Teddington Direct River Abstraction

Preliminary Environmental Information Report

Chapter 6 – Aquatic Ecology

Volume: 1

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6. Aquatic Ecology

6.1 Introduction

6.1.1 This chapter of the Preliminary Environmental Information (PEI) Report provides preliminary environmental information relating to aquatic ecology to allow stakeholders and local communities to understand and develop an informed view of the likely significant environmental effects of the Teddington Direct River Abstraction (TDRA) Project (hereafter referred to as 'the Project') as presented in Chapter 2: Project Description. The chapter sets out the methodology for the assessment of any likely significant effects of the Project on aquatic ecology in accordance with relevant recognised guidance in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM Guidelines) (CIEEM, 2024).

6.1.2 This chapter describes the baseline aquatic ecological features of the relevant study areas (defined in Sections 6.6 and 6.7 below) as they are understood at present and identifies the potential environmental effects of the Project on aquatic or hydrologically connected protected sites and aquatic ecology that could arise from the construction and operation of the Project. The assessment assumes that embedded design (primary) mitigation and standard good practice (tertiary) are in place, and the results of the assessment then inform the need for any additional (secondary) mitigation requirements during construction. This chapter presents enhancement measures aimed at avoiding or minimising harm to aquatic receptors. These measures are integrated into the assessment of likely significant residual effects of the Project.

6.1.3 This chapter is supported by Figures 5.1 and 6.1 in Volume 2 PEI Report Figures.

6.1.4 This chapter draws on the findings of other chapters and is supported by Volume 3 PEI Report Appendices, including:

a. Chapter 2: Project Description
b. Chapter 4: Approach to Environmental Assessment
c. Chapter 5: Water Resources and Flood Risk
d. Chapter 7: Terrestrial Ecology
e. Chapter 18: Climate Change
f. Chapter 20: Cumulative Effects
g. Appendix 5.3 Water Framework Directive (WFD) Screening
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j. Appendix 6.3 Supporting Information for Burnell Avenue Site Operational Phase Impact

k. Appendix 6.4 Further Invasive Non-Native Species (INNS) Assessment

6.2 Legislation, policy and guidance

6.2.1 This section examines key legislation and policy frameworks relevant to aquatic ecology, emphasising alignment with the National Policy Statement (NPS) for Water Resources Infrastructure (Department for Environment, Food and Rural Affairs (Defra), 2023a), the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government (MHCLG), 2024), the London Plan (Greater London Authority (GLA), 2021), and local plans such as the Hounslow Local Plan (2015-2030) (London Borough of Hounslow (LBH), 2015) and Hounslow Local Plan (2020-2041) (LBH, 2024), London Borough of Richmond (LBR) Local Plan (LBR, 2018) and draft Richmond Local Plan (LBR, 2023), and Kingston Core Strategy (Royal Borough of Kingston upon Thames (RBK), 2012) and Kingston's draft Local Plan 2019 – 2041 (RBK, 2019).

6.2.2 These policies collectively aim to protect biodiversity, mitigate ecological impacts, and deliver net gains in environmental conservation. By integrating national, regional, and local strategies, the Project would ensure alignment with ecological and environmental objectives while addressing site-specific conservation priorities.

6.2.3 A detailed list of applicable national legislation and policy is included in Appendix 1.1 National Policy and Legislation Context.

Legislation

6.2.4 The Water Framework Directive (WFD) (2000/60/EC) promotes sustainable water management by protecting water quality, reducing pollution, and enhancing aquatic ecosystems. This EU Directive was transposed into law in England and Wales as The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, herein referred to as the WFD Regulations.

6.2.5 The WFD Regulations and River Basin Management Plans (RBMPs) implement WFD standards, requiring projects to prevent habitat deterioration and achieve ecological objectives. The WFD Regulations also establish objectives for groundwater quality and quantity, aiming for good status in all groundwater bodies. These regulations guide assessments of chemical status, reversal of pollutant trends, and measures to prevent or limit pollutant inputs. They also regulate hazardous and non-hazardous substances and activities causing accidental losses. As part of the WFD Regulations, there is a requirement to consider protected areas such as nature conservation designations and drinking water protected areas, as well as conduct a risk assessment for INNS.

6.2.6 The Habitats Directive (92/43/EEC) and Conservation of Habitats and Species Regulations 2017 (and post-Brexit amendments) ensure protection for aquatic species and habitats, mandating assessments for developments. The Conservation of Habitats and Species Regulations 2017 (as amended in 2019)

protect biodiversity by designating Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) as European sites. These sites form a national network, in addition to Ramsar wetlands, and are protected under river basin planning to prevent deterioration and set objectives. Competent authorities including the Natural England, conduct Habitats Regulations Assessments (HRAs) to ensure activities do not harm site integrity. Further reforms were explored in the Nature Recovery Green Paper (Defra, 2022).

6.2.7 The statutory provisions relating to Biodiversity Net Gain (BNG) in nationally significant infrastructure projects (NSIPs) (e.g. section 99 and Schedule 15 of the Environment Act 2021) are not yet in effect. They are not anticipated to come into effect until late 2025. Further details and draft Regulations are awaited from the Government to explain how these statutory provisions will apply to NSIPs. The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024 set specific guidelines regarding irreplaceable habitats and biodiversity gain, which can be relevant to aquatic ecology.

6.2.8 Relevantly, Section 6 of the Environment Act 1995 requires the Environment Agency to promote the conservation and enhancement of the natural beauty and amenity of inland and coastal waters, and the conservation of flora and fauna which are dependent on an aquatic environment. Section 7 outlines the Environment Agency's conservation duties with respect to conserving and enhancing natural beauty and the protection of Sites of Special Scientific Interest (SSSIs), pollution control, and impacts on all flora, fauna, and other conservation areas relating to shellfish, bathing water, and drinking water.

6.2.9 The Wildlife and Countryside Act 1981 prohibits harmful activities affecting aquatic ecosystems (section 9 and section 13) and obliges public bodies (section 28G(3)a-d) to further the conservation and enhancement of SSSI features (section 28G(2)), assess proposed operations likely to damage relevant environmental aspects and consult Natural England (section 28I). The Act empowers Natural England to enforce conservation works (section 28K) and prohibits releasing or allowing INNS to escape into the wild (section 14). In terms of the Act, new abstraction and impoundment licence applications must be assessed to determine effects on SSSIs, and consultation with Natural England is required.

6.2.10 The Invasive Non-native Species (Amendment, etc.) (EU Exit) Regulations 2019 aims to ensure the continued operability of environmental laws related to invasive species within the new national framework. The Regulations maintain a strong focus on preventing the entry of high-risk aquatic INNS and allow for UK-specific adaptation of the list of species of special concern.

6.2.11 The Environmental Targets (Biodiversity) (England) Regulations 2022 set legally binding goals for species abundance and habitat restoration by 2030/2042. For aquatic ecology, robust impact assessments and stronger mitigation/compensation for developments affecting water bodies are required to support these targets. Management must proactively restore aquatic habitats and reduce pressures like pollution.

6.2.12 The Natural Environment and Rural Communities (NERC) Act 2006 (section 40) requires public authorities to consider what action they can take to conserve biodiversity when exercising their functions. Section 41 requires the Secretary of State to publish a list of priority habitats and species in England for consideration under section 40 biodiversity duties.

6.2.13 The Environment Act 2021 establishes a framework for environmental governance, supporting the 25 Year Environment Plan (Defra, 2018) and sets targets for air, water, waste, and biodiversity, introduces resource efficiency measures, strengthens air and water quality protections, and promotes nature recovery through the Nature Recovery Network and Local Nature Recovery Strategies (LNRS). These strategies identify priorities for habitat restoration and nature-based solutions for areas in England. The Act mandates a minimum of 10% BNG. This BNG requirement is not yet mandatory for NSIPs such as the Project. The Project will contribute to, and enhance the natural environment by providing net gains for biodiversity.

6.2.14 Under the Environment Act 2021, the Environmental Targets (Biodiversity) (England) Regulations 2023 aim to:

a. Halt species abundance decline by 2030 and increase current levels by at least 10% by 2042

b. Restore or create 500,000ha of wildlife-rich habitats by 2042

c. Reduce the extinction risk for native species, focusing on long-term biodiversity recovery through evidence-based targets, monitoring, and reporting mechanisms

6.2.15 The Environmental Protection Act 1990 regulates water pollution, and the Infrastructure Act 2015 introduces biodiversity offsetting and measures against invasive species into the Wildlife and Countryside Act 1981.

6.2.16 Planning and infrastructure legislation, including the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and the Planning Act 2008, mandate ecological assessments and promote biodiversity conservation in major projects, including during the approval process for NSIPs.

6.2.17 The Invasive Alien Species (Enforcement and Permitting) Order 2019 regulates the management of invasive species in England and Wales, establishing enforcement measures and permitting requirements for their control and trade.

6.2.18 The Infrastructure Act 2015 grants powers to compel landowners in England and Wales to control INNS on their land. It also permits authorities to enter the land to carry out eradication works if voluntary agreements cannot be reached; and failure to comply is a criminal offence. Schedule 9A provides for species control agreements that outline responsibilities and timeframes for species control operations.

6.2.19 The Salmon and Freshwater Fisheries Act 1975 primarily aims to safeguard salmon and trout migration routes. The Act allows for enforcement action against polluters who cause harm to fish and spawning grounds.

6.2.20 The Eels (England and Wales) Regulations 2009 grant the Environment Agency authority to issue notices requiring the installation of eel passes on structures and obstructions (Regulation 14). Also, the Regulations mandate the provision of screens on all water intakes capable of abstracting at least 20m³/day, as well as on outfalls, unless exempted by the Environment Agency. Eel management plans aim to restore eel populations to 40% of historic levels through a combination of measures, including fishery regulation, barrier removal, habitat restoration and reduction of entrainment risks.

6.2.21 Improving water and environmental quality requires a collective effort, not solely government action. The Catchment Based Approach (Defra, 2013) supports community-led partnerships across 106 catchments in England, fostering collaboration to identify local issues, prioritise actions and mobilise resources. Catchment Based Approach partnerships engage 2,500 organisations, delivering 1,000 projects annually with significant investment returns (UK Government, 2022).

6.2.22 The Marine and Coastal Access Act 2009 introduced Marine Conservation Zones (MCZs) to protect important habitats and species, supported by RBMPs extending to one nautical mile offshore. Public bodies must consider impacts on MCZs, prioritise their objectives, minimise hindrances, notify conservation bodies of significant conflicts, and align decisions with marine plans and relevant considerations (section 125).

6.2.23 The Thames Conservancy Act 1932 empowers the Conservators of the River Thames to manage navigation, prevent pollution, maintain water flow, and implement flood defence measures (sections 44, 76 and 233) along the River Thames.

6.2.24 The Port of London Act 1968, as amended, will apply to the Project through licensing requirements for works in the River Thames, pollution prevention measures, and navigation regulations. The Port of London Authority's jurisdiction covers 95 miles of the River Thames, from Teddington Weir to the North Sea.

National policy

National Policy Statement for Water Resources Infrastructure

6.2.25 The requirements of the NPS for Water Resources Infrastructure (Defra, 2023a) in relation to aquatic ecology are provided in Table 6.1.

Table 6.1 Key policy from the National Policy Statement for Water Resources Infrastructure

Paragraph	Requirements for the Applicant	How the Project addressed this
2.1.2	*There is an immediate need to build resilience in the water sector to address pressures on water supplies. Clean and plentiful water is a goal set out in the government's 25 Year Plan to Improve the Environment (the 25 Year Environment Plan) and in its first revision, the Environmental Improvement Plan (2023) for improving the natural environment (the Environmental Improvement Plan [Defra, 2023b]). The government's vision is a water industry that works for everyone providing reliable, robust services now and in the future, without compromising the needs of the environment.*	The Project would provide up to 75 megalitres per day (Ml/d) water supply, mitigate climate change risks, and incorporate resilient infrastructure design. This chapter evaluates the impact of water abstraction on River Thames habitats, emphasising flow rates, ecological receptors, the need for future evidence, and ongoing monitoring to minimise adverse ecological effects. The future baseline has considered the implications of climate change, which are assessed in detail in Chapter 18: Climate Change.
2.2.14	*The UK is home to globally important wetlands, rivers and chalk streams. A range of species' healthy existence depends on the availability of good quality water. Having the right flow in our rivers and protecting groundwater levels is essential to support healthy ecology and enhancing natural resilience to drought. The impacts of climate change and the growing demand for water are putting added pressure on this availability.*	This chapter assesses affected aquatic habitats in the River Thames, emphasising flow rates, ecological receptors, the need for future evidence, and ongoing monitoring to mitigate ecological harm and protect habitats. The Project would be located near designated ecological sites, including Local Nature Reserves (LNRs), Sites of Importance for Nature Conservation (SINCs), SPAs, SACs and Ramsar sites. A 2km buffer identified statutory and non-statutory sites, with no Regionally Important Geodiversity Sites (RIGS) nearby. The Project would be shaped by the UK Biodiversity Action Plan (BAP) (Joint Nature Conservation Committee (JNCC), 2012a), RBMPs, and local diversity frameworks, which inform habitat protection and enhancement and the creation of resilient ecosystems to counteract climate change impacts.

Paragraph	Requirements for the Applicant	How the Project addressed this
2.2.15	*The abstraction of water from the environment can alter the natural flow regime. Current levels of water abstraction from some sources will need to be reduced to protect the environment and help sustain important heritage assets, in line with the Water Abstraction Plan and River Basin Management Plans. In the Environmental Improvement Plan [Defra, 2023b], the government set out its commitment to reduce damaging abstraction of water from rivers and groundwater, while maintaining and improving water supply resilience now and in the future. The challenge in delivering this will increase in the future due to the impacts of climate change and population growth.*	The Project would include a new abstraction site on the River Thames close to Teddington Weir. The abstracted water would be replaced by recycled water from a new tertiary treatment plant (TTP) within the existing Mogden Sewage Treatment Works (STW) site boundary. The proposed distance between the intake and outfall has been established based on modelling work and through discussions with the Environment Agency to ensure no risk of recirculation of discharged recycled water into the intake and to minimise the potential for reduced river flow between the intake and outfall. Potential effects have been scoped into the relevant chapters. Simultaneous operation of the intake and outfall would ensure that the volume of discharge into the River Thames at Burnell Avenue would be the same as the volume abstracted.
3.3.1	*The applicant is required to provide sufficient information in their Habitats Regulations Assessment to enable the Secretary of State to discharge their functions as the competent authority. The Habitats Regulations Assessment undertaken at the water resources management plan options appraisal process stage could provide relevant information to inform any project specific Habitats Regulations Assessment.*	Stage 1 (Habitats Regulations Assessment Screening Report, Appendix 7.1) identified significant effects on sites like Richmond Park SAC, focusing on species like the stag beetle. Stage 1 informs the Stage 2 Appropriate Assessment to be undertaken as part of the Environmental Statement (ES), determining ecological impacts. See Chapter 7: Terrestrial Ecology. The identified mitigation would result in the assessment being concluded at Stage 2.
3.3.5	*Where a development may negatively affect any priority natural habitat type or priority species any IROPI [Imperative Reasons of Overriding Public Interest] case would need to be established solely on one or more of the grounds relating to human health,*	The Project is progressing through the required HRA stages. If significant adverse effects on priority natural habitats or species cannot be avoided or mitigated, an IROPI case would be required — specifically only on the grounds of human health, public safety, or

Paragraph	Requirements for the Applicant	How the Project addressed this
	public safety or beneficial consequences of primary importance to the environment or any other reasons which the appropriate authority considers to be imperative reasons of overriding public interest. The competent authority may only rely on other (i.e. social or economic) imperative reasons of overriding public interest if it has first obtained an opinion from the appropriate authority.	environmental benefit, in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended).
3.4.1	*Environmental net gain is an approach to development that aims to leave the natural environment in a measurably better state than beforehand. Biodiversity net gain is an essential component of environmental net gain. Projects should consider and seek to incorporate improvements in natural capital, ecosystem services and the benefits they deliver when planning how to deliver biodiversity net gain. Biodiversity net gain is addressed in section 4.3.*	The Project would target a 10% BNG as per the Environment Act 2021, noting that this BNG requirement is not yet mandatory for NSIPs. BNG guidance for NSIPs is yet to be published but may apply from November 2025. Surveys would be completed as part of the ES to assess baselines using the Biodiversity Metric (Defra, 2024a). BNG boosts ecosystem services, prioritising local contributions, stakeholder engagement, and mitigation steps and aligning with relevant guidance. See Appendix 7.2 Approach to Achieving BNG.
3.4.2	*Water resources infrastructure projects have the potential to deliver significant benefits and enhancements beyond biodiversity net gain, resulting in wider environmental net gains. The scope of potential gains will be dependent on the type, scale and location of specific projects. The water resources management plan options appraisal process is informed by the Environment Agency and Ofwat's water resources guidance, which provide advice on relevant assessment methodologies, and other related guidance, including the Water Industry Strategic Environmental Requirements. The options appraisal*	The Project aims to deliver enhancements not only to biodiversity but also to ecosystem services, including water quality improvement, climate resilience and habitat connectivity, particularly through river corridor enhancements (e.g. Burnell Avenue, see Section 6.9). These reflect broader natural capital benefits. The project complies with Environmental Impact Assessment (EIA), HRA, and WFD statutory assessments, ensuring the integration of environmental guidance at each stage. These assessments help ensure net gains are considered holistically, not just through a biodiversity lens.

Paragraph	Requirements for the Applicant	How the Project addressed this
	process is also subject to statutory environmental assessments.	
3.4.3	*In addition to delivering biodiversity net gain, developments may also deliver wider environmental gains relevant to the local area, and to national policy priorities, such as reductions in greenhouse gas emissions, reduced flood risk, improvements to air or water quality, or increased access to natural greenspace. Applications for development consent should be accompanied by a statement demonstrating how opportunities for delivering wider environmental net gains have been considered, and where appropriate, incorporated into the design (including any relevant operational aspects) of the project. Applicants should make use of available guidance and tools for measuring natural capital assets and ecosystem services, such as the Natural Capitals Committee's 'How to Do it: natural capital workbook' (Natural Capital Committee, 2017) and Defra's guidance on Enabling a Natural Capital Approach (Defra, 2020). Where environmental net gain considerations have featured as part of the strategic options appraisal process in the water resources management plan to select a project, the statement should reference that information to supplement the site-specific details.*	The Project incorporates wider gains beyond biodiversity, including water quality improvement, habitat connectivity, and climate resilience, which are outlined in Sections 6.4 and 6.9. This chapter outlines how environmental gains in relation to aquatic ecology have been identified and incorporated. See also Chapter 7: Terrestrial Ecology and Appendix 7.2 Approach to Achieving BNG.
3.5.1	*The applicant should comply with the legal obligations and policy set out in the National Policy Statement on the assessment of alternatives as set out here:* • *the Environmental Impact Assessment Regulations requires projects with significant environmental*	This chapter and Chapter 5: Water Resources and Flood Risk examine habitat loss, water quality changes, flow modifications, and invasive species impacts that may be caused by the Project; and address construction effects, mitigation measures, and

Paragraph	Requirements for the Applicant	How the Project addressed this
	effects to include a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the • *ignificant effects of the project on the environment* • *other specific legal obligations requiring the consideration of alternatives, for example, under the Habitats Regulations and the WFD Regulations* • *policies in the National Policy Statement requiring consideration of alternatives, for example, the flood risk sequential test and the assessment of alternatives for developments in National Parks, the Broads and Areas of Outstanding Natural Beauty (AONB).*	compliance with the WFD Regulations and bathing water standards. A WFD screening and scoping assessment has been undertaken, which covers Stage 1 - WFD Regulations Screening; Stage 2 - WFD Regulations Scoping ; and identifies that Stage 3 - WFD Regulations Impact Assessment would follow as a next step for those waterbodies where a more detailed impact assessment is required (Appendix 5.3 WFD Screening). Chapter 3 has considered alternatives and presents how environmental considerations have shaped the design and siting of the Project components and the preferred option, including intake/ outfall locations, tunnelling options, and site layouts. The HRA will determine whether less damaging alternatives to the Project exist if likely significant effects on protected habitats/species are confirmed. The flood risk sequential test and design constraints in relation to sensitive areas like AONBs or heritage assets are addressed across the Project's assessment framework, though the specific reference to AONBs (now known as National Landscapes) is not applicable here as the Project area is urban/riverine and not within a designated landscape. The principles are applied to avoid flood-prone or ecologically sensitive zones where possible.
3.8.6	*Applicants are encouraged to begin pre-application discussions with the Environment Agency as early as possible. Where applicants wish to parallel track Development Consent Order and Environmental Permit applications, the Environment Agency suggests*	Early consultation took place during the scoping phase with relevant authorities, including the Environment Agency. Consultation and engagement related to aspects of aquatic ecology are outlined in Section 6.3 of this

Paragraph	Requirements for the Applicant	How the Project addressed this
	that applicants should start work towards submitting the permit application at least 6 months prior to the submission of an application for a Development Consent Order. This will help ensure that applications take account of all relevant environmental considerations and that the relevant regulators are able to provide timely advice and assurance to the Examining Authority.	chapter. The Applicant will engage with both statutory and non-statutory consultees throughout the EIA process, sharing progress and findings. Engagement with stakeholders and the local community would continue as part of the Regulators' Alliance for Progressing Infrastructure Development (RAPID) gated process, the DCO process and general information sharing. Local authorities, other stakeholders, and the public will be consulted on the Project and its alternatives during the Statutory Consultation in summer 2025. The PEI Report will be published as part of the Statutory Consultation.
4.3.4	*The development of water resources infrastructure could have impacts (both adverse and beneficial) on biodiversity and nature conversation interests during construction and operational phases. A site-specific Habitats Regulations Assessment (where required) and a plan level Habitats Regulations Assessment undertaken for water resources management plans should identify likely significant effects and necessary mitigation measures.*	Stage 1 (Habitats Regulations Assessment Screening Report, Appendix 7.1) informs the Stage 2 Appropriate Assessment to be undertaken as part of the ES, determining ecological impacts. See Chapter 7: Terrestrial Ecology. The identified mitigation would result in the assessment being concluded at Stage 2.
4.3.6	*The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.*	The Project incorporates embedded design (primary) mitigation (Section 6.4) to avoid or reduce harm to habitats and species, such as designing intake and outfall structures to minimise riverbank disturbance and to protect fish and aquatic invertebrates. Enhancement measures (Section 6.9) include marginal aquatic planting, revegetation, and habitat improvements at key locations like Burnell Avenue, aimed at increasing habitat diversity and resilience. This chapter has

Paragraph	Requirements for the Applicant	How the Project addressed this
		considered specific protected and priority species and habitats.
4.3.7	*Applicants should include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how these will be secured. In particular, the applicant should demonstrate that:* • *during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works* • *during construction and operation, best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised* • *habitats will, where practicable, be restored after construction works have finished* • *developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where possible and reasonable* • *opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals* • *where habitat creation is required as mitigation, compensation or enhancement, the location and quality will be of key importance. In this regard, habitat creation should be focused on areas where the most ecological and ecosystems services benefits can be realised*	Embedded mitigation and standard good practice (tertiary) are outlined in Section 6.4. Based on the current assessment, no additional (secondary) mitigation measures are deemed necessary. The commitment to restoring habitats after construction is directly addressed in Section 6.4: Embedded design (primary) mitigation and standard good practice (tertiary), of this chapter. Habitats will, where practicable, be restored after construction works have finished. Habitat restoration is considered part of the mitigation hierarchy, which includes avoiding impacts, minimising impacts, and restoring habitats where practicable. The mitigation measures are integrated into the Code of Construction Practice (CoCP), which would secure implementation and monitoring of such restoration actions post-construction. Embedded design (primary) mitigation (Section 6.4) includes planning infrastructure placement and working areas to avoid unnecessary disruption to habitats. The use of existing developed areas and avoidance of sensitive zones helps minimise fragmentation. Section 6.9 outlines enhancement measures, including those at the Burnell Avenue site (Table 6.13), which propose habitat enhancements such as marginal habitat creation and vegetation planting to benefit aquatic species. Although BNG is not yet mandatory for NSIPs, the Project is aiming to meet the 10% BNG requirement as set out in the Environment Act 2021.

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4.3.8	*The government's policy for biodiversity in England is set out in the Environmental Improvement Plan (Defra, 2023b), Biodiversity 2020 (Defra, 2011), the National Pollinators Strategy (Defra, 2014) and the UK Marine Strategy (Defra, 2019). The aim is to halt overall biodiversity loss, support healthy, well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people. This aim needs to be viewed in the context of the challenge presented by climate change. Healthy, naturally functioning ecosystems and coherent ecological networks will be more resilient and adaptable to climate change effects. Failure to address this challenge will result in significant adverse impact on biodiversity and the ecosystem services it provides.*	The Project is shaped by national and local policy, including the UK BAP (JNCC, 2012a), River Basin Management Plans, and LNRS, which inform the approach to habitat protection and enhancement and the creation of resilient ecosystems to counteract climate change impacts.
4.3.11	*Subject to the specific policies below, development should avoid significant harm to biodiversity and geological conservation interests and provide net gains for biodiversity (see section 4.3).*	The Project follows the mitigation hierarchy (avoidance, minimisation, restoration, and compensation), and design and construction methods have considered avoidance of ecologically sensitive areas and species (Section 6.4). Although not yet a legal requirement for NSIPs, the Project aims to achieve 10% BNG in line with the Environment Act 2021. See Appendix 7.2 Approach to Achieving BNG.
4.3.17	*Sites of regional and local biodiversity and geological interest (which include Local Geological Sites, Local Nature Reserves and Local Wildlife Sites and Nature Improvement Areas) have an important role to play in meeting national biodiversity goals and targets, in contributing to the quality of life and the well-being of*	The Project would be located near designated ecological sites, including LNRs, SINCs, SPAs, SACs and Ramsar sites. A 2km study area identified statutory and non-statutory sites, with no RIGS nearby. See Table 6.8.

Paragraph	Requirements for the Applicant	How the Project addressed this
	the community, and in supporting research and education. The Secretary of State should give due consideration to such regional or local designations to ensure that these sites are safeguarded. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent where harm cannot be avoided (through locating on an alternative site with less harmful impacts) or adequately mitigated. In these circumstances, there should be compensatory measures.	
4.3.19	*The Secretary of State should ensure that applicants have taken measures to ensure [protected] species and habitats are protected from the adverse effects of development. Where appropriate, requirements or planning obligations may be used in order to deliver this protection. The Secretary of State should refuse consent where it would result in harm to these habitats and species unless the benefits of the development (including need) clearly outweigh that harm.*	This chapter identifies several protected and priority species, such as the European eel, Atlantic salmon, river lamprey and water vole and describes the ecological surveys (Section 6.6) and impact assessments (Section 6.8) that have informed mitigation (Sections 6.4 and 6.9). Protective measures will be formalised and secured through the CoCP. While temporary, minor impacts may occur, these are not considered significant after mitigation.
4.3.21	*Development should contribute to and enhance the natural environment by providing net gains for biodiversity. Applicants should use the current version of the biodiversity metric and should use the same version to calculate their biodiversity baseline and inform their biodiversity net gain outcomes. Applicants should take into account the requirements of any biodiversity gain statement published in respect of nationally significant infrastructure projects. Opportunities should be explored to deliver biodiversity*	Although not yet a legal requirement for NSIPs, the Project aims to achieve 10% BNG in line with the Environment Act 2021. See Appendix 7.2 Approach to Achieving BNG.

Paragraph	Requirements for the Applicant	How the Project addressed this
	net gain within the development footprint in the first instance. Applications for development consent should set out how opportunities for on-site delivery of biodiversity net gain have been considered and, where they are proposed, how they have been incorporated into the project design.	
4.3.22	*Biodiversity net gain can also be delivered wholly or partially off-site. Any off-site delivery of biodiversity net gain should also be set out within the application for development consent. When delivering biodiversity net gain off-site, developments should do this in a manner that best contributes to the achievement of relevant wider strategic outcomes, for example by increasing habitat connectivity or enhancing other ecosystem service outcomes. Reference should be made to relevant national or local plans and strategies, such as green infrastructure strategies or Nature Recovery Networks, to inform off-site biodiversity net gain delivery. Applicants are encouraged to refer to industry good practice principles and guidance for development before preparing their application. Where biodiversity net gain considerations have featured as part of the water resources management plan strategic options appraisal process to select a Project Wide, then applicants could reference that information to supplement the site specific details.*	The Project would target a 10% BNG as per the Environment Act 2021, noting that this BNG requirement is not yet mandatory for NSIPs. BNG guidance for NSIPs is yet to be published but may apply from November 2025. Surveys would be completed as part of the ES to assess baselines using the Biodiversity Metric (Defra, 2024a). BNG boosts ecosystem services, prioritising local contributions, stakeholder engagement and mitigation steps and aligning with relevant guidance. See Appendix 7.2 Approach to Achieving BNG.
4.3.23	*Development proposals potentially provide many opportunities for building in beneficial biodiversity or geological features as part of good design. When considering proposals, the Secretary of State should consider whether the applicant has maximised such opportunities in and around developments. The*	Enhancement measures have been proposed as part of the Project (Section 6.9), including marginal planting, in-stream habitat creation, and vegetated buffers. These enhancements will be secured through the CoCP,

Paragraph	Requirements for the Applicant	How the Project addressed this
	Secretary of State may use requirements or planning obligations where appropriate in order to ensure that such benefits are delivered.	ensuring delivery through planning conditions as necessary.
4.10.24	*Where networks of green or blue infrastructure have been identified in development plans, they should normally be protected from development and, where possible, strengthened by or integrated within it. The Secretary of State will also have regard to the effect of the development upon and resulting from existing land contamination, as well as the mitigation proposed.*	The Project incorporates embedded design (primary) mitigation (Section 6.4) to avoid or reduce harm to habitats and species, such as designing intake and outfall structures to minimise riverbank disturbance and to protect fish and aquatic invertebrates. Enhancement measures (Section 6.9) include marginal aquatic planting, revegetation, and habitat improvements at key locations like Burnell Avenue, aimed at increasing habitat diversity and resilience. This chapter has considered specific protected and priority species and habitats.
4.11.9	*[Mitigation measures] should also take into account seasonality of wildlife in any nearby designated sites.*	Chapter 7: Terrestrial Ecology considers protected terrestrial species including otter and water vole. This chapter considers aquatic species, including migratory fish, and uses data from the Ecology and Fish Data Explorer (Environment Agency, 2021) and the Zoological Society of London's (ZSL) eel trap data provided by the Environment Agency to provide insights into eel populations and migratory patterns. Potential risks to fish include impingement on intake screens and displacement of juvenile fish due to changes in water velocity at the outfall location (Appendix 6.1 Aquatic Ecology Baseline). Proposed design adaptations include intake screening and operational protocols to reduce entrainment and impingement, which are critical for protecting migratory fish routes.
4.15.2	*Projects could also cause adverse ecological effects resulting from physical modifications to the local water*	A separate WFD screening and scoping assessment (Appendix 5.3) has been undertaken. Stage 3 – WFD

Paragraph	Requirements for the Applicant	How the Project addressed this
	environment (hydro-morphological changes). This is particularly relevant for 'impounding' reservoirs. These effects could lead to adverse impacts on health and/or on protected species and habitats (see also section 4.3), and could, in particular, result in surface waters, bathing waters (bodies of water designated as recreational waters), groundwater or protected areas failing to meet environmental objectives required under the Water Framework Directive Regulations. Preventing deterioration in status is the primary environmental objective of the Water Framework Directive Regulations.	Impact Assessment would follow as a next step for those water bodies where a more detailed impact assessment is required. Potential hydrodynamic and geomorphological impacts are assessed in Section 6.8, and it has been considered as part of the risk assessment for INNS in Appendix 6.4 Further Invasive Non-Native Species Assessment.
4.15.4	*The government's planning policies make clear that the planning system should contribute to and enhance the natural and local environment. It should do this by preventing both new and existing development from contributing to water pollution so that the environment is not adversely affected or put at unacceptable risk. The government has issued guidance on water supply, wastewater and water quality considerations in the planning system. Water companies have an important role in protecting and enhancing the water environment. The government expects water companies to deliver water environment improvements, such as reduced nutrient pollution and sewage discharges from storm overflows. The Secretary of State must also consider duties under other legislation including duties under the Environment Act 2021 in relation to water targets and have regard to the policies set out in the Environmental Improvement Plan [Defra, 2023b].*	The Project would include a TTP at Mogden STW to treat effluent to higher standards, improving River Thames water quality. Appendix 6.2 considers the results of hydrodynamic modelling and impacts on water quality and olfaction, and this will be considered further in the HRA Stage 2 Appropriate Assessment to support the DCO. The Project includes embedded design (primary) and construction mitigation measures that are aimed at limiting the runoff of pollutants into the water environment.

Paragraph	Requirements for the Applicant	How the Project addressed this
4.15.4	*The government's planning policies make clear that the planning system should contribute to and enhance the natural and local environment. It should do this by preventing both new and existing development from contributing to water pollution so that the environment is not adversely affected or put at unacceptable risk. The government has issued guidance on water supply, wastewater and water quality considerations in the planning system. Water companies have an important role in protecting and enhancing the water environment. The government expects water companies to deliver water environment improvements, such as reduced nutrient pollution and sewage discharges from storm overflows. The Secretary of State must also consider duties under other legislation including duties under the Environment Act 2021 in relation to water targets and have regard to the policies set out in the Environmental Improvement Plan [Defra, 2023b].*	Chapter 5 has assessed the impacts on water quality related to the Project. This chapter includes an assessment of the effects on aquatic habitats and physical characteristics of river systems (Sections 6.5 – 6.8) and considers both the construction and operational phases.
4.15.5	*The applicant should make early contact with the relevant regulators, including the local authority, the Environment Agency and Marine Management Organisation, where appropriate, for relevant licensing and environmental permitting requirements. Where the proposed development is likely to have adverse effects on the water environment, the applicant should undertake an assessment of the existing status and impacts of the proposed development on water quality, water resources and physical characteristics as part of the Environmental Statement. A project-specific Water Framework Directive assessment may also be required.*	Early consultation during the scoping phase took place with relevant authorities, including the Environment Agency. Consultation and engagement related to aspects of aquatic ecology are outlined in Section 6.3 of this chapter. The chapter includes an assessment of impacts on water quality, aquatic habitats and physical characteristics of river systems (Sections 6.5 – 6.8) and considers both construction and operational phases. A WFD Stage 1 Screening and Stage 2 Scoping have been completed (Appendix 5.3), and a Stage 3 Impact

Paragraph	Requirements for the Applicant	How the Project addressed this
		Assessment will form part of the ES to ensure compliance with the WFD Regulations.
4.15.9	*The applicant may also need to assess other measures to protect the water environment. This could include protecting eels or improving fish passage.*	European eel, Atlantic salmon, and river lamprey have been identified as key sensitive species in this chapter. Mitigation measures to protect these species include fish-friendly intake designs, seasonal construction restrictions, sediment control and flow management to maintain suitable aquatic conditions (Section 6.4).
4.15.12	*The risk of impacts on the water environment can be reduced through careful design and adherence to pollution control practice.*	The Project design includes features to reduce in-channel disturbance and avoid riverbank impacts (Section 6.4). Standard good practice (tertiary) mitigation will be implemented, and mitigation will be secured through the CoCP.

National Planning Policy Framework

6.2.26 The NPPF (MHCLG, 2024) outlines England's planning policies, emphasising sustainable development. Key considerations include protecting natural, built, and historic environments, improving biodiversity, prudent resource use, reducing waste and pollution, mitigating and adapting to climate change, transitioning to a low-carbon economy, and implementing planning policies to prevent water pollution.

6.2.27 Development plans and decisions support river basin management by aligning with the NPPF's sustainable development goals, addressing water pollution risks, climate change adaptation, and water infrastructure provision. Development should avoid contributing to or being impacted by unacceptable levels of pollution or land instability. Wherever possible, it should enhance local environmental conditions, such as air and water quality, in line with relevant plans like RBMPs.

6.2.28 The NPPF (MHCLG, 2024) requires that planning permission should be refused if significant biodiversity harm cannot be avoided, mitigated, or compensated. Developments affecting SSSIs or irreplaceable habitats are rarely permitted, except in exceptional circumstances where the benefits of the development in the location proposed clearly outweigh both the local and wider environmental impacts, typically accompanied by appropriate compensation measures. Biodiversity-enhancing developments should be supported, prioritising measurable biodiversity gains and public access integration in designs.

6.2.29 The Project aims to achieve a 10% BNG in alignment with the requirements of the Environment Act 2021. However, as noted in Table 6.1, this BNG requirement is not yet mandatory for NSIPs such as the Project.

Other national policy

6.2.30 The 25 Year Environment Plan (Defra, 2018) and the Environmental Improvement Plan 2023 (Defra, 2023b) commit to leaving the environment in a better state within a generation. The Environmental Improvement Plan 2023 is the first revision of the 25 Year Environment Plan, containing 10 goals including clean air, clean and plentiful water, thriving plants and wildlife, enhanced biosecurity, reduced risk of harm from environmental hazards, and mitigating and adapting to climate change. Progress is tracked annually by Defra using the Outcome Indicator Framework (Defra, 2025).

6.2.31 Outcome D5 of the 25-Year Environment Plan - Conservation status of our native species (Natural England, 2022) highlights the conservation status of aquatic and freshwater species using the Red List Index (International Union for Conservation of Nature (IUCN), 2025). Freshwater fish and aquatic invertebrates are among the assessed groups, with some species at significant risk of extinction. The index shows a decline in biodiversity, emphasising habitat degradation and climate change as key threats.

6.2.32 The Great Britain Invasive Non-native Species Strategy (Defra, 2015) provides a framework to coordinate actions against invasive species, focusing on education, information sharing, early detection, rapid response, partnership, research and pathway identification.

6.2.33 This chapter has considered the guidance on eels, namely Safe Passage for eels: Best Achievable Eel Protection (BAEP) (Environment Agency, 2023) and the guidance Safe Passage for Eels (Environment Agency, 2024). 'Best' refers to the most effective solution to achieve the highest possible level of eel protection in comparison to other options in consideration. The definition of 'achievable eel protection' means applying appropriate technologies developed at the correct scale to be implemented in accordance with Safe Passage for Eels (Environment Agency, 2024), which outlines requirements for fitting an eel pass or screen to water structures and the process of applying for a new licence or permit. An eel pass may be required for in-river obstructions, and an eel screen may be required for abstractions of more than 20 cubic metres per day.

6.2.34 The List of UK BAP Priority Habitats (JNCC, 2011) identifies semi-natural habitats needing conservation under the UK BAP (JNCC, 2012a). The UK BAP ended in 2012 and was succeeded by the UK Post-2010 Biodiversity Framework (JNCC, 2012b), the UK Biodiversity Framework 2024 (JNCC, 2024) and the UK National Biodiversity Strategy and Action Plan (Defra, *et al*, 2025). Conservation now occurs at a country level. Habitat Action Plans (HAPs) were created for many habitats.

6.2.35 The UK BAP Priority Species (JNCC, n.d.b) identified the most threatened species requiring conservation under the UK BAP. Initially created between 1995 and 1999, it was expanded in 2007 to 1,150 species. While the UK BAP ended in 2012, the list remains a reference for conservation at country level.

6.2.36 The UK Biodiversity Framework 2024 (JNCC, 2024) was developed in response to the Kunming-Montreal Global Biodiversity Framework from COP15. Led by the Four Countries' Biodiversity Group, it involves the Department of Agriculture, Environment and Rural Affairs in Northern Ireland, Defra in England, and the Scottish and Welsh Governments, with JNCC as an independent secretariat. It replaces the UK Post-2010 Biodiversity Framework (JNCC, 2012b) and coordinates joint biodiversity actions across the UK.

6.2.37 The Royal Society for the Protection of Birds (RSPB) Birds of Conservation Concern (RSPB, 2015) report highlights the declining status of many aquatic bird species in the UK, Channel Islands, and Isle of Man. Key species now Red-listed include Bewick's swan, goldeneye, smew, and dunlin. Climate change-driven 'short-stopping' affects wintering patterns, with some species shifting their wintering grounds to the north-east. According to the report, some species like white-tailed eagle have improved, moving from the Red to Amber list.

6.2.38 The UK Conservation Designations Spreadsheet (JNCC, 2023) collates species' conservation statuses, or 'badges,' from international agreements, UK legislation, and national lists. The list includes Red-listed species and Nationally

Rare or Scarce species. Red List assessments are continually updated and undergo two review stages before inclusion.

6.2.39 The Protected Species and Development: Advice for Local Planning Authorities (Guidance) (Natural England and Defra, 2014) helps local planning authorities assess the impact of development on protected species. The guidance outlines when surveys are needed, mitigation and compensation measures, licensing requirements, and decision-making criteria. Natural England provides standing advice, while consultation is required for significant environmental impacts. Developers must ensure compliance with conservation laws and planning policies.

6.2.40 The UK has various types of Protected Areas for nature conservation, categorised under national legislation, European directives, global agreements, and Marine Protected Areas (JNCC, 2022). Some areas overlap across these categories. The protected areas with water-dependent features relevant to this Project include the Richmond Park Special Area of Conservation (SAC) located downstream of the Project area (the focus of the HRA), the Syon Park SSSI located 7.3km downstream of the outfall location, and several local SINCs, including the River Thames and Tidal Tributaries SINC located within the draft Order limits, Ham Lands SINC approximately 0.6km downstream of the outfall, and Isleworth Ait SINC, within 2km of the existing Mogden STW discharge.

6.2.41 The South East Inshore Marine Plan (Marine Management Organisation, 2021) covers the inshore marine area from Felixstowe to Folkestone, balancing economic, environmental and social factors over 20 years. The Plan influences planning, decision-making and marine activities, ensuring sustainable development. The River Thames significantly impacts the South East Inshore plan area (Figure 6.1 in Volume 2 PEI Report Figures). The Project would fall within the South East Inshore Marine Plan area, which extends along the River Thames up to Teddington Weir. By 2041, the South East Marine Plan aims to achieve Good environmental status, biodiversity conservation, ecosystem resilience, sustainable fisheries, pollution reduction, habitat restoration and integrated governance.

Regional policy

6.2.42 The Coastal Partnerships Network (UK Government, 2022) facilitates information exchange and collaboration among 55 Coastal Partnerships and connects with other catchment, estuarine, and coastal groups, supporting local coastal initiatives. Similarly, the Coastal and Estuary Partnership links communities and individuals from catchment to coast. Both partnerships offer expertise and networks for integrating statutory plans, actions, and nature-based solutions, focusing on water quality management and habitat restoration.

6.2.43 In the London Plan (GLA, 2021), Policy SI 5 Water Infrastructure requires that water resources should be sustainably managed, minimising mains water use and improving infrastructure efficiency. Development plans should enhance water quality, align with the Thames RBMP and Catchment Plans, promote

wastewater systems, integrate water-saving measures, and address flood risks using early Integrated Water Management Strategies for growth locations. Policy SI 17 Protecting and Enhancing London's Waterways promotes river restoration and biodiversity enhancement, limiting development that may impound or narrow waterways. Policy SI 17 supports water-related uses, seeks to protect the heritage and open character of the waterways, and encourages accessible, vibrant and sustainable waterways.

6.2.44 The GLA is preparing the LNRS for London as required under the Environment Act 2021. This strategy will guide areas where nature recovery should be prioritised with the aim of restoring, creating and connecting habitats. This strategy will support the delivery of BNG while helping to deliver the national environmental targets. Once published, the maps can inform decisions on where to site off-site BNG delivery and potential enhancements for the Project. These decisions will contribute to and enhance the natural environment by providing net gains for biodiversity.

6.2.45 RBMPs are prepared in terms of the WFD Regulations for each district, and reviewed and updated every six years. Plans were published in December 2009 and updated in February 2016 and December 2022 (UK Government, 2022). The Thames River Basin District Management Plan aims to implement various measures to enhance habitats and improve fish passage by 2027. These include removing barriers at weirs, reconnecting floodplains, creating two-stage channels and implementing natural flood management (Environment Agency, 2022). The plans will be reviewed and updated again by December 2027. Any biodiversity enhancements proposed around waterbodies should complement the local environmental objectives and programmes of measures within the relevant RBMPs.

Local policy

Royal Borough of Kingston upon Thames (RBK)

6.2.46 The Core Strategy (RBK, 2012) Policy DM6 Biodiversity requires new developments to protect and enhance biodiversity through sustainable design and ecological assessments. Policy DM6 supports habitat creation, green infrastructure, and access to nature. Linked policies stress retaining and improving open space, especially near the Thames and Hogsmill Valley, to meet the environmental and recreational needs of a growing population. Policy DM7 Thames Policy Area (RBK, 2012) requires that riverside developments avoid unacceptable navigation, biodiversity and flood risk impacts, preserve or enhance waterside heritage and character, and enhance connectivity. Financial contributions may support riverside improvements, infrastructure, open spaces and sustainable river-based services. In Policy KT1 - Kingston Town Neighbourhood, the council seeks to address flood risks, biodiversity and green infrastructure by implementing Sustainable Urban Drainage Systems (SuDS), enhancing public spaces, supporting housing and employment growth, promoting sustainable transport, improving education, health, and community services, and preserving the area's heritage and character through collaborative

partnerships and strategic planning. Through Policy IMP 2 - Sewerage and Water Infrastructure, the council aims to ensure water and sewerage infrastructure improvements are completed before development occupancy.

6.2.47 The RBK Local Plan (Regulation 18) (RBK, 2019) Policy KC1 (Climate Change and Environmental Sustainability) supports environmentally sustainable, climate-resilient development that prioritises net-zero goals, heat and flood risk mitigation, air and water quality, and biodiversity enhancement. Draft Policy KC1 promotes resource efficiency, sustainable drainage, circular economy principles, and integration with decentralised energy networks to reduce emissions and support a healthier, low-carbon borough. Draft Policy KC4 (Sustainable Drainage) requires developments to manage surface water through SuDS, reducing flood risk and runoff at source. Strategies must align with the London Plan, reducing impermeable surfaces and supporting groundwater protection. SuDS should also enhance biodiversity, urban cooling, water reuse, and the visual quality of spaces. Draft Policy KN1 Green and Blue Infrastructure promotes a strategic green and blue infrastructure network by protecting and enhancing natural assets like rivers, green spaces and trees. Developments must integrate urban greening, sustainable drainage and biodiversity features, aligning with Kingston's BAP and All London Green Grid to deliver long-term environmental and social benefits. Draft Policy KN3 Biodiversity requires that developments should contribute to the conservation of priority species and the restoration and enhancement of priority habitats and nature conservation sites, including SINCs, where relevant. Developments must deliver a minimum of 30% BNG and seek to deliver biodiversity gains on-site. The mitigation hierarchy must be applied to limit negative impacts and to provide an overall positive net gain for biodiversity. The Project will contribute to and enhance the natural environment by providing net gains for biodiversity. The provision of net gains for biodiversity is defined as a project-wide minimum 10% increase in 'habitat units' as measured by the statutory Biodiversity Metric calculation (Defra, 2024a).

London Borough of Richmond Upon Thames (LBR)

6.2.48 The LBR Local Plan (LBR, 2018) was adopted in July 2018. A new Local Plan is under development (see below), which will replace the current Local Plan and Twickenham Area Action Plan (LBR, 2013). Policy LP 15 Biodiversity protects and enhances biodiversity by safeguarding designated sites and connecting habitats. Major developments must deliver BNG through habitat creation, green infrastructure and soft landscaping. Harm to biodiversity must be avoided, mitigated, or compensated. The policy promotes the integration of biodiversity into development design and long-term ecological management. Policy LP18 River Corridors states that the council aims to protect the River Thames corridor's environment and character, ensuring developments enhance access, views, and public enjoyment. River-dependent uses will be preserved, with public riverside access, walks, and flood defence compatibility prioritised. Major developments must respect the Thames Policy Area's heritage and ecological significance. Policy LP 23 Water Resources and Infrastructure states that the

council will protect water resources, permit necessary water and wastewater facilities, and require developments to ensure adequate water, drainage, and sewerage infrastructure without harming the environment or local amenities.

6.2.49 The new Richmond Local Plan, 'The Best for our Borough' Draft for Consultation (Regulation 19) (LBR, 2023), is currently under examination. Policy 9 Water Resources and Infrastructure (Strategic Policy) states that the council will protect water resources, permit necessary water infrastructure with minimal environmental impact, and require developments to ensure adequate water, drainage, and sewerage capacity, with improvements funded if needed. Policy 34 - Green and Blue Infrastructure (Strategic Policy) requires that development proposals protect and enhance green spaces, particularly the Green Belt, Metropolitan Open Space Land, Local Green Space, and Other Open Land of Townscape Importance. Policy 39 – Biodiversity and Geodiversity – ensures that the council will protect and enhance sites designated for biodiversity and nature conservation value, such as SACs, SSSIs, National Nature Reserves (NNRs), LNRs, and SINCs, including their buffer zones, as well as designated geodiversity sites. Policy 39 also requires certain types of development to deliver 20% BNG. Policy 40 - Rivers and River Corridors states that the council will protect the natural and built environments of river corridors, enhance public riverside access, resist loss of river-dependent uses, promote biodiversity, and ensure developments complement the river's character and ecology.

London Borough of Hounslow (LBH)

6.2.50 The LBH Local Plan 2015 – 2030 (2015) and the emerging Local Plan 2020 – 2041 (programmed to be adopted in 2025, no changes to policies) set out the planning framework for this borough. The key objective that is relevant to aquatic ecology for this Project is Policy GB7 (Biodiversity), which sets out the borough's approach to protecting and enhancing the borough's natural environment and seeking to create net gains in the quantity and quality of the borough's biodiversity through taking a nature recovery network-led approach. Also relevant to the Project is Policy GB5 (Blue Ribbon Network), which aims to protect and enhance the borough's aquatic and riverside habitats in the Blue Ribbon Network, consistent with the Hounslow BAP (LBH, 2011), Hounslow Nature Recovery Action Plan (LBH, 2023) and London LNRS (CLA, 2025).

6.3 Consultation, engagement and scoping

6.3.1 Table 6.2 presents the section of the scoping opinion (Planning Inspectorate (PINS), 2024) relating to aquatic ecology and the Applicant's response to those comments. The Project consultation and engagement to date can be found in Section 4.5 of Chapter 4: Approach to Environmental Assessment.

Table 6.2 Key scoping opinion comments for aquatic ecology

PINS ID reference	Comment	Response
PINS (ID 2.1.2)	*Paragraph 2.2.1 of the Scoping Report states that the Proposed Development would intermittently supply up to a maximum of 75Ml/d. The ES should explain the transferral of this water including whether the inflow and outflow would operate at the same time, what the flow rate of transferral would be, if there would be any changes in thermal properties and if this has potential to alter flow rates within the River Thames. This should be used to inform relevant ES aspect assessments such as terrestrial and aquatic ecology, and water environment and flood risk.*	The transfer of water is detailed in Chapter 2: Project Description. The Project would include a new abstraction site on the River Thames close to Teddington Weir. The abstracted water would be replaced by recycled water from a new TTP within the existing Mogden STW site boundary. The proposed distance between the intake and outfall has been established based on modelling work and through discussions with the Environment Agency to ensure no risk of recirculation of discharged recycled water into the intake and to minimise the potential for reduced river flow between the intake and outfall. Potential effects have been scoped into the relevant chapters. Simultaneous operation of the intake and outfall would ensure that the volume of discharge would be the same as the volume abstracted.
PINS (ID 2.2.10)	*There are discrepancies between the section discussions and scoping summary tables. For example, Scoping Report paragraph 10.4.31 proposes to scope out impacts during construction on the River Crane and Whitton Brook for aquatic ecology, however, this is not included in the summary table at the end of the section and there is no discussion on impacts during operation.*	As per Section 6.7, no construction works nor operational activities are planned that would be hydrologically connected to the River Crane or Whitton Brook, therefore, they have been scoped out of the assessment.
PINS (ID 3.4.1)	*Impacts from pollution and INNS on species are not addressed in Scoping Report Table 9.6 without explanation. This is also not captured in the assessment on Aquatic Ecology. The ES should assess associated*	Section 6.8 assesses the potential effects of pollution and INNS during both the construction and operational phases of the Project.

PINS ID reference	Comment	Response
	significant effects on species as well as habitats, where they are likely to occur.	
PINS (ID 3.5.2)	*Scoping Report paragraph 10.4.31 states that although these waterbodies are in the study area, no construction works are proposed that would have hydrological connection to them. It is not stated as to whether this matter is proposed to be scoped out during operation.* *The Inspectorate agrees based on no hydrological connectivity between the Proposed Development and the waterbodies that impacts during operation can be scoped out of further assessment. However, for the reasons stated at ID 3.5.6 of this Opinion, the Inspectorate does not agree to scope this matter out for construction.*	As per Section 6.7, no construction works are planned that would be hydrologically connected to the River Crane or Whitton Brook, therefore, they have been scoped out of the assessment. Please also refer to the Applicant's response to PINS ID 3.5.6 below.
PINS (ID 3.5.6)	*The Inspectorate disagrees that there would be no pathway for effect during construction as additional noise and vibration and potential pollution from increased runoff may be introduced where the River Crane and Whitton Brook cross the River Thames. On this basis, the Inspectorate considers that this matter should be scoped in, and the ES should include an assessment of significant effects where they are likely to occur.*	As per Section 6.7, no construction works are planned which would be hydrologically connected to the River Crane or Whitton Brook. This is because the tunnelling for the recycled water conveyance tunnel is in the London Clay and would be more than 20m below ground level. The assessment in Section 6.8 considers the effect of noise and vibration from sites in close proximity to the River Thames. The assessment recognises that noise and vibration from construction activities could have temporary and localised impacts on aquatic species. Where practicable, sheet pile wall, if required for a cofferdam, would be installed using methods to reduce noise and vibration (Section 6.4).

PINS ID reference	Comment	Response
		Further assessment of the effects of underwater noise and vibration on aquatic receptors in the River Thames will be included in the ES.
PINS (ID 3.5.7)	*The Inspectorate considers no evidence has been provided to substantiate that there would be no difference to the impact of climate change in isolation or in combination with the Proposed Development given that it would include potential changes in water properties eg temperature increases from discharge. On this basis, the Inspectorate considers that this matter should be scoped in, and the ES should include an assessment of significant effects where they are likely to occur.*	Chapter 18: Climate Change and the in-combination climate impacts (ICCI) briefing note (Appendix 18.1) outlines the anticipated implications of climate change for the operation of the Project. Section 6.8 includes an assessment of climate change impacts, in combination with the Project.
PINS (ID 3.5.8)	*The Scoping Report identifies two overlapping study areas for assessment of aquatic ecology. These are 2km from the scoping boundary and 2km upstream and downstream of the proposed intake and outfall at Teddington Weir.* *It is not explained why 2km is an appropriate study area. As construction potentially includes deliveries via river, this may lead to increases in boat traffic (Scoping Report paragraph 10.5.15) which has potential to impact aquatic ecology beyond 2km.* *Scoping Report paragraph 10.4.7 states that the operational study area may extend based on the outcomes of hydraulic modelling.* *The ES should identify and justify an appropriate study area for construction and operation based on the anticipated impacts and effects.*	Chapter 12: Traffic and Transport assesses river freight, which is limited to the Burnell Avenue site. The effects associated with the use of river freight have been considered in this assessment for the Burnell Avenue site. The study area for the assessment is described and explained in Section 6.6

PINS ID reference	Comment	Response
	If the study area extends because of hydrological modelling, the ES should explain how this influences the scope of assessment and how this has been accounted for in the assessment of likely significant effects.	
PINS (ID 3.5.9)	*The baseline identifies that surveys have been undertaken between 2020 and 2022 and further surveys are proposed to inform the EIA. However, the Scoping Report does not identify what INNS are present based on current data. The ES should identify which INNS species are present and use this to form the basis of any relevant assessment of likely significant effects.*	INNS present have been described in Section 6.7, and potential effects related to the Project are described in Section 6.8.
PINS (ID 3.5.10)	*Consideration should be given to the use of watercourse buffers as a best practice measure where working within relevant proximity to a watercourse; the need for buffer mitigation should be agreed with the relevant consultation bodies.*	Watercourse buffers would be suggested as standard good practice (tertiary) mitigation where appropriate. Due to the nature of the Project involving building intake and outfall directly onto the watercourse, these may not be possible at all sites.
PINS (ID 3.5.11)	*The Applicant's attention is drawn to the comments of the Environment Agency (EA) and London Borough of Richmond upon Thames (Appendix 2 of this Opinion) regarding fish species present in the study area. The Inspectorate advises that these fish species should be considered in the assessment where significant effects are likely to occur.*	Relevant baseline data for fish are considered in Section 6.7 of this chapter and further detailed in Appendix 6.1 Aquatic Ecology Baseline. Fish species present are scoped in for assessment where significant effects are likely to occur.

6.3.2 Further scoping opinion feedback for aquatic ecology was received from the Environment Agency and other stakeholders, and is considered in Table 6.3.

Table 6.3 Further scoping opinion feedback for aquatic ecology

Stakeholder	Comment	Response
Environment Agency	The Biodiversity Gain Requirements (Irreplaceable Habitat) Regulations 2024 were flagged for consideration.	Considered in Section 6.2.
Environment Agency	Listing of the River Crane as a 'priority habitat' was a mapping error.	Corrected – only mudflats are now listed as priority habitat for the study area (Table 6.7).
Environment Agency	The use of the UKHab survey of habitats, Statutory Biodiversity Metric, and the EA Ecology and Fish Data Explorer is supported.	Noted.
Environment Agency	The use of the Watercourse Metric (where appropriate) is recommended.	The Project is regarded as an NSIP for which BNG guidance is yet to be published. The Project will contribute to and enhance the natural environment by providing net gains for biodiversity, defined as a project-wide minimum 10% increase in 'habitat units' as measured by the statutory Biodiversity Metric calculation (Defra, 2024a). See Appendix 7.2 Approach to Achieving BNG.
Environment Agency	Further INNS surveys are supported. Zebra mussel (*Dreissena polymorpha*) and quagga mussel (*Dreissena bugensis*), which have been detected near the Teddington Weir, are known to attach to pipes and other water transport utilities (biofouling). Floating Pennywort is also known to be present within the river at Mogden STW.	Biosecurity protocols are included in Section 6.4 as part of the standard good practice (tertiary) to be implemented. Floating pennywort and other INNS are described in Appendix 6.1 Aquatic Ecology Baseline.
Environment Agency	The commitment to providing net gains for biodiversity and alignment with the mitigation hierarchy, use of the latest statutory metric and Watercourse Metric (if	Proposed enhancement measures are outlined in Section 6.9. See Appendix 7.2 Approach to Achieving BNG.

Stakeholder	Comment	Response
	suitable), and alignment with local environmental objectives and programmes is supported.	
Environment Agency	Species-specific surveys are supported and should be reviewed by consultees as part of the PEI Report, particularly in regard to protected species such as water vole and otter. Methods and extents/ scope of the baseline surveys undertaken or proposed should be provided for comment.	Further details on baseline survey methodology are provided in Appendix 6.1 Aquatic Ecology Baseline.
Environment Agency	Off-site areas may also need to be surveyed in case these will need to be used as part of a mitigation strategy (e.g. translocation).	See Appendix 7.2 Approach to Achieving BNG.
Environment Agency	Natural England and the London Wildlife Trust should be consulted regarding designated and non-designated sites.	The Applicant will engage with both statutory and non-statutory consultees throughout the EIA process, sharing progress and findings as relevant. Engagement with stakeholders and the local community would continue as part of the RAPID gated process, the DCO process and general information sharing.
Environment Agency	There is the potential for the outfall velocity and temperature to attract fish and impede migration.	These effects are assessed in Section 6.8.
Environment Agency	An off-bank outfall is recommended to allow for an uninterrupted migration pathway for juvenile eel and to protect the important marginal habitat.	The design and position of the intake and outfall are described in Chapter 2: Project Description.
Environment Agency	To ensure maximum resilience to any impacts from the intake and particularly the outfall, a suitably located and designed eel pass should be installed on the Teddington Weir and lock complex.	The preliminary assessment of effects on eels undertaken as part of this chapter does not predict significant effects on eel migration. On this basis, the Project does not currently propose the inclusion of an eel pass.
Environment Agency	The effects of changes in water quality on aquatic receptors are flagged.	These effects are assessed in Section 6.8.

Stakeholder	Comment	Response
Environment Agency	Any mitigation that would require changes to the fish pass design in order to maintain functionality may require fish pass approval from the National Fish Pass Panel.	No changes to the fish pass design are required to accommodate the Project.
Canal & River Trust	The Grand Union Canal north of the site is identified as a potential ecological receptor.	The Grand Union Canal is located beyond the 2km study area, as outlined in Section 6.6, with no identified hydrological connection to the Project activities.
Elmbridge Borough Council	The River Thames Scheme should be considered in the design and cumulative effects assessment due to the overlap of construction phases.	The River Thames Scheme (Environment Agency and Surrey County Council, 2025) is a flood alleviation scheme located upstream of the proposed Project, which may impact operations. The River Thames Scheme has been considered in the assessment of inter-project effects in Section 6.8.
LBR	The scheme must comply with the Regulators' Alliance for Progressing Infrastructure Development (RAPID) gated process and Environmental Agency permitting requirements.	As per section 4.6, the Project is progressing through the RAPID gated process. The RAPID gated process runs alongside but is separate from the DCO consenting process. Early consultation during the scoping phase took place with relevant authorities including the Environment Agency. Consultation and engagement related to aspects of aquatic ecology are outlined in Section 6.3 of this chapter. Activities will be undertaken in accordance with any relevant licence or permitting regulations, in agreement with the licence-granting body and the relevant regulators.
LBR	A commitment to BNG and application of the Watercourse Unit Module is required in both terrestrial and aquatic habitats.	The Project is regarded as an NSIP for which BNG guidance is yet to be published. The Project will contribute to and enhance the natural environment by providing net gains for biodiversity, defined as a project-

Stakeholder	Comment	Response
		wide minimum 10% increase in 'habitat units' as measured by the statutory Biodiversity Metric calculation (Defra, 2024a). See Appendix 7.2 Approach to Achieving BNG.
LBR	Development should contribute to the improvement of water quality and not change the chemical makeup of the river water and its temperature.	The impacts on water quality and temperature are assessed in Chapter 5: Water Resources and Flood Risk, and effects on aquatic receptors are assessed in Section 6.8.
LBR	The Two-lipped door snail needs to be scoped into protected species.	This is a terrestrial species that is assessed in Chapter 7: Terrestrial Ecology.
LBR	Clarification on the rationale for and the scope of further baseline surveys was requested.	Further details on baseline survey methodology are provided in Appendix 6.1 Aquatic Ecology Baseline. Surveys and monitoring to refine baseline data and assess biodiversity conditions will continue in 2025.
LBR	*Salmo trutta* was flagged for inclusion in the list of protected and notable species.	6.3.3 Included in Table 6.9.
LBR	The impact on water quality related to the transfer of abstracted water to Lockwood Pumping Station via the Thames Lee Tunnel should be assessed.	The Drinking Water Inspectorate oversees the regulation of drinking water quality in England and Wales and therefore water quality has not been assessed in the PEI Report.
LBR	The assessment should consider the cumulative impacts of components in the treated effluent on the aquatic flora and fauna and organisms at the aquatic/terrestrial interface.	Section 6.8 includes an assessment of the effects of changes in water quality, including the anticipated effects on nutrient levels in the construction and operational phases.

Scope of the assessment

6.3.4 A summary of the impacts to be scoped in or out of the PEI Report and ES Aquatic Ecology assessment is provided in Table 6.4. This summary is based on the outcome of the assessments in the Scoping Report as well as the scoping opinion and subsequent technical engagements with the Environment Agency.

6.3.5 The Northweald Lane site has been removed from the Project design for this PEI Report, as detailed in Chapter 3: Consideration of Alternatives. The Project now includes an adit to the Thames Lee Tunnel (TLT) within the Burnell Avenue site from the connection shaft, eliminating the need for a TLT connection shaft at Northweald Lane.

Table 6.4 Summary of potential impacts scoped in for assessment at PEI Report and ES

Project component	Scoped in/out	Comment
Construction phase		
Mogden STW site	Out	Proposed works at Mogden STW are not in proximity to watercourses or aquatic species, therefore, no pathways for impact have been identified.
Ham Playing Fields site	In	Ham Playing Fields site was selected for the intermediate shaft, which limits aquatic impacts. However, construction of pipework associated with dewatering extends to the river and could impact River Thames ecology through habitat loss, sedimentation, pollution, and noise and vibration. Standard good practice (Section 6.4) aims to minimise effects on aquatic species, water quality, INNS and biodiversity.
Burnell Avenue site	In	The Burnell Avenue site construction could impact River Thames ecology through habitat loss, sedimentation, pollution, noise and vibration. Standard good practice and embedded design (primary) mitigation (Section 6.4) and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity.
Northweald Lane site	Out	This site is no longer included in the Project design. An adit to the TLT is now included within the Burnell Avenue site.
Tudor Drive site	Out	No surface waters identified in proximity to the site, therefore, no pathways for impact are identified.
Conveyance tunnel	Out	Conveyance tunnel would be located at sufficient depth and within the London Clay and would not be in hydrological connectivity with surface waters; therefore, no pathways for impact are identified.
Operational phase		
Mogden STW site	In	Change from Scoping: this site has now been scoped in. Operation of Mogden STW reduces effluent discharge, benefiting the tidal River Thames water quality by lowering temperature, increasing dissolved oxygen and sedimentation. Impacts on aquatic ecology, macroinvertebrates, fish and protected species are negligible.
Ham Playing Fields site	Out	No likely significant effects are expected, as no disturbance or pathway for impact is identified.

Project component	Scoped in/out	Comment
Burnell Avenue site	In	The operation of Burnell Avenue site could cause minor, localised impacts on aquatic ecology, including temperature, velocity, water quality changes and entrainment.
Northweald Lane site	Out	This site is no longer included in the Project design. An adit to the TLT is now included within the Burnell Avenue site.
Tudor Drive site	Out	The TLT connection shaft at Tudor Drive site is not in proximity to watercourses or aquatic species; therefore, no pathways for impact identified.
Conveyance tunnel	Out	Conveyance tunnel would be located at sufficient depth and within the London Clay and would not be in hydrological connectivity with surface waters; therefore, no pathways for impact identified.
Climate change	In	Change from Scoping: Impact of climate change in isolation or in combination with the Project has now been scoped in. Section 6.8 includes an assessment of climate change impacts, in combination with the Project.

6.4 Embedded design (primary) mitigation and standard good practice (tertiary)

Embedded design (primary) mitigation

6.4.1 The Applicant has worked through the design process to avoid and reduce environmental impacts through the use of embedded design (primary) mitigation. Chapter 3: Consideration of Alternatives details the design alternatives that have been considered, including the environmental factors which have influenced the decision making in this regard.

6.4.2 Embedded design (primary) mitigation relevant to aquatic ecology includes:

a. If there is a requirement for cofferdams or use of in-river sheet pile walls, installation methodology to include methods to reduce noise and vibration where reasonably practicable (Provisional Commitment Reference No. 8 (PCR 8)).

b. Direction of outfall (if bankside) to be angled from the perpendicular of the riverbank to mitigate disturbance of river flow (PCR 9).

c. In-river works would be undertaken using appropriate engineering methods, which could include the use of sheet-piled areas where practicable to reduce impacts on water quality (PCR 47).

d. Intake will be designed to minimise ingress of fish in consultation with the regulators (PCR 116).

e. Intake screen installation, design and operational protocol would be designed to comply with the existing regulations, including the Eels (England and Wales) Regulations 2009 and relevant guidance, to reduce the risks of entrainment and impingement of fish, including European eel (PCR 26).

Standard good practice (tertiary)

6.4.3 Standard good practice (tertiary) mitigation measures would occur as a matter of course due to legislative requirements or standard sector practices. Standard good practice (tertiary) measures relevant to aquatic ecology include:

a. The Project would comply with the WFD (2000/60/EC) and WFD Regulations, ensuring no deterioration of WFD water bodies and achieving ecological objectives.

b. The Project would include prevention measures such as biosecurity protocols to reduce the spread of INNS during the construction phase (PCR 24).

c. As required under the Environment Act 2021, mandatory BNG requires an overall net gain of 10%. The Project is regarded as an NSIP for which BNG guidance is yet to be published. The Project will contribute to and enhance the natural environment by providing net gains for biodiversity, defined as a project-wide minimum 10% increase in ‘habitat units’ as measured by the statutory Biodiversity Metric calculation (Defra, 2024a) (PCR 25).

d. If in-river percussive piling is used, it would be carried out with a soft-start method to reduce noise and vibration effects where reasonably practicable.

The JNCC statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010) would be followed where practicable and as far as this is relevant to the freshwater River Thames and tidal River Thames environment where works would be carried out. Supervision of the piling activity would be undertaken by a suitably qualified ecologist (PCR 27).

e. If it is determined that percussive piling is required for in-river works, then avoiding sensitive timings for fish would be considered. This would factor in the timing and duration of the works. Any restrictions on the timing of in-river pile driving activities would be agreed upon with the Environment Agency (PCR 117).

f. A suitably qualified ecologist would be present during any dewatering activities. During construction and dewatering of any cofferdams, fish rescue would take place, and any fish caught within the cofferdam would be returned to the main channel of the River Thames prior to the final drain-down (PCR 28).

g. The Project would incorporate sensitive lighting strategies where reasonably practicable to reduce impacts on aquatic species (PCR 19d).

h. Any relevant protected species licences would be obtained as necessary (PCR 20).

i. Construction works would be programmed, where practicable, to adhere to host local authorities' standard working hours outlined in Chapter 2: Project Description under the 'working hours' section. Certain activities that need to be conducted outside the standard working hours may require consultation and agreement with the relevant local authority, depending on the location and nature of the activity. Examples of activities are also provided in the 'working hours' section in Chapter 2.

j. To reduce impacts, sensitive lighting strategies would include avoiding directing light into the river and minimising light spill onto the river by using shielding and directional lighting. Light intensity would be reduced where possible, and where a higher light intensity is required, these works would be scheduled for daylight hours (PCR 19d).

k. Further standard good practice (tertiary) related to effects on water resources is outlined in Chapter 5: Water Resources and Flood Risk and within Appendix 4.3 draft CoCP.

6.5 Assessment methodology

General approach

6.5.1 The ecological assessment has been undertaken with reference to recognised guidance, including Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2024). The assessment methodology itself is semi-quantitative, based on empirical data and professional judgement.

6.5.2 The aims and objectives of the assessment are to:

a. Determine the value/importance of ecological features (or receptors) to be affected by the Project.

b. Characterise (e.g., extent, magnitude, duration, reversibility, timing and frequency) the potential effects of the Project on identified aquatic ecological features within the study area.

c. Identify embedded design (primary) mitigation measures and standard good practice (tertiary) to avoid, minimise and/or reduce the likely significant effects.

d. Assess the significance of the potential effects and identify ecologically significant effects of the Project in respect of aquatic ecology.

e. Identify any required additional (secondary) mitigation and enhancement measures.

f. Establish residual likely significant effects after additional (secondary) mitigation has been implemented.

Assessing the significance of effects

6.5.3 The aquatic ecology assessment is undertaken following the guidelines (CIEEM, 2024) as detailed below and does not follow the generic PEI Report assessment methodology as presented in Chapter 4: Approach to Environmental Assessment.

Determining the value/importance of ecological features

6.5.4 The sensitive receptors identified in Section 6.7 were attributed a value/importance according to the criteria set out in Table 6.5, which have been created following CIEEM Guidelines (CIEEM, 2024). Consideration was also given to distinguish both biodiversity value and legal status.

Table 6.5 Criteria for determining the value/importance of ecological features

Value	Criteria
International and European	An internationally designated site or candidate site, i.e. SPA, provisional SPA, SAC, candidate SAC, Ramsar site, or area which would meet the published selection criteria for designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat that are essential to maintain the viability of a larger whole. Sites supporting populations of species of international or European importance.
National (England)	A nationally designated site, i.e. SSSI, NNR, or a discrete area which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines). A viable area of a priority habitat identified in the UK BAP (JNCC, 2012a) or smaller areas of such habitat essential to maintain wider viability. Viable populations of nationally important species that are of threatened or rare conservation status, including those identified as priority species in the UK BAP.

Value	Criteria
Regional (South East)	Sites that exceed the Metropolitan-level designation but fall short of SSSI selection criteria. Smaller areas of key habitat identified in the UK BAP (JNCC, 2012a) that are essential to maintain wider viability. Viable populations of nationally scarce species identified in Regional or Metropolitan BAP and/or regularly occurring populations of a regionally important species.
Metropolitan/ County (Greater London)	Sites recognised by local authorities, e.g. Sites of Metropolitan Importance for Nature Conservation, SINCs, or considered to meet published ecological selection criteria for such designation. A viable area of key habitat identified in the London BAP. A LNRS designated as one of the best for habitats and/or species assemblages in the metropolitan area. Viable populations of regionally scarce species identified in Regional or Metropolitan BAP and/or regularly occurring populations of a species important at the metropolitan scale.
Borough/District (LBH, LBR and RBK)	Site recognised by local authorities, e.g. Sites of Borough Importance or considered to meet published ecological selection criteria for such designation. A viable area of habitat identified in the District BAP. A LNR designated as one of the best for habitats and/or species assemblages in the borough area. Viable populations of species identified in the Metropolitan BAP and/or regularly occurring populations of species important at the borough scale.
Local (e.g. within 1km of above ground sites)	Areas of habitat or populations/assemblages of species that appreciably enrich the local habitat resource (e.g. ponds). Sites that retain other elements of semi-natural aquatic vegetation due to their size, quality or wider distribution within the local area. Viable populations of species identified in the Borough BAP and/or regularly occurring populations of species important at the local scale.
Within the Zone of Influence (ZoI) only	Sites that retain habitats and/or species of limited ecological importance due to their size, species composition or other factors.

6.5.5 The next step was to determine which ecological features are of sufficient importance to be included in the assessment, with Guidelines (CIEEM, 2024) recommending this approach to ensure attention is focused on those receptors that are susceptible to effects. Therefore, the thresholds for inclusion within the Ecological Impact Assessment (EcIA) are defined as:

a. Any sites, habitats and/or species that are considered to be of at least Local biodiversity value

b. Sites, habitats and/or species that receive legal protection or are referenced in policy (e.g. BAPs)

c. Habitats that form corridors and commuting networks for important species

Characterising impacts and effects

6.5.6 Once value/importance was assigned to the ecological features and those of sufficient importance for inclusion were identified, an assessment of the likely effects on the features arising from the Project was undertaken.

6.5.7 In the Guidelines for EcIA in the UK and Ireland (CIEEM, 2024), the terms ‘impact’ and ‘effect’ have specific meanings. ‘Impact’ refers to an action that results in changes to an ecological feature. For example, construction activities such as clearing riparian vegetation overhanging a watercourse, would be considered an impact. It is essentially the direct cause of change. An ‘effect’ is the outcome or consequence of an impact on an ecological feature. For instance, the effect of clearing overhanging riparian vegetation might be a decrease in the local macroinvertebrate or fish population due to the loss of habitat. The effect represents the broader consequences of the impact on the ecosystem.

6.5.8 The identification of effects refers to ecological structure and function, and the effects were assessed in the context of the predicted baseline conditions, as described in Section 6.7.

6.5.9 When describing ecological effects, reference has been made to the following characteristics as required:

a. Positive or negative impact, according to whether the change is in line with nature conservation objectives and policy.

b. Magnitude – refers to the size, amount, intensity and volume of an effect, quantitatively where possible (e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population).

c. Extent – the spatial or geographical area over which an effect may occur.

d. Duration – the time period for which an effect is expected to last. Effects may be described as short, medium or long term, and permanent or temporary. These periods are defined in Chapter 4: Approach to Environmental Assessment.

e. Reversibility – a permanent effect is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible effect is one from

which spontaneous recovery is possible or which may be counteracted by mitigation.

f. Timing and frequency – where the number of times an activity occurs would influence the resulting effect. This should consider whether effects are constantly ongoing, separated but recurrent, or single events and whether they occur during critical seasons or life stages of habitats or fauna.

Determining ecologically significant effects

6.5.10 The guidance (CIEEM, 2024) defines ecologically significant effects as '*impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species*. A definition of 'integrity' is provided in the Government Circular: Biodiversity and Geological Conservation (Defra, 2005): '*The integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*'. The importance/value of the feature that may be affected by the Project and the type of effect were considered when determining the geographical scale at which the effect was deemed to be a likely significant effect for this assessment.

6.5.11 The significance of any identified impact has been determined through the application of guidance (CIEEM, 2024) alongside professional judgement.

6.5.12 As part of the design and assessment process, measures to deliver ecological mitigation, enhancement and compensation were reviewed, with any subsequent implementation to be secured through a CoCP.

6.5.13 Ecologically significant effects are effects that are assessed as being likely significant effects following the implementation of proposed embedded design (primary) mitigation and standard good practice (tertiary) measures (as outlined in Section 6.4). An assessment of potential effects was undertaken to determine the significance of the effects on ecological features as a result of the Project.

Determining the residual likely significant effects

6.5.14 Residual likely significant effects are defined as likely significant effects that remain after the implementation of all types of mitigation measures (including additional (secondary) mitigation measures identified and implemented to address likely significant effects identified at earlier stages of the assessment). An assessment of identified residual likely significant effects has been undertaken.

Assumptions and limitations

6.5.15 Through further design development, the potential piling methodology for in-river construction would be refined. Currently, pile-driving methods under consideration include push-in piling, vibro-piling, and percussive piling. Final methods have not been confirmed. At the time of writing, consideration of these options is underway, and the results would be used to determine the need for further mitigation if required.

6.5.16 In-river works would be undertaken using appropriate engineering methods. Sheet piled areas/cofferdams would be considered to be the most intrusive method and are therefore assessed as the worst case in this chapter. If alternative engineering methods are identified, it is assumed that these would have an equivalent or greater level of control and effectiveness in reducing impacts on water quality compared to a cofferdam.

6.5.17 For this assessment, the cofferdams are considered to be in place for a limited period. The period of time is yet to be determined, but the maximum time would be 18 months. At the outfall location, the cofferdam is assumed to extend into the river by 20m. At the intake location, the cofferdam has been assumed to extend into the river by 13m.

6.5.18 The TELEMAC-2D River Thames hydrodynamic model (see Appendix 5.1 Surface Water Resources and Water Quality Baseline Information) includes the current infrastructure design at Teddington Weir and an understanding of the operation of the gates and sluices in the weir at times of low river flow, provided by the Environment Agency Waterways team. The model includes the thermal properties of water to account for plume mixing of the recycled water. Field validation of the baseline water column thermal profile of the River Thames is not feasible due to constraints in placing fixed depth sensors in the navigable channel, so the model thermal mixing is based on scientific principles alone.

6.5.19 The TELEMAC-3D hydrodynamic and water quality model of the Thames Tideway has a long history of development by the Port of London Authority and Thames Water, working collaboratively with the Environment Agency. Model bathymetry is from survey information. Current profiles, tidal water levels, salinity and water quality are validated using field data. However, it remains a mathematical model.

6.5.20 It is assumed that any water generated by the Project through the dewatering of excavations for tunnel or shaft construction from on-site construction processes or site operations would be appropriately disposed of in accordance with standard good practice (tertiary) measures, as detailed in Chapter 5: Water Resources and Flood Risk.

6.5.21 The use of a jack-up barge has been considered in this assessment for the cofferdam installation and excavation of spoil from activities occurring at the Burnell Avenue site. The feasibility of this option would be considered further in the ES.

6.6 Study area

6.6.1 The study area has been informed by the Zone of Influence comprising the draft Order limits and areas outside, in which important ecological features (including habitats and species) have the potential to be affected by biophysical changes as a result of the Project. The study area broadly aligns with that outlined in Chapter 5: Water Resources and Flood Risk.

6.6.2 The study area begins 2km upstream of the intake location and finishes at Battersea Bridge. Downstream of Battersea Bridge, marine conditions exert greater influence on estuarine processes especially at times of low river flow conditions and low river influence when the Project would be operational. The Environment Agency has classified the reach downstream of Battersea Bridge as a separate WFD water body due to estuarine processes identified by differences in salinity and water level fluctuation. Therefore, downstream of Battersea Bridge, it was identified that there would be no significant impacts due to the Project.

6.6.3 The study area includes a 2km buffer extent from the draft Order limits identified through a desk-based review of sensitive receptors and potential pathways, and with consideration of the hydraulic potential pathways identified as part of the water resources assessment (Chapter 5: Water Resources and Flood Risk) and is based on professional judgement. The study area may be extended to assess the operational impacts of the Project if requirements are identified in design development for the ES, which is consistent with the approach to be undertaken as part of Chapter 5.

6.6.4 The study area is shown in Figure 6.1 in Volume 2 PEI Report Figures and includes:

a. International, national and local statutory sites within 2km of the draft Order limits

b. Water features within 250m of the draft Order limits, which are sensitive to disturbance

c. Water features within 100m of the draft Order limits which are not hydrologically linked to the above ground sites

d. Water features identified in Chapter 5 where there are hydrological, hydrodynamic, physico-chemical or water quality effects from the operation of the Project. These include the freshwater River Thames from the intake to Teddington Weir and the tidal River Thames (also known as the Thames Tideway) from Teddington Weir to Battersea Bridge.

6.6.5 Within these water features, the relevant aquatic ecology receptors for the ES have been identified. The individual study areas for each specific aquatic ecological receptor comprise the land within the draft Order limits and a buffer area outside that boundary according to the sensitivity of the receptor. The same study areas would be used for the ES. The relevant aquatic ecological receptors and corresponding buffer areas are detailed in Table 6.6.

Table 6.6 Buffer area for aquatic ecological receptors

Receptors	Buffer area
Phytoplankton	Within 2km of the draft Order limits where hydrological connectivity exists, to Battersea Bridge
Phytobenthos (diatoms) – freshwater only	Within 2km of the draft Order limits where hydrological connectivity exists, to Battersea Bridge
Aquatic macrophytes and tidal macroalgae	Within 2km of the draft Order limits where hydrological connectivity exists, to Battersea Bridge
Aquatic macroinvertebrates (freshwater and estuarine)	Within 2km of the draft Order limits where hydrological connectivity exists, to Battersea Bridge
Fish (including freshwater, estuarine and migratory fish)	Within 2km of the draft Order limits where hydrological connectivity exists, to Battersea Bridge
Internationally and nationally designated statutory sites (excluding SACs with only bats as a qualifying feature, SPAs, Ramsar sites, SSSIs and NNRs)	Within 2km of the draft Order limits where hydrological connectivity exists
Locally designated statutory and non-statutory sites (LNR and SINC)	Within 2km of the draft Order limits where hydrological connectivity exists
Priority habitats	Within 2km of the draft Order limits where hydrological connectivity exists
Protected and notable species	Within 2km of the draft Order limits where hydrological connectivity exists
Protected and notable species	Noise and vibration-sensitive aquatic species within 2km of the draft Order limits
INNS	Within 2km of the draft Order limits where hydrological connectivity exists

6.7 Baseline conditions

Baseline sources

6.7.1 The existing baseline has been established through a desk-based review of available data, and targeted surveys were completed as part of a monitoring programme. The monitoring programme was initially developed in 2020 and has been subsequently amended to include additional features as the understanding of the design and operation of the Project has developed. This

monitoring programme applies standard good practice (tertiary)guidance to collect additional data and was subject to consultation with the relevant regulators.

6.7.2 The reaches of the River Thames within the study area include the freshwater and tidal River Thames, the former extending from 2km upstream of the intake location to Teddington Weir, the latter extending downstream from Teddington Weir to Battersea Bridge. Baseline data are summarised in Appendix 6.1 Aquatic Ecology Baseline, and all monitoring data from 2020 to 2023 are available in the Aquatic Ecology Consolidated Reports (Thames Water, 2024a) and the Fisheries Baseline Consolidated Report (Thames Water, 2024b). The surveys and baseline data will continue to be updated to support the ES. Where survey or monitoring data from 2024 have been made available, these have been included and identified in the data range for the individual dataset. These included targeted macrophyte and fish surveys around the Burnell Avenue site (see Appendix 6.1) in August 2024.

6.7.3 The evidence base for aquatic ecology includes freshwater and estuarine fish species, weir pool and marginal habitat assessment and migratory fish species. Baseline data surveys for aquatic ecology have been conducted for aquatic macroinvertebrates (freshwater and estuarine), marginal habitat assessment, plants/diatoms, and macroalgae, angiosperm and phytoplankton, with details of baseline conditions provided in Appendix 6.1 and summarised within Table 6.7.

Table 6.7 Summary of aquatic ecology baseline data

Receptor	Feature(s)	Baseline data/reports
Phytoplankton	River Thames (Habitats – ponds, ditches, lakes and rivers)	Review of data from Environment Agency Ecology and Fish Data Explorer from 2011 to 2023
Phytobenthos (diatoms)		
Aquatic macroinvertebrates, freshwater and estuarine		
Aquatic macrophytes and macroalgae	River Thames (Habitats – ponds, ditches, lakes and rivers)	Review of data from Environment Agency Ecology and Fish Data Explorer from 2011 to 2023 Biological records data Project specific baseline data summarised in Aquatic and Estuarine Ecology Baseline Consolidated Report (Thames Water, 2024a) A one-off targeted macrophyte survey in August 2024 around the Burnell Avenue site (see Appendix 6.1 Aquatic Ecology Baseline) Macroalgae Monitoring 2023 (Jacobs UK Ltd, 2023)

Receptor	Feature(s)	Baseline data/reports
Fish (WFD/NERC) freshwater and estuarine (including European eel)	River Thames (Habitats – ponds, ditches, lakes and rivers)	Environment Agency Ecology and Fish Data Explorer data from 2011 to 2023 throughout the study area (both river and estuary) Assessment of Environment Agency fisheries survey data, including boom boat, hydroacoustic and Atlantic salmon and sea trout records post-2013 Environment Agency / ZSL River Thames fish and eel trap data Project specific baseline data summarised in Fisheries Baseline Consolidated Report (Thames Water, 2024b) Targeted fish survey in August 2024 around the Burnell Avenue site (see Appendix 6.1)
Migratory fish (including European eel)	River Thames (Habitats – ponds, ditches, lakes and rivers)	Environment Agency Ecology and Fish Data Explorer data from 2011 to 2023 Study area water quality data informing olfactory cues of diadromous fish (that migrate between freshwater and saltwater environments) and salmonid migratory cues Assessment of WFD and Environmental Quality Standards Directive chemical quality throughout the study area (both river and estuary) for the range of reference conditions Project specific baseline data summarised in Fisheries Baseline Consolidated Report (Thames Water, 2024b)
Statutory and non-statutory designated sites	Internationally and nationally designated statutory sites (SAC, SPA, Ramsar, SSSI, NNR). Locally designated statutory and non-statutory sites (LNR, SINC).	Full list can be found in Table 6.8.
Protected and notable species	River Thames (Habitats – ponds, ditches, lakes and rivers)	Environment Agency Ecology and Fish Data Explorer data Mammals - Review of Greenspace Information for Greater London (GiGL) data (GiGL, 2025) and ZSL reports in relation to bottle-nosed

Receptor	Feature(s)	Baseline data/reports
		dolphin, common porpoise, common seal and grey seal distribution within the tidal River Thames Project specific baseline data summarised in Aquatic and Estuarine Ecology Baseline Consolidated Report (Thames Water, 2024a) Fisheries Baseline Consolidated Report (Thames Water, 2024b)
INNS	River Thames (Habitats – ponds, ditches, lakes and rivers)	National Biodiversity Network data search within study areas Project specific baseline data summarised in Aquatic and Estuarine Ecology Baseline Consolidated Report (Thames Water, 2024a) Fisheries Baseline Consolidated Report (Thames Water, 2024b)
Priority habitats	Mudflats	Priority Habitats Inventory (England) (Defra, 2024b)

Baseline environment

Phytoplankton

6.7.4 Phytoplankton, although not generally monitored for WFD river classification, are part of the WFD classification for coastal and transitional waters (see more information in Appendix 5.3 Water Framework Directive Screening) and are an essential component of aquatic ecosystems such as in the freshwater and tidal River Thames. The deeper, slower-flowing environment created by the large size of the freshwater River Thames and water level control structures (for navigational purposes) particularly favour phytoplankton communities in the study area. These communities, along with detritus (and to a lesser extent, macrophytes) are the predominant food sources for the aquatic communities associated with the freshwater and tidal River Thames in the study area. The WFD waterbodies are shown in Figure 5.1 in Volume 2 PEI Report Figures.

Freshwater River Thames

6.7.5 The baseline data available for phytoplankton in the freshwater River Thames are presented in Appendix 6.1 Aquatic Ecology Baseline, along with an analysis of seasonal patterns and potential water quality drivers of community composition and abundance.

6.7.6 The data for the River Thames show that chlorophyll (used as a measure of phytoplankton biomass) follows a consistent annual pattern of increasing in the spring, driven by the growth of diatoms, peaking from the end of April to early May, with the size of the peak increasing with distance downstream of the study area. Typically, by June, diatoms and nano-chlorophytes have reduced in number, and pico-chlorophytes are dominant and continue to be so through to

the autumn before all phytoplankton drop to low numbers throughout the winter. Diatom and chlorophyll concentrations sometimes produce very large peaks in late August to end of September. Cyanobacteria make up only a small proportion of the total phytoplankton biomass, and their blooms tend to be sporadic and short-lived, and they are most common in August.

6.7.7 Project-specific data were collected for the freshwater reaches of the River Thames between 2021 and 2024. These samples were indicatively assessed following the UKTAG Transitional Water Assessment Method and the Transitional Water Phytoplankton Tool (UKTAG, 2014), considering inner salinity zone (1-25ppm) threshold values as an approximation for phytoplankton values in freshwater. Phytoplankton samples from the River Thames at Surbiton and Walton-on-Thames, upstream of the Project, indicate a 'Poor' ecological status whilst sampling of the freshwater Thames at Teddington indicates a 'Moderate' status.

Tidal River Thames

6.7.8 The phytoplankton element for the tidal River Thames within the study area (Thames Upper (Tideway) waterbody (GB530603911403)) was of 'Good' status in 2022 and also in 2019. Community composition and seasonal patterns in the upper area of the tidal River Thames (Richmond Pound) sampled in 2024 were similar to those observed for the freshwater River Thames detailed above. Phytoplankton sampling at the two sites within Richmond Pound in 2024 indicated a 'Moderate' ecological status in this area.

Phytobenthos (diatoms)

6.7.9 Phytobenthos (diatoms) are considered good indicators of water quality conditions, notably indicating where high phosphate is a potential cause of water quality impacts. A full description of the baseline monitoring is presented in Appendix 6.1.

6.7.10 No diatom data are available from the tidal River Thames. Phytobenthos are not used as water quality indicators in the same way within tidal systems where the focus of monitoring is on the extent of filamentous algae and macroalgae (UKTAG, 2024) and are therefore not considered a receptor for the tidal River Thames.

6.7.11 Monitoring from the freshwater River Thames indices indicated a freshwater phytobenthos community with a high tolerance to nutrients but not a high organic pollution tolerance. Indices recorded as part of the baseline indicated slow to moderate flow conditions and moderate levels of siltation. Ecological quality ratios suggested there may be some impacts on the phytobenthos community due to nutrient levels, but only at one of the sites sampled.

6.7.12 The Environment Agency classified the lower River Thames (Egham to Teddington) as having 'Poor' status in Cycle 2 (2019) and in Cycle 3 (2022), leading to a combined classification of 'Poor' status for macrophytes and phytobenthos in both years (Environment Agency, 2023).

Aquatic macrophytes and macro-algae

6.7.13 A full outline of the baseline monitoring for aquatic macrophytes and macro-algae is presented in Appendix 6.1.

Freshwater River Thames

6.7.14 Along the freshwater River Thames within the study area, the bank profile is largely modified, with artificial concrete banks and steep/vertical banks and channel profiles, which leaves only small areas of marginal habitat for macrophytes to colonise. Where suitable habitat is available the bankside vegetation consists of stands of alder (*Alnus glutinosa*) and willow species (*Salix* sp.) and small areas of marginal aquatic species. Common marginal species include water mint (*Mentha aquatica*), gypsywort (*Lycopus europaeus*), yellow iris (*Iris pseudacorus*) and purple loosestrife (*Lythrum salicaria*).

6.7.15 The in-channel macrophyte community consists largely of lowland macrophytes with a preference for deep, slow-flowing, base-rich waterbodies. Common species include yellow water lily (*Nuphar lutea*), unbranched bur-reed (*Sparganium emersum*), hornwort (*Ceratophyllum demersum*), arrowhead (*Sagittaria sagittifolia*), and the INNS Nuttall's waterweed (*Elodea nuttallii*). Green filamentous algae (*Cladophora glomerata/Rhizoclonium hieroglyphicum*) and mosses like greater water-moss (*Fontinalis antipyretica*) and fountain pocket-moss (*Octodiceras fontanum*) (often associated with concrete structures) are also frequent.

6.7.16 In the freshwater River Thames, three designated macrophyte species were identified from baseline conditions. Information on these species can be found in the discussion of baseline conditions for 'Protected and notable species'.

6.7.17 Indices based on baseline monitoring showed a community tolerance of high nutrient levels. Indicative WFD classifications also suggest that nutrient levels at the sites were slightly elevated compared to what would be expected for the River Thames. WFD classifications from the baseline data were indicative of 'Moderate' to 'High' ecological status.

6.7.18 The freshwater River Thames in the study area was of WFD 'High' status for the macrophyte sub-element in both Cycle 2 (2019) and Cycle 3 (2022) (Environment Agency, 2023). However, it should be noted that when combined with the phytobenthos sub-element, the overall WFD biological status of the combined macrophytes and phytobenthos quality element is 'Poor'. The WFD waterbodies are shown in Figure 5.1 in Volume 2 PEI Report Figures.

6.7.19 A targeted macrophyte survey was conducted in August 2024 to assess juvenile fish habitat availability upstream of Teddington Weir. Results from the survey showed the riverbed around the Burnell Avenue site and upstream of Teddington Weir was sparsely vegetated, with frequent to semi-continuous beds of macrophytes confined to strips in marginal areas. The community around the Burnell Avenue site was similar to other areas monitored for the recording of baseline conditions. More information on the results of this survey

and the sites used for the recording of the baseline conditions can be found in the Macrophyte and Macroalgae Baseline Conditions section within Appendix 6.1.

Tidal River Thames

6.7.20 The baseline macroalgae community for the tidal River Thames is based on baseline monitoring conducted downstream of Teddington Weir. From the available baseline, species diversity and abundance were low, which is typical of tidal river reaches. The community composition was made up mostly of green filamentous algae and a small number of freshwater marginal species. More information on the baseline community can be found in the Macrophyte and Macroalgae Baseline Conditions section within Appendix 6.1.

6.7.21 Macrophyte indices were not indicative of high nutrient enrichment; however, WFD indicative classifications based on a low number of species may not be fully reliable. Baseline data resulted in a WFD classification indicative of 'Good' ecological status.

6.7.22 Data relating to the macroalgae element for the Environment Agency WFD classification of the tidal River Thames within the study area were not publicly available in 2019 and 2022.

Aquatic macroinvertebrates

6.7.23 Macroinvertebrate communities play an important role in the food chain within rivers, both as food for other groups such as fish and birds and playing essential roles in ecological processes, including filtering and the shredding and processing of organic material such as dead leaves and plant matter. A full outline of the baseline monitoring for aquatic macroinvertebrates is presented in Appendix 6.1.

Freshwater River Thames

6.7.24 The majority of the macroinvertebrate community within the freshwater River Thames was made up of the following taxonomic groups: molluscs (Mollusca), worms (Annelids), crustaceans (Crustacean), caddisflies (Trichoptera), mayflies (Ephemeroptera) and true flies (Diptera). Molluscs were the taxon group with the highest abundance and diversity of taxa, and mussels form an important part of the community.

6.7.25 Taxa which may be sensitive to environmental changes were also present: crawling water beetles (Haliplidae), riffle beetles (Elmidae), long-horned caddisfly (Leptoceridae and Molannidae), small square-gilled mayfly (Caenidae) and burrowing mayfly (Ephemeridae).

6.7.26 Macroinvertebrate indices from the freshwater River Thames were indicative of a community with tolerance to high nutrient levels. Indices also demonstrated that the macroinvertebrate community may be under stress due to low flows and sedimentation. More information on the macroinvertebrate community can be found in the Aquatic Macroinvertebrate section within Appendix 6.1.

6.7.27 In the freshwater River Thames, 14 designated macroinvertebrates were identified from baseline conditions. These include a number of mussel species, snails, water beetles, dragonflies, mayfly, soldierfly and caddisfly, which are likely to be more sensitive to environmental change. The full list of designated macroinvertebrates is outlined in Table 6.8.

6.7.28 The macroinvertebrate community of the freshwater River Thames in the study area includes a high number of INNS which make up a relatively high abundance of the community. Details of the INNS recorded along the freshwater River Thames can be found in

6.7.29 Table 6.9.

6.7.30 Targeted surveys for the rare, depressed river mussel *Pseudanodonta complanata* were conducted within the freshwater River Thames between 2021 and 2023. Historical records of the species are present from 2010, but no further records of the species have been made. The targeted surveys conducted between 2021 and 2023 did not record any depressed river mussels. Results from the Project surveys are shown in Appendix 6.1.

6.7.31 The available data indicate that macroinvertebrate communities of the freshwater River Thames in the study area range from ‘Bad’ to ‘Good’ status when indicative WFD classifications are applied to the data. This indicates that the baseline macroinvertebrate is potentially impacted by nutrient enrichment. The WFD waterbodies are shown in Figure 5.1 in Volume 2 PEI Report Figures.

6.7.32 The Environment Agency classified the lower River Thames (Egham to Teddington) in Cycle 2 as ‘Poor’ status (2019) and in Cycle 3 as ‘High’ status (2022) (Environment Agency, 2023).

Tidal River Thames

6.7.33 The macroinvertebrate community along the tidal River Thames was mostly made up of molluscs (Mollusca), crustaceans (Crustacean), worms (Annelids), mayflies (Ephemeroptera), true flies (Diptera), and caddisflies (Trichoptera). Molluscs were the most abundant group. The results of the surveys did show a presence of species with a preference for saline conditions, such as the shrimp *Gammarus zaddachi.* However, the data were still dominated by freshwater species. More information on the macroinvertebrate community can be found in the Aquatic Macroinvertebrate section within Appendix 6.1.

6.7.34 In the tidal River Thames, 11 designated macroinvertebrates were identified from baseline conditions, including mayflies, snails, riffle beetles, caddisflies and a spongefly. The full list of designated macroinvertebrates is outlined in Table 6.8.

6.7.35 The macroinvertebrate community of the tidal River Thames also had a high abundance of INNS. Details of the INNS recorded within the study area can be found in

6.7.36 Table 6.9.

6.7.37 Indices based on baseline monitoring showed a community tolerance of high nutrients, which may also be impacted by low flows and sedimentation. However, the tidal influence of these sites may also impact the indices used.

6.7.38 Indicative WFD classifications were not applied to the site on the tidal River Thames. Assessments are usually only applied to freshwater rivers and are not used to assess invertebrate communities in estuarine or saline environments. The invertebrate element for the WFD classification of the tidal River Thames in the study area was not publicly reported in Cycle 2 (2019) and Cycle 3 (2022).

Fish (freshwater and estuarine and migratory)

6.7.39 A full assessment of the baseline data can be found in Appendix 6.1. This includes an assessment of non-diadromous (fish that spend their entire lifecycle in either freshwater or saltwater) and diadromous fish (fish that migrate between freshwater and saltwater environments). The assessment of diadromous fish includes analysis of the migration patterns of European eel (*Anguilla anguilla*) using eel trap data obtained by the ZSL (data provided by the Environment Agency).

6.7.40 The freshwater River Thames fish community in the study area is diverse and representative of the dominant habitat, which is a slow-flowing glide typical of a large lowland river on the fringe of the tidal limit. The Environment Agency and project-specific fisheries' monitoring data have identified 32 species of fish present within this reach. Several coarse fish species dominate the fish community and contribute up to approximately 95% of the reported total abundance. These are roach (*Rutilus rutilus*), dace (*Leuciscus leuciscus*), gudgeon (*Gobio gobio*), pike (*Esox lucius*), perch (*Perca fluviatilis*), bleak (*Alburnus alburnus*) and chub (*Squalius cephalus*). Migratory species of note were also recorded within the reach, including European eel from across a range of life stages, Atlantic salmon (*Salmo salar*), and lamprey (*Lampetra sp.*).

6.7.41 The Environment Agency does not currently classify the fish biological quality element for the freshwater River Thames in the study area.

6.7.42 The tidal River Thames fisheries data for the study area are representative of oligohaline water quality conditions. The fish community present is dominated by freshwater species along with estuarine fish species that can tolerate low salinity or freshwater environments. Environment Agency data have identified 26 species within this reach. However, two coarse fish species and three estuarine species contribute approximately 90% of the reported total abundance. These are dace, flounder (*Platichthys flesus*), roach, common goby (*Pomatoschistus microps*) and sea bass (*Dicentrarchus labrax*).

6.7.43 The tidal River Thames (Thames Upper) in the study area was classified by the Environment Agency in Cycle 2 (2019) and Cycle 3 (2022) as achieving WFD 'Good' status for fish.

Statutory and non-statutory designated sites

6.7.44 As detailed in Chapter 7: Terrestrial Ecology, preliminary ecological appraisal and UK Habitat Classification were completed at several sites within the draft Order limits. Only those sites with potential hydrological connectivity and aquatic or estuarine receptors have been considered in this chapter.

6.7.45 Table 6.8 summarises statutory and non-statutory sites and habitats with water-dependent features within the relevant study area. Full descriptions of the designated sites can be found in Appendix 6.1.

Table 6.8 Statutory and non-statutory sites and habitats with water-dependent features within the relevant study area

Statutory and non-statutory sites	Proximity	Designation criteria	Receptor for consideration
National statutory designated conservation sites			
Syon Park	Approximately 7.3km downstream of the outfall location and within 2km of Mogden STW site.	SSSI	Unit 004 fen, marsh and swamp – Lowland (favourable condition). The site represents one of the largest single remaining areas of floodplain swamp in the Greater London area and supports wetland invertebrate fauna, including several rare species.
Metropolitan/county statutory and non-statutory designated nature conservation sites			
River Thames and Tidal Tributaries	Freshwater and tidal Thames SINC is located within the draft Order limits.	SINC (non-statutory)	All aquatic ecology receptors as identified in Table 6.6.
Ham Lands	Within 2km of the intermediate shaft location and approximately 0.6km downstream of the outfall.	LNR (statutory)	Wetland features. Note that wetland features are considered further in Chapter 7: Terrestrial Ecology, as part of the terrestrial ecology assessment and are therefore not considered in this chapter.
Isleworth Ait	Within 2km of the existing Mogden STW discharge location at Isleworth Ait.	LNR (statutory)	German hairy snail *Perforatella rubiginosa* and its marginal habitat.

Protected and notable species

6.7.46 The data from GiGL records from within 2km of the draft Order limits showed a total of 36 aquatic protected and notable species recorded from 2004 to 2023[1].These are outlined in

6.7.47 Table 6.9. All protected and notable species identified through the GiGL records search and the other monitoring undertaken are described in full in Appendix 6.1 Aquatic Ecology Baseline, including record source and dates.

6.7.48 An indication is provided as to whether the individual species are considered receptors for the freshwater River Thames or tidal River Thames, based on their typical habitat preferences and, where available, the locations of records.

6.7.49 Some species are considered receptors within both freshwater and tidal reaches of the River Thames. In some cases (such as migratory fish) this is because they move between the freshwater and tidal reaches depending on life stage and migration patterns. Some species that are typically considered as coastal or estuarine species may move into freshwater areas on an opportunistic basis (e.g. seals moving into the freshwater River Thames to feed), and could therefore be impacted within the freshwater River Thames as well as within the tidal reaches. Some species that would usually be considered freshwater species may be found in the tidal River Thames within the study area due to the predominantly freshwater influence in this upper reach of the Thames Tideway (e.g. macroinvertebrate species).

Table 6.9 Aquatic protected and notable species recorded within 2km of the draft Order limits. Receptors for the freshwater River Thames and tidal River Thames within the study area are indicated by (F) and (T) respectively, following their name

Group	Species	Designation
Mammals	Common porpoise *Phocoena Phocoena* (T) Common seal *Phoca vitulina* (T,F) Grey seal *Halichoerus grypus* (T, F) Minke whale *Balaenoptera acutorostrata* (T)	Habitats Directive Annex II and Annex IV Conservation Regulation 2010 Schedule 2 Wildlife and Countryside Act 1981 Schedule 5 sections 9.1 and 9.4a NERC Act Section 41 Local Species of Conservation Concern
Fish	Atlantic salmon *Salmo salar* (F, T) Brown trout *Salmo trutta* (F,T) Barbel *Barbus barbus* (F) European eel *Anguilla anguilla* (F,T)	NERC Act Section 41 Local Species of Conservation Concern

[1] N.B. The number of protected and notable species' records differs slightly from that identified at scoping due to changes in the draft Order limits and also in consideration of the dates of the records (all records from 2004 forward are considered here to present a 20-year baseline).

Group	Species	Designation
	Bullhead *Cottus gobio* (F) Lamprey *Lampetra sp.* (F,T) European smelt *Osmerus eperlanus* (T) Twaite shad *Alosa fallax* (F,T) (Environmental DNA (eDNA) record)	UK Red List Critically Endangered and Vulnerable UK BAP Habitats Directive The Conservation (Natural Habitats, etc.) Regulations 1994 Oslo and Paris Convention The Conservation of Habitats and Species Regulations 2010
Aquatic macro-invertebrates	Swollen river mussel *Unio tumidus* (F) River orb mussel *Sphaerium rivicola* (F,T) Depressed river mussel *Pseudanodonta complanata* (F) Lister's river snail *Viviparus contectus* (F) Marsh pond snail *Stagnicola palustris/fuscus/corvus* (F) Two riffle beetles *Stenelmis canaliculata* (F,T), *Macronychus quadrituberculatus* (F,T) Water beetle *Hydrovatus clypealis* (F) Brilliant emerald dragonfly *Somatochlora metallica* (F) Scarce chaser *Libellula fulva* (F) Common darter *Sympetrum striolatum* (F,T) Striped mayfly *Ephemera lineata* (F,T) Dark winged soldier fly *Oxycera analis* (F) Smooth ramshorn *Gyraulus laevis* (F,T) Brown mayfly *Kageronia fuscogrisea* (F,T) Caddisflies *Metalype fragilis* (F,T), *Oecetis notata* (F,T), *Sisyra terminalis* (F,T), *Psychomyia fragilis* (F) Large-mouthed valve snail *Valvata macrostoma* (T,F) Pond mud snail *Omphiscola glabra* (T,F)	Nationally Scarce. Includes Red Listed taxa Red listed based on 2001 IUCN guidelines Vulnerable, Nationally Scarce and Near Threatened Global Red List status – Vulnerable UK Red List Data Deficient, Vulnerable and Near Threatened Nationally Scarce London Priority Species (LPS) Local Species of Conservation Concern Nationally Notable

Group	Species	Designation
Aquatic macrophytes	Flat-stalked pondweed *Potamogeton friesii* (F) Small water-pepper *Persicaria minor* (F) Mudwort *Limosella aquatica* (F)	Red listing based on 2001 IUCN guidelines Near Threatened Local Species of Conservation Concern UK Red List Endangered and Vulnerable

Invasive Non-Native Species

6.7.50 The 2020 to 2024 Strategic Resource Option (SRO) Monitoring Programme (see Appendix 6.1 Aquatic Ecology Baseline and Supporting Information) includes bespoke INNS surveys within the study area, which were undertaken to inform the EIA. Data up to 2023 are included in this assessment and will be updated with 2024 data for ES.

6.7.51 Data from project-specific and publicly available records showed that there were high numbers of INNS present within the length of the freshwater River Thames and tidal River Thames, along with many records within the 2km buffer for the draft Order limits. The most common species were the aquatic invertebrate species Asian clam (*Corbicula fluminea*), New Zealand mud snail (*Potamopyrgus antipodarum*) and demon shrimp (*Dikerogammarus haemobaphes*). Zebra mussel (*Dreissena polymorpha*) and quagga mussel (*Dreissena bugensis*) were also frequent within the study area and are of particular note due to issues they pose in pipes and other water transport infrastructure through biofouling. A full summary of the INNS recorded in the study area can be seen in Appendix 6.1.

6.7.52 The Environment Agency Aquatic INNS Risk Assessment Tool (SAI-RAT), which considers the risk of transfer of INNS for the raw water transfer element of the Project, was completed (detailed in Appendix 6.4). The Project was assessed using two operating scenarios. The existing TLT scheme was also assessed for comparison. The assessment showed the existing TLT scheme had an Inherent Risk Score for INNS of almost double that of the Project. However, it must be noted that the abstraction from the Project may increase the potential to transfer INNS on top of the existing abstraction, so although no new pathway for transfer of new/existing INNS is created, the risk/frequency of transfer may be slightly raised by the Project.

Priority habitats

6.7.53 Small areas of the estuarine priority habitat of mudflats are found along the tidal River Thames within 2km of the draft Order limits, near Isleworth Ait and at Syon Park. A description of the relevant priority habitat is in Appendix 6.1 Aquatic Ecology Baseline.

Future baseline

6.7.54 In general, climate change is expected to lead to an increase in temperatures, with a greater frequency of hotter, drier summers and warmer, wetter winters. Climate change is also expected to lead to a rise in sea level, which will affect tide levels and associated flood risk within the tidal section of the River Thames as far west as Teddington Weir. Further information on projected changes in climate parameters is provided in Chapter 18: Climate Change. Projected future changes in climate (e.g., an increase in temperatures) have the potential to interact with effects identified within some environmental aspects and exacerbate or diminish their impact. Such combined impacts are termed in-combination climate impacts (ICCI). Consideration of the potential ICCIs associated with aquatic ecology during the operational phase is provided in Section 6.8 of this chapter.

6.7.55 Water quality improvements are expected through the implementation of Thames Water and other water company Water Industry National Environment Programme obligations[2], as well as through the River Thames Scheme (Environment Agency and Surrey County Council, 2025) which is further outlined in Section 6.8 (inter-project effects).

6.7.56 A UK Water Industry Research (UKWIR) report on invasive species (UKWIR, 2016) predicted habitat suitability for eleven invasive species across 24 water companies, including Thames Water, under three different climate conditions. Himalayan balsam, floating pennywort and New Zealand pygmyweed show a marked increase in suitability under both 2050 scenarios, especially pessimistic. Signal crayfish, zebra mussel and quagga mussel are already moderately suitable and may remain so or increase slightly. Killer shrimp and round goby remain low risk through 2050, although the latter shows a slight rise. Of the 130 INNS in the UK's freshwater, 40% were first detected in the Thames region, which is considered a hotspot for freshwater biological invasions.

6.8 Preliminary assessment of likely significant effects

6.8.1 The preliminary assessment of likely significant effects on aquatic ecology during the construction and operational phases of the Project is detailed below. The impacts and effects have been identified with reference to the CIEEM Guidelines (CIEEM, 2024) for EcIA and in consideration of the sensitivity of the baseline biological communities and the proposed construction and operational activities. Some effects associated with the operation of the Project may have positive impacts.

6.8.2 The CIEEM Guidelines determine the value/importance of ecological features where clear designations are available, which is detailed in Table 6.5. Where ecological features are not designated or recognised specifically in policy, the value/importance is determined by professional judgement in the context of the local environment baseline condition and baseline abundance (as detailed in

[2] The programme is designed to ensure that water companies contribute to the protection and enhancement of the natural environment, addressing issues such as water quality, biodiversity, and resilience to climate change.

Table 6.10). Receptor sensitivity to potential impacts is assessed, where relevant, as part of the magnitude of impact assessments (which includes factors such as duration, extent, timing and reversibility). The value/importance of an ecological feature considered in combination with the magnitude of impact provides the significance of the effect.

6.8.3 Within the draft Order limits, ancillary works include utility diversions, Public Right of Way diversions and minor highway amendments. The location and nature of these activities have been reviewed, and no likely significant effects or hydraulic link to aquatic receptors have been identified. Therefore, they are scoped out for further assessment within this PEI Report chapter.

6.8.4 The value/importance of aquatic receptors relevant to the Project is set out in Table 6.10.

Table 6.10 Value/importance of aquatic receptors

Receptor group	Value/ importance	Justification
Phytoplankton		
Freshwater	Medium	The group is not recognised by any national or local designation and falls within the ZoI only. Phytoplankton are a foundational element of freshwater ecosystems as they are the primary food source for other species to survive and function. Phytoplankton are directly responsive to environmental changes. Changes in water quality, light and sediment will have a direct impact on phytoplankton. However, data for the baseline condition suggest that phytoplankton in the freshwater River Thames and the tidal River Thames are tolerant of relatively high nutrient levels and unlikely to be very sensitive to changes in water quality (indicative WFD classification of 'Moderate' status for the freshwater River Thames and the tidal River Thames).
Estuarine	Medium	
Phytobenthos (diatoms)		
Freshwater	Low	The group is not recognised by any national or local designation and falls within the ZoI only. Phytobenthos (diatoms) are a foundational element of freshwater ecosystems as a primary food source for other aquatic species to survive and function. Phytobenthos (diatoms) are directly responsive to environmental changes. Changes in water quality, light and sediment will have a direct impact on phytobenthos. However, phytobenthos data from the baseline suggest the community would not be sensitive to changes in water quality (indicative WFD classification of 'Poor').
Aquatic macrophytes and macroalgae		
Freshwater	Low	Nationally designated macrophyte taxa are listed under the protected and notable species section. No other species recorded are of local concern and would fall within the ZoI only.
Estuarine	Low	

Receptor group	Value/ importance	Justification
		Macrophytes play an important role in the ecology of rivers by creating habitats and adding complexity to the river environment, which increases the diversity of other aquatic species. Macrophytes (not including protected species) recorded in the freshwater River Thames are common, and INNS are frequent throughout the freshwater River Thames. Macrophytes will respond to long-term changes in water quality. Short-term disturbances may damage individual species, but given time to recover, species will recolonise areas that were previously disturbed. Macrophytes in the freshwater River Thames are likely to be tolerant of environmental change. Macrophytes recorded in the tidal River Thames were low in diversity and will be tolerant to changes in water quality.
Aquatic macroinvertebrates		
Freshwater	Low	Nationally designated macroinvertebrate taxa are listed under the Table 6.8. No other species recorded are of local concern and would fall within the ZoI only. Macroinvertebrates play an important role in the food chain of rivers and are essential in water filtration and decomposition. Macroinvertebrates (not including protected species) recorded in the River Thames are common, and a large proportion of the community is made up of INNS. Macroinvertebrate communities will respond to more long-term changes in water quality, although sudden changes in environmental conditions can have an immediate impact on the community composition (i.e. pollution incidents). Macroinvertebrates recorded in the baseline for the freshwater River Thames are likely to be tolerant of environmental change. Macroinvertebrates recorded in the tidal River Thames were similar to the composition of the freshwater River Thames and will be tolerant to changes in water quality.
Estuarine	Low	
Fish		

Receptor group	Value/ importance	Justification
Diadromous species	High	A number of species are internationally designated. The European eel is critically endangered, and Atlantic salmon, river lamprey and sea lamprey are designated under the Habitats Directive. This group tends to have complex lifecycles, which makes them more susceptible to impacts from environmental changes. Migratory behaviour is influenced by a large variety of variables, including individual size, behaviour, life-history strategy, and movement response to flow-related cues. Their migratory behaviour means they travel through a number of different riverine habitats, making them more susceptible to environmental impacts.
Non-diadromous freshwater species	Medium	Majority of species in this group of fish are not designated and fall into the ZoI only, however, there are some designated freshwater species present, such as bullhead. Most species have a relatively high tolerance to temperatures and nutrients. This group has a long spawning season, and environmental changes during spawning can have significant impacts on the success of species. Pollutants and environmental disturbance can have an impact on species within this group.
Non-diadromous estuarine species	Medium	Species in this group are not designated and fall into the ZoI only. These species can be sensitive to environmental change, but sensitive life stages, e.g., spawning, are likely to occur further down the estuary and outside the ZoI.
Statutory and non-statutory designated sites		
Syon Park SSSI	Medium	Syon Park is designed as an SSSI and has national importance.
River Thames and Tidal Tributaries SINC	Low	The River Thames and Tidal Tributaries SINC is designated as a locally significant site.
Isleworth Ait LNR	Low	Isleworth Ait is designated as an LNR and is locally significant.
Protected and notable species		

Receptor group	Value/ importance	Justification
Mammals	High	The marine mammals identified in the baseline are internationally designated under the Habitats Directive. Marine mammals such as seals are important predators within the food chain. Their home ranges mean they utilise a variety of habitats including both the freshwater River Thames and the tidal River Thames. Their requirements for prey and their complex behaviours make them susceptible to environmental changes and disturbance.
Fish	High	See diadromous species and non-diadromous freshwater species within the fish section.
Aquatic macroinvertebrates	High	A number of species recorded in the baseline are listed as nationally or internationally vulnerable. Macroinvertebrates like mayfly and caddisfly require suitable terrestrial and aquatic habitats to complete their lifecycles. Many of the designated macroinvertebrates are localised to the River Thames or have a habitat preference for large, clean, lowland rivers, meaning their range is restricted. Mussels and bivalves are negatively affected by pollutants and environmental changes like temperature increases.
Aquatic macrophytes	Medium	The designated macrophyte species recorded in the baseline are internationally designated as Near Threatened or nationally designated as Endangered or Vulnerable. Species such as flat-stalked pondweed have a preference for lowland rivers but are impacted by environmental changes such as nutrient enrichment.
INNS		
Freshwater	N/A	INNS were recorded in high abundance throughout the baseline receptors. Most INNS have a high tolerance to environmental change and are easily spread by human activity. INNS tend to have a negative impact on the species and habitats they colonise. As such, this receptor is being assessed to prevent the spread of INNS.
Estuarine	N/A	

Receptor group	Value/ importance	Justification
Priority habitats		
Freshwater	N/A	No freshwater priority habitats have been recorded in the baseline.
Estuarine	Medium	The priority habitat recorded in the baseline was estuarine mudflats. The location of these mudflats coincides with the nationally designated Syon Park SSSI and the locally designated Isleworth Ait and River Thames and Tidal Tributaries SINC.

Construction phase

6.8.5 This section sets out the likely significant effects on aquatic ecology during the construction of the Project and is based on the construction activities detailed in Chapter 2: Project Description. The assessment assumes that embedded design (primary) mitigation and standard good practice (tertiary) measures outlined in Section 6.4 and the draft CoCP would be implemented, and the results of the assessment then inform the need for any additional (secondary) mitigation requirements during construction.

6.8.6 The assessment of changes to surface water quality has been undertaken in Chapter 5: Water Resources and Flood Risk and assessed as Slight adverse (Not Significant) at Ham Playing Fields and Burnell Avenue sites.

Ham Playing Fields site

6.8.7 The Main Work Area of the Ham Playing Fields site is approximately 250m from the tidal River Thames and has been identified as not being in direct hydraulic connectivity with the river. The Support Work Area by Ham Street Car Park is immediately adjacent to the tidal River Thames. Construction of the Ham Playing Fields site has the potential to impact the ecology of the tidal River Thames through temporary impacts on surface water quality, pollution, sediment release and loss of habitat. Noise and vibration have the potential to cause disturbance to some species.

6.8.8 As the construction design of the Ham Playing Fields site is still in development, the impacts from the construction activities are conservative and taken as a reasonable worst case and would require further assessment in the ES.

Phytoplankton

6.8.9 The phytoplankton community in the tidal River Thames is considered to have medium ecological value/importance within the study area in the context of the assessment methodology. The release of sediment associated with any in-river works could potentially result in a spike in available nutrients, which has the potential to affect phytoplankton communities, encourage growth and potentially cause the occurrence of algal blooms. Suspended contaminant release may occur; however, any mobilisation of sediment is predicted to be small relative to the baseline sediment load already in the tidal River Thames, and phytoplankton densities would be low in an estuarine environment. With the implementation of embedded design (primary) mitigation and standard good practice (tertiary) measures outlined in Section 6.4, it is likely that the level of suspended sediment generated would be within the natural fluctuations of suspended sediment within the River Thames. High flows would flush sediment, so impacts are predicted to be temporary, with phytoplankton communities able to return to baseline conditions rapidly. The impact on phytoplankton communities from the release of sediment is therefore considered to be temporary, localised and minor, assessed as a Minor adverse (Not Significant) effect.

6.8.10 Phytoplankton communities are unlikely to be affected by disturbance, noise, vibration, or lighting, and the impact of these factors on phytoplankton within the River Thames is considered to be a Negligible adverse (Not Significant) effect.

Phytobenthos (diatoms)

6.8.11 No diatom data are available from the tidal River Thames. Phytobenthos are not considered a receptor for the tidal River Thames (see 'Baseline environment' section above).

Macrophytes and macroalgae

6.8.12 Macrophytes and macroalgae communities are considered to have low ecological value/importance in the tidal River Thames within the study area in the context of the assessment methodology. Potential in-river works at the Ham Playing Fields site are not expected to lead to permanent loss of macrophyte species. Potential in-river works may involve temporary disturbance to the riparian zone, channel banks and potentially the channel bed in the immediate vicinity of the works. The effects of this disturbance to habitat would be assessed fully in the ES when further details of the proposed construction are available. However, macrophyte and macroalgal communities in the reach of the tidal River Thames are not considered sensitive, comprising predominantly filamentous algae, and the impacts on the macrophyte/macroalgal communities are assessed as a Minor adverse (Not Significant) effect.

6.8.13 The construction of the Ham Playing Fields site has the potential to cause disturbance or mortality to macrophyte species through the release of sediment. Sedimentation and increased turbidity can impact macrophytes by inhibiting photosynthesis or gas exchange. Heavy sedimentation can cause mortality to species, with certain species being more sensitive to the impacts than others. Any mobilisation of sediment is predicted to be small. With the implementation of embedded design (primary) mitigation and standard good practice (tertiary) measures outlined in Section 6.4, it is likely that the level of sediment released would be within the natural fluctuations of suspended sediment within the River Thames. If sediment is released, it would be dispersed by flows in the area, so impacts are considered to be temporary, with a Minor adverse (Not Significant) effect on macrophytes.

6.8.14 Vibration caused by excavation works has the potential to impact macrophytes through physical disturbance, movement of sediments and mortality. Construction activities may result in soil disturbance and root exposure and would mainly affect riparian vegetation in drier areas where soil may be eroded. Given the low abundance of macrophytes recorded in the tidal River Thames in the baseline, excavation works are not likely to impact the macrophyte community significantly. Impacts are considered to be low and temporary due to the small area, which would be subjected to disturbance and consolidation in the boundary of the working area. The overall effect of this will be considered further in the ES but is assessed as Minor adverse (Not Significant).

Macroinvertebrates

6.8.15 Macroinvertebrate communities in the tidal River Thames are considered to be of low ecological value/importance in the context of the assessment methodology. The potential in-river works are not expected to lead to permanent loss of macroinvertebrate species but may involve temporary disturbance to the riparian zone, channel banks and potentially the channel bed in the immediate vicinity of the temporary contingency dewatering pipe. The effects of this disturbance on habitats will be assessed fully in the ES when further details of the proposed construction are available. However, any direct habitat loss is expected to be minimal, and macroinvertebrate communities are expected to recolonise the area rapidly following the cessation of construction works. Thus, the effects on the macrophyte/macroalgal communities are assessed as Minor adverse (Not Significant).

6.8.16 The works at the Ham Playing Fields site have the potential to cause disturbance or mortality to macroinvertebrate species through the release of sediment. Sedimentation can impact macroinvertebrates by clogging their gills and inhibiting respiration or causing mortality to individuals, particularly to more sensitive species. Any mobilisation of sediment is predicted to be small. With the implementation of embedded design (primary) mitigation and standard good practice (tertiary) measures outlined in Section 6.4, it is likely that the level of sediment released would be within the natural fluctuations of suspended sediment within the Thames. If sediment is released, it would be subject to rapid dispersion, so impacts are considered to be temporary and minor, resulting in a Minor adverse (Not Significant) effect.

6.8.17 Night-time work and the use of lighting have the potential to impact macroinvertebrate species through changes in behaviour and attractance. Particularly with species like the designated striped mayfly (*Ephemera lineata*), which is attracted to bankside lighting, night-time lighting could interfere with timings for mating or emergence. Following the implementation of the standard good practice (tertiary) outlined in Section 6.4, artificial lighting for construction activities is considered to have a Negligible adverse (Not Significant) effect on macroinvertebrates.

Fish

6.8.18 Diadromous fish within the tidal River Thames are considered of high ecological value/importance and non-diadromous freshwater and estuarine fish communities are of medium ecological value/importance in the context of the assessment methodology. For the identified construction activities, it is anticipated that the implementation of standard good practice (tertiary) guidance and embedded mitigation, as outlined in Section 6.4, would reduce the risk of pollution, degrading water quality and disturbance through noise, vibration and lighting during construction activities. With the implementation of standard good practice (tertiary) and mitigation, it is considered that the construction activities would have a Minor adverse (Not Significant) effect on the fish populations of the River Thames. This assessment has been made

considering species more sensitive to deterioration in water quality, such as brown trout, Atlantic salmon, smelt and bullhead. However, this assessment will be reviewed at the ES stage once further details are known. Furthermore, it is anticipated that any loss of habitat would be minor and temporary, but more details are required before this assessment can be finalised.

Statutory and non-statutory designated sites

Syon Park SSSI

6.8.19 Syon Park is cited as a floodplain swamp and wetland invertebrate fauna SSSI and is considered to have medium ecological value/importance in the context of the assessment methodology. Based on the scale of the current construction activities at the Ham Playing Fields site, the extent of the impact is anticipated to be very localised. The magnitude of the construction impacts on water quality after implementation of standard good practice (tertiary) and embedded design (primary) mitigation, is considered to be low and minor and therefore assessed to have a Negligible adverse (Not Significant) effect on Syon Park SSSI.

Isleworth Ait LNR

6.8.20 Isleworth Ait LNR is designated for tidal habitats and German hairy snail (*Perforatella rubiginosa*) and is considered of low ecological value/importance in the context of the assessment methodology. Based on the scale of the current construction activities at the Ham Playing Fields site, the extent of the impacts is anticipated to be very localised. The magnitude of the construction impacts on water quality after standard good practice (tertiary) and mitigation implementation, is anticipated to be low and minor and is therefore assessed to have a Negligible adverse (Not Significant) effect on Isleworth Ait LNR.

River Thames and Tidal Tributaries SINC

6.8.21 The River Thames and Tidal Tributaries SINC is considered to have low ecological value/importance in the context of the assessment methodology. It is anticipated that the construction at the Ham Playing Fields site would have a very localised and temporary impact downstream of the site. Given the scale and magnitude of the construction impacts compared to the size of the River Thames and Tidal Tributaries SINC, it is considered that the construction at the Ham Playing Fields site would have a Negligible adverse (Not Significant) effect on the SINC.

6.8.22 Assessments of the impacts on wildfowl and saltmarsh habitat linked to the SINC can be found in Chapter 7: Terrestrial Ecology. Impacts on fish found within the SINC can be found in the ‘Fish’ section above.

Priority habitats

6.8.23 The mudflats along the tidal River Thames within 2km downstream of the Project are situated within the boundaries of Isleworth Ait LNR and Syon Park SSSI. They are considered of medium ecological importance in the context of the assessment methodology. Assessments for these designated sites are

outlined in the paragraphs above. The outcome from the assessments for Isleworth Ait LNR and Syon Park SSSI is that the construction of the Ham Playing Fields site would have no impact on these designated sites once standard good practice (tertiary) and embedded design (primary) mitigation are implemented. It can be concluded that the construction of the Project is considered to have a Negligible adverse (Not Significant) effect on the mudflats situated within these site boundaries. Construction impacts on the mudflats situated downstream of Isleworth Ait LNR and Syon Park SSSI sites are not likely due to the distance between the Ham Playing Fields site and the locations of these mudflats.

Protected and notable species

Aquatic mammals

6.8.24 Protected and notable mammals present within the tidal River Thames are considered of high ecological value/importance in the context of the assessment methodology. Records of common porpoise (*Phocoena phocoena*), common seal (*Phoca vitulina*), grey seal (*Halichoerus grypus*) and minke whale (*Balaenoptera acutorostrata*) were returned from the GiGL data search. All these species spend the majority of their time within estuarine or marine environments and rely on the habitats in these areas for activities such as foraging or breeding. Cetaceans upstream of Battersea are likely vagrant individuals which have travelled upstream to feed or that are injured or unwell.

6.8.25 The construction at the Ham Playing Fields site may negatively affect aquatic mammals due to noise and vibration disturbances. Additionally, any impacts on their prey species could have cascading effects on the success of these mammal populations. The potential effects on fish, which serve as a key prey source, are detailed in the ‘Fish’ section above. However, with the implementation of standard good practice (tertiary) guidance and embedded design (primary) mitigation as outlined in Section 6.4, impacts on water quality, such as pollution and sedimentation, are considered to have a Negligible adverse (Not Significant) effect.

Fish

6.8.26 Seven designated fish species were identified from baseline conditions and are considered of high to medium ecological value/importance in the context of the assessment methodology. The effects of construction at the Ham Playing Fields site would be similar on these species, as outlined in the ‘Fish’ section under ‘Macroinvertebrates’ heading above being a Minor adverse (Not Significant) effect. This assessment has been made considering species more sensitive to deterioration in water quality, such as brown trout, Atlantic salmon, smelt and bullhead. However, this assessment will be reviewed at the ES stage once further details are known. Furthermore, it is anticipated that any loss of habitat would be minor and temporary, but more details are required before this assessment can be finalised.

Aquatic macroinvertebrates

6.8.27 In the tidal River Thames, 11 designated macroinvertebrates were identified from baseline conditions and considered to have high ecological value/importance in the context of the study methodology. Taxa included mussels, dragonflies, mayfly, caddisfly, water beetles, snails and spongefly, which are all sensitive to environmental change. The effects of the construction at the Ham Playing Fields site are outlined in the 'Macroinvertebrates' section above as a Minor adverse (Not Significant) effect.

Aquatic macrophytes

6.8.28 Protected and notable macrophytes within the tidal River Thames are considered of medium ecological value/importance within the context of the assessment methodology. The impact assessment outlined in paragraphs 6.8.42 to 6.8.54 in the 'Macrophytes and macroalgae' section for the Burnell Avenue site during the construction phase concluded that any effects on aquatic macrophytes are considered to be Minor adverse (Not Significant).

Invasive Non-Native Species

6.8.29 Construction methods have the potential to facilitate the spread of INNS to and from the Ham Playing Fields site. Many aquatic INNS are spread via seeds, plant fragments and eggs, which pose a potential risk for INNS to be spread during the construction phase.

6.8.30 INNS can be transferred to construction vehicles and equipment and contained on or within construction materials. The transfer of soil and biological material itself can also facilitate the movement of INNS. INNS can be introduced or may proliferate following ground clearing during construction due to reduced competition from native species.

6.8.31 There is potential for an increase in the severity of impacts of INNS when they are transferred over larger distances, as it increases the risk of establishing new populations in areas where they were not previously present. Standard good practice for preventing the spread of INNS is outlined in Section 6.4. With the implementation of standard good practice (tertiary) such as a construction biosecurity management plan, the impact on aquatic ecology receptors due to the introduction and spread of INNS is considered to have a Negligible adverse (Not Significant) effect.

Burnell Avenue site

6.8.32 Details on the construction at the Burnell Avenue site are still in development, and the impacts of the construction of the site will require further assessment in the ES. Construction activities that have the potential to impact aquatic ecology receptors include in-river construction of the intake and outfall structures, near-bank construction activities, dewatering, noise, vibration, and lighting. Construction methods would be confirmed as plans develop.

6.8.33 Construction at the Burnell Avenue site has the potential to impact the ecology of the River Thames through water quality degradation, pollution, sediment release and loss of habit. Noise and vibration have the potential to cause disturbance to some species.

Phytoplankton

6.8.34 The phytoplankton community in the freshwater River Thames and tidal River Thames is considered of medium ecological value/importance within the study area in the context of the assessment methodology. The release of sediment associated with in-river works could potentially result in a spike in available nutrients, affecting phytoplankton communities, encouraging growth, and potentially causing algal blooms (either in situ or downstream). Suspended contaminant release may occur, with more significant effects in still waters. However, this effect is unlikely to be detectable in the dynamic conditions of the freshwater River Thames. Light penetration, and thereby photosynthesis, may be affected. Nevertheless, any sediment mobilisation is predicted to be small relative to the high sediment load already present in the freshwater River Thames, and phytoplankton densities in this area are generally lower than upstream.

6.8.35 With the implementation of embedded design (primary) mitigation and standard good practice (tertiary) as outlined in Section 6.4, it is likely that the level of suspended sediment generated would be within the natural fluctuations of suspended sediment within the River Thames. High flows would flush sediment, so impacts are predicted to be temporary, with phytoplankton communities able to return to baseline conditions rapidly. The impact on phytoplankton communities from the release of sediment is therefore expected to be temporary, localised and minor, and it is assessed to result in a Negligible adverse (Not Significant) effect.

6.8.36 As phytoplankton communities are transient, they are unlikely to be affected by disturbance, noise, vibration or lighting, and the impact of these factors on phytoplankton within the River Thames is considered negligible. The temporary loss of habitat in the area of the cofferdams is also unlikely to significantly affect phytoplankton communities outside the immediate area of the cofferdams. As such, there would be a temporary, very localised impact that is considered to result in a Negligible adverse (Not Significant) effect.

6.8.37 The combination of potential construction impacts at the Burnell Avenue site (disturbance, noise, vibration, lighting, sediment release and temporary changes to water quality) are considered to have a Negligible adverse (Not Significant) effect on the phytoplankton community of the River Thames.

Phytobenthos (diatoms)

6.8.38 The phytobenthos community in the freshwater River Thames and tidal River Thames is considered of low ecological value/importance in the context of the assessment methodology. The release of sediment associated with in-river works could potentially result in temporary sedimentation of benthic habitats and/or a spike in available nutrients, which has the potential to affect phytobenthos communities. Suspended contaminant release may occur, with more significant effects in still waters. However, suspended contaminant is less likely to be detectable in the dynamic conditions of the Thames. Light penetration and photosynthesis may be affected. However, any mobilisation of sediment is predicted to be small relative to the high sediment load already in the River Thames.

6.8.39 The benthic diatom communities in this reach result in a WFD classification of 'Poor' ecological status and are dominated by motile species which are relatively tolerant of sedimentation. With the implementation of embedded design (primary) mitigation and standard good practice (tertiary) as outlined in Section 6.4, it is likely that the level of suspended sediment generated would be within the natural fluctuations of suspended sediment within the River Thames. High flows would flush sediment, so any impacts are predicted to be temporary, with phytobenthos communities able to return to baseline conditions rapidly. The impact on benthic diatom communities from the release of sediment is therefore considered to be temporary, localised, and minor and assessed as a Negligible adverse (Not Significant) effect.

6.8.40 Due to the short lifecycle and response time of diatom communities within the phytobenthos, the impacts of disturbance, noise, vibration, lighting and temporary loss of habitat are assessed to have Negligible adverse (Not Significant) effects on these communities.

6.8.41 The combination of potential construction impacts at the Burnell Avenue site (disturbance, noise, vibration, lighting, sediment release and temporary changes to water quality) are considered to have a Negligible adverse (Not Significant) effect on the phytobenthos community of the River Thames.

Macrophytes and macroalgae

6.8.42 The macrophyte community in the freshwater River Thames and tidal River Thames is limited by habitat availability. It is considered to have low ecological value/importance within the study area in the context of the assessment methodology. Further context and discussion of effects on macrophyte and macroalgae communities is provided in Appendix 6.3 Supporting Information for Burnell Avenue Site Operational Phase Impact, and a summary of the assessment of effects is provided below.

Loss and disturbance of habitat

6.8.43 Construction of the outfall and intake at the Burnell Avenue site would require excavation of the riverbed and bankside and would lead to the permanent loss of river, marginal and bankside habitat where the structures would be installed. Construction of the outfall at the Burnell Avenue site would likely require a cofferdam. The installation of a cofferdam and the draining of the area for construction would lead to a temporary loss of aquatic habitat. The size of the cofferdam would be determined as the design progresses. It is estimated that the cofferdam would extend approximately 20m into the river from the bankside, which is a worst-case scenario within this PEI Report.

6.8.44 The permanent loss of marginal habitat due to the installation of the intake and outfall would likely lead to a permanent loss of macrophyte vegetation within the immediate footprint of the construction. The extent of this permanent loss is anticipated to be small within the context of the local area of the River Thames (for example, larger and more diverse macrophyte beds are present along the north bank, which would be outside the area affected), and negligible in the context of the River Thames as a whole. The loss of this small area of bankside and channel habitat is not likely to cause the permanent loss of any macrophyte species recorded in the baseline.

6.8.45 Once construction is complete, the area would be reinstated as riverine habitat. This temporary loss of wetted habitat would likely cause mortality of any macrophyte species within the cofferdam area. However, once the cofferdam is removed, macrophytes would likely be able to recolonise the area. The process of recolonising the area may take several years and the ability of macrophytes to recolonise the area would depend on the state of the channel bed after works have taken place. Modifying channel sediments or form/gradient may affect macrophyte colonisation, but the proposed temporary, small-scale habitat loss is unlikely to cause permanent species loss in the local stretch of the River Thames.

6.8.46 Details on the deployment of pontoons have not been finalised, and the impact of this and disturbance from boat traffic would be considered further within the ES. However, the temporary installation of floating pontoons is expected to result in shading of areas of marginal macrophyte habitat, potentially reducing or temporarily degrading the marginal habitat for macrophytes within the footprint of the pontoon. The impact of shading would be very localised to the site of the pontoon. Roots of plants, along with seeds, would remain in the sediment/soil for future regeneration. The deployment of pontoons is only expected to affect one growing season for macrophytes, and the macrophyte communities would be expected to recover over the following seasons, resulting in a minor, localised, temporary and reversible impact on macrophyte communities.

6.8.47 Overall effects on macrophyte communities from permanent and temporary habitat loss are therefore assessed as a Minor adverse (Not Significant) effect.

6.8.48 Vibration caused by pile driving activities during the construction of the cofferdam within the freshwater River Thames has the potential to impact macrophytes through physical disturbance, movement of sediments and mortality. Construction activities may result in soil disturbance, root exposure, and physical damage and would mainly affect riparian vegetation in drier areas where the soils may erode.

6.8.49 Currently, pile driving methods being considered are push-in piling, vibro-piling and percussive piling. Methods have not been confirmed. At the time of writing, modelling of the options is being undertaken, and the results would be used to inform further additional (secondary) mitigation, as required. Where possible, less intrusive methods like push-in piling and vibro-piling would be considered. These methods would reduce the amount of disturbance received from vibration. Further assessment of the effects of vibration on macrophyte species will be made at ES once the results of modelling are completed.

6.8.50 Embedded design (primary) mitigation and standard good practice (tertiary) related to piling are outlined in Section 6.4 and the draft CoCP. It is assumed that with the implementation of less intrusive methods, embedded design measures and standard good construction practice, there may still be impacts on macrophytes from vibration, but the magnitude would be reduced. The extent of the area compared to the rest of the freshwater River Thames would be small, and the impacts once piling is complete would be reversible.

6.8.51 Disturbance to macrophytes may also occur due to the use of barges and increases in boat traffic. The use of boats can disturb macrophytes through increased wave action. It may also cause disturbance or mortality through the uprooting of plants due to propellor damage or from contact with boats. Given the high use of boats on the River Thames by existing users, the introduction of construction-phase barges is unlikely to impact the macrophyte community along the river significantly.

6.8.52 Assuming the use of jack-up barges to transport materials such as piles, only a limited number would be required. Impacts are considered to be low and temporary due to the small area, which would be subjected to disturbance and consolidation in the boundary of the working area. The overall effect of habitat disturbance would be considered further in the ES when further details of piling methods and boat movements are known, but is currently assessed as a Minor adverse (Not Significant) effect.

Sedimentation

6.8.53 The construction of the intake and outfall at the Burnell Avenue site has the potential to cause disturbance or mortality to macrophyte species through the release of sediment. Sedimentation and increased turbidity can impact macrophytes by inhibiting photosynthesis and gaseous exchange. Heavy sedimentation can cause mortality to species, with certain species being more sensitive to the impacts than others.

6.8.54 Any mobilisation of sediment is predicted to be small relative to the high sediment load already in the River Thames. With the implementation of embedded design (primary) mitigation and standard good practice (tertiary) measures outlined in Section 6.4, it is likely that the level of sediment released would be within the natural fluctuations of suspended sediment within the River Thames. If sediment is released it would be dispersed by flows in the area, so impacts are predicted to be temporary. Effects of sedimentation on macrophyte communities are considered to be a Minor adverse (Not Significant) effect.

Macroinvertebrates

6.8.55 The macroinvertebrate community in the freshwater River Thames and tidal River Thames is considered of low ecological value/importance within the study area in the context of the assessment methodology.

Loss of habitat

6.8.56 Construction of the outfall and intake at the Burnell Avenue site would require excavation of the riverbed and bankside. This would lead to the permanent loss of river, marginal and bankside habitat where the structures would be installed. Construction of the outfall at the Burnell Avenue site would require a cofferdam. The installation of a cofferdam and the draining of the area to allow for construction would lead to a temporary loss of aquatic habitat. It is estimated that the cofferdam would extend approximately 20m into the river from the bankside, which is a worst-case scenario within this PEI Report.

6.8.57 There would be a permanent loss of marginal habitat and associated macroinvertebrates due to the installation of the intake and outfall. The extent of this permanent loss is anticipated to be very small in comparison to similar habitat in the River Thames. The loss of this small area of bankside and channel habitat is not likely to cause the permanent loss of any macroinvertebrate species as recorded in the baseline, as it is assumed more mobile species would be present along other areas of the River Thames. Less mobile species like mussels have been recorded around the area. However, it is unlikely that critical habitat would be lost during construction at the Burnell Avenue site. It is unlikely that habitat loss within the site would lead to the local loss of macroinvertebrate species, as sufficient habitat remains available to support the populations.

6.8.58 Once construction is completed, the area would be reinstated as a riverine habitat. This temporary loss of wetted habitat would likely cause mortality to any individual macroinvertebrates present within the cofferdam area that are unable to move away. However, once the cofferdam is removed and the habitat reinstated, macroinvertebrates would likely be able to recolonise the area. The process of recolonising the area may take several years. The ability of macroinvertebrates to recolonise the area would depend on the suitability of the channel bed and banks after works have taken place. It is not likely that the temporary loss of habitat would cause any permanent loss of species along the

Thames. Effects from habitat loss are considered to be Minor adverse (Not Significant).

Sediment

6.8.59 The construction of the intake and outfall at the Burnell Avenue site has the potential to cause disturbance or mortality to macroinvertebrate species through the release of sediment. Sedimentation can impact macroinvertebrates by clogging gills and inhibiting respiration or causing mortality to individuals, particularly more sensitive species. Any mobilisation of sediment is predicted to be small relative to the high sediment load already in the River Thames. With the implementation of embedded design (primary) mitigation and standard good practice (tertiary) measures outlined in Section 6.4, it is likely that the level of sediment released would be within the natural fluctuations of suspended sediment within the River Thames. If sediment is released, it would be subject to rapid dispersion, so impacts are predicted to be temporary and minor.

6.8.60 Localised disturbance to macroinvertebrates may also occur due to the use of barges and increases in boat traffic. Given the high use of boats on the River Thames by existing users, there is already a baseline level of disturbance, and the introduction of construction-phase barges is unlikely to significantly impact the macroinvertebrate community along the river. Assuming the use of jack-up barges to transport materials such as piles, only a limited number would be required. Impacts are considered to be low and temporary due to the small working area, the boundary of which would be subject to disturbance and consolidation'. The overall impact of this is currently unknown as the number and use of barges are to be decided during further design stages, but it is currently assessed as a Negligible adverse (Not Significant) effect.

Noise and vibration

6.8.61 Vibration caused by barges and pile driving activities during the construction of the cofferdam within the River Thames has the potential to impact macroinvertebrates through physical disturbance, noise, and movement of sediments. This may lead to changes in behaviour and mortality.

6.8.62 Currently, pile driving methods being considered are push-in piling, vibro-piling and percussive piling. Methods have not been confirmed. At the time of writing, modelling of the options is being undertaken, and the results would be used to inform any additional (secondary) mitigation as required. Where possible, less intrusive methods like push-in piling and vibro-piling would be recommended. These methods would reduce the amount of disturbance received from vibration.

6.8.63 Embedded design (primary) mitigation and standard good practice (tertiary) related to piling are outlined in Section 6.4 and the draft CoCP. It is assumed that with the implementation of less intrusive methods, embedded design (primary) mitigation and standard good construction practice, there may still be impacts on macroinvertebrates from vibration, but the magnitude would be reduced. The extent of the area compared to the rest of the River Thames

would be small, and the impacts once piling is complete would be reversible; therefore, effects are considered to be Minor adverse (Not Significant).

Lighting

6.8.64 Night-time working and the use of lighting have the potential to impact macroinvertebrate species through changes in behaviour and attractance. Particularly with species like the designated striped mayfly (*Ephemera lineata*), which is attracted to bankside lighting, night-time lighting could interfere with timings for mating or emergence.

6.8.65 Following the implementation of standard good practice (tertiary) outlined in Section 6.4, artificial lighting for construction activities is assessed to have a Negligible adverse (Not Significant) effect on macroinvertebrates.

INNS effects on macroinvertebrates

6.8.66 Following protocols outlined within the INNS Section of this assessment, no impacts on macroinvertebrates related to the spread of INNS during the construction phase of the Burnell Avenue site are anticipated; therefore, effects are predicted to be Negligible adverse (Not Significant).

Fish

6.8.67 Diadromous fish within the tidal River Thames are considered of high ecological value/importance and non-diadromous and estuarine fish communities are of medium ecological value/importance in the context of the assessment methodology.

Loss of habitat

6.8.68 Construction of the outfall and intake at the Burnell Avenue site would require excavation of the riverbed and bankside. This would lead to the permanent loss of river, marginal and bankside habitat where the structures would be installed. Construction of the outfall at the Burnell Avenue site would require a cofferdam. The installation of a cofferdam and the draining of the area to allow for construction would lead to a temporary loss of aquatic habitat. It is estimated that the cofferdam would extend approximately 20m into the river from the bankside, which is a worst-case scenario within this PEI Report. Standard good practice procedures related to cofferdams are outlined in Section 6.4.

6.8.69 The permanent loss of marginal habitat due to the installation of the intake and outfall would likely lead to a permanent loss of macrophyte vegetation. The extent of this permanent loss is anticipated to be small in comparison to similar habitats in the River Thames as a whole. The loss of this small area of bankside and channel habitat is not likely to significantly impact fish species due to the availability of similar habitat in the area and throughout the River Thames.

6.8.70 Once the cofferdam is installed, prior to dewatering of the works area, a fish rescue would take place as outlined in Section 6.4, by a suitably trained

ecologist to safeguard fish populations. All fish captured within the cofferdam area would be returned to the River Thames.

6.8.71 The cofferdam area is likely to be in place for 18 months. After the construction has been completed, the area would be reinstated as riverine habitat. This temporary loss of wetted habitat would likely cause a minor displacement of fish species within the cofferdam area. However, once the cofferdam is removed, fish would likely recolonise the area. The ability of fish to recolonise the area would depend on the state of the channel bed after works have taken place which may affect fish habitat. For example, heavy modification of the channel sediments or shape may impact the ability of fish to colonise the area. It is not likely that the temporary loss of habitat would cause the disappearance of certain species inhabiting this area of the River Thames; therefore, impacts as a result of habitat loss for fish during the construction phase are considered to have a Minor adverse (Not Significant) effect.

Water quality and sediment

6.8.72 Construction activities have the potential to impact fish populations of the River Thames through pollution, runoff and mobilisation of sediment. Under extreme circumstances such as conditions leading to clogging of gills, there may be sub-lethal effects on respiration, or fish mortalities. Salmonid species tend to be more sensitive to suspended solids than coarse species. However, it is noted that the lower catchments on the freshwater River Thames offer suboptimal habitat for salmonid species, as reflected by their limited presence in the baseline data presented in Appendix 6.1.

6.8.73 As outlined in Appendix 6.2 Additional Environmental Data to Support Aquatic Ecology Assessment, impacts on water quality as a result of construction activities would be mitigated through the implementation of standard good practice (tertiary) and by adhering to the CoCP. During both in-river and bankside construction, there is a risk that sediment may be mobilised in the river channel, which could have an adverse effect on fish. Any mobilisation of sediment is predicted to be small relative to the high sediment load already in the River Thames, and the high flow, impacts would be temporary. Following this, impacts on fish from changes to water quality as a result of the construction phase are assessed to have a temporary Minor adverse (Not Significant) effect.

Noise and vibration

6.8.74 Noise and vibration caused by barges and pile driving activities during the construction of the cofferdam within the River Thames have the potential to impact fish through disturbance, and in extreme cases, may result in mortality. The introduction of construction-phase barges is unlikely to significantly impact fish along the river.

6.8.75 Currently, pile driving methods being considered for prioritisation are push-in piling and vibro-piling. Before a construction method can be finalised, a number of factors need to be confirmed, including the results of ongoing ground

investigation works and design development. However, where possible, preference would be given to less intrusive methods such as push-in piling and vibro-piling. As outlined in Section 6.4, pile driving methods would utilise a soft start to reduce the noise and vibration effects, where possible.

6.8.76 Where it is determined that percussive piling is required, embedded design (primary) mitigation and standard good construction practices would be implemented as outlined in Section 6.4 and the draft CoCP.

6.8.77 Therefore, it is currently predicted that with the implementation of embedded design (primary) mitigation and standard good construction practice, the magnitude of the impact is considered to be low to negligible, resulting in a temporary, short-term Minor adverse (Not Significant) effect on fish populations. Following the finalisation of construction methods and based on the outcomes of the underwater noise modelling, this effect would be reassessed in the ES.

Lighting

6.8.78 Temporary lighting for construction activities could impact and influence fish behaviour, including affecting the migration of the elver life stage of European eel, amongst other species. Young fish may be attracted and become subject to increased predation. Following the implementation of standard good practice (tertiary) outlined in Section 6.4, artificial lighting for construction activities would have a Negligible adverse (Not Significant) effect on fish within the River Thames.

INNS effects on fish

6.8.79 Following the protocol outlined within the ‘INNS’ section below, no impacts on fish related to the spread of INNS during the construction phase of the Burnell Avenue site are anticipated; therefore, effects are assessed as Negligible adverse (Not Significant).

Statutory and non-statutory designated sites

6.8.80 As the construction details of the Burnell Avenue site are still in development, the impacts from the construction activities are conservatively estimated and considered reasonable worst case. Further assessment would be required in the ES.

Syon Park SSSI

6.8.81 Syon Park SSSI is considered to be of medium ecological value/importance in the context of the assessment methodology. Construction of the Burnell Avenue site may impact the cited floodplain swamp and wetland invertebrate fauna of Syon Park SSSI. The extent of the impacts is anticipated to be very localised. The magnitude of the construction impacts after implementation of standard good practice (tertiary) and mitigation is anticipated to be low. Due to the distance of Syon Park SSSI from the Burnell Avenue site, it is considered that there would be a Negligible adverse (Not Significant) effect on Syon Park SSSI.

Isleworth Ait LNR

6.8.82 Isleworth Ait LNR is considered to be of low ecological value/importance in the context of the assessment methodology. The construction activities at the Burnell Avenue site may impact the tidal habitats and German hairy snail (*Perforatella rubiginosa*) for which Isleworth Ait LNR is designated. The extent of the impacts is anticipated to be very localised. The magnitude of the construction impacts, after implementing standard good practice (tertiary) and mitigation, is anticipated to be low. Due to the distance of Isleworth Ait LNR from the Burnell Avenue site, it is considered that there would be a Negligible adverse (Not Significant) effect on Isleworth Ait LNR due to the construction of the Burnell Avenue site.

River Thames and Tidal Tributaries SINC

6.8.83 River Thames and Tidal Tributaries SINC is considered to be of low ecological value/importance in the context of the assessment methodology. It is anticipated that the construction at the Burnell Avenue site would have a very localised and temporary impact downstream of the site. Given the scale and magnitude of the construction impacts compared to the size of the River Thames and Tidal Tributaries SINC, it is considered that the construction at the Burnell Avenue site would have a Negligible adverse (Not Significant) effect on the SINC. Assessments of the impacts on wildfowl and saltmarsh habitat linked to the SINC can be found in Chapter 7: Terrestrial Ecology. Impacts on fish found within the SINC can be found in the ‘Fish’ section above under the Burnell Avenue site construction phase.

Priority habitats

6.8.84 Mudflat habitats within the tidal River Thames are considered to have medium ecological value/importance in the context of the assessment methodology. The mudflats along the tidal River Thames within 2km downstream of the Project are situated within the boundaries of Isleworth Ait LNR and Syon Park SSSI. Assessments for these designated sites are outlined in the paragraphs above. The outcome from the assessments for Isleworth Ait LNR and Syon Park SSSI is that the construction of the Burnell Avenue site would have a negligible impact on these designated sites. It is considered that the construction of the Project would have a Negligible adverse (Not Significant) effect on the mudflats situated within these site boundaries. Construction impacts on the mudflats situated downstream of Isleworth Ait LNR and Syon Park SSSI are not likely due to the distance between the outfall and the locations of these mudflats.

Protected and notable species

Aquatic mammals

6.8.85 Protected aquatic mammal species are considered of high ecological value/importance within the context of the assessment methodology. Records of common porpoise (*Phocoena phocoena*), common seal (*Phoca vitulina*), grey seal (*Halichoerus grypus*) and minke whale (*Balaenoptera acutorostrata*) were returned from the GiGL data search. All these species spend the majority of their time within estuarine or marine environments and rely on the habitats in these areas for activities such as foraging or breeding.

6.8.86 It has been assumed that Teddington Weir would be a barrier for any cetaceans (in this case, common porpoise and minke whale) travelling up the River Thames. Cetaceans upstream of Battersea are likely vagrant individuals which have travelled upstream to feed or that are injured or unwell.

6.8.87 Seals are known to travel upstream of Teddington Weir to feed, as indicated by observations during fish surveys. The likelihood of seal species being present during the construction at the Burnell Avenue site, is low. However, the possibility of species like grey and common seal being present upstream of Teddington Weir during construction cannot be ruled out.

6.8.88 The main cause of disturbance to any mammal species present would come from noise and vibration impacts. The installation of driven piles in the marine environment without mitigation is likely to produce noise levels capable of causing injury and disturbance to aquatic mammals.

6.8.89 Pile driving methods currently being considered are push-in piling, vibro-piling and percussive piling. Before a construction method can be finalised, a number of factors need to be confirmed, including the results of ongoing ground investigation works and design development. However, where possible, preference would be given to less intrusive methods such as push-in piling and vibro-piling.

6.8.90 The construction at the Burnell Avenue site may negatively affect aquatic mammals due to noise and vibration disturbances. Additionally, any impacts on their prey species could have cascading effects on the success of these mammal populations. The potential effects on fish, which serve as a key prey source, are detailed in the Fish section under ‘Protected and notable species'' heading above. However, with the implementation of standard best practice guidance and mitigation measures (Section 6.4), impacts on aquatic mammals are expected to be a Negligible adverse (Not Significant) effect.

Fish

6.8.91 Seven designated fish species were identified within the study area from baseline conditions and are considered of high to medium ecological value/importance in the context of the assessment methodology. All could potentially use/pass through the habitats around the site. The effects on these species would be similar to those outlined in the ‘Fish’ section above, under the

Burnell Avenue site construction phase. All effects were assessed as Minor adverse (Not Significant) owing to temporary habitat loss and minor fish displacement from cofferdam works, minor water quality impacts, and low and short-term noise, vibration and lighting impacts. This assessment has been made considering species more sensitive to deterioration in water quality such as brown trout, Atlantic salmon, smelt and bullhead.

Aquatic macroinvertebrates

6.8.92 Fourteen designated macroinvertebrates were identified within 2km of the draft Order limits from baseline conditions and are considered of high ecological value/importance in the context of the assessment methodology. Taxa included mussels, dragonflies, mayfly, caddisfly, snails, water beetles and spongefly, which are all sensitive to environmental change. The impacts of the construction at the Burnell Avenue site on macroinvertebrates are outlined in the 'Macroinvertebrates' section above, and the effects on these species are expected to be Minor adverse (Not Significant).

Aquatic macrophytes

6.8.93 Three designated macrophytes, Flat-stalked pondweed (*Potamogeton friesii*), mudwort (*Limosella aquatica*) and small waterpepper (*Persicaria minor*), identified within the study area are considered of medium ecological value/importance in the context of the assessment methodology. The impact assessment outlined in the 'Macrophytes and macroalgae' section above, under the Burnell Avenue site construction phase, concluded that any impacts on aquatic macrophytes would be minor, and effects on these species from the construction at the Burnell Avenue site would therefore be Minor adverse (Not Significant).

Invasive Non-Native Species

6.8.94 Construction methods have the potential to facilitate the spread of INNS to and from the River Thames at the Burnell Avenue site. Many aquatic INNS are spread via seeds, plant fragments and eggs, which pose a potential risk for INNS to be spread during the construction phase. INNS can be transferred to construction vehicles, vessels and equipment, and contained on or within construction materials. The transfer of soil and biological material itself can also facilitate the movement of INNS.

6.8.95 There is potential for an increase in the severity of impacts of INNS when they are transferred over larger distances, as it increases the risk of establishing new populations in areas where they were not previously present.

6.8.96 Standard good practice for preventing the spread of INNS is outlined in Section 6.4. With the implementation of standard good practice (tertiary), the impact on aquatic ecology receptors due to the introduction and spread of INNS during the construction phase of the Burnell Avenue site is considered to have a Negligible adverse (Not Significant) effect.

Operational phase

6.8.97 This section outlines the potential operational effects of the Project on aquatic receptors.

Mogden STW site

6.8.98 The operation of Mogden STW as part of the Project would reduce final effluent from Mogden STW discharged to the tidal River Thames with potential effects on aquatic ecology due to changes in water quality. The location of the current outfall from Mogden STW is detailed in Figure 6.1 in Volume 2 PEI Report Figures.

6.8.99 Impacts on hydrodynamics and water quality in relation to the Mogden STW are detailed in Chapter 5: Water Resources and Flood Risk, and Appendix 5.1. While in operation, the TTP would result in a reduction in the chemical load discharged to the estuary. Further hydrodynamic modelling would be interpreted to determine the magnitude of benefit, in the ES, currently assessed in Chapter 5 as a Slight benefit (Not Significant) effect for water quality. These changes to water quality are therefore considered in this section for aquatic ecology receptors.

Phytoplankton

6.8.100 The phytoplankton community in the tidal River Thames is considered to have medium ecological value/importance in the context of the assessment methodology. It has historically been of ‘Moderate’ to ‘Good’ ecological status, with sites within the tidal River Thames monitored in 2024 indicative of ‘Moderate’ ecological status for phytoplankton, indicating a community tolerant of relatively high nutrient levels. Community composition of predominantly green algae rather than potentially toxic cyanobacteria and abundances (as measured by chlorophyll a concentration) below 50µg/l suggest a relatively low risk of developing problematic algal blooms. As such, the community is considered to have low sensitivity in relation to water quality.

6.8.101 As the preliminary risk assessment for water quality for operational activities at Mogden STW suggests a slight benefit, i.e., reduction in nutrients such as phosphate and nitrate, any impacts of operation of the TTP on phytoplankton communities are likely to be beneficial. However, as any improvement to water quality is likely to be slight, the magnitude of the impacts is likely to be negligible in the context of existing fluctuations in nutrient levels and other environmental variables. Therefore, the preliminary assessment is assessed as a Negligible adverse (Not Significant) effect on phytoplankton communities.

Phytobenthos (diatoms)

6.8.102 As the area potentially impacted by operation of Mogden STW lies entirely within the tidal River Thames, phytobenthos are not considered a receptor for this site.

Macrophytes and macroalgae

6.8.103 The macrophyte and macroalgae community of the tidal River Thames is considered to have low ecological value/importance in the context of the assessment methodology. A decrease in the discharge from Mogden STW may increase the exposure time of tidal habitats, which may affect ecologically connected habitats at Syon Park and cause negative impacts through drying. During operation of the Project, sediment around Syon Park would be exposed to a total less than 20% of the tidal cycle. It is considered that the impact on Syon Park from this change in water level and sediment exposure would be a Negligible adverse (Not Significant) effect.

6.8.104 Baseline monitoring around Isleworth Ait showed a limited macrophyte community dominated by water felt (*Vaucheria* sp.). Information about the macrophyte community downstream of Teddington Weir in the upper Thames is limited. The plant community is assumed to be tolerant of tidal conditions, such as tidal exposure and high salinity. It is unlikely that the changes from Mogden STW have the potential to have any negative impacts on the macrophyte community within the upper Thames. Any changes in water quality are considered to have a Negligible adverse (Not Significant) effect on the macrophyte community.

6.8.105 Combined impacts from any changes in inundation and water quality are assessed as a Negligible adverse (Not Significant) effect. These changes are localised, temporary and anticipated to be low in magnitude given the composition of the macrophyte and macroalgal community recorded for baseline conditions.

Macroinvertebrates

6.8.106 Macroinvertebrate communities of the tidal River Thames are considered to have low ecological value/importance in the context of the assessment methodology. Changes to the discharge at Mogden STW may increase the exposure time of tidal habitats, which may affect ecologically connected habitats at Syon Park SSSI and cause negative impacts through drying. The total time sediment around Syon Park SSSI would be exposed during the Project is <20%. It is considered that the effect on Syon Park SSSI from this change in water level and sediment exposure would be a Negligible adverse (Not Significant) effect.

6.8.107 The macroinvertebrate community composition of the Thames around Isleworth Ait is dominated by freshwater macroinvertebrates. It is anticipated the changes to water quality would have a negligible impact on macroinvertebrates in the stretch of the tidal River Thames. The operation of the Project is likely to temporarily improve the water quality directly downstream of the Mogden STW discharge. Changes in water quality are not anticipated to be of a magnitude to change the composition or condition of macroinvertebrate communities. They are therefore assessed as a Negligible adverse (Not Significant) effect. The operation of Mogden STW would only impact the tidal reach of the Thames and

any associated designated macroinvertebrates and would not affect the freshwater River Thames.

6.8.108 Combined impacts from any changes in inundation and water quality are assessed as a Negligible adverse (Not Significant) effect. These changes are localised, temporary and anticipated to be low in magnitude given the composition of the macroinvertebrate community recorded for baseline conditions.

Fish

6.8.109 The fish community composition of the tidal River Thames around Isleworth Ait is predominantly a mixture of coarse and estuarine fish, considered of high to medium ecological value/importance within the context of the assessment methodology. It is considered that the changes to water quality would have a Negligible beneficial (Not Significant) effect on fish along the tidal River Thames, as the operation of the Project is likely to temporarily improve the water quality directly downstream of the Mogden STW discharge. Minor changes identified in sediment exposure are considered to have a Negligible adverse (Not Significant) effect on fish species present in the tidal River Thames. The combined impacts from changes in water quality and tidal inundation due to the operation of Mogden STW are anticipated to have a Negligible adverse (Not Significant) effect on fish populations in the Thames.

Statutory and non-statutory designated sites

Syon Park SSSI

6.8.110 Syon Park SSSI is considered to be of medium ecological value/importance in the context of the assessment methodology. The operation of the Project may have an impact on the habitats and species of Syon Park SSSI. Impacts may include changes in water quality and inundation. Effluent from Mogden would reduce between 50-75Ml/d with operation, which in context of the whole river flow and tidal changes results in small changes in water levels. It is predicted that any changes in minimum (low tide) water levels resulting from the Project would be considerably less than 6cm. The greatest effect would be concentrated around Isleworth Ait, and no effect is predicted to extend further into the tidal River Thames, as detailed in Appendix 6.1 Aquatic Ecology Baseline.

6.8.111 A reduction in discharge from Mogden STW is likely to benefit the tidal River Thames as discharges would be reduced during low river flows. This would remove any temperature increases from the discharge and reduce the volume of freshwater entering the tideway. Dissolved oxygen and salinity are predicted to reduce during operation. Suspended sediments and dissolved inorganic nitrogen are predicted to reduce as a result of the discharge. These changes during the operation of the Project would likely be beneficial to Syon Park SSSI. Reductions in nutrients, even if temporary, may increase the diversity of wetland plants at the site, which may have indirect benefits for the cited

terrestrial invertebrates there (see Appendix 6.1 for details). The changes in water quality due to the operation of Mogden STW are considered to have a Negligible beneficial (Not Significant) effect.

6.8.112 Changes to the discharge at Mogden STW may impact the inundation of tidal habitats. This may impact the hydrologically connected habitats at Syon Park SSSI and may cause negative impacts through drying. Changes to the discharge at Mogden STW may increase the exposure time of tidal habitats, which may affect ecologically connected habitats at Syon Park SSSI and cause negative impacts through drying. The total time sediment around Syon Park SSSI would be exposed during the Project is <20%. It is considered that the impact on Syon Park SSSI from this change in water level and sediment exposure would be a Negligible adverse (Not Significant) effect.

Isleworth Ait LNR

6.8.113 Isleworth Ait LNR is considered to be of low ecological importance in the context of the assessment methodology. The operation of the Project is likely to have positive impacts on the water quality around Isleworth Ait due to a reduction in final effluent being released from Mogden STW. It is anticipated that the operation of Mogden STW would remove any temperature increases caused by the discharge. Dissolved oxygen and salinity would increase, and suspended sediments and dissolved inorganic nitrogen would reduce. It is considered that there would be Negligible adverse (Not Significant) effect on Isleworth Ait due to changes in water quality.

6.8.114 Modelling was undertaken to investigate if decreases in Mogden STW discharges could impact the water level and inundation of tidal sediments around Isleworth Ait. Modelling of exposure for tidal sediments showed the overall increase in exposed sediments along the side channel of Isleworth Ait, reaching a maximum of 2% across all scenarios. Total exposure of sediments around Isleworth Ait would be no more than 50% of the time, which is in keeping with the current inundation around the site. It is considered that there would be a Negligible adverse (Not Significant) effect on Isleworth Ait and its listed features due to the operation of the proposed TTP.

River Thames and Tidal Tributaries SINC

6.8.115 The River Thames and Tidal Tributaries SINC is considered to have low ecological value/importance in the context of the assessment methodology. The operation of the proposed TTP would only affect the upper tidal River Thames downstream of the outfall. Out of the habitats and species listed in the SINC, it is considered that mudflats and fish have the potential to be affected by the operation of the Project. Assessments of the impacts on wildfowl and saltmarsh habitat linked to the SINC can be found in Chapter 7: Terrestrial Ecology.

6.8.116 It is anticipated that the operation of the proposed TTP within the Mogden STW site would reduce the impact of the current operation of the Mogden STW on the upper tidal River Thames by reducing temperature increases and water quality changes from Mogden's final effluent discharge. Given the scale and

duration of the impacts compared to the size of the River Thames and Tidal Tributaries SINC, it is considered that the operation of the Project would have a Negligible adverse (Not Significant) effect on the SINC. Impacts on fish found within the SINC can be found in paragraph 6.8.109. An assessment of the impact of the mudflats within the SINC can be found in paragraph 6.8.117 below.

Priority habitats

Mudflats

6.8.117 The mudflats along the tidal River Thames within 2km of the Project are situated within the boundaries of Isleworth Ait LNR and Syon Park SSSI. Assessments for these designated sites are outlined in paragraphs 6.8.110 to 6.8.114 above. The outcome of the assessments for Isleworth Ait LNR and Syon Park SSSI indicates that the operation of the Mogden STW site, as part of the Project, would have a negligible impact on these designated sites. It can be concluded that the operation of the Project would have a negligible impact on the mudflats situated within these site boundaries. Any effects on the mudflats from the operation of the Mogden STW site as part of the Project, are assessed as Negligible adverse (Not Significant) due to the distance between the Mogden STW discharge and the locations of these mudflats.

Protected and notable species

Aquatic mammals

6.8.118 Records of common porpoise (*Phocoena phocoena*), common seal (*Phoca vitulina*), grey seal (*Halichoerus grypus*) and minke whale (*Balaenoptera acutorostrata*) were returned from the GiGL data search. These species are considered of high ecological importance within the context of the assessment methodology. All these species spend the majority of their time within estuarine or marine environments and rely on the habitats in these areas for feeding and other behaviours. Any occurrence of one of these species upstream of Battersea is likely a vagrant individual which has travelled upstream to feed (one example being a sighting of a seal (species unconfirmed) upstream of Teddington Weir during a Ricardo fish survey in 2024). The effects of the operation of Mogden STW as part of the Project, are predicted to be positive and localised. The effect on fish, which may be a food source for these species, is anticipated to be Negligible adverse (Not Significant), localised and short term. It is unlikely that the operation of Mogden STW, as part of the Project, would have a significant impact on the populations of these protected species.

Fish

6.8.119 Seven designated fish species were identified from baseline conditions and are considered of high to medium ecological value/importance in the context of the assessment methodology. These were European eel, brown trout, Atlantic salmon, barbel, bullhead, lamprey, smelt and shad sp. The impacts of the

operation of the Mogden STW site as part of the Project, on these protected fish species are outlined in paragraph 6.8.109.

Aquatic macroinvertebrates

6.8.120 Fourteen designated macroinvertebrate species were recorded along the freshwater River Thames, and 11 designated macroinvertebrate species were recorded along the tidal River Thames. These species are considered of high ecological importance in the context of the assessment methodology. Any effects from changes in temperature, velocity or water quality on aquatic macroinvertebrates have been assessed as Negligible adverse (Not Significant) due to the operation of Mogden STW as part of the Project. The operation of Mogden STW would only impact the tidal reach of the Thames and any associated designated macroinvertebrates and would not affect the freshwater River Thames. Changes in tidal inundation and water quality are considered to have a Negligible adverse (Not Significant) effect. The impacts of these changes in combination are also considered to have a Negligible adverse (Not Significant) effect.

Aquatic macrophytes

6.8.121 Three designated macrophyte species were recorded within the freshwater River Thames and are considered of medium ecological value/importance in the context of the assessment methodology. These species were not recorded under the baseline for the tidal River Thames, but they may be present downstream of Teddington Weir. The impact assessment outlined in paragraphs 6.8.103 to 6.8.105 concluded that any impacts from changes in temperature, velocity or water quality would be negligible on aquatic macrophytes. These changes in combination are therefore also considered to have a Negligible adverse (Not Significant) effect. It was concluded that designated macrophyte species would not be negatively impacted by the operation of the Mogden STW site as part of the Project.

Invasive Non-Native Species

6.8.122 The INNS present in the tidal River Thames around Isleworth Ait are representative of those present along the length of the assessed reaches. INNS, with large populations in the tidal River Thames around Isleworth Ait, include New Zealand Mud Snail (*Potamopyrgus antipodarum*), Demon Shrimp (*Dikerogammarus haemobaphes*) and *Hypania invalida.* These are generalist, with broad ranges of habitat conditions in which they can occupy.

6.8.123 The operation of the Project is likely to temporarily improve water quality directly downstream of Mogden STW discharge, which would keep the water conditions within the preference thresholds of INNS. It is considered that the changes to water quality would have a Negligible adverse (Not Significant) effect on the distribution of INNS within the tidal River Thames.

6.8.124 Minor changes identified in sediment exposure are considered to have Negligible adverse (Not Significant) effect on INNS present in the tidal River

Thames. The combined impacts on INNS populations from changes in water quality and tidal inundation due to the operation of Mogden STW as part of the Project, are considered to have a Negligible adverse (Not Significant) effect in the Thames.

Burnell Avenue site

6.8.125 The effects of the operation of the outfall on aquatic ecology include potential impacts on water quality, water temperature and velocities in the freshwater and tidal River Thames downstream of the outfall. Two outfall options have been considered for the operation of Burnell Avenue site: a bankside option and a near bankside in-river option. Three modelled scenarios were run for each outfall option (Table 6.11 and Table 6.12).

6.8.126 From the baseline data, it is estimated that in typical river flow conditions under which the Project would operate (58% of the Project operation would be at 700-799Ml/d), the mean river temperature would be 16.9°C.

6.8.127 During the coldest river temperatures, the Project would operate at times that would correspond with very low river flows (400Ml/d), with the mean river temperature of 8.9°C.

6.8.128 At the lowest flow scenario (300Ml/d), the Project would discharge at freshwater River Thames temperatures of 13.0°C (mean). Full details of the modelling, alongside figures showing the thermal plume and changes in velocity, can be found in Appendix 6.2 Additional Environmental Data to Support Aquatic Ecology Assessment.

Table 6.11 Modelled scenario results for bankside outfall.

Scenario	Percentage of surface area between C4 and Teddington Weir with change in ambient temperature >2°C	Percentage of cross-sectional area of the river C4 with change in ambient temperature >2°C	Percentage of cross-sectional area of C4 with velocity increase of >0.05m/s
Bankside outfall scenario 1 (700Ml/d)	1.5%	0.2%	1.2%
Bankside outfall scenario 2 (400Ml/d)	2.7%	1.2%	1.5%
Bankside outfall scenario 3 (300Ml/d)	1.2%	0.1%	1.5%

6.8.129 Under all scenarios for the bankside design, a >2°C increase would not exceed 1.2% of the channel cross-section. Velocities of >0.05m/s would not exceed 1.5% of the channel C4 cross-section.

Table 6.12 Modelled scenario results for near bankside in-river outfall

Scenario	Percentage of surface area between C4 and Teddington Weir with change in ambient temperature >2°C	Percentage of cross-sectional area of the river C4 with change in ambient temperature >2°C	Percentage of cross-sectional area of C4 with velocity increase of >0.05m/s
Near bankside in-river outfall scenario 1 (700Ml/d)	0.1%	0.4%	0.8%
Near bankside in-river outfall scenario 2 (400Ml/d)	3.7%	7.7%	3.0%
Near bankside in-river outfall scenario 3 (300Ml/d)	0%	0.2%	1.7%

6.8.130 Under all scenarios for the near bankside design, a >2°C increase would not exceed 7.7% of the channel cross-section. Velocities >0.05m/s would not exceed 3% of the channel cross-section.

6.8.131 When considering the effect of the Project outfall on maximum river temperatures, the data indicate that when the maximum ambient temperatures occur in the River Thames, the recycled water from the outfall would be a lower temperature than ambient river temperatures and therefore would not push the river temperatures above those already expected.

6.8.132 For both design options, temperatures and velocity changes would be localised and fully mixed with the water in the River Thames upstream of Teddington Weir. Changes to temperatures in the tidal River Thames below Teddington Weir would be less than above the weir, with no change in 10th or 90th percentile temperatures and no significant change in temperature profiles across the tidal cycle (Appendix 5.1). For median temperatures (50th percentile), the greatest difference during operation is 0.5°C above baseline temperatures, directly below Teddington Weir for approximately 1km, reducing downriver to 6.5km, where it becomes 0.2°C or lower.

6.8.133 Effects on water quality from both outfall options are currently under review but expected to be slight as will be required under a discharge permit which will include water quality requirements. It is expected there will be negligible change outside the immediate mixing zone (the discharge would be fully mixed before Teddington Weir). Potential slight changes to water quality could include an increase in phosphorus and ammonia and reduction in dissolved oxygen during the operation of the Project. Further information will be available at ES as a full assessment of effects will be produced.

6.8.134 The nature and magnitude of the hydrological, geomorphological, water quality and temperature impacts are described in Chapter 5 and Appendix 5.1. In addition, further water quality and hydrodynamic modelling relevant to the Aquatic Ecology assessment are provided in Appendix 6.2. Further baseline information on specific receptors, including fish, macrophytes, macroinvertebrates and INNS is provided in Appendix 6.1.

6.8.135 Decreased river flow between the intake and outfall is expected to result in no discernible change to water levels due to the control of levels within this reach of the Thames. Only very slight flow velocity reductions are anticipated, with negligible effects on hydrodynamics and geomorphological processes within the short, depleted reach. As such, consequential effects on general aquatic ecology receptors due to a decrease in river flow within this reach are assessed as Negligible adverse (Not Significant) and have not been considered further. However, the effects of flow changes and operation of the intake, particularly with respect to impingement and entrainment of fish, are considered further in the fish section below.

6.8.136 Impacts relating to the operation of the intake and outfall are considered for all receptors below.

Phytoplankton

6.8.137 Phytoplankton communities of the freshwater River Thames and tidal River Thames are considered to have medium ecological value/importance in the context of the assessment methodology.

Freshwater River Thames

6.8.138 The operation of the outfall has the potential to impact phytoplankton communities along the freshwater River Thames through increases in temperature and velocity, and changes in water quality.

6.8.139 Effects on water quality are currently under review for both outfall options. Changes in water quality include slight increases in phosphorus and ammonia, with negligible change outside the immediate mixing zone (the discharge would be fully mixed before Teddington Weir).

6.8.140 This area of the River Thames has historically recorded peaks in both the total phosphorus and soluble reactive phosphorus concentrations over the growing season, with an increase in water temperature positively related to an increase in available soluble reactive phosphorus concentrations (Appendix 6.2). Therefore, the introduction of more phosphorus to the site may further fuel phytoplanktonic growth over the growing season and the relationship between phytoplankton growth and phosphorus within the study area is described further in Appendix 6.1.

6.8.141 Ammonium concentrations in this area of the River Thames demonstrated a positive relationship with water temperature, resulting in an increase in ammonium concentrations over the growing season. Ammonium is favoured over other nitrogen sources, such as nitrate, by some organisms, e.g.,

cyanobacteria. Phosphorus is a limiting nutrient in freshwater systems, and nitrogen is a limiting nutrient in estuarine systems.

6.8.142 Increases in nutrient levels in the immediate mixing zone of the outfall may, therefore, increase phytoplankton levels, increasing the risk of phytoplankton blooms, especially over spring months when phytoplankton biomass (as measured by chlorophyll a) is already relatively high in this area.

6.8.143 However, given the limited scale of the increase and extent of the mixing zone, combined with the rapid response of phytoplankton to changing environmental conditions, any slight increase in the risk of bloom formation is expected to be temporary. This effect would remain limited to the mixing zone and would quickly return to baseline conditions when the Project is not operational. In the context of the local waterbody and wider River Thames, this risk represents a Minor adverse (Not Significant) effect on phytoplankton communities for the bankside design and the near bankside in-river design.

6.8.144 An increase in water temperature as a result of the discharge for both outfall options may risk increasing the intensity or growth window of phytoplanktonic blooms in the immediate area affected by the temperature rise. An increase in water temperature above the typical annual range may stimulate metabolic activity earlier in the growing season. In addition, elevated water temperatures during the autumnal period may extend the phytoplankton growing season. However, this effect would be naturally limited by the decreasing availability of daylight as autumn transitions into winter.

6.8.145 The maximum temperature change to river temperature beyond the mixing zone is predicted to be small, with the maximum temperature increase predicted to occur twice every 50 years. Furthermore, under maximum temperature extremes, it is noted that recycled water is predicted to discharge at a lower temperature than ambient river temperature and would not push the river temperatures above those already expected. Changes in temperature from both the bankside and near bankside in-river outfall options are expected to have a Minor adverse (Not Significant) effect on the phytoplankton communities.

6.8.146 In combination, any resultant changes in phytoplankton community composition and a slight increase in the risk of bloom formation from impacts on temperature and nutrients would be temporary and limited to the area between the outfall and Teddington Weir, returning to baseline conditions rapidly when the Project is not operational. This would be the case for both the bankside outfall and the near bankside in-river outfall. In the context of the local waterbody and wider River Thames, this risk represents a Minor adverse (Not Significant) effect on phytoplankton communities.

Tidal River Thames

6.8.147 Changes in water quality due to operation at the Burnell Avenue site are deemed negligible below Teddington Weir for both outfall options. Therefore,

the impacts on phytoplankton communities within the tidal River Thames are assessed as a Negligible adverse (Not Significant) effect.

6.8.148 The increase in temperatures in the tidal River Thames below Teddington Weir due to the operation of the outfall at the Burnell Avenue site is negligible. Downstream of Teddington, there would be no change in 10th or 90th percentile temperatures and no significant change in temperature profiles across the tidal cycle (Appendix 5.1). For median temperatures (50th percentile), temperature increases would be small in the context of the Thames system and short in extent.

6.8.149 Phytoplankton abundance is lower in the tidal River Thames ('Moderate' to 'Good' WFD ecological status for phytoplankton) than in the freshwater River Thames above Teddington Weir ('Poor' WFD ecological status) and is therefore considered less sensitive as the risk of blooms is lower. Given the intermittent nature of operation, the duration of any impacts of increased temperatures on phytoplankton communities would be temporary and expected to revert to baseline conditions when operation ceases. In the context of both the local waterbody and wider Thames Estuary, effects on phytoplankton communities are therefore considered Minor adverse (Not Significant) for both outfalls.

Phytobenthos (diatoms)

6.8.150 Phytobenthos are not considered receptors for the tidal River Thames and are therefore only assessed for freshwater River Thames in this section.

Freshwater River Thames

6.8.151 The benthic diatom communities in this reach of the freshwater River Thames results are classified as having 'Poor' ecological status and are dominated by motile species which are relatively tolerant of sedimentation. The community is considered to be of low ecological value/importance in the context of the assessment methodology. As another group of algae, benthic diatom communities are considered likely to be impacted very similarly to phytoplankton communities, and the impact assessment for freshwater phytoplankton above, can also be applied here. The combination of potential operational impacts from the two outfall options for the Burnell Avenue site (changes in water quality, velocity and temperature) are considered likely to have a Minor adverse (Not Significant) effect on the phytobenthos community of the freshwater River Thames.

6.8.152 This is due to the temporary, localised impacts during operation and the projected magnitude of the impacts. Diatoms can rapidly recover from changes in water quality and environmental conditions. Once operation ceases and temperatures and water quality parameters return to baseline conditions, diatom populations are expected to rapidly re-establish their pre-operation conditions.

Macrophytes and macroalgae

6.8.153 The macrophyte communities of the freshwater River Thames and tidal River Thames within the study area are considered of low ecological value/importance in the context of the assessment methodology. Operation of the Burnell Avenue site has the potential to impact macrophyte and macroalgae communities along the River Thames through increases in temperature, velocity and changes in water quality. The impact of these changes is discussed in detail in Section 4.2 of Appendix 6.1.

Freshwater River Thames

6.8.154 Increases in temperature from both outfall options at the Burnell Avenue site are likely to be small, localised, and infrequent. The species composition recorded around the Burnell Avenue site is not likely to be sensitive to small, temporary increases in temperature. The three protected species recorded in the baseline conditions may be more sensitive to temperature changes. However, the magnitude of change is considered small. The near bankside in-river design would reduce localised temperature increases along the marginal habitat downstream of the outfall in comparison to the bankside option. The effect of temperature increases on the macrophyte community along the freshwater River Thames from the operation of both design options for the Burnell Avenue site is considered a Minor adverse (Not Significant) effect.

6.8.155 Increases in velocity from the outfall at the Burnell Avenue site are anticipated to be small in magnitude, localised and infrequent. The macrophyte species assemblage along this part of the River Thames is not likely to be sensitive to the magnitude of velocity increases predicted from the operation of either design for the Burnell Avenue site. The near bankside in-river design would reduce localised velocity increases along the marginal habitat downstream of the outfall in comparison to the bankside option. The effect of velocity increases is considered to be Minor adverse (Not Significant) for both options.

6.8.156 Increases in phosphorus and ammonia are anticipated to be the same for both design options and are considered to have a Negligible adverse (Not Significant) effect on macrophytes. Operation of the Project would be intermittent and temporary and not likely to permanently change the macrophyte community recorded downstream of the Burnell Avenue site outfall.

6.8.157 Dissolved oxygen could be slightly reduced during the operation of both outfall options. However, the overall dissolved oxygen concentration would remain high and would not impact the success of macrophytes downstream of the outfall. All other changes in water quality due to the operation of both outfall options are likely to have a Negligible adverse (Not Significant) effect on macrophytes present on the River Thames.

6.8.158 Furthermore, under maximum temperatures in summer, it is noted that recycled water is predicted to discharge at a lower temperature than ambient river temperature. More details on the modelling are provided in Appendix 6.2 Additional Environmental Data to Support Aquatic Ecology Assessment.

Tidal River Thames

6.8.159 There are anticipated to be no changes in velocity, water levels, or water quality downstream of Teddington Weir, and there would be no net change to the water as the point in which it flows over Teddington Weir during the operation of the Project at the Burnell Avenue site. There may be a 1°C increase compared to baseline temperatures under certain low flow scenarios downstream of Teddington Weir. It is unlikely that an irregular, temporary 1°C increase downstream of Teddington Weir would affect the macrophyte and macroalgae community downstream of the weir; therefore, effects are assessed as Negligible adverse (Not Significant) for both outfall options.

Macroinvertebrates

6.8.160 The macroinvertebrate community of the freshwater River Thames and tidal River Thames within the study area are considered of low ecological importance in the context of the assessment methodology. The operation of the Burnell Avenue site has the potential to impact macroinvertebrate communities along the River Thames through increases in temperature, velocity and changes in water quality. The impact of these changes is discussed in detail in Appendix 6.1 Aquatic Ecology Baseline.

Freshwater River Thames

6.8.161 Increases in temperature from the two outfall options at the Burnell Avenue site are likely to be small, localised and infrequent. The species recorded around the Burnell Avenue site are not likely to be sensitive to small, temporary increases in temperature. Temporary increases in temperature may cause behavioural changes in some macroinvertebrate species, but these impacts are likely to be temporary with no long-term ecological effects. Therefore, temperature increases due to both outfall options are considered to have a Minor adverse (Not Significant) effect on the macroinvertebrate community.

6.8.162 Increases in velocity from the two outfall options are anticipated to be small in magnitude as no sediment movement or scouring is anticipated to take place. The highest impact from the operation is anticipated to be very localised, and the overall impact would be temporary and infrequent. Protected species may be more sensitive to changes in velocity, particularly less mobile species like mussels, as they would be unable to move away from the affected location to areas with more suitable velocities. However, given the designated species recorded around the Burnell Avenue site, it is likely that these species would not be sensitive to localised velocity increases modelled. It is considered that velocity increases due to the two outfall options would have a Minor adverse (Not Significant) effect on the macroinvertebrate community.

6.8.163 Increases in phosphorus and ammonia from the two outfall options are anticipated to have a Negligible adverse (Not Significant) effect on macroinvertebrates. This is due to the intermittent and temporary nature of the Project operation, which is unlikely to cause permanent changes to long-term phosphorus and ammonia levels in the River Thames or the macroinvertebrate community recorded downstream of the Burnell Avenue site outfall.

6.8.164 Dissolved oxygen could be slightly reduced during the operation of both outfall options. However, the overall dissolved oxygen concentration would remain high and would not impact the success of macrophytes downstream of the outfall. All other changes in water quality due to the operation of both outfall options for the Burnell Avenue site are likely to have a Negligible adverse (Not Significant) effect on macroinvertebrates present in the River Thames.

6.8.165 Designated macroinvertebrate species in the River Thames may be more sensitive to increases in temperature, which could also heighten their sensitivity to other environmental factors such as eutrophication. Baseline assessments recorded eleven designated macroinvertebrate species, which may also be affected by changes in velocity and water quality, though data on their specific responses to environmental changes are limited. Given the anticipated duration of the Project, its localised impacts, and the likelihood of protected macroinvertebrates being present within the affected area, the environmental changes are expected to be temporary. More mobile species are likely to relocate if conditions become unsuitable, whereas less mobile species, such as mussels, may experience greater impacts. However, the magnitude of change is predicted to be small for both outfall options, considering the scale, duration, and infrequency of the Project activation. As a result, the impact of temperature increases and other environmental changes on protected macroinvertebrate species in the freshwater River Thames is assessed as a Minor adverse (Not Significant) effect for both outfall options.

Tidal River Thames

6.8.166 There is anticipated to be no change in velocity, water levels, or water quality downstream of Teddington Weir, and there would be no net change in pass forward flow over Teddington Weir due to the operation of the Burnell Avenue site. There may be a 1°C increase under certain low flow scenarios downstream of Teddington Weir. An intermittent 1°C increase downstream of Teddington Weir is unlikely to affect the macroinvertebrate community downstream of the weir; therefore, the effects on estuarine macroinvertebrate communities for both outfall options are considered to be Negligible adverse (Not Significant).

Fish

6.8.167 Diadromous migratory fish of the River Thames within the study reach are considered to be of high ecological importance, and non-migratory freshwater and estuarine fish communities are of medium ecological value/importance in the context of the assessment methodology.

6.8.168 The operation of the Burnell Avenue site has the potential to impact fish communities along the River Thames through increases in temperature, velocity, impingement or entrainment (entrapment) at the intake, and changes in water quality, including effects on olfaction. The impact of these changes is discussed in detail in Appendix 6.1.

6.8.169 As shown in the Key Diadromous Fish Species section of Appendix 6.1, the Project is proposed to be operational at a rate of <1 in 100 years in February to

May and a rate of 1 in 50 years in June. As operation is expected to be only an extremely exceptional occurrence from February to May (inclusive), the corresponding windows for downstream migration of smelt, shad, lamprey and salmonids, which occur over these months, would be avoided; therefore, these are scoped out of the assessment.

6.8.170 Although the downstream migration of adult European eel coincides with the operational timings of the Project, it is considered unlikely that Project operation would impact their seaward migration. This is because they exhibit negatively rheotactic swimming behaviour during their downstream migration, meaning they swim with the current rather than against it. Therefore, adult European eel on their seaward migration have been scoped out of the assessment.

Temperature

6.8.171 The outfall discharge is anticipated to have a localised, intermittent effect on river temperatures, with a minor increase in temperature predicted under both proposed outfall options. Temperature increases from the outfall may impact fish in several ways. Higher temperatures can reduce dissolved oxygen levels, stressing aquatic life and making conditions less favourable for temperature-sensitive species. The outfall discharge could also shift the temperature of the river beyond the preferred range of resident species, creating a thermal barrier that affects salmonid migration or attracting warm-water species like coarse fish and European eel. These changes may lead to reduced fish migration success, increased risk of disease and predation due to localised fish aggregations, greater exposure to chemicals, and a higher likelihood of fish entrapment at the outfall.

6.8.172 Modelling in Appendix 6.2 shows the small variations in temperature in the freshwater River Thames between the outfall and Teddington Weir. This modelling also shows temperatures within this area are lower than observed temperatures in the tidal River Thames below Teddington Weir throughout the predicted operational period, apart from some brief minor increases above the tidal River Thames temperature under the M96 scenario (1 in 20 year scenario). Therefore, no impacts for either the near bankside in-river outfall or bankside outfall option as a result of temperature change within the tidal River Thames downstream of Teddington Weir are anticipated as a result of the Project operation.

6.8.173 The magnitude of impact of both the bankside and near bankside in-river outfall options, on the preferred temperature range for fish in the River Thames is predicted to be negligible, given the small incremental change to mixed river temperatures. It is noted these changes are localised to approximately 200m of the Freshwater River Thames above Teddington Weir. The changes in temperature do not put any species identified within their upper lethal limit for temperature. This, alongside the intermittent frequency and duration of operation of the Project, means that the predicted changes in temperature are considered unlikely to affect the fish assemblage of the River Thames. The maximum temperature change to mixed river temperature is predicted to be

1.45°C above the ambient river temperature during a very low flow year, with a return frequency of 1:20. This scenario is only predicted to occur twice every 50 years. It is still compliant with the WFD High standard for an increase or decrease in the ambient river temperature.

6.8.174 Furthermore, under maximum temperature extremes, it is noted that recycled water is predicted to discharge at a lower temperature than ambient river temperature and would not push the river temperature beyond the critical thermal maximum for fish. It is anticipated that any effects on the fish populations of the River Thames would be reversible in the short term due to the Project's intermittent operation and localised area of effect. Therefore, effects on the preferred temperature range of fish in the River Thames are considered to be Minor adverse (Not Significant) for both the bankside and near bankside in-river outfall. However, it is noted that the near bankside in-river outfall reduces impacts on the marginal habitat, consequently further limiting any impacts on the preferred temperature range of juvenile coarse fish or migrating elvers.

6.8.175 The magnitude of the impact of temperature on salmonid migration through the formation of a thermal barrier for both the bankside and near bankside in-river outfall has been assessed as Negligible. This is on the basis of the small incremental change to mixed river temperatures and confinement of the thermal plume to within 10m of the riverbank and a 1.2% cross-sectional area for the bankside outfall; and within 20m of the riverbank and 7.7% cross-sectional area for the near bankside in-river outfall, on a river with a width of approximately 80m. See details and mapping of the thermal plumes under Physical Environment Modelling within Appendix 6.2 Additional Environmental Data to Support Aquatic Ecology Assessment.

6.8.176 Although temperature changes are localised to approximately a 200-metre stretch of the freshwater River Thames, the impact of reduced migration success could extend beyond this area, potentially affecting salmonid recruitment throughout the Thames catchment upstream of Teddington Weir. However, temperature fluctuations resulting from the Project fall within the natural range of variations which fish experience during migration. Given the intermittent frequency and limited duration of operation, these fluctuations are unlikely to affect salmonid migration in the River Thames. It is also noted that the Project is compliant with WFD High standards for increases or decreases to the ambient river temperature and that the extent of the thermal plume complies with identified guidance. It is anticipated that any effects on salmonid migration within the River Thames would be reversible in the short term due to the intermittent operation and localised area of effect. Therefore, effects on salmonid migration due to the formation of a thermal barrier in the River Thames are considered to be Minor adverse (Not Significant) for both the bankside and near bankside in-river outfall options. Neither option is expected to create thermal barriers that would impact salmonid migration.

6.8.177 During periods when the Project operates concurrently with upstream eel migration, temperature differences between the river and recycled water remain relatively low, less than 2°C in peak migration months (July and August) and less than 3.5°C in September. These differences fall within the natural temperature fluctuations that eels encounter throughout their migration. While there is limited evidence to confirm or refute the formal attraction of eels to warmer water, it is noted that upstream migration occurs during warmer months, when river temperatures may already be within the optimal range for eels. As a result, any thermal attraction to the minor temperature increases around the outfall is likely to be minimal, and in some cases, may even lead to avoidance behaviour. The duration and frequency of the Project's operation relative to the eel migration period is low. Based on historical data from a six-year period (2013–2018), the Project is estimated to overlap with only 20% of the European eel elver upstream migration window (April to September). The predicted frequency of operation varies by month:

a. April and May: Less than once in 100 years
b. June: Once in 50 years
c. July (peak migration month): Once in 20 years
d. August and September (peak migration months): Once in five years

6.8.178 Additionally, when Teddington Weir overtops, the Project would not be operational. Historical data indicate that these overtopping events align with peak European eel migration, ensuring that the Project would not be running during the most critical migration events. Any potential effects on eel migration are expected to be short term and reversible, given the Project's intermittent operation and mitigation measures. Factoring in the operation of the Project, the anticipated attraction effects of the Project on European eel elvers are predicted to be Minor adverse (Not Significant) for both the bankside and near bankside in-river outfall options. However, it is noted that the near bankside in-river outfall is offset from the river margins, where elver are likely to migrate, meaning that the highest degree of change is outside their likely path, which may further reduce the likelihood of attraction to the outfall under this option.

6.8.179 The magnitude of the impact of thermal attraction of both the near bankside in-river and bankside outfall options on coarse fish populations is considered to be negligible. This is on the basis of the small incremental change to mixed river temperatures and confinement of the thermal plume to within 10m of the riverbank and a 1.2% cross-sectional area for the bankside outfall; and within 20m of the riverbank and 7.7% cross-sectional area for the near bankside in-river outfall, on a river with a width of approximately 80m. However, some scope for attraction remains. Although temperature changes are localised to approximately a 200m stretch of the freshwater River Thames above Teddington Weir, these fall within the natural temperature variations that fish experience along the course of the river. When combined with the intermittent frequency and limited duration of operation of the Project, these temperature

changes are unlikely to have a significant effect on fish populations in the River Thames.

6.8.180 The Project complies with WFD High standards for increases or decreases in the ambient river temperature, and the extent of the thermal plume aligns with the relevant guidance. It is anticipated that any effects on coarse fish populations within the River Thames would be reversible in the short term due to the Project's intermittent operation and localised area of effect. Therefore, effects on coarse fish due to thermal attraction to both the near bankside in-river and bankside outfall options in the River Thames are considered to be Minor adverse (Not Significant). However, it is noted that the near bankside in-river outfall is offset from the river margins reducing impacts on the marginal habitat.

Velocity

6.8.181 Velocity changes as a result of the outfall may affect fish by shifting the velocity regime of the River Thames, which may result in displacement of juvenile fish, disorientation of salmonids affecting migration, or the higher flows attracting European eel elvers during their upstream migration, which may lead to reduced fish migration success.

6.8.182 Modelling in Appendix 6.2 Additional Environmental Data to Support Aquatic Ecology Assessment, shows small variations in the flow regime in the freshwater River Thames as a result of the outfall discharge that would have dissipated prior to Teddington Weir. Therefore, no impacts for both the bankside and near bankside in-river outfall options as a result of velocity changes within the tidal River Thames downstream of Teddington Weir are anticipated as a result of the Project operation.

6.8.183 The magnitude of the impact of the outfall velocity on the displacement of juvenile fish for both the near bankside in-river and bankside outfall options has been assessed as Negligible given the small severity of change to overall river velocity, with the majority of the river seeing a change of <0.05m/s. These changes are localised to a small, approximately 200m stretch of the freshwater River Thames above Teddington Weir and fall within the natural velocity variations that fish experience along the course of the river. Given the intermittent frequency and limited duration of operation of the Project, these changes are unlikely to have a significant effect on fish populations in the River Thames.

6.8.184 A potential exclusion zone for weaker-swimming fish was identified; however, it is limited to 10m downstream of the bankside outfall, covering only 1.5% of the cross-sectional area; and 10m downstream of the near bank in-river outfall, covering only 3.0% of the cross-sectional area. Given its small extent, this does not represent a significantly important portion of habitat and is unlikely to have a significant effect on fish populations.

6.8.185 Furthermore, the identified exclusion zone is easily avoidable and would not significantly displace any fish. Therefore, it is not considered to impact juvenile

fish populations. It is anticipated that any effects on juvenile fish populations within the River Thames would be reversible in the short term due to the intermittent operation and localised area of effect. Therefore, effects on juvenile fish due to displacement by outfall velocity in the River Thames for both the bankside and near bankside in-river options are considered to be Minor adverse (Not Significant). However, it is noted that the near bankside in-river outfall reduces impacts on the marginal habitat by moving the identified potential exclusion zone for weak swimming fish out of the margin and into the channel, further reducing impacts for juvenile coarse fish.

6.8.186 The magnitude of the impact of the outfall velocity on salmonid migration for both the near bankside in-river and bankside outfall options has been assessed as Negligible, given the small severity of change to overall river velocity, with the majority of the river seeing a change of <0.05m/s. It is noted these changes are localised to a small area of approximately 200m of the freshwater River Thames above Teddington Weir and are within the realms of velocity changes fish would experience naturally on their migration. Factored with the intermittent frequency and duration of operation of the Project, it is considered unlikely for the outfall velocity to affect salmonid migration in the River Thames. It is anticipated that any effects on salmonid migration within the River Thames would be reversible in the short term due to the Project's intermittent operation and localised area of effect. Therefore, effects on salmonid migration due to disorientation in the River Thames for both the near bankside in-river and bankside outfall options are considered to be Minor adverse (Not Significant). Neither option would likely affect salmonid disorientation.

6.8.187 It is uncertain whether velocity changes would create a formal attraction. Elvers would be unable to enter the pipe system due to the internal weir system incorporated within its design and the current flow rate of 0.3m/s, which dissipates to <0.1m/s within 10m of discharge under both outfall options. Factoring in the operation of the Project, the overall impact of the anticipated attraction effects of the Project on European eel elvers are predicted to be Minor adverse (Not Significant) for both the bankside and near bankside in-river outfall options. However, it is noted that the near bankside in-river outfall is offset from the river margins where elver are likely to migrate, meaning that the highest degree of change is outside their likely path, which may further reduce the likelihood of attraction to the outfall under this option.

Impingement and entrainment

6.8.188 Entrainment is the unwanted passage of fish through a water intake, which is generally caused by an absent or inadequate screen (mesh size larger than individual fish present in the population) surrounding the water intake. Impingement is the physical contact of a fish with such a screen due to intake velocities, which are too high to allow the fish to escape.

6.8.189 The intake could impact fish species through impingement or entrainment of juvenile fish species, including eel. As outlined within the embedded design (primary) mitigation (Section 6.4), this will be mitigated through the inclusion of

a fish screen on the intake. Currently, the proposed screen technology to mitigate fish entrainment and impingement at the intake is a travelling screen with a 1.75mm mesh size, which has been assessed in Appendix 6.1.

6.8.190 The magnitude of the impact of entrapment of fish populations at the intake is considered to be low, given the compliance with The Eels (England and Wales) Regulations 2009; and Safe passage for eels: Best Achievable Eel Protection (BAEP) (Environment Agency, 2023). The low predicted equivalent adult values of fish entrained under the modelled scenarios are assessed in Appendix 6.1. When factored with the intermittent frequency and duration of operation of the Project and lack of predicted limited operation during the most vulnerable months in spring for juvenile fish, it is considered unlikely the intake would significantly affect fish populations in the River Thames. It is anticipated that any effects on fish populations within the River Thames would be reversible in the short term due to the intermittent operation and localised area of effect. Therefore, effects on fish due to impingement or entrainment at the outfall in the River Thames are considered to be Minor adverse (Not Significant).

Water quality

6.8.191 Changes to water quality can affect fish in several ways, but in significant scenarios, they can result in disruption to migration through impacts on olfaction or even mortality. Reduced dissolved oxygen levels, increased pollutant exposure, and shifts in pH or turbidity can further stress fish populations, impacting feeding, reproduction, and overall ecosystem balance.

6.8.192 Assessment of changes to physico-chemical parameters has been carried out in Appendix 5.1. Changes to water parameters, including oxygen, ammonia, biochemical oxygen demand and suspended solids have been predicted to be small, with no deterioration in WFD status in physico-chemical quality elements. Effects on freshwater, estuarine and migratory fish or their behaviour as a result of water quality changes during Project operation are predicted to be Negligible adverse (Not Significant). It is not predicted that either the near bankside in-river or bankside outfall options would differ in impacts relating to water quality.

6.8.193 Currently, the magnitude of the impact of both the near bankside in-river and bankside outfall options on olfaction is predicted to be Negligible. Considering the intermittent frequency and duration of operation of the Project combined with the fact that the Project is not introducing a new source of olfactory inhibitors in the Thames Catchment but is redistributing Mogden STW’s final effluent, which will have undergone tertiary treatment, it is unlikely to affect fish populations or migration in the River Thames. Furthermore, the outfall is also low down within the Thames Catchment and is not upstream of any known salmonid or lamprey spawning grounds. Therefore, it is not predicted to prevent these species from locating their natal spawning grounds. It is anticipated that any effects on fish populations within the River Thames would be reversible in the short term due to the Project’s intermittent operation and localised area of effect. Therefore, effects on fish due to olfaction disruption for both the near bankside in-river and bankside outfall options are considered to be Minor

adverse (Not Significant). It is not predicted that either the near bankside in-river or bankside outfall options would change impacts relating to olfaction. However, following further understanding of the tertiary treatment process, this assessment would be updated at ES.

INNS effects on fish

6.8.194 As outlined within the 'INNS' section below, the operational phase of the Burnell Avenue site is considered to have a Negligible adverse (Not Significant) effect on the spread of INNS and, therefore, a Negligible adverse (Not Significant) effect on fish.

Statutory and non-statutory designated sites

Freshwater River Thames

6.8.195 No statutory or non-statutory designated sites within the freshwater River Thames were identified as hydrologically linked. Therefore, no designated sites have been assessed for the freshwater River Thames.

Tidal River Thames - Syon Park SSSI

6.8.196 Syon Park SSSI is an area of wetland situated downstream of Isleworth Ait and is considered of medium ecological importance in the context of the assessment methodology. Changes in the tidal River Thames due to the operation of the Project may impact this protected habitat. Changes in water quality, temperature, velocity and inundation all have the potential to negatively impact this SSSI.

6.8.197 Many of the species listed under the SSSI citation are wetland species which could be impacted by hydrological changes. The species most likely to be impacted by these changes would be the German hairy snail (*Perforatella rubiginosa*), as this species is associated with bare mud on strandlines and requires some tidal inundation. The River Thames is an important habitat for the snail and is one of the only rivers in the UK where the species is found (the other location is the River Medway, Kent).

6.8.198 German hairy snail inhabits freshwater tidal regions. The species occupies a narrow zone in the uppermost intertidal areas, which is characterised by large amounts of tidal drift and usually by tall, nutrient-tolerant vegetation, often with common stinging nettle (*Urtica dioica*) dominant.

6.8.199 Assessments of the operation of both outfall options concluded there would be no impacts on the tidal River Thames (downstream of Teddington Weir) from the outfall discharge. The only impact could be a 1°C increase in water temperature under certain low flow scenarios, which would extend past Teddington Weir. This degree of temporary temperature increase is considered to have a negligible impact on receptors, which may be located immediately downstream of Teddington Weir. Given the distance of Syon Park from the proposed outfall locations, it is considered that this increase in temperature would have a Negligible adverse (Not Significant) effect on Syon Park SSSI.

Tidal River Thames - Isleworth Ait LNR

6.8.200 Isleworth Ait LNR is designated for the presence of German hairy snail and the marginal habitat associated with the species. It is considered of minor ecological importance in the context of the assessment methodology.

6.8.201 It is anticipated that the only effect from the operation of the two Burnell Avenue site outfall options would be a temperature increase of up to 1°C immediately downstream of Teddington Weir. This increase in temperature is considered to cause Negligible adverse (Not Significant) effects on the German hairy snail and its associated habitats on Isleworth Ait.

Tidal River Thames - River Thames and Tidal Tributaries SINC

6.8.202 The River Thames and Tidal Tributaries SINC is considered to have low ecological value/importance in the context of the assessment methodology. It is anticipated that the operation of both Burnell Avenue site outfall options would have a very localised and temporary impact on the temperature, velocity and water quality of the Thames downstream of the outfall. Given the limited scale and duration of the impacts in relation to the overall size of the River Thames and Tidal Tributaries SINC, the operation of both outfall options is expected to have a Negligible adverse (Not Significant) effect on the SINC. Assessments of the impacts on wildfowl and saltmarsh habitat linked to the SINC can be found in Chapter 7: Terrestrial Ecology. Impacts on fish within the SINC are as per those outlined in 6.8.167-6.8.194.

Priority habitats

Mudflats

6.8.203 The mudflats along the tidal River Thames within 2km of the Project are situated within the boundaries of Isleworth Ait LNR and Syon Park SSSI. They are considered of medium ecological importance in the context of the assessment methodology. Assessments for these designated sites are outlined in paragraphs 6.8.196 to 6.8.200. The outcome of the assessments for Isleworth Ait LNR and Syon Park SSSI is that the operation of the Burnell Avenue site would have a negligible impact on these designated sites. It can be concluded that the operation of the Project would have a negligible impact on the mudflats situated within these site boundaries. Any effects from the operation of the Project on the mudflats situated downstream of Isleworth Ait LNR and Syon Park SSSI are considered to be Negligible adverse (Not Significant) due to the distance from the outfall and the locations of these mudflats.

Protected and notable species

Aquatic mammals

6.8.204 Records of common porpoise (*Phocoena phocoena*), common seal (P*hoca vitulina*), grey seal (*Halichoerus grypus*) and minke whale (*Balaenoptera acutorostrata*) were returned from the GiGL data search. These species are

considered of high ecological value/importance in the context of the assessment methodology. All these species spend the majority of their time within estuarine or marine environments and rely on the habitats in these areas for feeding and other behaviours. Any occurrence of one of these species upstream of Battersea is likely a vagrant individual which has travelled upstream to feed (one example being a sighting of a seal (species unconfirmed) upstream of Teddington Weir during a Ricardo fish survey in 2024). The effects of the operation of the two outfall options are predicted to be localised. The impacts on fish, which may be a food source for these species, are anticipated to be minor, localised and short term. It is unlikely that the operation of either outfall option would have a significant impact on the populations of these protected species. The effect of the operation of the Burnell Avenue site on aquatic mammals is considered to be Negligible adverse (Not Significant).

Fish

6.8.205 Seven designated fish species were identified from baseline conditions and considered to have high ecological value/importance in the context of the assessment methodology. These were European eel, brown trout, Atlantic salmon, barbel, bullhead, lamprey and smelt. eDNA sampling also returned positive results for the presence of shad (*Alosa sp.*). The impacts of the operation of the Burnell Avenue site on these protected fish species are as assessed in 6.8.167-6.8.194. Owing to localised and infrequent temperature and velocity changes, no significant impact on fish migration, mitigation of impingement/ entrainment risks through screens, and negligible water quality changes, all effects are assessed as Minor adverse (Not Significant).

Aquatic macroinvertebrates

6.8.206 Fourteen designated macroinvertebrates were identified from baseline conditions and considered to have high ecological value/importance in the context of the assessment methodology. In the tidal River Thames, 11 designated macroinvertebrates were identified from baseline conditions.

6.8.207 The impact assessment outlined in paragraphs 6.8.160 to 6.8.166 concluded that any impacts from changes in temperature, velocity or water quality would be negligible on aquatic macroinvertebrates. It was concluded that the operation of the Burnell Avenue site would have a Negligible adverse (Not Significant) effect on designated species listed within the baseline.

Aquatic macrophytes

6.8.208 Three protected or notable macrophyte species were identified from the baseline and considered to have medium ecological value/importance in the context of the assessment methodology. The impact assessment outlined in paragraphs 6.8.153 to 6.8.159 concluded that any effects from changes in temperature, velocity or water quality would be Minor adverse (Not Significant) on aquatic macrophytes. It was concluded that populations of flat-stalked pondweed (*Potamogeton friesii*), mudwort (*Limosella aquatica*) and small

waterpepper (*Persicaria minor*) would not be negatively affected by the operation of the Burnell Avenue site.

Invasive Non-Native Species

6.8.209 The operation of the Burnell Avenue site has the potential to impact INNS in and around the River Thames through increases in temperature, velocity and changes in water quality. The impact of these changes is discussed in detail in Appendix 6.1 Aquatic Ecology Baseline.

Freshwater River Thames

6.8.210 Temperature increases due to the operation of the outfall have the potential to affect the survival, behaviour and growth of a range of INNS. Groups present in the freshwater River Thames include non-native aquatic invertebrates, macrophytes, riparian plants and fish. Increases in temperature due to the operation of the Burnell Avenue site have the potential to improve the fitness of some individual INNS present (in particular aquatic macroinvertebrates and macrophytes), which could result in a competitive advantage over native species.

6.8.211 Many of the non-native aquatic macroinvertebrate and macrophyte species recorded within the River Thames have a broad preference for temperature, and increases in temperature may aid the success of these species. Increases in temperature are expected to be small in magnitude, infrequent and temporary due to the predicted operation of both outfall options. Increases in temperature would not be permanent and would return to baseline conditions when the Project is not operational. The magnitude and frequency of temperature increases are not expected to aid the growth and colonisation of INNS. The effect on INNS is considered to be Negligible adverse (Not Significant) for both outfall options.

6.8.212 Increases in velocity from the outfall at the Burnell Avenue site have the potential to impact the INNS community by driving a change in community composition downstream of the outfall. Increases in velocity may create favourable conditions for invasive species that tolerate higher velocities, potentially allowing them to outcompete native species currently present downstream of the outfall.

6.8.213 Many of the non-native aquatic macroinvertebrate and macrophyte species present in the River Thames prefer low velocities. Increases in velocity are not expected to aid the spread of these INNS. Operational activities and increased velocity from both outfall options are unlikely to contribute to the spread of INNS through sediment movement, siltation, or the displacement of plants. The Project would operate intermittently, with effects highly localised. The anticipated increase in velocity from both outfall options is expected to be minimal and unlikely to impact the physical habitat downstream of the outfall, thus having a Negligible adverse (Not Significant) effect on INNS.

6.8.214 Changes in water quality due to the operation of the Burnell Avenue site have the potential to aid the growth and colonisation of non-native aquatic macrophytes and macroinvertebrate species. Increases in phosphorus and decreases in dissolved oxygen could create an environment which favours INNS, as many species have high tolerances for phosphorus and can tolerate low dissolved oxygen. However, the magnitude of change in these water quality parameters is considered low. The Project would run intermittently, therefore not permanently changing baseline conditions and the effects are expected to be very localised. It is considered that the effect on INNS would be Negligible adverse (Not Significant) due to changes in water quality from the operation of both outfall options.

Tidal River Thames

6.8.215 There is anticipated to be no change in velocity, water levels or water quality downstream of Teddington Weir, and there would be no net change in pass forward flow over Teddington Weir due to the operation of the Burnell Avenue site. There may be a 1°C increase under certain low flow scenarios downstream of Teddington Weir. It is unlikely that an intermittent 1°C increase downstream of Teddington Weir would have an effect on the survival or spread of INNS in the Upper Thames Estuary; therefore, effects are considered to be Negligible adverse (Not Significant) for both outfall options.

Cumulative effects

6.8.216 A preliminary assessment of intra-project and inter-project cumulative effects (excluding climate change) for aquatic ecology is contained in Chapter 19: Cumulative Effects.

In-combination effects with climate change

6.8.217 This section outlines how climate change may affect the aquatic ecology receptors/resources or exacerbate/diminish the effect of an existing impact of the Project.

6.8.218 Based on the latest programme (see Chapter 2: Project Description, Section 2.6), the construction phase is anticipated to have a duration of approximately three years, commencing in 2029 and completing in winter 2033. The Project would not be in operation immediately after construction as there would be approximately a year and a half of commissioning and performance testing before the Project would come into operation in 2034-2035. Based on the relatively short duration of the construction, commissioning and performance testing phase, ICCI effects are not considered likely.

6.8.219 Refer to Appendix 18.1 for further details/description of the ICCIs. Further consideration and assessment of the ICCI (and identification of additional (secondary) mitigation if required or confirmation that existing mitigation is sufficient) would be undertaken for the ES.

Operational phase ICCI

6.8.220 The ICCI in relation to aquatic ecology are not considered significant owing to the temporary nature of the Project and the likely periods of operation typically avoiding the hottest months when ecological sensitivity to temperature would be highest.

6.8.221 It is not likely that the Project would contribute to any potential push towards critical temperature thresholds in summer. In fact, the Project may slightly mitigate this, as the discharge would be cooler than river water above a certain ambient temperature (around 24°C). When the greatest temperature differences occur (i.e. in winter), the Project is much less likely to be operating.

6.8.222 Warmer temperatures associated with climate change during the operational phase may increase water temperatures, leading to decreased dissolved oxygen levels, which can reduce habitat suitability for temperature-sensitive aquatic species. Rising temperatures associated with climate change may alter the migratory patterns of species such as European eels and salmon, affecting their breeding and survival rates. However, the Project is not expected to increase or prolong the maximum temperatures currently experienced on the River Thames. Therefore, this combined effect would be limited to potentially increased duration of temperatures already experienced and could, at higher temperatures, slightly mitigate the impact of climate change on temperatures.

6.8.223 Drought conditions and reduced summer flows associated with climate change can lead to higher concentrations of pollutants in outfall discharge areas, creating ecological stress for aquatic habitats and species. Heavy rainfall events and storms associated with climate change may overwhelm drainage systems, resulting in increased nutrient runoff and causing eutrophication, which can disrupt aquatic ecosystems. In combination with these climate-related stressors, the operation of the proposed Project—particularly at the Burnell Avenue site—may intermittently exacerbate localised impacts on water quality and river ecology through minor increases in water temperature, changes in phosphorus and dissolved oxygen levels, and (very slightly) altered patterns of tidal habitat inundation.

6.8.224 Altered tidal regimes associated with climate change may change sediment transport patterns, affecting estuarine spawning and nursery grounds, which could disrupt the lifecycles of estuarine species. Although operational activities from both outfall options may contribute to very localised sediment movement or siltation, the anticipated increases in velocity are small and not expected to result in sediment scouring or significant redistribution. Modelling indicates that the highest impacts would be very localised, temporary, and infrequent, with changes in sediment exposure around Isleworth Ait limited to a maximum increase of 2%, and overall exposure remaining consistent with current tidal patterns, not exceeding 50% of the time.

6.8.225 Warmer temperatures and changes in flow regimes associated with climate change may create favorable conditions for INNS to spread and proliferate, leading to disruptions in local biodiversity as opportunistic species outcompete native species. The Project may contribute cumulatively to this risk by altering local water temperature and water quality—particularly near outfall locations—potentially creating very localized microhabitats that support the establishment or persistence of invasive species.

6.8.226 Overall, due to the low magnitude of the impacts of the Project in comparison to overall climate change effects, ICCI are not currently considered further as they are deemed to be likely Not Significant as outlined in Appendix 18.1.

6.9 Additional (secondary) mitigation and enhancement measures

Additional (secondary) mitigation

6.9.1 Mitigation measures are defined in Chapter 4: Approach to Environmental Assessment of this PEI Report. Details of embedded design (primary) mitigation and standard good practice (tertiary) specific to this aspect are provided in Section 6.4.

6.9.2 Based on the available data and current design, there are no likely significant effects from either the construction or operational phases of the Project on the identified aquatic ecology receptors. Consequently, no additional (secondary) mitigation measures are deemed necessary.

Enhancement measures

6.9.3 A number of enhancement measures at the Burnell Avenue site are under consideration as it has been identified that they could provide opportunities for aquatic species by improving habitat connectivity and complexity, including improving European eel elver migration routes as outlined in Table 6.13. This is subject to further assessment at ES.

Table 6.13 Enhancement opportunities at the Burnell Avenue site

Enhancement	Benefit	Relevant considerations
Bolt on structures to sheet piled walls.	This could encourage macrophyte growth and provide habitat for juvenile fish and European eel elvers.	Minimal impacts to the Project design.
Planting macrophytes or bankside trees to improve marginal habitat structure.	This would improve the marginal habitat structure and refuge opportunities for juvenile fish and European eel elvers.	Planting would be limited by the artificial bank structure downstream of the outfall location. Would need to ensure that any planting of macrophytes is matched to suitable habitat. Can be included in the design if bankside discharge is retained to compensate for increased marginal impacts.
Floating macrophyte beds which can hinge on sheet piling implemented locally.	This would provide habitat for juvenile fish and European eel elvers.	Need to consider how this enhancement may impact other waterway users. Would need to be sighted to avoid shading existing macrophyte beds.
Hinge trees/woody debris to the bankside around new structures to soften the structure.	This would offer fry and European eel elver habitat around the intake and outfall structures and screen the intake.	There may be issues with creating good fry habitat around an intake and increasing the likelihood of impinging juvenile fish.

6.10 Summary of residual likely significant effects

6.10.1 There are no residual likely significant effects identified as a result of either the construction or operational phases on identified aquatic ecology receptors at any of the relevant Project sites. The effects are considered to be Negligible adverse (Not Significant) to Minor adverse (Not Significant) across all the identified receptors.

6.11 Next steps

6.11.1 The Applicant will engage with both statutory and non-statutory consultees throughout the EIA process, sharing progress and findings as relevant.

Engagement with stakeholders and local communities will continue as part of the RAPID gated process, the DCO process and general information sharing.

6.11.2 Local authorities, other stakeholders, and the public will be consulted on the Project during the Statutory Consultation in summer 2025. The PEI Report will be published as part of the Statutory Consultation.

6.11.3 Surveys and monitoring to refine baseline data and assess biodiversity conditions will continue in 2025.

6.11.4 Construction and operational layouts may develop further as the Project progresses. Consequently, the hydraulic model of the River Thames will need to be rerun when further Project details emerge to determine the impacts and any required mitigation.

6.11.5 Ground investigations currently being undertaken will obtain further details about the ground conditions and inform the detailed design and mitigation measures, such as in-river construction methodology.

6.11.6 An assessment of the effect of underwater noise and vibration on fish and seals in the River Thames at the Burnell Avenue site, will be included in the ES.

6.11.7 The Applicant will undertake the next phase of the WFD assessment in line with guidance (PINS, 2025), which will form part of the ES.

6.11.8 The Applicant will undertake the next phase of the HRA, proceeding to Stage 2 Appropriate Assessment (see Chapter 7: Terrestrial Ecology). The impact pathway will be further assessed within the ES in consultation with Natural England.

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