Teddington Direct River Abstraction
EIA Scoping Report
Appendix F WFD Screening

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This document has been produced to support Thames Water's request for an Environmental Impact Assessment (EIA) Scoping Opinion under Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) for the London Water Recycling Teddington Direct River Abstraction. The information presented in this document includes material or data which is still in the course of completion, pending consultation, engagement, further design development and technical assessment as part of the ongoing EIA.

Contents

List of Figures

List of Tables

Acronyms and abbreviations

BOD	Biochemical Oxygen Demand
CoCP	Code of Construction Practice
DCO	Development Consent Order
DRA	Direct River Abstraction
EA	Environment Agency
EU	European Union
EQS	Environmental Quality Standards
EQSD	Environmental Quality Standards Directive
FRAP	flood risk activity permit
INNS	Invasive Non-Native Species
MBBR	moving bed biofilm reactor
Ml/d	Megalitres of Water per Day; noting one megalitre is one million litres
PINS	Planning Inspectorate
RAPID	Regulators' Alliance for Progressing Infrastructure Development
RBMP	River Basin Management Plan
RFD	Reasons for Deterioration
RNAG	Reasons for Not Achieving Good
SAC	Special Area of Conservation
SPA	Special Protection Area
SRO	Strategic Resource Option
STW	Sewage Treatment Works
TDRA	Teddington Direct River Abstraction
TLT	Thames Lee Tunnel
TBM	Tunnel Boring Machine
TTP	tertiary treatment plant
UWWTD	Urban Wastewater Treatment Directive
WFD	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
WRMP	Water Resource Management Plan
ZoI	Zone of Influence

0 Executive Summary

0.1.1 The Teddington Direct River Abstraction (DRA) (hereafter known as Teddington DRA or the Project) has been identified as the preferred option in the Water Resources Management Plan 2024 (WRMP24). The Teddington DRA would comprise a new abstraction site on the River Thames close to Teddington Weir, allowing for abstractions during low flow conditions, thereby providing additional resilience during drought conditions. The Project will help Thames Water achieve resilience to a 1:200-year drought event.

0.1.2 Abstracted water would be transferred into the Thames-Lee Tunnel for conveyance to Thames Water's Lee Valley reservoirs in North London. The operational rate of the intake, when active, is up to 75Ml/d. The intake is not anticipated to be constantly operational. It will most likely operate during low flow periods only to maintain essential water supply to Thames Water customers during times of water stress. When in operation, the modelling undertaken to date has indicated that the Project would typically be used in August through to November. Wastewater from the Mogden Sewage Treatment Works would be treated to a high standard at a new tertiary treatment plant (TTP), which would include the following water quality treatment processes as detailed in Chapter 2 of Environmental Impact Assessment Scoping Report: Ferric sulphate dosing, a moving bed biofilm reactor, Mechanical Cloth Filters and associated backwash and desludging equipment for filter units, proposed within the existing Mogden STW site boundaries and transferred via a new underground tunnel to a point close to and downstream of the abstraction site to compensate for water abstracted from the River Thames. The discharge would be at a rate of up to 75Ml/d when the intake is operational. During non-drought periods, the TTP would operate at a maximum flow of 15Ml/d to maintain biomass in the moving bed biofilm reactor with discharge at the current Mogden STW outfall to the Thames Tideway

0.1.3 The Water Framework Directive is an European Union Directive which was transposed into law in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[1].. The Water Framework Directive aims to protect and enhance the quality of the water environment. It takes a holistic approach to the sustainable management of water by considering the interactions between surface water (including rivers, lakes, transitional and coastal waters), groundwater and aquatic ecosystems. This Water Framework Directive Regulations Screening and Scoping Report aims to identify the relevant Water Framework Directive groundwater and surface waterbodies located in proximity to the Project site and to assess the features identified that could potentially be impacted by the construction, and operation phase of the Project. Given the Project is a drought resilience scheme that comprises an infrastructure Project for the

distribution of public water supply, it is assumed that the asset Project will be operated, within its operational parameters, indefinitely. It is, therefore, proposed to scope decommissioning out of the assessment.

0.1.4 This assessment complies with the Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive. It is noted that this report only covers Stage 1- Water Framework Directive Regulations Screening and Stage 2- Water Framework Directive Regulations Scoping stages and that Stage 3- Water Framework Directive Regulations Impact Assessment will follow as a next step.

0.1.5 A Stage 1 Water Framework Directive Regulations screening assessment has been undertaken to address and identify:

- The extent to which the Project is likely to affect the relevant River Basin Management Plans and waterbodies
- The Zone(s) of Influence based on aspects of the Project that could affect the identified waterbodies
- Any aspects of the Project that have been screened out and why

0.1.6 From this, the following waterbodies have been identified, and Zone of Influence has been defined within the Thames River Basin District.

- Crane (ID: GB106039023030)
- Lower Duke of Northumberland's River Water Body (ID: GB806100095)
- Thames (Egham to Teddington) (ID: GB106039023232)
- Thames Upper (ID: GB530603911403)
- Lockwood Reservoir (ID: GB30641865)
- Banbury Reservoir (ID: GB30647003)
- High Maynard Reservoir (ID: GB30641884)
- Lower Thames Gravels Water Body (ID: GB40603G000300)

0.1.7 The Water Framework Directive Regulations screening aspects have been reviewed in two groups, namely construction and commissioning activities and Project operation. Some aspects of construction and commissioning activities are Water Framework Directive Regulations compliant (i.e., not requiring additional management or mitigation), some require management through within the Code of Construction Practice or similar documents, and others are compliant through mitigation, which may be required by the Environment Agency through permitting process requirements or the Water Industry Act 1991 or through the Development Consent Order process. The scheme operation aspects are assessed in two different ways: hydrological impacts and water quality impacts.

0.1.8 Stage 2 Water Framework Directive Regulations scoping identifies the risks from the Teddington DRA to Water Framework Directive Regulations receptors (within the Zone of Influence[2]) based on the relevant waterbodies and their water quality elements. It also identifies those waterbodies where a more detailed impact assessment is required at Stage 3. In line with the

requirements of the WFD Regulations the following WFD waterbodies are identified as requiring further assessment in Stage 3 of the WFD process.

- Thames (Egham to Teddington) (ID: GB106039023232)
- Thames Upper (ID: GB530603911403)
- Lockwood Reservoir (ID: GB30641865)
- Banbury Reservoir (ID: GB30647003)
- High Maynard Reservoir (ID: GB30641884)
- Lower Thames Gravels Ground Water Body (ID: GB40603G000300)

F. WFD Screening

F.1 Introduction

Background and Purpose of Report

F.1.1 The Water Framework Directive, as transposed into Regulations in England and Wales (see section F.1.4 below) aims to protect and enhance the quality of the water environment. It takes a holistic approach to the sustainable management of water by considering the interactions between surface water (including rivers, lakes, transitional and coastal waters), groundwater and aquatic ecosystems. This Water Framework Directive Regulations Screening and Scoping aims to identify the relevant Water Framework Directive Regulations groundwater and surface waterbodies located in proximity to the Project and to assess the Water Framework Directive Regulations features identified that could potentially be impacted by the construction and operation phase of the Project. Given the Project is a drought-resilience scheme that comprises an infrastructure Project for the distribution of public water supply, it is assumed that the asset Project will be operated within its operational parameters indefinitely. It is, therefore, proposed to scope decommissioning out of the assessment.

F.1.2 The overall aims and objectives of the Water Framework Directive are to:

- Enhance the status and prevent further deterioration of surface waterbodies, groundwaterbodies and their ecosystems
- Ensure progressive reduction of groundwater pollution
- Reduce pollution of water, especially by Priority Substances and Certain Other Pollutants (Annex II, Environmental Quality Standards (EQS) Directive (2008/105/EC) as amended)
- Contribute to mitigating the effects of floods and droughts
- Achieve at least Good surface water status for all surface waterbodies and Good chemical status in groundwaterbodies by 2015 (Article 4, Water Framework Directive (2000/60/EC)) (or Good ecological potential in the case of artificial or heavily modified waterbodies)
- Promote sustainable water use

F.1.3 This report only includes Stage 1- Water Framework Directive Regulations Screening and Stage 2- Scoping assessments considering the Water Framework Directive Regulations[3] and the Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive[4]. .The next step is the preparation of the Stage 3- Water Framework Directive Regulations Assessment.

Teddington Direct River Abstraction

F.1.4 The Teddington Direct River Abstraction (DRA) (hereafter known as Teddington DRA or the Project) is the preferred option in the Water Resources Management Plan 2024 (WRMP24).

F.1.5 To ensure a secure and sustainable water supply for future generations, Thames Water, alongside many other water companies in England, is required to invest in new sources of water. The southeast of England gets the majority of its potable water supply from groundwater. However, the region has a large and growing population and receives comparatively little rainfall in comparison with other regions, so it is considered water-stressed.

F.1.6 Ofwat recognised this following the submission of the Water Resource Management Plans 2019 (WRMP19), and subsequently, funding was provided for water companies to investigate and then develop Strategic Resource Options (SROs) that will benefit customers and wider society and help to protect and enhance the environment.

F.1.7 The National Framework for Water Resources plans for England's future water needs and sets out actions required to ensure resilient water supplies. It is reported that if no action is taken between 2025 and 2050, approximately an extra 3,435 million litres of water per day will be required in England by 2050 to address future pressures. To ensure future needs are met, a number of SROs have been developed and investigated by Water Companies and Ofwat. The Teddington DRA is a source identified to bring direct deployable output benefits to Thames Water and deliver a resilient supply of water to the London Water Resource Zone.

F.1.8 The Teddington DRA Project was classified as a Nationally Significant Infrastructure Project in December 2023 through a Section 35 application to Defra and will follow the Development Consent Order route for planning (Planning Act, 2008[5]).

F.1.9 The Project components for the Water Framework Directive Regulations assessment, including tunnels and shaft locations and waterbodies under consideration, can be seen in Figure F.1.

Project Overview

F.1.10 The Project is a drought resilience scheme that would provide additional water capacity to London during certain conditions. The Project would operate intermittently and would only supply up to the maximum 75Ml/d when required. Modelling scenarios have indicated that the Project would typically operate during low flow periods in the River Thames and on average once in every two years, primarily between the months of August to November.

F.1.11 The Project involves a new abstraction site on the River Thames close to Teddington Weir. The abstracted water would be transferred to Lockwood Pumping Station, part of Thames Water's Lee Valley reservoirs in North London, and replaced by recycled water from the new tertiary treatment plant (TTP) within the existing Mogden sewage treatment works (STW). The Project comprises the following principal components:

- Tertiary treatment facilities to recycle a portion of the final effluent at Mogden STW within a new TTP with an output of up to 75Ml/d of recycled water
- A tunnel conveyance route at 3.5m internal diameter (ID) for the transfer of 75Ml/d of recycled water between the TTP and the outfall discharge infrastructure
- A tunnel boring drive shaft and recycled water interception shaft at Mogden STW
- An intermediate construction shaft
- A tunnelled conveyance route reception shaft and connecting conveyance route to the outfall discharge located on land to the south of Burnell Avenue, Ham
- A new outfall for the discharge up to 75Ml/d recycled water located adjacent to and either within the southern riverbank of the River Thames or within the river close to Teddington Weir
- A new abstraction intake with an abstraction rate of up to 75Ml/d of river water from the River Thames, located adjacent to and within the riverbank of the River Thames upstream of the new outfall discharge
- An abstraction connection shaft and 2.2m ID river water conveyance route connecting to the existing Thames Lee Tunnel (TLT) via a new TLT connection shaft

F.1.12 Abstracted water would be pumped into the nearby TLT for transfer to Lockwood Pumping Station, part of Thames Water's Lee Valley reservoirs in North London. The operational rate of the intake, when active, is up to 75Ml/d. The intake is not anticipated to be constantly operational. It will most likely operate during low flow periods in the River Thames and, on average, once every two years, primarily between August and November. Wastewater from the Mogden STW would be treated to a high standard at a new TTP, which would include the following water quality treatment processes: Ferric sulphate dosing, moving bed biofilm reactor (MBBR), Mechanical Cloth Filters and associated backwash and desludging equipment for filter units, within the existing Mogden STW site boundaries and transferred via a new underground conveyance tunnel to a point close to and downstream of the abstraction site, to compensate for water abstracted from the River Thames. A full description of the Project is provided in Chapter 2 The Project of the EIA Scoping Report This sets out timescales for construction as well as proposed operation and maintenance.

F.1.13 During non-drought periods, the TTP would operate at a maximum flow of 15Ml/d to maintain biomass within the moving bed biofilm reactors with discharge at the current Mogden STW outfall to the Thames Tideway.

F.1.14 The intake site is upstream of Teddington Weir (NGR: TQ17287136) and is positioned upstream of the outfall (sufficient distance away to prevent potential recirculation).

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

F.1.15 The Water Framework Directive is an EU Directive which was transposed into law in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017[6]. As of 31 December 2020, the 2017 Regulations became retained EU law, and the references in the "Water Framework Directive Regulations" to the Water Framework Directive refer to the version of the Directive that was in force at the time when the 2017 Regulations came into force (10 April 2017). Therefore, the principal legal basis is the Water Framework Directive Regulations, which currently mirror the Water Framework Directive. In this report, "WFD" refers to Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 applicable to England and Wales, not the EU Directive.

F.1.16 The WFD provides a framework for managing and improving the water environment in England and Wales. The WFD set an objective to protect, enhance and restore each body of surface water (other than an artificial or heavily modified waterbody) with the aim of achieving good ecological status and good surface water chemical status. They also set an objective to protect, enhance and restore each body of groundwater, and ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater chemical status and good groundwater quantitative status by using their River Basin Management Plans (RBMP) and Programmes of Measures (PoM). The WFD sets out the classifications and standards for use by the Environment Agency (EA) as the competent authority in England. The WFD Regulations also require the EA to identify river basin districts and establish river basin management plans and undertake monitoring. They also set out a framework for establishing environmental objectives for each waterbody, and programmes of measures to meet those objectives.

F.1.17 The WFD assessment of the Teddington DRA has been undertaken in the context of the Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive. The Advice Note outlines the information that the Planning Inspectorate expects an Applicant to include with a Nationally Significant Infrastructure Project application, demonstrating proper consideration of the WFD. The Advice Note also provides guidance on the process to be followed prior to application.

F.1.18 It is noted that WFD compliance is assessed in this report strictly according to the WFD assessment methodology set out in section F.2 which is consistent with the Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive.

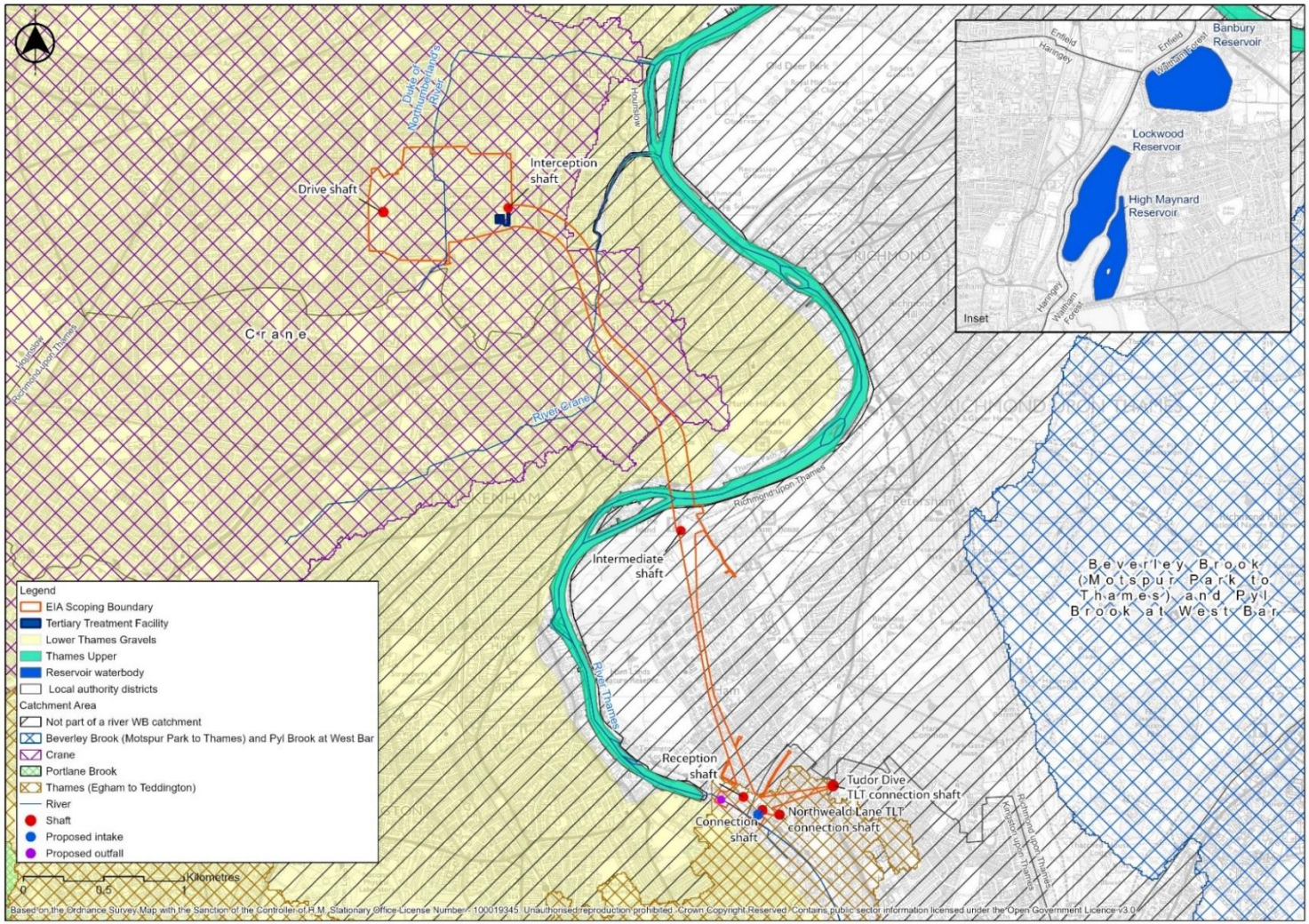

Figure F.1 Project Boundary and WFD-relevant waterbodies

Structure of the Report

F.1.19 This report provides details of the WFD Stage 1 Screening and Stage 2 Scoping, identifying the relevant WFD groundwater and surface waterbodies located in the proximity of the Project and to assess the WFD features identified, which could potentially be impacted by the construction and operation phase of the Project.

F.1.20 The contents of the WFD Screening and Scoping Report are set out in the following structure:

- Section F.1 – Introduction: Sets out the overview, requirements for WFD and the purpose and structure of this report
- Section F.2 – Methodology: Outlines the proposed process applied for this report
- Section F.3 – Stage 1 - WFD Screening: Addresses and identifies relevant WFD waterbodies, Zone of Influence (ZoI) and screening aspects for the Project construction and operation activities
- Section F.4 – Stage 2 - WFD Scoping: Identifies the risks from the Teddington DRA to receptors
- Section F.5 – Conclusions: concludes with a summary of the WFD Screening and Scoping outcomes

Consultation

F.1.21 Consistent with the Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive, the EA is being consulted throughout the Regulators' Alliance for Progressing Infrastructure Development (RAPID) Gated process with respect to WFD compliance assessment. This has included the preparation of a high-level WFD Compliance Assessment Report in Gate 2[7] with review by the EA.

F.2 Methodology

F.2.1 There is no specific or prescribed format or process to follow for WFD assessments of water resources schemes, or for planning in the environment of rivers and lakes. The Planning Inspectorate has published Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive. to alert applicants to the requirements of the WFD for Development Consent Order (DCO) applications. The Advice Note outlines the information that the Planning Inspectorate expects an Applicant to include with a Nationally Significant Infrastructure Project application, demonstrating proper consideration of the WFD. The Advice Note also provides guidance on the process to be followed prior to application.

F.2.2 The EA has produced guidance in relation to estuarine and coastal waters in England (WFD assessment: estuarine and coastal waters[8]) which was also referred to by the Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive. That guidance sets out a three-stage approach described below:

- Stage 1 – WFD screening – to determine if there are any activities associated with the Project that don't require further consideration, for example, activities which have been ongoing since before the current RBMP plan cycle and which have thus formed part of the baseline. This assessment can be found in section F.3 of this report.
- Stage 2 – WFD scoping – to identify risks of the Project's activities to receptors based on the relevant waterbodies and their water quality elements (including information on status, objectives, and the parameters for each waterbody). It has been completed using the scheme design, including embedded mitigation and good construction practice. This assessment can be found in section F.4 of this report.
- Stage 3 – WFD impact assessment – a detailed assessment of waterbodies and their quality elements that are considered likely to be affected by the Project; identification of any areas of non-compliance; consideration of additional mitigation measures, enhancements, and contributions to the RBMP objectives. Where the potential for deterioration of waterbodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, the Project would need to be assessed in the context of WFD Regulation 19.

F.2.3 The Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive guidance notes that an assessment of a Project's compliance with the WFD can be made at any of the outlined stages above. The need for applicants to proceed through all stages depends on the specific circumstances of a Project. From Stages 1 and 2, where pathways are identified or there is sufficient certainty of likely significant effects requiring further consideration, further assessment in Stage 3 would be required. If the assessment shows that the waterbodies might deteriorate or fail to achieve the objectives, and it's not possible to mitigate the impacts, the Project would need to be assessed in the context of Article 4.7 (Regulation 19 of the WFD). Where a derogation under Article 4.7 is needed, applicants must provide the required information to justify their case whilst demonstrating they have sought to avoid deterioration of the waterbody or bodies. The Secretary of State will consider whether the legal tests for derogation under Regulation 19 of the WFD are met for the Project.

F.2.4 The guidance also notes that mitigation relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured. For Stages 1 and 2, mitigation is limited to the embedded mitigation included in the Project's design, such as the TTP.

F.2.5 It is noted that this report only covers Stage 1- WFD Screening and Stage 2- WFD Scoping stages. A Stage 3- WFD Impact Assessment, will be undertaken as a next step and detailed in a separate report.

F.3 Stage 1 - WFD Screening

Stage 1 – WFD Screening Methodology

F.3.1 The format used in this report to determine the proposed Teddington DRA implications for the objectives of the WFD and relevant RBMPs is a Stage 1 WFD Screening approach. The Planning Inspectorate has set out suggested contents of Stage 1 Screening for river waterbodies, and this is adopted as the methodology for the assessment undertaken and reported here:

- Stage 1 – WFD Screening (after Planning Inspectorate Advice on the Water Framework Directive)

F.3.2 In accordance with the guidance, the WFD waterbodies have been identified on a map (Figure F.1). The WFD screening has identified the extent to which the Project is likely to affect the waterbodies (i.e. defining the Project's ZoI). The ZoI is defined as the extent of the surface and groundwater waterbodies. This includes the extent to which potential changes to water flows and water quality are realised. At this stage, the decision to exclude any aspects, and the associated environmental aspect areas relevant to the assessment of effects from further consideration (screening out) have been stated alongside reasoning for their exclusion.

F.3.3 WFD screening addresses and identifies the following:

- Relevant RBMPs and waterbodies
- ZoI based on aspects of the Project that could affect the identified waterbodies
- Any aspects of the Project that have been screened out and why

F.3.4 WFD screening may determine that no further consideration of WFD matters is required, for example, due to the absence of an impact pathway to the WFD waterbodies (i.e. where they do not fall within the Project's ZoI). With regard to the decision to include or exclude aspects, based on the significance of WFD assessment risk, the requirement for Environmental Permits (including Flood Risk Activities: Environmental Permits) through the Environmental Permitting Regulations is also considered.

Relevant RBMPs and Waterbodies

Surface Waterbodies

F.3.5 Further to the Project overview provided in section F.1.3, the Project involves the construction of a new TTP at Mogden STW and the construction of a new 3.5m internal diameter tunnel using a Tunnel Boring Machine (TBM) for transferring treated water into the freshwater River Thames at a new outfall upstream of the tidal limit at Teddington Weir. The Project would also include the construction of a new abstraction intake on a take-put basis from the freshwater River Thames upstream of the new outfall. Abstracted water would be transferred to the nearby TLT for pumping out at Lockwood Pumping Station, part of Thames Water's Lee Valley reservoirs in North London. When the Project's intake is abstracting, the Project reduces the final effluent at the extant Mogden STW outfall to the estuarine Thames Tideway. When the Project's intake is not abstracting, the new TTP would operate at a maximum flow of 15Ml/d to maintain biomass within the moving-bed bioreactors, with discharge at the current Mogden STW outfall to the Thames Tideway.

F.3.6 The Project is in the Thames Lower Operational Catchment (in the Maidenhead and Sunbury Management Catchment). The Maidenhead and Sunbury Management Catchment is in the Thames River Basin District, and the Thames RBMP is applicable.

F.3.7 The locations of the intake, outfall, and pipeline, together with the WFD waterbodies in the local area, are shown in Figure F.1.

F.3.8 The Project TTP at Mogden STW is located in the WFD river waterbody Crane (ID: GB106039023030). The drive shaft is located on the west of the Mogden STW, and the conveyance tunnel passes under the Lower Duke of Northumberland's River Water Body (ID: GB806100095). The Mogden STW current outfall is located in Thames Upper transitional water body (ID: GB530603911403).

F.3.9 A TTP is proposed to be constructed at Mogden STW. Following tertiary treatment, recycled water would be discharged into the same river waterbody a short distance (approximately 150m) downstream of the abstraction prior to the end of that waterbody. The water transfer pipes and shafts are located in Crane, Thames Upper and Thames (Egham to Teddington) waterbody catchment areas, as shown in Figure F.1. The abstraction intake from the freshwater River Thames would match the rate of discharge locally downstream in the WFD river waterbody Thames (Egham to Teddington) (ID: GB106039023232). It is proposed that abstracted water would be taken into the nearby Thames-Lee Tunnel for transfer to three of Thames Water's Lee Valley reservoirs in North London, each of which are artificial lake waterbodies (Lockwood Reservoir ID: GB30641865; Banbury

Reservoir ID: GB30647003; High Maynard Reservoir ID: GB30641884). These waterbodies are in Lee Lower Rivers and Lakes Operational Catchment in the Thames River Basin District, and the Thames RBMP is applicable.

F.3.10 The ZoI with respect to WFD assessment is defined based on aspects of the Project that could affect the identified waterbodies. This reflects the high-level WFD Compliance Assessment Report in Gate 2[9] which the EA was consulted on. Considering this, the identified WFD waterbodies under consideration for the Teddington DRA WFD Screening are:

- Crane (ID: GB106039023030)
- The Lower Duke of Northumberland's River Water Body (ID: GB806100095)
- Thames (Egham to Teddington) (ID: GB106039023232)
- Thames Upper (ID: GB530603911403)
- Lockwood Reservoir (ID: GB30641865)
- Banbury Reservoir (ID: GB30647003)
- High Maynard Reservoir (ID: GB30641884)

Groundwaterbodies

F.3.11 The WFD groundwaterbodies within the Project ZoI with respect to the WFD assessment have been identified using EA Catchment Data Explorer. The Project components are located in the Lower Thames Gravels Water Body (ID: GB40603G000300) catchment area, as shown in Figure F.2. This groundwater body is in the Colne Groundwater Operational Catchment (in the Thames Groundwater Management Catchment). The Thames Groundwater Management Catchment is in the Thames River Basin District, and the Thames RBMP is applicable. This waterbody is also classified as a Drinking Water Protected Area. The identified WFD groundwaterbodies under consideration for the Teddington DRA WFD assessment are shown in Figure F.2.

F.3.12 This is a revision to the high-level WFD Compliance Assessment Report in Gate 2[10] which the EA was consulted on and includes screening in of groundwaterbodies to reflect updates to scheme design, notably the change to a conveyance tunnel.

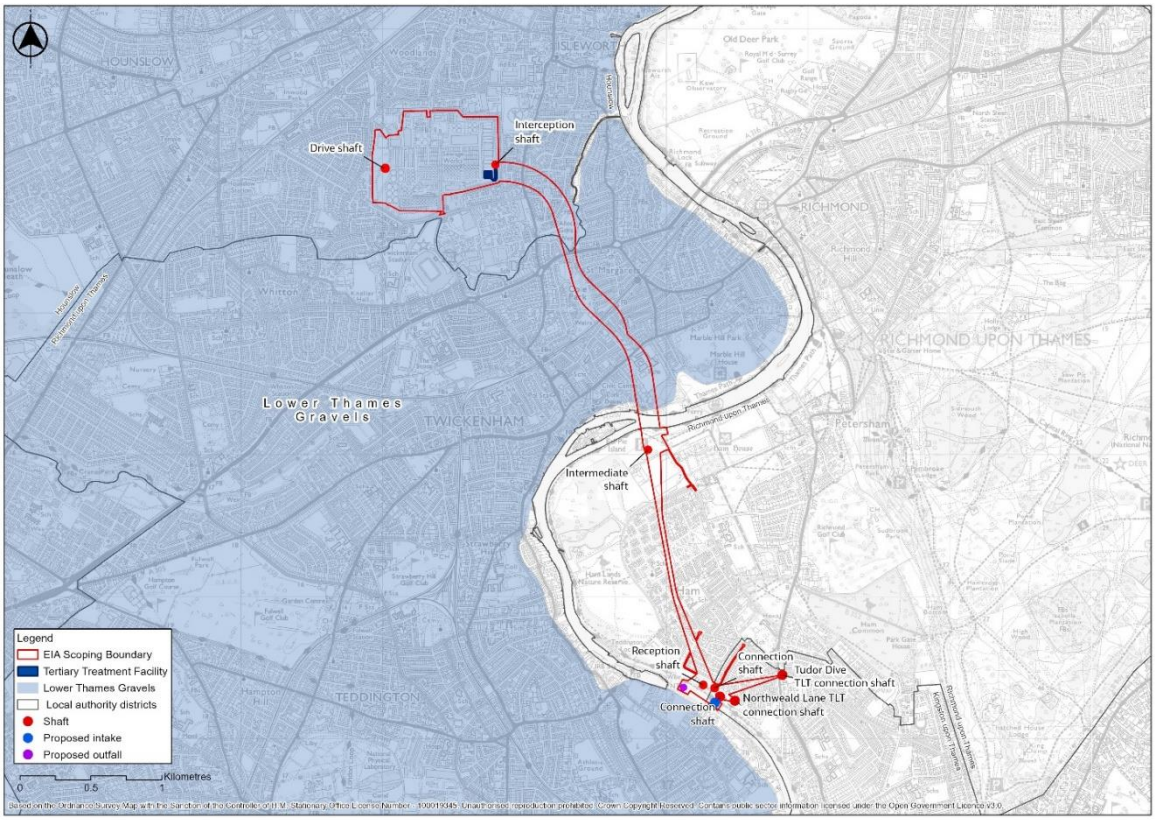

Figure F.2 Project Boundary and WFD groundwater waterbodies

Project ZoI

Construction and commissioning activities

F.3.13 The proposed construction activities have been reviewed, and those considered to have potential pathways resulting in effects on watercourses through construction activities or drainage pathways are listed in Table F.1.

Table F.1 Project`s ZoI[11] from a review of aspects of the Project

Aspects of the Project	Potential pathway of effect	WFD waterbody
Construction of a new TTP at Mogden STW Construction site compounds • Final effluent conveyance • Final effluent pumping station	Construction of a new TTP (set back from a watercourse). Site drainage. Change in water quality due to changes to the existing discharge of surface water into a surface waterbody.	Crane (ID: GB106039023030) The Lower Duke of Northumberland's River Water Body (ID: GB806100095) Thames Upper (ID: GB530603911403)

Aspects of the Project	Potential pathway of effect	WFD waterbody
• Wastewater pumping station. • Chemical store		
Construction site compounds Drive shaft Interception shaft (to become a recycled water interception shaft) Intermediate shaft The recycled water tunnel reception and connection shaft The river water intake connection shaft Northweald Lane TLT connection shaft or Tudor Dive Thames Lee Tunnel connection shaft	Site drainage. Change in water quality due to changes to the existing discharge of surface water into a surface waterbody. Change in water quality due to changes to the existing discharge to ground into groundwater body.	Crane (ID: GB106039023030) The Lower Duke of Northumberland's River Water Body (ID: GB806100095) Thames Upper (ID: GB530603911403) Lower Thames Gravels Water Body (ID: GB40603G000300)
Tunnel construction (transferred in a tunnel)	Tunnel will be installed using TBM.	Crane (ID: GB106039023030) The Lower Duke of Northumberland's River Water Body (ID: GB806100095) Thames Upper (ID: GB530603911403) Thames (Egham to Teddington) (ID: GB106039023232) Lower Thames Gravels Water Body (ID: GB40603G000300)
Tunnel construction (watercourse crossing)	River Thames is being crossed with a tunnel installed using TBM.	Thames Upper (ID: GB530603911403) Lower Thames Gravels Water Body (ID: GB40603G000300)

Aspects of the Project	Potential pathway of effect	WFD waterbody
Construction of below-ground structures (shaft/retaining wall) within 500m of a sensitive groundwater feature Identified WFD ground waterbody (Lower Thames Gravels Water Body) within the Project area, which is a Drinking Water Protection Area.	All proposed below-ground structures (shafts) are located within 500m of a sensitive groundwater feature. Excavated works de-watering. Runoff, including excavated materials following drainage pathways. Natural percolation in permeable ground.	Crane (ID: GB106039023030) Thames Upper (ID: GB530603911403) Thames (Egham to Teddington) (ID: GB106039023232) Lower Thames Gravels Water Body (ID: GB40603G000300)
Tunnel commissioning	Commissioning water discharge.	Thames (Egham to Teddington) (ID: GB106039023232)
Construction of a new outfall structure to a watercourse (River Thames) • Partially buried concrete outfall to River Thames • Discharge ancillary equipment	Construction works on the riverbank and partly in-channel works.	Thames (Egham to Teddington) (ID: GB106039023232)
Construction or modification of a river intake and fish protection screens • River intake structures and screens • River abstraction ancillary equipment	Construction works on the riverbank and partly in-channel works.	Thames (Egham to Teddington) (ID: GB106039023232)

Scheme operation effects

F.3.14 The operation of scheme effects is divided into five groups. The operation ZoI is given as a waterbody scale and is shown in Table F.2. The ZoI is based on aspects of the Project's operation that could affect the identified waterbodies. This includes the extent to which potential changes to water flows and water quality.

Table F.2 Project`s ZoI from a review of aspects of the Project

Aspects of the Project	Potential pathway of effect	WFD waterbody
Treated water discharge	Treated water discharge may result in changes to receiving waterbody and downstream waterbodies: • Flow velocity and volume • Change in sedimentation deposition • Change in river process and habitats • Change in water quality	Thames (Egham to Teddington) (ID: GB106039023232) Thames Upper (ID: GB530603911403)
Water abstraction	Direct water abstraction at Teddington may have impacts on the abstracted waterbody and downstream waterbodies: • Flow velocity and volume • Change in sedimentation deposition • Change in river process and habitats • Change in water quality due to risk of change in dilution	Thames (Egham to Teddington) (ID: GB106039023232) Thames Upper (ID: GB530603911403)
Reduction of existing discharge to a watercourse	Change in hydrodynamics in the estuary Change in sediment Change in wetted habitat	Thames Upper (ID: GB530603911403)

Aspects of the Project	Potential pathway of effect	WFD waterbody
Water discharge impact on Lockwood Reservoir, Banbury Reservoir and High Maynard Reservoir, part of Thames Water's Lee Valley reservoirs in North London	Reservoir water balance regime Reservoir water quality	Lockwood Reservoir (ID: GB30641865) Banbury Reservoir (ID: GB30647003) High Maynard Reservoir (ID: GB30641884)

Baseline Characteristics of Waterbodies

F.3.15 This section establishes the baseline characteristics for each waterbody identified above. This section also describes the current classification status for all elements for each identified waterbody and indicates reasons for not achieving Good status (RNAG) and reasons for deterioration (RFD).

F.3.16 The EA's classification of the status of these waterbodies is the 2019 3rd Cycle RBMP (RBMP3) status classification, as listed online on the EA's Catchment Data Explorer[12], which is summarised in Appendix A. The following section provides a detailed baseline condition assessment for each specific waterbody.

Crane water body (ID: GB106039023030)

F.3.17 It is a river waterbody with a 57.11km^2 catchment area. According to the WFD status classification, biological quality elements (fish, invertebrates, macrophytes, and phytobenthos) were classified as Moderate. Physico-chemical quality elements classification shows Moderate status based on the below quality element status (Appendix A).

- Biochemical Oxygen Demand (BOD) – Moderate
- Dissolved oxygen – Poor
- Phosphate – Poor
- Temperature – Moderate

F.3.18 Specific pollutants are classified as High. Therefore, the ecological status classification falls to Moderate status. The chemical status is Fail due to exceeded EQS elements of priority hazardous substances, which are given below.

- Benzo(g-h-i)perylene
- Perfluorooctane sulphonate (PFOS)
- Polybrominated diphenyl ethers (PBDE)

F.3.19 The reason for not achieving Good status is that the diffuse and point-source pressures from various urban sectors have currently affected the waterbody. In addition, physical modification pressures from urban development, flood protection structures, and barriers have also caused adverse impacts on this waterbody. Impoundment activities also impact the river hydrological regime. There are no protected areas listed within the Crane catchment area. The indicated reason for deterioration is ammonia status deterioration from High to Good status. However, no action is required.

F.3.20 The objective of achieving Good ecological status is 2027 with low confidence, and the objective of Good chemical status is 2063.

Lower Duke of Northumberland's River Water Body

F.3.21 It is a surface water transfer waterbody. According to the WFD status classification, ecological status was classified as Moderate see Appendix A.

F.3.22 The chemical status is Fail due to exceeded EQS elements of priority hazardous substances, which are given below.

- Perfluorooctane sulphonate (PFOS)
- Polybrominated diphenyl ethers (PBDE)

F.3.23 The reason for not achieving Good status is unknown and under investigation due to exceedance limits of Perfluorooctane sulphonate (PFOS) and Polybrominated diphenyl ethers (PBDE). Physical modification is another reason for not achieving Good status.

F.3.24 The objective of achieving Good ecological status is 2027 with low confidence, and the objective of Good chemical status is 2063.

Thames (Egham to Teddington water body (ID: GB106039023232)

F.3.25 It is a river waterbody with a 44.82km^2 catchment area. The waterbody was designated as heavily modified. In line with the WFD status classification, biological quality elements (invertebrates, macrophytes, and phytobenthos combined) were classified as Poor. The physico-chemical quality elements were classified as Moderate due to the moderate status classification of phosphate and temperature. Specific pollutants are classified as High (Appendix A). The chemical status is Fail due to exceeded EQS elements of priority hazardous substances and priority substances, which are given below.

- Perfluorooctane sulphonate (PFOS)
- Polybrominated diphenyl ethers (PBDE)
- Tributyltin Compounds
- Cypermethrin (Priority)

F.3.26 The reason for not achieving Good status is diffuse and point-source pressures from transport drainage, poor nutrient management, and sewage discharge. In addition, physical modifications impact this waterbody. The

determining elements for not achieving Good status are macrophytes and phytobenthos (combined) among biological quality elements; phosphate among physico-chemical quality elements; perfluorooctane sulphonate (PFOS); and polybrominated diphenyl ethers (PBDE). Mitigation measure assessment (supporting element) is also listed.

F.3.27 The objective of achieving Good ecological status is defined as not technically feasible in 2015, and the objective of Good chemical status is 2063.

F.3.28 There are four protected areas within the waterbody catchment, which are listed below. It is noted that the Thames (Egham to Teddington) is a drinking water-protected area.

Table F.3 Protected areas (PA) within the Thames (Egham to Teddington) water body catchment area

PA Name	ID	Directive and Scope of Protection
Lower Thames (Cookham Egham Teddington)	SWSGZ4016	Safeguard Zone (Drinking Water)
South West London Waterbodies	UK9012171	Special Protection Area
South West London Waterbodies	UK11065	Ramsar Site
River Thames	UKENRI17	Urban Waste Water Treatment Directive

Thames Upper Transitional Water Body (ID: GB530603911403)

F.3.29 It is a transitional waterbody with a 3.34km^2 surface area. The waterbody was designated as heavily modified. In line with the WFD status classification, biological quality elements (fish, phytoplankton) are classified as Good. The physico-chemical quality elements were not classified in 2019. Specific pollutants and supporting elements show Moderate status, noting that only Zinc is Moderate. Hydromorphological supporting elements were classified as Supports Good. Therefore, the overall ecological status classification falls in Moderate status (Appendix A).

F.3.30 The chemical status is Fail due to exceeded EQS elements of priority hazardous substances and priority substances, which are given below.

- Benzo(a)pyrene
- Benzo(g-h-i)perylene
- Benzo(k)fluoranthene
- Mercury and Its Compounds
- Polybrominated diphenyl ethers (PBDE)
- Tributyltin Compounds
- Cypermethrin (Priority)

F.3.31 The reason for not achieving Good status is that diffuse and point source pressures from sources of urban development, contaminated sediment, landfill leaching, sewage discharge, and the use of restricted substances (Tributyltin Compounds) have impacted the waterbody. In addition, physical modifications and surface water abstraction are among the pressures seen in this waterbody.

F.3.32 The sources of the chemicals listed below are also unknown and are under investigation.

- Benzo(g-h-i)perylene
- Benzo(k)fluoranthene
- Cypermethrin (Priority)
- Zinc
- Benzo(b)fluoranthene

F.3.33 The indicated reason for deterioration is phytoplankton status deterioration from High to Good status. However, no action is required.

F.3.34 The objective of achieving Good ecological status is 2027 with low confidence, and the objective of Good chemical status is 2063.

F.3.35 The River Wandle (ID: UKENRI157) was identified as a Nutrient Sensitive Area under the Urban Waste Water Treatment Directive under Article 5. The reason for sensitive area designation is eutrophication in rivers.

Lockwood Reservoir Water Body (ID: GB30641865)

F.3.36 It is an artificial lake waterbody with a 108.13km^2 catchment area. According to the WFD status classification, the biological quality element (phytoplankton) is classified as Good. The physico-chemical quality elements were classified as Moderate due to the Bad status of total nitrogen and phosphorus. The status of copper, a specific pollutant, was classified as High status. Supporting elements were classified as Moderate. Therefore, the ecological status classification falls to Moderate status (Appendix A).

F.3.37 Based on the Pass/Fail assessment, the chemical status was Fail due to exceeded EQS elements of priority hazardous substances, which are perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers (PBDE).

F.3.38 The waterbody is not achieving Good status due to the total phosphorus concentration originating from sewage discharge. Perfluorooctane sulphonate (PFOS) was assessed as Fail, and the originating source is under investigation. In addition, physical modification is among the pressures seen in this waterbody.

F.3.39 The objective of achieving Good ecological status is not defined due to disproportionately expensive mitigation measures, and the objective of Good chemical status is 2063.

F.3.40 Lockwood Reservoir, part of Thames Water's Lee Valley reservoirs in North London, waterbody is a drinking water protected area, and there are four protected areas, which are listed below.

Table F.4 Protected areas within Lockwood Reservoir water body catchment area

PA Name	ID	Directive and Scope of Protection
Lee Nitrate Vulnerable Zone	S443	Nitrate Vulnerable Zone (Nitrates Directive)
Lee Valley	UK9012111	Special Protection Area
Lee Valley	UK11034	Ramsar Site
Lee	SWSGZ4006	Safeguard Zone

Banbury Reservoir Water Body (ID: GB30647003)

F.3.41 It is an artificial lake waterbody with a 27.98km^2 surface area. According to the WFD status classification, the ecological status was classified as Moderate (Appendix A).

F.3.42 Based on the Pass/Fail assessment, the chemical status was Fail due to exceeded EQS elements of priority hazardous substances, which are perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers (PBDE).

F.3.43 The waterbody is not achieving Good status due to the perfluorooctane sulphonate (PFOS) was assessed as Fail, and the originating source is under investigation. In addition, physical modification is among the pressures seen in this waterbody.

F.3.44 The objective of achieving Good ecological status is defined in 2027 with low confidence due to disproportionately expensive burdens and the objective of Good chemical status is 2063.

F.3.45 Banbury Reservoir, part of Thames Water's Lee Valley reservoirs in North London, is a drinking water protected area, and there is a protected area, which is Lee NWZ (ID: S443) under the Nitrates Directive.

High Maynard Reservoir Water Body (ID: GB30641884)

F.3.46 It is an artificial lake waterbody with a 0.149km^2 surface area. According to the WFD status classification, the biological quality element (phytoplankton) is classified as Moderate. The physico-chemical quality elements were classified as Moderate due to the Bad status of total nitrogen and phosphorus. Supporting elements were classified as Moderate. Therefore, the ecological status classification falls to Moderate status (Appendix A).

F.3.47 Based on the Pass/Fail assessment, the chemical status was Fail due to exceeded EQS elements of priority hazardous substances, which are perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers (PBDE).

F.3.48 The waterbody is not achieving Good status due to pressures from diffuse source, point source and physical modification. The perfluorooctane sulphonate (PFOS) was assessed as Fail, and the originating source is under investigation. In addition, physical modification is among the pressures seen in this waterbody.

F.3.49 The objective of achieving Good chemical status is defined in 2063 due to chemical status recovery time and technically infeasible.

F.3.50 Protected areas within the High Maynard Reservoir catchment area are listed below.

Table F.5 Protected areas within High Maynard Reservoir water body catchment area

PA Name	ID	Directive and Scope of Protection
Lee Nitrate Vulnerable Zone	S443	Nitrate Vulnerable Zone (Nitrates Directive)
Lee Valley	UK9012111	Special Protection Area
Lee Valley	UK11034	Ramsar Site
Walthamstow Reservoirs	UKGB30641884	Drinking Water Protected Area

Lower Thames Gravels Water Body (ID: GB40603G000300)

F.3.51 It is a groundwater body with a 269.86km^2 surface area. According to the WFD status classification, quantitative status is classified as Poor due to the quantitative water balance, and chemical status is classified as Good. Based on these, the overall waterbody classification is Poor (Appendix A). The reason for not achieving Good status is continuous sewage discharge.

F.3.52 Lower Thames Gravels waterbody is a drinking water protected area, and there are three protected areas within the waterbody surface area, which are listed below.

Table F.6 Protected areas within High Maynard Reservoir water body catchment area

PA Name	ID	Directive and Scope of Protection
South West London Waterbodies	UK9012171	Special Protection Area
South West London Waterbodies	UK11065	Ramsar Site
Roundmoor Ditch and Boveney Ditch NVZ	S466	Nitrates Directive
South West London Waterbodies	UK9012171	Special Protection Area

WFD Screening Aspects

F.3.53 WFD screening aspects have been reviewed in two groups, namely construction and commissioning activities and scheme operation. Given the Project is a drought-resilience scheme that comprises an infrastructure project for the distribution of public water supply, it is assumed that the asset Project will be operated within its operational parameters indefinitely. It is, therefore, proposed to scope decommissioning out of the assessment.

Construction and commissioning activities

F.3.54 The relevant components of the construction programme and the range of activities have been screened to determine the extent to which the Project is likely to affect the WFD objectives of the waterbodies listed above, as per the WFD screening guidance.

F.3.55 Screening of aspects of the Project against the WFD objectives is shown in Table F.7 also shows the proposed management of potential effects on the relevant waterbodies, and notes that some aspects are WFD compliant, some require management through implementation of a Code of Construction Practice (CoCP) (or similar document), and others are compliant through mitigation, which the EA may require through permitting process requirements or the Water Industry Act 1991 such as Section 166 consent[13].

Table F.7 Screening of aspects of the Project

Item	Aspect of the Project	Potential pathway of effect	WFD Screening
1	Construction of a new TTP at Mogden STW	Storage of hydrocarbons or chemicals -potential losses to the environment	WFD risks will be managed through the environmental permitting regulations.
		Excavated works de-watering	WFD risks will be managed by environmental permitting regulations. An environmental permit to discharge liquid into surface water would be required for discharges other than those which are a short-term, temporary discharge of uncontaminated water, which is wholly or mainly rainwater, from an excavation to surface water (such as pumping water out of excavations on a building site). Such temporary discharges are only allowed on the condition of compliance with all the conditions in the EA's regulatory position statement[14]. A Section 166 consent under the Water Industry Act 1991 may be required from the EA for the discharge. This does not require a WFD Assessment.
		Runoff, including excavated materials following drainage pathways	WFD risks are managed by the implementation of CoCP, which sets out good practice measures for pollution prevention, drainage management, materials storage, and spill clean-up, for example. Pollution prevention guidance from Defra[15] identifies it is for the developer to assess and minimise pollution risk at a site and know how to respond to an incident.
2	Construction site compounds	Site drainage	WFD risks are managed by environmental permitting regulations. Flood risk activity permits (FRAPs) would be required for the temporary in-river works.

Item	Aspect of the Project	Potential pathway of effect	WFD Screening
3	Tunnel construction using TBM (transferred in a tunnel- away from water courses)	Loss of hydraulic fluid into the ground from TBM Cause environmental impacts on soil chemistry. Water flows in the springs, and where the water naturally comes out, it may be decreased due to groundwater discharge from the drainage of the surrounding grounds of the tunnel site.	EA Advice Note 488_10 identifies temporary works (including flow diversion) and service crossings more than 1.5m below the riverbed as not requiring WFD assessment. WFD risks managed by environmental permitting regulations.
4	Tunnel construction using TBM (watercourse crossings)	River Thames is being crossed with a tunnel installed by TBM..	Pathway has no impacts on the WFD related risks. EA Advice Note 488_10 (available on request) identifies temporary works (including flow diversion) and service crossings more than 1.5m below the riverbed as not requiring WFD assessment.
5	Construction of below-ground structures (shaft/retaining wall) within 500m of a sensitive groundwater feature	Excavated works de-watering	WFD risks will be managed by environmental permitting regulations. An environmental permit to discharge liquid into surface water would be required for discharges other than those which are a short-term, temporary discharge of uncontaminated water, which is wholly or mainly rainwater, from an excavation to surface water (such as pumping water out of excavations on a building site). Such temporary discharges are only allowed on the condition of compliance with all the conditions in the EAs regulatory position statement[16].

Item	Aspect of the Project	Potential pathway of effect	WFD Screening
			A Section 166 consent under the Water Industry Act 1991 may be required from the EA for the discharge. This does not require a WFD Assessment.
		Runoff, including excavated materials following drainage pathways	WFD risks will be managed by implementation of CoCP. WFD risks are managed by the implementation of CoCP, which sets out good practice measures for pollution prevention, drainage management, materials storage, and spill clean-up, for example. Pollution prevention guidance from Defra[17] identifies it is for the developer to assess and minimise pollution risk at a site and know how to respond to an incident.
6	Tunnel commissioning	Commissioning water discharge	WFD risks managed by consent / permit. A Section 166 consent under the Water Industry Act 1991 may be required from the EA for the discharge. This does not require a WFD Assessment. Upon consultation, the EA may advise that a bespoke environmental permit[18] to discharge is required. Such a permit would comply with WFD requirements.
7	Construction of a new outfall structure to a watercourse (River Thames)	Deposition of silt or release of another form of suspended material or pollution	WFD risks managed by environmental permitting regulations. Flood risk activities: environmental permits (FRAP) guidance[19] lists the activities that need to apply for permission; Erecting any temporary or permanent structure in, over or under a main river, such as a culvert, outfall, weir, dam, pipe crossing, erosion protection, scaffolding or bridge WFD risks will be managed by WFD assessment for an environmental permit[20]

Item	Aspect of the Project	Potential pathway of effect	WFD Screening
8	Construction or modification of a new pumping station and river intake	Deposition of silt or release of another form of suspended material or pollution	WFD risks managed by environmental permitting regulations. Flood risk activities: environmental permits (FRAP) guidance[21] lists the activities that need to apply for permission; Erecting any temporary or permanent structure in, over or under a main river, such as a culvert, outfall, weir, dam, pipe crossing, erosion protection, scaffolding or bridge WFD risks will be managed by WFD assessment for an environmental permit[22]

Scheme operation effects

F.3.56 The Project operation effects are assessed in two different ways: hydrological impacts and water quality impacts.

Hydrological Impacts

F.3.57 The Project operation would have an impact on the magnitude of flow during operation. The flow change is only between Teddington DRA intake and outfall (Thames Egham to Teddington ID: GB106039023232).

F.3.58 The change in the natural variability of the flow has the potential to impact the river ecology by impacting habitats, sedimentation, erosion and deposition patterns, and water quality. In operation, the abstracted water would supplement water in the Thames-Lee Tunnel abstracted at Thames Water's Hampton intake on the River Thames and collectively provide water into Lockwood Reservoir, Banbury Reservoir and High Maynard Reservoir, part of Thames Water's Lee Valley reservoirs in North London.

Water Quality Impacts

F.3.59 The final effluent from Mogden STW would be subject to further treatment at a new TTP at Mogden STW. The treated water would be transferred by pumping through a new tunnel for discharge into the freshwater River Thames at a new outfall upstream of the tidal limit at Teddington Weir. Therefore, there is some impact expected on water quality due to the discharge of the treated water, including water temperature. These require review against WFD water quality standards.

F.3.60 Abstraction of water through the Project's river intake at Teddington would result in a portion of the water in the TLT being sourced from a different abstraction location on the freshwater River Thames than the current source. The current source is located upstream of Teddington at the existing Hampton intake, and abstraction from the current source to the TLT is likely to continue during operational periods of the Project. Water quality at the two locations on the River Thames is similar and waters from the two sources would be mixed within the TLT and with water already in the three specific Lee Valley Reservoirs at the time of operation. Although there is low risk of environmental effects due to changes in water quality within Lockwood Reservoir, Banbury Reservoir or High Maynard Reservoir these require review against WFD water quality standards.

F.3.61 The water quality in the Upper Thames Tideway is considered likely to improve due to the reduction in the discharge rate from Mogden STW associated with the Project size (75Ml/d).

F.4 Stage 2 - WFD Scoping

Identify the Risks to the Receptors

F.4.1 This section provides an initial assessment to identify the potential risks from the Teddington DRA to receptors (within the ZoI[23]) based on the relevant waterbodies and their water quality elements, as well as identify those waterbodies where a more detailed impact assessment is required. The following receptors have been identified:

- Hydrology
- Hydromorphology
- Biology – Benthic invertebrates, fish, phytoplankton, macrophytes and phytobenthos, macroalgae and angiosperm for transitional and coastal waterbodies)
- Water quality – physico-chemical, specific pollutants (refers pollutants given in the Water Framework Directive (Standards and Classification) Directions (England and Wales) (2015), priority substances (refers chemicals are listed as priority substances and certain other polluting chemicals in the Water Framework Directive (England and Wales) Regulation 2017 and Environmental Quality Standards Directive (EQSD)[24]
- Protected areas
- INNS

Hydrology

F.4.2 The Project would abstract flows from the freshwater River Thames locally upstream of Teddington Weir by 75Ml/d when in use for water resources purposes. Correspondingly, the Project would discharge at the same time and at the same rate approximately 150m downstream.

F.4.3 The flow changes associated with a Teddington DRA scheme would be exclusively within the ~150m reach between the intake and outfall, with no change at Teddington Weir. The Project may have impact on reduction in effluent contribution from Mogden STW to the upper Thames Tideway. The Project may have a minimal impact (<2cm) on the water level during low spring tide conditions between Isleworth and Teddington Weir on account of reduced Mogden STW final effluent during operation of the Project.

F.4.4 Table F.8 summarises the potential risks from the scheme operation to river hydrology and whether further assessment is required.

Table F.8 Potential risks from the scheme operation to hydrology

Activities	Potential Risk Issues	WFD Water Body	Requires Impact Assessment (Yes or No)
Water abstraction impacts	Direct water abstraction from the River Thames above Teddington Weir may decrease the flow between intake and outflow.	Thames (Egham to Teddington) (ID: GB106039023232)	Yes
Discharge of treated water from TTP into River Thames	Treated water will be discharged at the same rate as abstraction at the intake with no flow changes downstream of that point. Local velocity effects at outfall.	Thames (Egham to Teddington) (ID: GB106039023232)	Yes
Reduction of existing discharge to a watercourse	Reduction of the final effluent at the extant Mogden STW outfall to the estuarine Thames Tideway The risk of tidal water level change.	Thames Upper (ID: GB530603911403).	Yes
Transferred water impact on Lee Valley Reservoirs in North London receiving the abstracted water	Increased rate of transfer may result from operation that may alter the residence times in the reservoirs that are typically maintained full.	Lockwood Reservoir (ID: GB30641865 Banbury Reservoir (ID: GB30647003) High Maynard Reservoir (ID: GB30641884).	Yes

Hydromorphology

F.4.5 The risks on hydromorphology have been assessed under two different aspects, quantity and dynamics of water flow and wetted width. The potential risks from the scheme assessed against hydromorphological quality elements and included in the risk assessment are shown in Table F.9.

F.4.6 The Project has the potential to change flow velocity patterns at the outfall and intake locations. The Project also has the potential to impact the flow

regime, which is linked to wetted width, fish pass, and barrier passability. The reduction of the final effluent at the extant Mogden STW outfall to the estuarine Thames Tideway may lead to a change in flow velocity pattern and water level and a change in the intertidal area of exposure and duration of exposure. The following hydromorphology elements are not at risk due to the Project.

F.4.7 For river waterbodies;

- Connection to groundwaterbodies
- River continuity
- Depth and width variation
- Structure and substrate of river bed
- Structure of the riparian zone.

F.4.8 For lake waterbodies;

- Connection to groundwaterbodies
- Structure and substrate of lake bed
- Structure of the lake shore

F.4.9 For transitional waterbodies,

- Morphology of the intertidal zone
- Potential risks from the scheme operation to hydrology

Table F.9 Scheme operation potential risks to biological quality elements

Activities	Potential Risk Issues	WFD Water Body	Requires Impact Assessment (Yes or No)
Water abstraction impacts	Direct water abstraction from River Thames may lead to change in flow velocity pattern, which is associated with hydromorphological quality element of quantity and dynamics of water flow.	Thames (Egham to Teddington) (ID: GB106039023232)	Yes
Discharge of treated recycled water from TTP into River Thames	Treated recycled water discharge may lead to change in flow velocity pattern which is associated with hydromorphological quality element of quantity and dynamics of water flow.	Thames (Egham to Teddington) (ID: GB106039023232)	Yes

Activities	Potential Risk Issues	WFD Water Body	Requires Impact Assessment (Yes or No)
Reduction of existing discharge to a watercourse	Reduction of the final effluent at the extant Mogden STW outfall to the estuarine Thames Tideway may lead to change in flow velocity pattern and water level. Change in intertidal area exposure and duration of exposure.	Thames Upper (ID: GB530603911403).	Yes
Transferred water impact on Lee Valley Reservoirs in North London receiving the abstracted water	Increased rate of transfer may result from operation that may alter the residence times in the reservoirs that are typically maintained full.	Lockwood Reservoir (ID: GB30641865 Banbury Reservoir (ID: GB30647003) High Maynard Reservoir (ID: GB30641884).	Yes

Biological Quality Elements

F.4.10 Biological quality elements relevant to the different categories of surface water are:

- WFD biological quality elements for rivers and lakes are benthic invertebrates, fish, phytoplankton, macrophytes and phytobenthos
- WFD biological quality elements for transitional waters are benthic invertebrates, fish, phytoplankton, macroalgae and angiosperm

F.4.11 There is no coastal waterbody within areas of influence. Therefore, coastal water quality elements are not listed.

F.4.12 The potential risks and issues of the Project activities on biological quality elements have been provided in Table F.10, including whether these require impact assessment.

Table F.10 Scheme operation potential risks to biological quality elements

Activities	Risk/Issues	WFD Quality Elements	WFD Water Body	Requires Impact Assessment (Yes or No)
Water abstraction impacts	Direct water abstraction from River Thames may lead to change in flow velocity pattern. Change in water chemistry (see in Table F.10) Turbidity (light transmittance)	**Fish** Could impact normal fish behaviour like movement, migration or spawning. Fish entrainment / impingement on screens **Invertebrates** If flow velocity change is high, this could impact invertebrate diversity and indicator species. Some water quality parameters can be vital for this, e.g. dissolved oxygen. **Phytoplankton** The taxonomic composition and biomass of phytoplankton can be changed in relation to water depth, flow regime, and water chemistry. Change in turbidity can have impact on the taxonomic composition of phytoplankton. **Macrophytes and phytobenthos** Changes in flow velocity and water chemistry might prevent macrophytes from attaching.	Thames (Egham to Teddington) (ID: GB106039023232)	Yes

Activities	Risk/Issues	WFD Quality Elements	WFD Water Body	Requires Impact Assessment (Yes or No)
Discharge of treated recycled water from TTP into River Thames	Treated recycled water discharge may lead to change in flow velocity pattern. Change in water chemistry (see in Table F.11) Turbidity (light transmittance)	**Fish** Could impact normal fish behaviour like movement, migration or spawning. Fish entrainment / impingement on screens **Invertebrates** If flow velocity change is high, this could impact invertebrate diversity and indicator species. Some water quality parameters can be vital for this, e.g. dissolved oxygen. **Phytoplankton** The taxonomic composition and biomass of phytoplankton can be changed in relation to water depth, flow regime, and water chemistry. Change in turbidity can have impact on the taxonomic composition of phytoplankton. **Macrophytes and phytobenthos** Changes in flow velocity and water chemistry might prevent macrophytes from attaching.	Thames (Egham to Teddington) (ID: GB106039023232)	Yes
Reduction of existing discharge to a watercourse	Reduction of the final effluent at the extant Mogden STW outfall to the estuarine	**Fish** Could impact normal fish behaviour like movement, migration or spawning.	Thames Upper (ID: GB530603911403).	Yes

Activities	Risk/Issues	WFD Quality Elements	WFD Water Body	Requires Impact Assessment (Yes or No)
	Thames Tideway may lead to change in flow velocity pattern and water level. Change in intertidal area exposure and duration of exposure. Change in water chemistry (see in Table F.11) Turbidity (light transmittance)	Fish entrainment / impingement on screens **Invertebrates** If flow velocity change is high, this could impact invertebrate diversity and indicator species. Some water quality parameters can be vital for this, e.g. dissolved oxygen. **Phytoplankton** The taxonomic composition and biomass of phytoplankton can be changed in relation to water depth, flow regime, and water chemistry. Change in turbidity can have impact on the taxonomic composition of phytoplankton. **Macrophytes and phytobenthos** Changes in flow velocity and water chemistry might prevent macrophytes from attaching. **Macroalgae and angiosperm** If the there is significant flow change in baseline condition of freshwater, it may impact water regime in Tideway, which potentially has impacts on macroalgae and angiosperm composition.		

Activities	Risk/Issues	WFD Quality Elements	WFD Water Body	Requires Impact Assessment (Yes or No)
Transferred water impact on Lee Valley Reservoirs in North London receiving the abstracted water	Increased rate of transfer may result from operation that may alter the residence times in the reservoirs that are typically maintained full Change in water chemistry (see in Table F.11**Error! Reference source not found.**) Turbidity (light transmittance)	**Fish** Could impact normal fish behaviour like movement, migration or spawning. Fish entrainment / impingement on screens **Invertebrates** If flow velocity change is high, this could impact invertebrate diversity and indicator species. Some water quality parameters can be vital for this, e.g. dissolved oxygen. **Phytoplankton** The taxonomic composition and biomass of phytoplankton can be changed in relation to water depth, flow regime, and water chemistry. Change in turbidity can have impact on the taxonomic composition of phytoplankton. **Macrophytes and phytobenthos** Changes in flow velocity and water chemistry might prevent macrophytes from attaching.	Lockwood Reservoir (ID: GB30641865 Banbury Reservoir (ID: GB30647003) High Maynard Reservoir (ID: GB30641884).	Yes

Water Quality Elements

F.4.13 Water quality elements include general physico-chemical and WFD and EQSD chemical parameters.

F.4.14 The potential impacts of the Project activities on water quality elements have been provided in Table F.11, including whether they require impact assessment.

F.4.15 Physico-chemical parameters relevant to the different categories of surface water have been listed below.

- Rivers: dissolved oxygen, biochemical oxygen demand, pH, acid neutralising capacity, phosphorus, temperature and ammonia
- Lakes: dissolved oxygen, ammonia, acid neutralising capacity, salinity and phosphorus
- Transitional waters: dissolved oxygen, dissolved inorganic nitrogen

Table F.11 Scheme operational potential risks to water quality elements

Activities	Risk/Issues	WFD Quality Elements	WFD Water Body	Requires Impact Assessment (Yes or No)
Water abstraction impacts	Direct water abstraction from River Thames may lead to change in water chemistry and dilution rate in river depending on the magnitude of the intake. Change in water chemistry	**Physicochemical** The Project might have an impact on general water chemistry. **Specific pollutants** The Project might have an impact on specific pollutants. **Priority substances** The Project might have an impact on priority substances.	Thames (Egham to Teddington) (ID: GB106039023232)	Yes
Discharge of treated recycled water from TTP into River Thames	Treated recycled water discharge will not have an adverse impact on water chemistry due to application of advanced treatment processes. However, discharge water temperature might have an impact on river temperature depending on the magnitude of the discharge.	**Temperature** River temperature might be impacted.	Thames (Egham to Teddington) (ID: GB106039023232) Thames Upper (ID: GB530603911403)	Yes

Activities	Risk/Issues	WFD Quality Elements	WFD Water Body	Requires Impact Assessment (Yes or No)
Reduction of existing discharge to a watercourse	Reduction of the final effluent at the extant Mogden STW outfall to the estuarine Thames Tideway may lead to change in water chemistry. The total load discharged in Mogden STW final effluent would reduce.	There is a potential risk of change in the discharge load of general physico-chemical parameters, specific pollutants and priority substances. This impact is likely to be beneficial. There is a potential risk of reduction in thermal uplift. This impact is likely to be beneficial.	Thames Upper (ID: GB530603911403).	Yes
Transferred water impact on Lee Valley Reservoirs in North London receiving the abstracted water	Treated effluent recycled water discharge in River Thames will not have an adverse impact on water chemistry due to application of advanced treatment processes. Considering the existing TLT transfer, transferring water from River Thames to Lee Valley Reservoirs will not have an adverse impact on reservoir water chemistry.	There is a potential risk of change in concentration of general physico-chemical parameters, specific pollutants, and priority substances.	Lockwood Reservoir (ID: GB30641865) Banbury Reservoir (ID: GB30647003) High Maynard Reservoir (ID: GB30641884).	Yes

Protected Areas

F.4.16 It has been assessed whether WFD protected areas are at risk from the Project's operational activities.

F.4.17 The types of WFD protected areas include:

- Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas)
- Areas designated for the protection of economically significant aquatic species (Freshwater Fish and Shellfish)
- Bodies of water designated as recreational waters, including areas designated as Bathing Waters
- Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under Urban Wastewater Treatment Directive (UWWTD)
- Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Natura 2000 sites, Special Areas of Conservation (SAC) and Special Protection Areas (SPA)

F.4.18 Protected areas located in the waterbody catchments within the ZoI area are identified in Table F.12. This table also identifies where further impact assessment is proposed due to the potential for risks to these protected areas being identified.

Table F.12 Protected areas within WFD water body catchments

WFD Water Body (Only waterbodies that are protected areas within the waterbody catchment are listed)	PA Name	ID	Directive and Scope of the Protection	Requires Impact Assessment (Yes or No)
Thames (Egham to Teddington) (ID: GB106039023232)	Lower Thames (Cookham Egham Teddington)	SWSGZ4016	Safeguard Zone	Yes
	South West London Waterbodies	UK9012171	Special Protection Area	Yes
	South West London Waterbodies	UK11065	Ramsar Site	Yes
	River Thames	UKENRI17	Urban Waste Water Treatment Directive	Yes
Lockwood Reservoir (ID: GB30641865 Banbury Reservoir (ID: GB30647003)	Lee Nitrate Vulnerable Zone	S443	Nitrates Directive	Yes
	Lee Valley	UK9012111	Special Protection Area	Yes
	Lee Valley	UK11034	Ramsar Site	Yes
High Maynard Reservoir (ID: GB30641884).	Lee	SWSGZ4006	Safeguard Zone	Yes
	Walthamstow Reservoirs	UKGB30641884	Drinking Water Protection Area	Yes

WFD Water Body (Only waterbodies that are protected areas within the waterbody catchment are listed)	PA Name	ID	Directive and Scope of the Protection	Requires Impact Assessment (Yes or No)
Thames Upper (ID: GB530603911403)	The River Wandle	UKENRI157	Urban Wastewater Treatment Directive	No
Lower Thames Gravels Ground Water Body (ID: GB40603G000300)	South West London Waterbodies	UK9012171	Special Protection Area	Yes
	South West London Waterbodies	UK11065	Ramsar Site	Yes
	Roundmoor Ditch and Boveney Ditch NVZ	S466	Nitrates Directive	Yes

Invasive non-native species (INNS)

F.4.19 The risk of spreading invasive non-native species due to the Project's operational activities has been assessed. There is no risk of introducing or spreading existing INNS from the activity of water discharge from the Mogden STW advanced treatment process. The INNS will be removed by the treatment process. The water from the River Thames to Lockwood Reservoir, Banbury Reservoir and High Maynard Reservoir, part of Thames Water's Lee Valley reservoirs in North London, will be transferred by using exiting TLT transfers. The existing TLT takes raw water from Hampton to the Lockwood Pumping Station, part of Thames Water's Lee Valley reservoirs in North London. Therefore, it is considered that the Project does not pose an increased risk of spreading INNS in Lockwood Reservoir, Banbury Reservoir and High Maynard Reservoir.

F.5 Conclusion

F.5.1 The WFD Screening and Scoping assessment for the Project has followed the Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive. A Stage 1 WFD screening assessment has been undertaken to address and identify:

- The extent to which the Project is likely to affect relevant RBMPs and waterbodies
- ZoI based on aspects of the Project that could affect the identified waterbodies
- Any aspects of the Project that have been screened out and why

F.5.2 From this, the following waterbodies have been identified, and ZoI with respect to the WFD assessment has been defined.

- Crane (ID: GB106039023030)
- Lower Duke of Northumberland's River Water Body (ID: GB806100095)
- Thames (Egham to Teddington) (ID: GB106039023232)
- Thames Upper (ID: GB530603911403)
- Lockwood Reservoir (ID: GB30641865)
- Banbury Reservoir (ID: GB30647003)
- High Maynard Reservoir (ID: GB30641884)
- Lower Thames Gravels Water Body (ID: GB40603G000300)

F.5.3 WFD screening aspects have been reviewed in two groups, namely construction and commissioning activities and operation. Some aspects of construction and commissioning activities are WFD compliant (the pathway has no impacts on the WFD related risks). Other aspects of construction could be managed through the application of a CoCP (or similar document) as an approach, and others are compliant through mitigation, which may be required by the EA through permitting process requirements or the Water

Industry Act 1991, such as Section 166 consent. It is also noted that additional mitigation may be required as part of the DCO consenting process. The scheme operation aspects are assessed in two different ways: hydrological impacts and water quality impacts.

F.5.4 Stage 2 Water Framework Directive Regulations scoping identifies the risks from the Teddington DRA to Water Framework Directive Regulations receptors (within the Zone of Influence) based on the relevant waterbodies and their water quality elements. It also identifies those waterbodies where a more detailed impact assessment is required at Stage 3. In line with the requirements of the WFD Regulations the following WFD waterbodies are identified as requiring further assessment in Stage 3 of the WFD process.

- Thames (Egham to Teddington) (ID: GB106039023232)
- Thames Upper (ID: GB530603911403)
- Lockwood Reservoir (ID: GB30641865)
- Banbury Reservoir (ID: GB30647003)
- High Maynard Reservoir (ID: GB30641884)
- Lower Thames Gravels Ground Water Body (ID: GB40603G000300)

Annex. EA Classification of Waterbodies Included in ZoI

Table A.1 presents the EA classification of waterbodies included in the ZoI. These are taken from the EAs online Catchment Data Explorer for the following web pages:

- https://environment.data.gov.uk/catchment-planning/WaterBody/GB106039023030
- https://environment.data.gov.uk/catchment-planning/WaterBody/GB106039023232
- https://environment.data.gov.uk/catchment-planning/WaterBody/GB530603911403
- https://environment.data.gov.uk/catchment-planning/WaterBody/GB30641865
- https://environment.data.gov.uk/catchment-planning/WaterBody/GB30647003
- https://environment.data.gov.uk/catchment-planning/WaterBody/GB30641884
- https://environment.data.gov.uk/catchment-planning/WaterBody/GB40603G000300
- https://environment.data.gov.uk/catchment-planning/WaterBody/GB806100095

Table A.1 Environment Agency classification of waterbodies included in the ZoI (2019 classification-Crane and Thames (Egham to Teddington))

Crane Water Body GB106039023030		Thames (Egham to Teddington) GB106039023232	
Classification Item	2019	Classification Item	2019
Heavily Modified Designation	Heavily Modified	Heavily Modified	
Ecological	Moderate	Ecological	Poor
Biological quality elements	Moderate	Biological quality elements	Poor
Fish	Moderate	Invertebrates	Poor
Invertebrates	Moderate	Macrophytes and Phytobenthos Combined	Poor
Macrophytes and Phytobenthos Combined	Moderate	Macrophytes Sub Element	High
Macrophytes Sub Element	Moderate	Phytobenthos Sub Element	Poor
Phytobenthos Sub Element	Moderate	Physico-chemical quality elements	Moderate
Physico-chemical quality elements	Moderate	Acid Neutralising Capacity	High
Acid Neutralising Capacity	High	Ammonia (Phys-Chem)	High
Ammonia (Phys-Chem)	Good	Biochemical Oxygen Demand (BOD)	
Biochemical Oxygen Demand (BOD)	Moderate	Dissolved oxygen	Good
Dissolved oxygen	Poor	Phosphate	Moderate
Phosphate	Poor	Temperature	Moderate
Temperature	Moderate	pH	High
pH	High	Supporting elements (Surface Water)	Moderate
Hydromorphological Supporting Elements	Supports Good	Mitigation Measures Assessment	Moderate or less
Hydrological Regime	Does not support Good	Specific pollutants	High
Specific pollutants	High	Arsenic	High

Crane Water Body GB106039023030		Thames (Egham to Teddington) GB106039023232	
Chlorothalonil	High	Chlorothalonil	High
Chromium (VI)	High	Copper	High
Copper	High	Diazinon	High
Iron	High	Dimethoate	High
Manganese	High	Iron	High
Pendimethalin	High	Manganese	High
Triclosan	High	Pendimethalin	High
Zinc	High	Zinc	High
Chemical	Fail	Chemical	Fail
Priority hazardous substances	Fail	Priority hazardous substances	Fail
Benzo(a)pyrene	Good	Benzo(a)pyrene	Good
Benzo(b)fluoranthene	Good	Benzo(b)fluoranthene	Good
Benzo(g-h-i)perylene	Fail	Benzo(g-h-i)perylene	Good
Benzo(k)fluoranthene	Good	Benzo(k)fluoranthene	Good
Cadmium and Its Compounds	Good	Cadmium and Its Compounds	Good
Di(2-ethylhexyl)phthalate (Priority hazardous)	Good	Dioxins and dioxin-like compounds	Good
Dioxins and dioxin-like compounds	Good	Heptachlor and cis-Heptachlor epoxide	Good
Heptachlor and cis-Heptachlor epoxide	Good	Hexabromocyclododecane (HBCDD)	Good
Hexabromocyclododecane (HBCDD)	Good	Hexachlorobenzene	Good
Hexachlorobenzene	Good	Hexachlorobutadiene	Good
Hexachlorobutadiene	Good	Hexachlorocyclohexane	Good
Hexachlorocyclohexane	Good	Mercury and Its Compounds	Good
Mercury and Its Compounds	Good	Nonylphenol	Good
Nonylphenol	Good	Pentachlorobenzene	Good

Crane Water Body GB106039023030		Thames (Egham to Teddington) GB106039023232	
Pentachlorobenzene	Good	Perfluorooctane sulphonate (PFOS)	Fail
Perfluorooctane sulphonate (PFOS)	Fail	Polybrominated diphenyl ethers (PBDE)	Fail
Polybrominated diphenyl ethers (PBDE)	Fail	Quinoxyfen	Good
Quinoxyfen	Good	Tributyltin Compounds	Fail
Tributyltin Compounds	Good	Priority substances	Fail
Priority substances	Good	Aclonifen	Good
1,2-dichloroethane	Good	Alachlor	Good
Aclonifen	Good	Benzene	Good
Alachlor	Good	Bifenox	Good
Benzene	Good	Cybutryne	Good
Bifenox	Good	Cypermethrin (Priority)	Fail
Cypermethrin (Priority)	Good	Dichlorvos (Priority)	Good
Dichloromethane	Good	Fluoranthene	Good
Dichlorvos (Priority)	Good	Lead and Its Compounds	Good
Fluoranthene	Good	Nickel and Its Compounds	Good
Lead and Its Compounds	Good	Octylphenol	Good
Nickel and Its Compounds	Good	Terbutryn	Good
Terbutryn	Good	Other Pollutants	Does not require assessment
Other Pollutants	Good		
Carbon Tetrachloride	Good		
DDT Total	Good		
para - para DDT	Good		

Table A.2 Environment Agency classification of waterbodies included in the ZoI (2019 classification- Thames Upper and Lower Duke of Northumberland's)

THAMES UPPER Water Body GB530603911403		Lower Duke of Northumberland's River Water Body GB806100095	
Classification Item	2019	Classification Item	2019
Heavily Modified		Artificial	
Ecological	Moderate	Ecological	Moderate
Biological quality elements	Good	Supporting elements (Surface Water	Moderate
Fish	Good	**Mitigation Measures Assessment**	Moderate or less
Phytoplankton	Good	Chemical	Fail
Physico-chemical quality elements		**Priority hazardous substances**	Fail
Dissolved oxygen		Benzo(a)pyrene	Good
Hydromorphological Supporting Elements	Supports Good	Dioxins and dioxin-like compounds	Good
Hydrological Regime	Does not support Good	Heptachlor and cis-Heptachlor epoxide	Good
Supporting elements (Surface Water)	Moderate	Hexabromocyclododecane (HBCDD)	Good
Mitigation Measures Assessment	Moderate or less	Hexachlorobenzene	Good
Specific pollutants	Moderate	Hexachlorobutadiene	Good
2,4-dichlorophenol	High	Mercury and Its Compounds	Good
2,4-dichlorophenoxyacetic acid	High	Perfluorooctane sulphonate (PFOS)	Fail
Arsenic	High	Polybrominated diphenyl ethers (PBDE)	Fail

THAMES UPPER Water Body GB530603911403		Lower Duke of Northumberland's River Water Body GB806100095	
Chlorothalonil	High	Priority substances	Good
Chromium (VI)	High	Fluoranthene	Good
Copper	High	Other Pollutants	Does not require assessment
Diazinon	High		
Dimethoate	High		
Iron	High		
Linuron	High		
Mecoprop	High		
Pendimethalin	High		
Permethrin	High		
Phenol	High		
Toluene	High		
Triclosan	High		
Zinc	Moderate		
Chemical	Fail		
Priority hazardous substances	Fail		
Anthracene	Good		
Benzo(a)pyrene	Fail		
Benzo(b)fluoranthene	Fail		
Benzo(g-h-i)perylene	Fail		
Benzo(k)fluoranthene	Fail		
Cadmium and Its Compounds	Good		
Di(2-ethylhexyl)phthalate (Priority hazardous)	Good		

THAMES UPPER Water Body GB530603911403		Lower Duke of Northumberland's River Water Body GB806100095
Dioxins and dioxin-like compounds	Good	
Endosulfan	Good	
Heptachlor and cis-Heptachlor epoxide	Good	
Hexabromocyclododecane (HBCDD)	Good	
Hexachlorobenzene	Good	
Hexachlorobutadiene	Good	
Hexachlorocyclohexane	Good	
Mercury and Its Compounds	Fail	
Nonylphenol	Good	
Pentachlorobenzene	Good	
Perfluorooctane sulphonate (PFOS)	Good	
Polybrominated diphenyl ethers (PBDE)	Fail	
Quinoxyfen	Good	
Tributyltin Compounds	Fail	
Trifluralin (Priority hazardous)	Good	
Priority substances	Fail	
1,2-dichloroethane	Good	
Aclonifen	Good	
Alachlor	Good	
Atrazine	Good	
Benzene	Good	
Bifenox	Good	
Chlorfenvinphos	Good	

THAMES UPPER Water Body GB530603911403		Lower Duke of Northumberland's River Water Body GB806100095
Chlorpyrifos	Good	
Cybutryne	Good	
Cypermethrin (Priority)	Fail	
Dichloromethane	Good	
Dichlorvos (Priority)	Good	
Diuron	Good	
Fluoranthene	Good	
Isoproturon	Good	
Lead and Its Compounds	Good	
Napthalene	Good	
Nickel and Its Compounds	Good	
Octylphenol	Good	
Pentachlorophenol	Good	
Simazine	Good	
Terbutryn	Good	
Trichlorobenzenes	Good	
Trichloromethane	Good	
Other Pollutants	Good	
Aldrin, Dieldrin, Endrin and Isodrin	Good	
Carbon Tetrachloride	Good	
DDT Total	Good	
Tetrachloroethylene	Good	
Trichloroethylene	Good	
para - para DDT	Good	

Table A.3 Environment Agency classification of waterbodies included in the ZoI (2019 classification- Lockwood Reservoir and Lower Thames Gravels)

Lockwood Reservoir GB30641865		Lower Thames Gravels (Groundwater) GB40603G000300	
Classification Item	2019	Classification Item	2019
Heavily Modified Designation	Artificial	Overall Water Body	Poor
Ecological	Moderate	Quantitative	Poor
Biological quality elements	Good	Quantitative Status element	Poor
Phytoplankton	Good	Quantitative Dependent Surface Water Body Status	Good
Physico-chemical quality elements	Moderate	Quantitative GWDTEs test	Good
Salinity	High	Quantitative Saline Intrusion	Good
Total Nitrogen	Bad	Quantitative Water Balance	Poor
Total Phosphorus	Bad	Chemical (GW)	Good
Supporting elements (Surface Water)	Moderate	Chemical Status element	Good
Expert Judgement	Moderate	Chemical Dependent Surface Water Body Status	Good
Mitigation Measures Assessment	Moderate or less	Chemical Drinking Water Protected Area	Good
Specific pollutants	High	Chemical GWDTEs test	Good
Copper	High	Chemical Saline Intrusion	Good
Chemical	Fail	General Chemical Test	Good

Lockwood Reservoir GB30641865		Lower Thames Gravels (Groundwater) GB40603G000300	
Priority hazardous substances	Fail	Supporting elements (Groundwater)	
Benzo(a)pyrene	Good	Prevent and Limit Objective	Active
Dioxins and dioxin-like compounds	Good	Trend Assessment	No trend
Heptachlor and cis-Heptachlor epoxide	Good		
Hexabromocyclododecane (HBCDD)	Good		
Hexachlorobenzene	Good		
Hexachlorobutadiene	Good		
Mercury and Its Compounds	Good		
Nonylphenol	Good		
Perfluorooctane sulphonate (PFOS)	Fail		
Polybrominated diphenyl ethers (PBDE)	Fail		
Priority substances	Good		
Fluoranthene	Good		
Octylphenol	Good		
Other Pollutants	Does not require assessment		

Table A.4 Environment Agency classification of waterbodies included in the ZoI (2019 classification- High Maynard and Banbury Reservoir)

High Maynard Reservoir GB30641884		Banbury Reservoir GB30647003	
Classification Item	2019	2019	2019
Heavily Modified Designation	Artificial	Heavily Modified Designation	Artificial
Ecological	Moderate	Ecological	Moderate
Biological quality elements	Moderate	Supporting elements (Surface Water)	Moderate
Phytoplankton	Moderate	Expert Judgement	Moderate
Supporting elements (Surface Water)	Moderate	Mitigation Measures Assessment	Moderate or less
Expert Judgement	Moderate	Chemical	Fail
Mitigation Measures Assessment	Moderate or less	Priority hazardous substances	Fail
Chemical	Fail	Benzo(a)pyrene	Good
Priority hazardous substances	Fail	Dioxins and dioxin-like compounds	Good
Benzo(a)pyrene	Good	Heptachlor and cis-Heptachlor epoxide	Good
Dioxins and dioxin-like compounds	Good	Hexabromocyclododecane (HBCDD)	Good
Heptachlor and cis-Heptachlor epoxide	Good	Hexachlorobenzene	Good
Hexabromocyclododecane (HBCDD)	Good	Hexachlorobutadiene	Good
Hexachlorobenzene	Good	Mercury and Its Compounds	Good
Hexachlorobutadiene	Good	Perfluorooctane sulphonate (PFOS)	Fail
Mercury and Its Compounds	Good	Polybrominated diphenyl ethers (PBDE)	Fail

High Maynard Reservoir GB30641884		Banbury Reservoir GB30647003	
Perfluorooctane sulphonate (PFOS)	Fail	Priority substances	Good
Polybrominated diphenyl ethers (PBDE)	Fail	Fluoranthene	Good
Priority substances	Good	Other Pollutants	Does not require assessment
Fluoranthene	Good		
Other Pollutants	Does not require assessment		

[1]The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/407/contents
[2]. The zone of influence is based on aspects of the Project that could affect the identified waterbodies. This includes consideration of impact pathways that extend outside the footprint of the Project including for example changes to water flows and water quality.
[3] Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. SI 2017 No. 407
[4] Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive
. Available at Nationally Significant Infrastructure Projects: Advice on The Water Framework Directive
[5] The Planning Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/29/contents
[6]The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/407/contents
[7] Thames Water (2022) London Effluent Reuse SRO: Annex B4: Water Framework Directive Compliance Assessment Report
Available at https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/water-recycling-schemes-in-london/gate-2-reports/Annex-B4--WFD-report.pdf
[8] Water Framework Directive assessment: estuarine and coastal waters. Available at: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters
[9] Thames Water (2022) London Effluent Reuse SRO: Annex B4: Water Framework Directive Compliance Assessment Report
Available at https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/water-recycling-schemes-in-london/gate-2-reports/Annex-B4--WFD-report.pdf
[10] Thames Water (2022) London Effluent Reuse SRO: Annex B4: Water Framework Directive Compliance Assessment Report
Available at https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/water-recycling-schemes-in-london/gate-2-reports/Annex-B4--WFD-report.pdf
[11] The ZOI is based on aspects of the Project that could affect the identified waterbodies. This includes consideration of impact pathways that extend outside the footprint of the Project, including, for example, changes to water flows, water quality.
[12] Draft 3rd cycle RBMP (RBMP3) published 22 October 2022.
[13] Environment Agency (2011) Determining an application for a Section 166 consent under the Water Industry Act 1991. Operational instruction 059_08
[14] https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water/temporary-dewatering-from-excavations-to-surface-water
[15] https://www.gov.uk/guidance/pollution-prevention-for-businesses
[16] https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water/temporary-dewatering-from-excavations-to-surface-water
[17] https://www.gov.uk/guidance/pollution-prevention-for-businesses
[18] https://www.gov.uk/government/collections/environmental-permit-application-forms-for-a-new-bespoke-permit
[19] https://www.gov.uk/guidance/flood-risk-activities-environmental-permits
20 Water Framework Directive assessment for a flood risk activity - GOV.UK (www.gov.uk)
[21] https://www.gov.uk/guidance/flood-risk-activities-environmental-permits
[22] Water Framework Directive assessment for a flood risk activity - GOV.UK (www.gov.uk)
[23] The ZoI is based on aspects of the Project that could affect the identified waterbodies. This includes the extent to which potential changes to water flows and water quality.
[24] Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Available at: https://eur-lex.europa.eu/eli/dir/2008/105/oj

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