality element	Method of checking compliance	Classification	Objective	Impact score	Data confidence	Design certainty	Does the component comply with WFD objectives (post mitigation)			Mitigation applied	Post mitigation impact score	Comment of the impact of 'Changes to channel footprint' on each element	Comment of the impact of 'Changes in flow velocity and volume (increase or decrease)' on each element	Comment of the impact of 'Changes in sedimentation deposition' on each element	Comment of the impact of 'Changes to water body hydromorphology leading to changes in river processes and habitats upstream and downstream' on each element
								Deterioration between status classes	Impediments to GES/SEP	Compromises water body objectives						
Biological quality elements	Fish		Moderate in 2015	No Objective	0	Medium	Medium	Possible	No	No	Fish / eels screens included on intake structure to ensure that fish are not drawn into the intake.	0	Source of water for this transfer option is SESRO. Total abstracted volume to supply SESRO reservoir will need to increase in order to supply the water for T2ST. This assessment does not consider the full abstraction or discharges from and to the Thames but will consider the implications of the additional abstraction from the Thames to support T2ST, and any implications to water quality in the reservoir and therefore changes in water quality discharged from SESRO to the Thames due to the T2ST scheme. The full WFD assessment of the SESRO scheme on the Thames waterbody can be found in the SESRO SRO WFD assessment. Additional abstraction from the Thames, during wetter periods of the order of a few additional days is required to support the T2ST scheme. This abstraction will only occur when flows in the Thames are sufficient to support the abstraction. The decrease in flow in watercourse expected to have negligible impacts on biology.			
	Invertebrates	Guidance document available	Moderate in 2015	No Objective	0	Medium	Medium	Possible	No	No		0				
Hydromorphological Supporting Elements	Morphology		Supports Good in 2015	No Objective	0	Medium	Medium	No	No	No		0	No measurable impact expected to the morphology of River Thames			
Physico-chemical quality elements	Ammonia (total as N)		High in 2015	Good by 2015	0	Medium	Medium	No	No	No	None needed	0	Water quality modelling has been carried out in conjunction with the SESRO option (see SESRO WFD assessment for implications on water quality from SESRO scheme). It is possible that the additional abstraction into and discharge from SESRO could lead to a change in the water quality in the reservoir (leading the changes in the impacts on the River Thames when SESRO discharges into the river). The Water quality modelling carried out shows that with the addition of the T2ST scheme there are only minor changes in water quality in the SESRO reservoir and therefore the addition of the T2ST scheme will not change the conclusions of the SESRO WFD assessment on water quality impacts on the River Thames.			
	Biochemical oxygen demand	Numerical limits for classes	High in 2015	Good by 2015	0	Medium	Medium	No	No	No		0				
	Dissolved oxygen	Numerical limits for classes	High in 2015	No Objective	0	Medium	Medium	No	No	No		0				
	pH		High in 2015	No Objective	0	Medium	Medium	No	No	No		0				
Priority hazardous substances	Di(2-ethylhexyl)phthalate	EQS directive	Good in 2015	Good by 2015	0	Medium	Medium	No	No	No	None needed	0				
	Tributyltin Compounds	EQS directive	Fail in 2015	No Objective	0	Medium	Medium	No	No	No	None needed	0				

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RNAG/PoM/HHWMM	id	Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Swmi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme? (Yes/No)	Impact score assessment	Data confidence	Design certainty	Does the component comply with WFD objectives			Mitigation applied	Post mitigation impact score (-2 to 3)	New or increased surface water abstraction
									Assists attainment of water body objectives	Impediment to GES/SEP	Compromises water body objectives			
(RNAG)	527935	Invertebrates	No sector responsible		No									
Reasons for Not Achieving Good (RNAG)	510838	Invertebrates	No sector responsible	Non-native invasive species	No									
Reasons for Not Achieving Good (RNAG)	510914	Phosphate	Water Industry	Pollution from waste water	No									No change to assessment carried out in SESRO WFD assessment.
Reasons for Not Achieving Good (RNAG)	510915	Phosphate	Agriculture and rural land management	Pollution from rural areas	No									
Reasons for Not Achieving Good (RNAG)	528898	Tributyltin Compounds	Water Industry	Pollution from waste water	No									
Reasons for Not Achieving Good (RNAG)	513874	Tributyltin Compounds	Water Industry	Pollution from waste water	No									

Option	T2ST Option C
Waterbody ID	GB40601G600900
Waterbody name	Berkshire Downs Chalk (GW)
Waterbody type	Ground Waterbody
Overall status	Poor
Overall status objective	Good by 2027

Activity	Below ground structures (shaft/retaining wall) with associated dewatering			
	Construction, Operation or	Construction	Operation	
Potential Impacts of asset (following consideration of embedded mitigation)	Change in groundwater levels by temporary dewatering	Disturbing or mobilising existing poor quality groundwater by temporary dewatering	Creating or altering of pathways along which existing poor quality groundwater can migrate	Changes in groundwater levels due to presence of shafts and pipeline
	Quantitative effects	✓	X	✓
Chemical effects	X	✓	✓	X

WFD status Component	WFD quality element	Method of checking compliance	WFD Classification	WFD Objective	Impact score	Data confidence	Design certainty	Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Mitigation applied	Post mitigation impact score	Comment of the impact of 'Change in groundwater levels by temporary dewatering' on each element	Comment of the impact of 'Disturbing or mobilising existing poor quality groundwater by temporary dewatering' on each element	Comment of the impact of 'Creating or altering of pathways along which existing poor quality groundwater can migrate' on each element	Comment of the impact of 'Changes in groundwater levels due to presence of shafts and pipeline' on each element
Quantitative Status elements	Quantitative Dependent surface water body status	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No	Dewatering discharge to surface water courses to maintain flow. Use of Clay Stanks in pipeline route where groundwater potentially encountered.	1	Pipeline will cross the River Lambourn and River Kennet which are both fed by the Chalk aquifer. Likely that temporary dewatering will be required for construction of shafts and pipelines beneath the river. Dewatering will lead to reduced groundwater level and in turn reduced river flows. Potential for temporary short term changes to flow in River Lambourn and River Kennet. Dewatering discharge to the rivers to help maintain flow but minor localised change in flow likely upstream of discharge location.			Pipeline crossing the River Lambourn and Kennet will be installed by pipejack or micro tunnel crossings so no long term impact on groundwater levels expected.
	Quantitative GWDE test	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No		1	Kennet & Lambourn Floodplain SSSI located 440m upstream of the River Lambourn crossing. The Kennet & Lambourn floodplain is primarily marsh and grassland and an environment for a species of whorl snail. As the site is within 500m of the crossing it is assumed there will be localised and temporary changes in groundwater that could impact on the GWDE. The Kennet Valley Alderwoods SAC is located approximately 100m from crossing of River Kennet. Short term temporary impacts on groundwater levels are possible due to dewatering, but are unlikely to impact in the integrity of the site.			Pipeline crossing the River Lambourn and Kennet will be installed by pipejack or micro tunnel crossings so no long term impact on groundwater levels expected. Where pipeline cross near to the Kennet Valley Alderwoods SAC, if groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on groundwater levels expected.
	Quantitative saline intrusion	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No		0	No measurable change from saline intrusions assumed.			No measurable change from saline intrusions assumed.
	Quantitative water balance	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No		1	Minimal change in water balance assumed, due to short term temporary nature of the works			If groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on water balance expected.
Chemical Status elements	Chemical dependent surface water body status	guidance document available	Good	Good by 2027	1	Low	Medium	No	No	No	Shafts to be sealed to ensure minimal groundwater egress after construction	1		Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where pipejack or micro tunnel crossings required, shafts may be required. There shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.	
	Chemical Drinking Water Protected Area	guidance document available	Poor	Good by 2027	1	Low	Medium	No	No	No		1				
	Chemical GWDEs test	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No		1				
	Chemical Saline Intrusion	guidance document available	Good	Good by 2027	0	Low	Medium	No	No	No		0	No change anticipated	No change anticipated		
	General Chemical Test	guidance document available	Poor	Good by 2015	1	Low	Medium	No	No	No		1	Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where pipejack or micro tunnel crossings required, shafts may be required. There shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.		
Supporting elements	Prevent and Limit Objective	guidance document available	-	Good by 2015	0	Low	Medium	No	No	No	0		Works unlikely to lead to a change in input of pollution to the groundwater			
	Trend Assessment	guidance document available	Upward trend	Good by 2027	0	Low	Medium	No	No	No	0	Works unlikely to lead to a long term change in the trend in this waterbody				Works unlikely to lead to a long term change in the trend in this waterbody

Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Swmi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme? (Yes/No)	Impact score assessment	Data confidence	Design certainty	Does the component comply			Mitigation applied	Post mitigation impact score (-2 to 3)
							Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives		
Chemical Drinking Water Protected Area	Agriculture and rural land management	Pollution from rural areas	No								
Trend Assessment	Agriculture and rural land management	Pollution from rural areas	No								
General Chemical Test	Agriculture and rural land management	Pollution from rural areas	No								

Note: Merge columns if activity appears multiple times

Option	T2ST Option C
Waterbody ID	GB40701G501200
Waterbody name	River Test Chalk (GW)
Waterbody type	Ground Waterbody
Overall status	Poor
Overall status objective	Poor by 2015

WFD status Component	WFD quality element	Method of checking compliance	WFD Classification	WFD Objective	Impact score	Data confidence	Design certainty	Deterioration between status classes	Impediments to GES/GEP	Compromises water body objectives	Activity		Below ground structures (shaft/retaining wall) with associated dewatering			
											Mitigation applied	Post mitigation impact score	Construction, Operation or	Construction	Operation	Operation
												Change in groundwater levels by temporary dewatering	Disturbing or mobilising existing poor quality groundwater by temporary dewatering	Creating or altering of pathways along which existing poor quality groundwater can migrate	Changes in groundwater levels due to presence of shafts and pipeline	
												Quantitative effects	✓	✓	✓	✓
												Chemical effects	X	✓	✓	X
													Comment of the impact of 'Change in groundwater levels by temporary dewatering' on each element	Comment of the impact of 'Disturbing or mobilising existing poor quality groundwater by temporary dewatering' on each element	Comment of the impact of 'Creating or altering of pathways along which existing poor quality groundwater can migrate' on each element	Comment of the impact of 'Changes in groundwater levels due to presence of shafts and pipeline' on each element
Quantitative Status elements	Quantitative Dependent surface water body status	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No	Further investigation into impact on groundwater levels of dewatering for construction and consideration of requirement to return water to the ground (through recharge trenches) to help minimise the impact of construction, if required.	1	Crossing of the River Test and River Dever occur in this waterbody. Potential for dewatering to lead to short term temporarily reduce groundwater levels and therefore flow in the watercourses. Dewatering discharge to the rivers to help maintain flow but minor localised change in flow likely upstream of discharge location.			Pipeline crossing the River Test (2 off) and Dever will be installed by pipejack or micro tunnel crossings so no long term impact on groundwater levels expected.
	Quantitative GWDE test	guidance document available	Good	Good by 2015	2	Low	Medium	Uncertain	No	Uncertain	Use of Clay Stanks in pipeline route where groundwater potentially encountered.	1	Two new river crossings of the River Test, 1 river crossing of the River Dever and a road crossing of the B400 within 500m of GWDE's. River Test and River Dever crossing locations are beneath the River Test SSSI GWDE (and could be partially with the site) and the River Test crossings also within the East Aston Common SSSI, and adjacent to Bere Mill Meadows SSSI. Dewatering for construction could lead to a reduction in groundwater levels at these sites, and although short term and temporary this could lead to significant temporary effects. There could also be a direct loss of habitat for both crossings as they are within SSSI sites, but this is not considered in this assessment. Drainage from the trench and from the shafts is assumed to be discharged into the river to help maintain flows. The timing of the recharge may be different to the timing of natural groundwater discharge. Impacts of changes to groundwater levels on SSSIs are currently unclear and further investigation required.			Pipeline crossing the River Test (2 off) and Dever assumed to be installed by pipejack or micro tunnel crossings so no long term impact on groundwater levels expected. Where pipeline cross River Test SSSI, East Aston Common SSSI and Bere Mill Meadows SSSI, if groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on groundwater levels expected.
	Quantitative saline intrusion	guidance document available	Good	Good by 2015	0	Low	Medium	No	No	No	Where possible ensure shafts for pipejack or micro tunnel crossings launch and reception are located outside of the SSSI	0	No measurable change from saline intrusions anticipated.			No measurable change from saline intrusions anticipated.
	Quantitative water balance	guidance document available	Poor	Poor by 2015	1	Low	Medium	No	No	No		1	Overall impact on water balance likely to be minor and temporary with no long term reduction in groundwater flows expected from this works.			If groundwater levels are found to be above the pipe level then pipeline bedding material will ensure no groundwater mounding upgradient of the pipeline and the use of clay stanks within the trench will ensure that the pipeline does not form a preferential pathway for groundwater flow and therefore only minor localised impact on water balance expected.
Chemical Status elements	Chemical dependent surface water body status	guidance document available	Good	Good by 2027	1	Low	Medium	No	No	No	Shafts to be sealed to ensure minimal groundwater egress after construction	1	Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where pipejack or micro tunnel crossings required, shafts may be required. There shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.		
	Chemical Drinking Water Protected Area	guidance document available	Poor	Good by 2027	1	Low	Medium	No	No	No		1				
	Chemical GWDEs test	guidance document available	Good	Good by 2015	1	Low	Medium	No	No	No		0	No change anticipated	No change anticipated		
	Chemical Saline Intrusion	guidance document available	Good	Good by 2027	0	Low	Medium	No	No	No		0				
	General Chemical Test	guidance document available	Poor	Good by 2015	1	Low	Medium	No	No	No		1	Potential for dewatering activities to mobilise existing contaminated groundwater. Risk expected to be minor as dewatering short term and therefore likely to have small radius of influence. Contractors will be expected to investigate potential water quality risks and monitor water quality if required.	Pipeline will be installed in shallow trench and no new pathways likely to be created. Where pipejack or micro tunnel crossings required, shafts may be required. There shafts will be constructed and sealed to ensure they do not form a pathway for surface water flow into the aquifer.		
Supporting elements	Prevent and Limit Objective	guidance document available	-	Good by 2015	0	Low	Medium	No	No	No		0	Works unlikely to lead to a change in input of pollution to the groundwater			
	Trend Assessment	guidance document available	Upward trend	Good by 2027	0	Low	Medium	No	No	No		0	Potential changes to chemical status assumed localised and low risk		Potential changes to chemical status assumed localised and low risk	

Relevant WFD Quality Element (RNAG) / Measure category 1 (PoM)	Category (RNAG)/Lead organisation (PoM)	National Swmi Header (RNAG) / Title (PoM)	Is this measure potential impacted by the scheme? (Yes/No)	Does the component comply						Mitigation applied	Post mitigation impact score (-2 to 3)	Change in groundwater levels by temporary dewatering
				Impact score assessment	Data confidence	Design certainty	Assists attainment of water body objectives	Impediment to GES/GEP	Compromises water body objectives			
Trend Assessment	Domestic General Public	Pollution from towns, cities and transport	No									
Trend Assessment	Agriculture and rural land management	Pollution from rural areas	No									
Chemical Drinking Water Protected	Agriculture and rural land management	Pollution from rural areas	No									
General Chemical Test	Agriculture and rural land management	Pollution from rural areas	No									
Quantitative Dependent Surface W: Water Industry	Water Industry	Changes to the natural flow and levels of water	Yes	0	Low	Medium	No	No	No	Assumed mitigation associated with below ground structures (i.e., Managing aquifer recharge	0	Temporary dewatering for construction could lead to temporary reductions in flow. However with appropriate mitigation this is not likely to impede measures to improve flow/ water balance
Quantitative Water Balance	Water Industry	Changes to the natural flow and levels of water	Yes	0	Low	Medium	No	No	No		0	

