

Teddington Direct River Abstraction

Preliminary Environmental Information Report Chapter 19 – Cumulative Effects

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19. Cumulative Effects

19.1 Introduction

- 19.1.1 This chapter of the Preliminary Environmental Information (PEI) Report outlines the approach to the Cumulative Effects Assessment (CEA) and should be read in conjunction with the description of the Teddington Direct River Abstraction Project (hereafter referred to as 'the Project') as presented in Chapter 2: Project Description.
- 19.1.2 Drawing from other chapter assessments, the CEA examines the intra-project and inter-project cumulative effects, aiming to predict how these interactions affect environmental, social and economic factors. These are defined as follows:
 - a. Intra-project effects this describes the relationships between the different environmental impacts associated with the Project, affecting the same receptor. For example, noise, dust and visual impacts may be experienced at one particular residential dwelling or area.
 - b. Inter-project effects the potential for effects of the Project to combine with effects from other existing and/or approved developments (hereafter referred to as 'the cumulative developments') in the vicinity. For example, if two building sites are active concurrently in close proximity, receptors may experience construction noise effects from both.
- 19.1.3 Effects can be:
 - a. Additive Resulting from the combined impact of past, present, or reasonably foreseeable actions alongside the Project itself
 - b. Interactive/synergistic Emerging from the interaction between a development's effects on various environmental aspects (IEMA, 2020)
- 19.1.4 This assessment of potential intra- and inter-project effects is based on information available at the time of preparing the PEI Report. The assessment will be finalised in the Environmental Statement (ES) that will be submitted with the Development Consent Order (DCO) application for the Project, when the environmental effects of the Project and the list of cumulative developments have been confirmed. Conclusions in this assessment are therefore preliminary and potentially subject to change.
- 19.1.5 This chapter is supported by the following Volume 2 PEI Report Figures:
 - a. Figure 19.1 Long list of Cumulative Developments
 - b. Figure 19.2 Short list of Cumulative Developments
- 19.1.6 This chapter is supported by the following Volume 3 PEI Report Appendices:
 - a. Appendix 19.1 Cumulative Assessment Stage 1 and Stage 2 list

19.2 Legislation, policy and guidance

19.2.1 CEA is governed by a range of legislative frameworks, policies, and guidance.

Legislation

- 19.2.2 The Environmental Impact Assessment (EIA) Directive (2014/52/EU), which amended the 2011 Directive (2011/92/EU), mandates the inclusion of the assessment of cumulative effects in Environmental Statements.
- 19.2.3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 set out in paragraph 5(e) of Schedule 4 that an ES should include: 'a description of the likely significant effects of the development... resulting from the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources'.
- 19.2.4 In line with this requirement, this chapter provides a description of the likely significant cumulative effects arising from the Project.

National policy

National Policy Statement for Water Resources Infrastructure

19.2.5 There is a requirement to consider cumulative effects in planning policy. Key policies relevant to cumulative effects set out in the National Policy Statement (NPS) for Water Resources Infrastructure (Department for Environment, Food and Rural Affairs, 2023) are provided in Table 19.1.

Paragraph(s)	Requirement for the Applicant	How the Project addressed this
3.1.3	In considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.	Section 19.5 of this chapter and the cumulative effects ES chapter will assess the inter- and intra- project cumulative effects of the Project. Appropriate mitigation measures to avoid, reduce and compensate for any adverse impacts will be considered.
3.2.6	When considering significant cumulative effects, any Environmental Statement should provide information on how the effects of an applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been granted).	Section 19.5 of this chapter and the cumulative effects ES chapter will assess the inter-project cumulative effects, taking into consideration potential combined effects between the Project and other developments.
3.2.7	The Examining Authority should consider how significant cumulative effects, and the interrelationship between effects, might as a whole affect the environment, even though they may be acceptable when considered on an individual basis or with mitigation measures in place.	Section 19.5 of this chapter and the cumulative effects ES chapter will consider the interaction of individual effects identified in the aspect chapters, to determine whether a significant effect will arise. Appropriate mitigation measures will be suggested to avoid or reduce any significant adverse effects.

Table 19.1 Key policy from the NPS for Water Resources Infrastructure

National Planning Policy Framework

19.2.6 Paragraph 198 of the National Planning Policy Framework (Department for Environment, Food and Rural Affairs, 2024) states that 'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.' This chapter considers the effect interactions on individual sensitive receptors that are impacted by effects of more than one source within the Project.

Guidance

19.2.7 For inter-project effects, the Planning Inspectorate (PINS) has set out a fourstage approach for the assessment of cumulative effects in its Advice on Cumulative Effects Assessment (PINS, 2024), ensuring proportionality and alignment with the Planning Act 2008.

Regional and local policy

- 19.2.8 In addition to the national policy set out above, the Project must also have regard to relevant local plans and policy. The following regional and local policies are relevant to the assessment of cumulative effects:
 - a. The London Plan (Greater London Authority, 2021)
 - b. Hounslow Local Plan 2015 2030 (London Borough of Hounslow (LBH), 2015)
 - c. Hounslow Local Plan 2020 2041 (emerging policy) (Regulation 19) (LBH, 2024)
 - d. Local Plan Review 2015 2018 (Adopted) London Borough of Richmond upon Thames (LBR),
 - e. LBR Publication Draft (Regulation 19) Local Plan (2023) (Examination)
 - f. Core Strategy 2012 (Adopted) (Royal Borough of Kingston upon Thames (RBK), 2012)
 - g. Kingston's Local Plan 2019 2041 (Regulation 18) (RBK, 2023)
- 19.2.9 Further detail on the relevant regional and local policies are contained within Section 2 of the aspect chapters.

19.3 Consultation, engagement and scoping

19.3.1 Table 19.2 identifies the key comments received from the EIA Scoping Opinion (PINS, 2024) and sets out the Applicant's response.

Table 19.2 Key scoping opinion comments for cumulative effects

PINS ID reference	Comment	Response
PINS (ID 3.14.2)	The Scoping Report states that professional judgement would be used to identify potential intra-project cumulative effects that could occur across aspects; and that effects would be reported in the aspect chapter dealing with the affected receptor, with a summary in the cumulative effects ES chapter. The ES should set out the methodology for assessment of cumulative effects on individual receptors in combination with other environmental aspects, including how receptors would be selected.	The methodology used for the intra-project CEA has been described in Section 19.4 of this chapter. A provisional intra-project CEA has been carried out in Section 19.5: Inter-project cumulative effects, which will be reviewed and updated for the ES.

PINS ID reference	Comment	Response
PINS (ID 3.14.3)	It should not be assumed that Tier 1 cumulative developments granted in 2024 or earlier form part of the baseline. Effort should be made to ascertain and report in the ES the status of Tier 1 projects scoped into the assessment. For Tier 1 projects where effects have not been fully determined, i.e. due to ongoing monitoring of mitigation effectiveness, consideration should be given to including these in the cumulative effects assessment or the ES should explain why it is appropriate to scope them out with evidence of agreement from relevant consultation bodies.	Tier 1 projects granted in 2024 or earlier have been reviewed to understand whether there is potential for a temporal overlap with the Project. Where there is potential to be an overlap, they have been included in the cumulative effects assessment.
PINS (ID 3.14.4)	Appendix G presents the Applicant's current Stage 1 and Stage 2 assessment of cumulative effects. The Applicant is advised to seek agreement regarding developments to be included in the assessment with relevant consultation bodies. The Applicant's attention is drawn to the comments of London Borough of Richmond upon Thames (Appendix 2 of this Opinion) identifying additional developments, including the Lower Thames Surbiton to Queen Mary reservoir scheme. The Inspectorate advises that these developments should be considered in the cumulative screening and assessed in the ES where significant effects are likely.	Developments that were suggested in the EIA Scoping Opinion to be included in the long list of Cumulative Developments have been reviewed. Those outside of the Zone of Influence (ZoI) have not been included in the long list of Cumulative Developments as they are not likely to interact with or be affected by the Project. Those within the ZoI have gone through the Stage 2 process to determine if they should be included in the short list of Cumulative Developments. This list will be reviewed and updated during preparation of the ES should the status of those schemes change between now and ES submission. Engagement was held with LBR, LBH and RBK in March 2025 and the developments included in the short list were agreed.

19.3.2 Following receipt of the EIA Scoping Opinion from PINS, engagement has been undertaken in March 2025 to address these comments. In the meeting with LBR, LBH and RBK, the Applicant has outlined the stages of the CEA methodology that will be undertaken and results presented in the PEI Report. Engagement has sought to gather input from LBR, LBH and RBK on updating the long list of Cumulative Developments (Figure 19.1) to ensure all relevant developments are considered.

- 19.3.3 Non-Statutory Public Consultation was undertaken from October 2023 to December 2023 to seek feedback about the site options for the Project from a variety of stakeholders such as landowners, residents, businesses, local authorities, and other statutory bodies who might be affected by or interested in the Project (see Section 2.4 of this PEI Report for more details of this public consultation). In relation to cumulative effects, the responses did not request any specific current or proposed developments to be included in the CEA.
- 19.3.4 Engagement with officers of LBH, LBR, and RBK relating to the assessment of cumulative effects, and in particular other potentially relevant projects or activities in the locality of the Project, was undertaken through meetings in March, May and June 2024. In the meetings, the Applicant outlined the proposed assessment methodology including proposed ZoIs for different environmental aspects, and sought views on relevant projects and activities to be included within the long list of projects in accordance with PINS guidance on CEA (see section Stage 1: long list).

19.4 Assessment methodology

Intra-project cumulative effects

19.4.1 The assessment methodology is included within Chapter 4: Approach to Environmental Assessment and Section 5 of each of the environmental aspect chapters.

Study area

- 19.4.2 There is no standard approach to intra-project cumulative assessment. The study area for intra-project cumulative effects is the area where the Zol of one or more assessment aspects interact.
- 19.4.3 The Zols have been developed using professional judgement and knowledge of effects experienced on similar schemes. Table 19.3 summarises the Zols in relation to the relevant environmental aspects.
- 19.4.4 For carbon and climate change, there is no Zol as the receptor is the climate, which is global and not geographically constrained. The potential for cumulative effects relating to Greenhouse Gas emissions and climate change will be considered in Appendix 18.1 In-Combination Climate Impact.
- 19.4.5 For materials and waste, there are two geographically different Zols used to assess the management of waste. The 'development Zol' comprises all land within the draft Order limits of the Project. The 'expansive Zol' includes the capacity of waste management infrastructure and remaining landfill void space, which is considered on a regional basis. The regions of London and the South East of England are assumed to be the areas where waste generated during construction of the Project will be disposed of.

- 19.4.6 For traffic and transport, there is no set Zol as this assessment considers the routes and road network that could be affected by the Project, which is not constrained by a specific distance.
- 19.4.7 For human health, effects vary spatially depending on the determinant that is being assessed, therefore, the assessment uses broad study areas for populations likely to be within the Zol of an impact. These include the local communities study area (see Figure 16.1 in Volume 2), the local authorities study area (see Figure 16.2 in Volume 2), and the London water resource zone study area (see Figure 16.3 in Volume 2).

Environmental aspect	Zone of influence
Internationally designated statutory sites with bats as a qualifying feature (Special Area of Conservation (SAC))	10km
Townscape and Visual	Up to 2.5km
Ecological features (addressed in Aquatic and Terrestrial Ecology chapters) including internationally and nationally designated sites (SACs excluding bats as a qualifying feature, Ramsar sites, Sites of Special Scientific Interest, Special Protection Areas, National Nature Reserves), locally designated statutory and non-statutory sites (Local Nature Reserves and Sites of Importance for Nature Conservation), protected and notable species, invasive non-native species, Aquatic Ecology, Water Resources and Flood Risk	2km
Air Quality	1km
Noise and Vibration, Historic Environment, Ground Conditions and Contaminated Land, priority habitat, ancient woodland, ancient/veteran trees, waterbodies suitable for great crested newt, Socioeconomics, Community, Access and Recreation (community accessibility and severance, and recreation)	Up to 500m

Table 19.3 The zone of influence of the environmental aspects

19.4.8 The individual environmental aspect chapters and respective appendices provide a description of the baseline conditions, including receptors, for all aspects considered within the CEA, as set out in . Baseline conditions and receptors will not be repeated in this chapter.

Environmental aspect	Chapter where covered
Water Resources and Flood Risk	Chapter 5
Aquatic Ecology	Chapter 6
Terrestrial Ecology	Chapter 7
Historic Environment	Chapter 8
Townscape and Visual	Chapter 9
Ground Conditions and Contaminated Land	Chapter 10
Materials and Waste	Chapter 11
Traffic and Transport	Chapter 12
Air Quality	Chapter 13
Noise and Vibration	Chapter 14
Socioeconomics, Community, Access and Recreation	Chapter 15
Human Health	Chapter 16
Carbon	Chapter 17
Climate Change	Chapter 18

Table 19.4 Environmental topics and their location within this PEI Report

Receptors

- 19.4.9 Professional judgement has been used to identify whether several effects on one receptor or receptor group could theoretically interact or combine to produce a combined significant overall effect.
- 19.4.10 The receptors that have potential to experience cumulative effects are identified in Table 19.5 below. Where more than one effect (of minor, slight, moderate or major significance of effect) on a receptor/resource has been identified, the potential for combined effects has been assessed in Section 19.5: Preliminary assessment of likely significant effects. Effects that are neutral or negligible have no potential to combine and generate cumulative effects, therefore have not been included in Table 19.5 below.
- 19.4.11 Potential effects on receptors are only considered where they are scoped into the EIA.
- 19.4.12 Intra-project cumulative effects of climate change for the Project are considered in Appendix 18.1 In-Combination Climate Impacts and therefore will not be repeated in this chapter.

Table 19.5 List of receptors and the potential for effect interactions

Category	Description of receptors	Potential effects	Potential for effect interaction
Construction workers	Workers employed for the construction phases of the Project	Air quality effects, noise and vibration effects, water resources and flood risk effects, socioeconomics, community, access and recreation effects, ground conditions and contaminated land effects, and human health effects	Yes
Future maintenance workers	Workers who will undertake maintenance activities at various locations (e.g. Mogden Sewage Treatment Works (STW), outfall and intake)	Traffic and transport effects	No. The potential impacts on future maintenance works of the Project are not affected by any other environmental aspect.
Non-motorised user (NMU) routes and public open space	Users of footways, public rights of way, bridleways and public open space	Air quality effects, socioeconomics, community, access and recreation effects, human health effects, water resources and flood risk effects, townscape and visual effects, and traffic and transport effects	Yes
Local residents	Local residents who live within the vicinity of the Project	Air quality effects (including odour), noise and vibration effects, water resources and flood risk effects, socioeconomics, community, access and recreation effects, human health effects, traffic and transport effects, townscape and visual effects, ground conditions and contaminated land effects	Yes

Category	Description of receptors	Potential effects	Potential for effect interaction
Community facilities	Users of community facilities (e.g. retail assets, pharmacy, healthcare facilities)	Air quality effects, noise and vibration effects, water resources and flood risk effects, socioeconomics, community, access and recreation effects, human health effects, traffic and transport effects.	Yes
The economy	Economy in the local and regional context	Socioeconomics, community, access and recreation effects	No. The potential economic impacts of the Project are not affected by any other environmental aspect.
Local road network	Road users in the area surrounding the Project	Traffic and transport effects, socioeconomics, community, access and recreation effects	Yes
Air quality	Local air quality within London Borough of Hounslow, Royal Borough of Kingston upon Thames and London Borough of Richmond	Air quality effects	No. Air quality is not affected by any other environmental aspect.
Terrestrial ecology	Terrestrial ecology receptors and habitats in the local and regional area including protected species and designated habitats	Air quality effects, noise and vibration effects, townscape and visual effects, and water resources and flood risk effects	Yes (although noting that ecology assessments inherently cover combined effects of dust, noise and pollution on individual ecological receptors).

Category	Description of receptors	Potential effects	Potential for effect interaction
Aquatic ecology	Aquatic ecology receptors and habitats in the location including protected species	Air quality effects, noise and vibration effects, and water resources and flood risk effects	Yes (although noting that ecology assessments inherently cover combined effects of dust, noise and pollution on individual ecological receptors).
Built historic assets	Heritage assets such as Conservation Areas, Scheduled Monuments, listed buildings and locally listed buildings	Noise and vibration effects, traffic and transport effects, air quality effects, and ground conditions and contaminated land effects	Yes
Below-ground archaeology	Materials and structures which may be present in the soils beneath the Project	Ground conditions and contaminated land effects, and water resources and flood risk effects	Yes
Townscape character areas	Discrete geographical areas of a particular townscape type	Air quality effects, noise and vibration effects, traffic and transport effects, and townscape and visual effects	Yes
Surface water features and bodies	The quality and hydromorphology of water features such as rivers, streams, ditches and catchments	Water resources and flood risk effects, air quality effects, and ground conditions and contaminated land effects	Yes
Groundwater	Water contained within the soils beneath the Project and in the local area	Water resources and flood risk effects, and ground conditions and contaminated land effects	Yes

Inter-project cumulative effects

- 19.4.13 PINS' Advice on Cumulative Effect Assessments (PINS, 2024) sets out a staged approach to the assessment process as follows:
 - a. Stage 1: Establishing the long list
 - b. Stage 2: Establishing the short list
 - c. Stage 3: Information gathering
 - d. Stage 4: Assessment
- 19.4.14 In line with this guidance, Stages 1 and 2 were completed prior to requesting an EIA Scoping Opinion and have been refined again for this PEI Report.
- 19.4.15 Stages 3 and 4 have been completed to provide a preliminary assessment for the PEI Report, but this will be refined further and the final assessment reported in the ES.

Stage 1: Long list

- 19.4.16 In accordance with PINS' Advice on Cumulative Effect Assessments (PINS, 2024), the first task in establishing the long list of relevant 'other existing development and, or approved development' is to determine the 'search area'. For inter-project effects, Nationally Significant Infrastructure Projects (NSIPs) 'often have a broad spatial and temporal Zone of Influence (ZoI)'. The 'search area' is determined by consideration of the ZoI for each environmental aspect assessed.
- 19.4.17 The ZoI for inter-project cumulative effects aligns with intra-project cumulative effects as set out in Table 19.3. The baseline conditions for each of the aspects, including likely receptors, have been detailed in the respective chapters in this PEI Report and are not repeated here.
- 19.4.18 The following types of existing and/or approved developments have been considered for inclusion in the long list:
 - a. NSIPs
 - b. Marine licences/development
 - c. Transport and Works Act Orders
 - d. Parliamentary acts (hybrid) (e.g. High Speed Two via the High Speed Rail (London West Midlands) Act 2017)
 - e. Major Development Applications (LBH, RBK and LBR)
 - f. Major Local Plan Allocations (LBH, RBK and LBR)
- 19.4.19 Planning applications granted before 1 June 2019 (10 years before the planned start of construction works for the Project) have not been considered. It was considered reasonably likely that developments related to permissions granted before 2019 will have been completed before the Project construction works start and the effects of those schemes would be fully determined. Such

developments were therefore considered unlikely to give rise to cumulative effects during construction, and operational effects of those schemes would already form part of the baseline assessment for the Project.

- 19.4.20 A cut off date (27 March 2025) was applied prior to the submission of the PEI Report to allow time for the short list to be finalised.
- 19.4.21 The search area for consideration of relevant NSIPs, marine licences, Transport and Works Act orders and parliamentary acts was 10km (including the draft Order limits) to reflect the largest ZoI set out in Table 19.3 related to the potential effects on European designated sites. In terms of major local authority applications and major Local Plan allocations, a search area of 3km (including the draft Order limits) has been adopted reflecting the nature of the environment and type and scale of these developments in relation to the environmental aspect ZoIs. Table 19.3 provides more detail on the ZoIs for the environmental aspects.
- 19.4.22 This search has been undertaken using the planning application search of local planning authorities including RBK, LBH and LBR, as well as the Marine Management Organisation website (2025) and PINS website (2025). These desk-based searches identified potential cumulative developments in proximity to the Project to create an initial long list which has been reviewed for the PEI Report (Appendix 19.1 Cumulative Assessment Stage 1 and Stage 2 list).
- 19.4.23 Also, in accordance with PINS' Advice on Cumulative Effect Assessments (PINS, 2024), the developments identified within the 'search area' are categorised according to the Tiers set out in Table 19.6. Tier 1 projects are the most likely to have associated environmental information available for use in an assessment of cumulative effects. Tier 3 projects are the least likely to have this information.

Table 19.6 PINS' Advice on Cumulative Effects Assessment – Assigning certainty to 'other existing development and, or approved development' (PINS, 2024)

Tier	Description
Tier 1	Under construction
	Permitted application under the Planning Act or other regimes but not yet determined
	Submitted application under the Planning Act or other regimes but not yet determined
	All refusals subject to appeal procedures not yet determined
Tier 2	Projects on the PINS programme of projects [i.e. where a scoping report has been submitted]
Tier 3	Projects on the PINS's programme of Projects where a scoping report has not been submitted
	Identified in the relevant Development Plan and emerging Development Plans, with appropriate weight given as they near adoption, recognising that there will be limited information available on the relevant proposals
	Identified in other plans and programmes, as appropriate, which set the framework for future development consents or approvals, where such development is reasonably likely to come forward

19.4.24 Where other projects are expected to be completed before construction of the Project, and the effects of those projects are fully determined, effects arising from them will be considered as part of either the baseline or future baseline and therefore be considered in the relevant aspect chapter as part of the construction and/or operational assessment.

Stage 2: Short list

- 19.4.25 Following the completion of the long list and in line with Stage 2 within PINS' Advice on Cumulative Effect Assessments (PINS, 2024), threshold criteria were applied to exclude or include relevant cumulative developments from the long list, to develop a short list.
- 19.4.26 This was undertaken to keep the inter-project CEA proportionate and focused. The criteria adopted to determine if the cumulative developments are taken through to further assessment stages included consideration of overlaps in temporal scope; the type, scale, proximity and nature of the cumulative developments; whether there is a source-pathway-receptor link; as well as professional judgement.
- 19.4.27 When creating the long list during Stage 1, multiple planning applications can be identified that relate to individual projects. Applications that have been refused planning permission have been excluded from the short list, where they are outside the six-month appeal process, as these projects do not have permission to be constructed and, therefore, do not have potential for cumulative effects.

19.4.28 Appendix 19.1 includes the Cumulative Assessment Stage 1 and Stage 2 list in a combined table comprising the long list and short list. Where the column 'Progress to Stage 3/4' has a response of 'Yes', this indicates that the cumulative scheme has been progressed to the short list and will be subject to further assessment. The short list is presented in Table 19.9. This table will be reviewed again prior to submission of the ES.

Stage 3: Information Gathering

- 19.4.29 During Stage 3, detailed information about each cumulative scheme will be collected, wherever available, for a robust assessment of potential cumulative effects including the nature of each cumulative scheme's likely environmental effects.
- 19.4.30 This information will be considered for each environmental aspect to determine the potential for cumulative effects between the Project and the shortlisted cumulative developments.

Stage 4: Assessment

- 19.4.31 In accordance with PINS (2024) Advice on CEA, an assessment will be undertaken for all shortlisted cumulative developments. The assessment will be undertaken by a competent EIA practitioner in collaboration with environmental specialists to describe and evaluate the likely significant inter-project cumulative effects arising from the Project. This will be based on professional judgement and effects will be identified as direct, indirect, short-term or long-term, permanent or temporary. The likely magnitude of effect will be determined, practical mitigation measures will be proposed as necessary, and an assessment of the residual significance of the effects will be confirmed.
- 19.4.32 Cumulative developments that lack sufficient available information on which to conduct an evidence-based assessment will either be excluded or only a high-level qualitative assessment will be undertaken, dependent on the level of up-to-date information available. These assessments will be updated for the ES if more information becomes available. In practice this is likely to include developments that may be in a Local Plan, but for which no definitive information, such as at least pre-application consultation or EIA scoping, is available.

Significance criteria

- 19.4.33 Cumulative effects have been identified by considering whether:
 - a. There would be any change in the magnitude of significance from the Project, as identified within the aspect chapter of the PEI Report, taking into consideration any relevant cumulative developments. For example, a moderate adverse (significant) effect becoming a major adverse (significant) effect.
 - b. The effects of the Project on key receptors along with the effects of cumulative developments would result in a likely significant effect on the relevant receptor where the effects of the Project in isolation would not.

That is to say that a likely non-significant effect from the Project becomes a significant effect when considered with effects from the cumulative developments.

- 19.4.34 Where the magnitude of significance is unchanged as a result of the cumulative developments, the cumulative effect would be 'neutral'. If an effect is worsened by in-combination effects with the cumulative developments, this will result in a minor, moderate or major effect. If there a beneficial effect due to the Project and the cumulative developments, the result might have a significant beneficial effect.
- 19.4.35 Based on this, each topic for each development on the short list provides a brief narrative of potential cumulative effects and whether cumulative effects are considered to be 'significant' or 'not significant'.

Assumptions and limitations

19.4.36 The key parameters and assumptions will be reviewed based on the final design of the Project, and, where required, updated or refined. The ES will present the final assumptions and limitations used within this assessment, drawing attention to any changes from what is presented in this PEI Report.

Intra-project cumulative effects assessment

19.4.37 The presentation of common receptors with potential to have intra-project cumulative effects is based on the known information of the Project at this stage of development. The receptor list will be reviewed and updated prior to undertaking the intra-project cumulative effects assessment to be included in the ES.

Inter-project cumulative effects assessment

- 19.4.38 New applications submitted after the cut-off date (27 March 2025) are not included in the PEI Report but will be considered in the ES when the long list is updated. Local planning authorities will be reconsulted on the updated long list.
- 19.4.39 As set out above, relevant information for assessment of some of the identified cumulative developments may not be available, or will not be sufficiently detailed to undertake a robust assessment. Where this is the case, the assessment will be based upon clearly reported assumptions and professional judgement. Engagement with the local authorities will also supplement available information.
- 19.4.40 It is assumed that proposed development descriptions and potential construction timescales within the planning documents are accurate. Information on potential construction timescales may also be sourced from other online sources, such as project websites and local news articles; it is assumed that this information, where found, is accurate.

- 19.4.41 It is assumed that the cumulative developments will implement good practice, such as implementation of a Construction Environmental Management Plan (CEMP). This would limit the potential for cumulative effects with the Project and therefore the potential of significant cumulative effects.
- 19.4.42 The assumptions and assessment will be developed and presented in the ES.

19.5 Preliminary assessment of likely significant effects

19.5.1 This section sets out the preliminary assessment of the potential for likely significant cumulative effects associated with intra-project and inter-project effects. It assumes that the relevant embedded design (primary) mitigation outlined in the relevant aspect chapters of the PEI Report and good practice measures are implemented.

Intra-project cumulative effects

19.5.2 This section identifies the minor, slight, moderate and major residual effects that have been identified in each aspect chapter of this PEI Report, and assesses whether multiple effects on the same individual receptor may combine to produce a cumulative effect in relation to that receptor.

During construction

19.5.3 Table 19.7 presents the minor, slight, moderate and major residual effects during construction, which have been identified in each aspect chapter of this PEI Report. Where sensitive receptors/receptor groups are not likely to experience intra-project effects, they have been omitted from the assessment. Where the relevant technical assessment for an environmental aspect has not yet been concluded, an assessment has been made based on preliminary information and professional judgement, with justification given where it is considered that the assessment is likely to conclude that the Project will not have a significant adverse effect on the relevant receptor. Further assessment will be undertaken in the preparation of the ES to support this conclusion.

Table 19.7 Potential	effect interactions	during	construction
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Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
Construction workers	Air Quality	Effects of vehicle exhaust emissions, non-road mobile machinery (NRMM) and generator emissions, dust and odour.	Neutral (Not Significant)	No effect interactions resulting in a greater significance of effect
Construction workers	Noise and Vibration	Effects of vibration associated with piling of embankment and platform foundations at Mogden Eastern Work Area Effects of night-time Tunnel Boring Machine (TBM) operation at Mogden STW Western Work area. Effects of daytime embankment piling and daytime TTP foundations at Mogden STW Eastern Work Area. Effects of daytime intake and outfall cofferdam piling and night-time construction of connection to TTP at Burnell Avenue site.	Significant adverse (no significance of effect in terms of minor, moderate or major assigned as anything above the Significant Observed Adverse Effect Level (SOAEL) is considered significant)	identified. Residual effects for socioeconomics, community, access and recreation and human health on construction workers are beneficial. Residual effects for noise and vibration as well as ground conditions and contaminated land are adverse, but are considered to not have
Construction workers	Water Resources and Flood Risk	 Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area). Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Playing Fields site, Burnell Avenue site and Tudor Drive site. Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site. Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site. Effects of permanent retaining wall on groundwater flows and levels at Mogden STW. Effects of fluvial obstruction from river intake and any site infrastructure that could encroach into the floodplain on off-site developed areas at Burnell Avenue site. 	Moderate adverse (Significant)	potential to result in an effect interaction greater than the significance of effect already identified. Residual effects for air quality and water resources to be confirmed at ES stage.
Construction workers	Socioeconomics, Community, Access and Recreation	Effects on community amenity at all sites. Effects on accessibility and severance at Ham Playing Fields site. Effects on recreation at Burnell Avenue (Open Space and users of the River Thames).	To be presented in the ES however, minor adverse effects identified on accessibility and severance at Ham Playing Fields site	
Construction workers	Ground Conditions and Contaminated Land	Potential contamination of Principal aquifer in the superficial geology when constructing the drive shaft where the historical landfill and embankment are located.	Minor adverse (Not Significant)	
Construction workers	Human Health	Effects of the Project providing construction workers choice and information on how they can access the sites via a variety of transport modes, including active travel.	Minor beneficial (Not Significant)	
NMU routes and public open space	Air Quality	Effects of vehicle exhaust emissions, NRMM and generator emissions, dust and odour.	Neutral (Not Significant)	Multiple effects relating to the use of open space and National
NMU routes and public open space	Socioeconomics, Community, Access and Recreation	Effects on community amenity at all sites. Effects on accessibility and severance at Ham Playing Fields site. Effects on recreation at Burnell Avenue (Open Space and users of the River Thames).	To be presented in the ES however, minor adverse effects identified on accessibility and severance at Ham Playing Fields site	I rail at Burnell Avenue site across socioeconomics, community, access and recreation (loss of recreational space), traffic and transport

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
				(National Trail – severance,
NMU routes and public open space	Human Health	Medium-term reduction in the attractiveness of the green space and riverside environment at Burnell Avenue Open Space due to presence of construction hoarding and safety fencing along with other construction activities, with potential for a moderate change in quality of life and psychosocial stress in sensitive groups for the populations of Hampton Wick and South Teddington, Tudor, Canbury Gardens, and Ham, Petersham and Richmond Riverside wards.	Moderate adverse (Significant)	pedestrian delay, NMU amenity, road safety, hazards/large loads), and human health (reduction in the attractiveness of the green space and riverside environment). Effects relate to same impact, so no intra-project cumulative effect. These effects will not interact with effects near Mogden STW due to the distance between the two above ground sites. Other traffic and transport effects relate to other above ground sites so no interaction effects anticipated. To be reviewed once air quality, townscape and visual, and water resources and flood risk assessment is completed.
NMU routes and public open space	Water Resources and Flood Risk	 Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area). Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Playing Fields site, Burnell Avenue site and Tudor Drive site. Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site. Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site. Effects of permanent retaining wall on groundwater flows and levels at Mogden STW. Effects of fluvial obstruction from river intake and any site infrastructure that could encroach into the floodplain on off-site developed areas at Burnell Avenue site. 	Moderate adverse (Significant)	
NMU routes and public open space	Townscape and Visual	There would potentially be likely significant effects on townscape character during construction, particularly where directly affected by the presence of construction activity and vegetation removal. There would potentially be likely significant effects on views during construction, particularly where visual receptors are of high sensitivity and in close proximity to the above ground construction works.	To be presented in ES	
NMU routes and public open space	Traffic and Transport	 Severance – Allianz Stadium - Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust - Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route Driver delay – Allianz Stadium - Rugby Road/ B361 Whitton Road; Tesco - Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)) Pedestrian delay – Allianz Stadium – Rugby Road/ B361 Whitton Road; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)) Pedestrian delay – Allianz Stadium – Rugby Road/ B361 Whitton Road; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and National Cycle Network Route NMU amenity – Allianz Stadium – Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route Fear and intimidation – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Sandy Lane Playground, Public Right of Way (PRoW) 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive 	Slight adverse (Not Significant)	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
		(Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route		
		Road safety – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Grey Court School, Sandy Lane Playground, PRoW 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields); and National Trail/National Cycle Network Route		
		Hazards/large loads – Allianz Stadium – Rugby Road/ B361 Whitton Road; Harlequins Rugby Football Club (Twickenham Stoop Stadium); Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); and National Trail/National Cycle Network Route		
Local residents Community facilities receptors	Air Quality	Effects of vehicle exhaust emissions, NRMM and generator emissions, dust and odour.	Neutral (not significant)	Multiple effects relating to the use of open space and National Trail at Burnell Avenue site
Local residents Community facilities	Noise and Vibration	Effects of vibration associated with piling of embankment and platform foundations at Mogden Eastern Work Area	Significant adverse	community, access and recreation (loss of recreational
receptors		Effects of night-time TBM operation at Mogden STW Western Work area. Effects of daytime embankment piling and daytime TTP foundations at Mogden STW Eastern Work Area.		space), traffic and transport (National Trail – severance, pedestrian delay, NMU amenity,
		Effects of daytime intake and outfall cofferdam piling and night-time construction of connection to TTP at Burnell Avenue site.		road safety, hazards/large loads), and human health
Local residents Community facilities	Water Resources and Flood Risk	Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area).	Moderate adverse (Significant)	the green space and riverside environment). Effects relate to same impact, so no intra-project
		Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Playing Fields site, Burnell Avenue site and Tudor Drive site.		cumulative effect. Other adverse effects identified at this stage are
		Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site.		located at different above ground sites therefore, there would be
		Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site.		To be reviewed once air quality,
		Effects of permanent retaining wall on groundwater flows and levels at Mogden STW.		socioeconomics, community,
		encroach into the floodplain on off-site developed areas at Burnell Avenue site.		access and recreation, and water resources and flood risk
Local residents	Socioeconomics,	Effects on community amenity at all sites.	To be presented in the ES	assessment are completed.
Community facilities receptors	Access and Recreation	Effects on accessibility and severance at Ham Playing Fields site. Effects on recreation at Burnell Avenue (Open Space and users of the River Thames).	nowever, minor adverse effects identified on accessibility and severance at Ham Playing Fields site	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
Local residents Community facilities receptors	Human Health	Medium-term reduction in the attractiveness of the green space and riverside environment at Burnell Avenue Open Space due to presence of construction hoarding and safety fencing along with other construction activities, with potential for a moderate change in quality of life and psychosocial stress in sensitive groups for the populations of Hampton Wick and South Teddington, Tudor, Canbury Gardens, and Ham, Petersham and Richmond Riverside wards.	Moderate adverse (Significant)	
Local residents Community facilities receptors	Traffic and Transport	Severance – Allianz Stadium - Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust - Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route	Slight adverse (Not Significant)	
		Driver delay – Allianz Stadium - Rugby Road/ B361 Whitton Road; Tesco - Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields))		
		Pedestrian delay – Allianz Stadium – Rugby Road/ B361 Whitton Road; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route		
		NMU amenity – Allianz Stadium – Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route		
		Fear and intimidation – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Sandy Lane Playground, Public Right of Way (PRoW) 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route		
		Road safety – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Grey Court School, Sandy Lane Playground, PRoW 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields); and National Trail/National Cycle Network Route		
		Hazards/large loads – Allianz Stadium – Rugby Road/ B361 Whitton Road; Harlequins Rugby Football Club (Twickenham Stoop Stadium); Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); and National Trail/National Cycle Network Route		
Local residents Community facilities receptors	Ground Conditions and Contaminated Land	Potential contamination of Principal aquifer in the superficial geology when constructing the drive shaft where the historical landfill and embankment are located.	Minor adverse (Not Significant)	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect
Local residents Community facilities receptors	Townscape and Visual	There would potentially be likely significant effects on townscape character during construction, particularly where directly affected by the presence of construction activity and vegetation removal.	To be presented in ES
		There would potentially be likely significant effects on views during construction, particularly where visual receptors are of high sensitivity and in close proximity to the above ground construction works.	
Local road network	Traffic and Transport	Severance – Allianz Stadium - Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust - Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route	Slight adverse (Not Signific
		Driver delay – Allianz Stadium - Rugby Road/ B361 Whitton Road; Tesco - Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields))	
		Pedestrian delay – Allianz Stadium – Rugby Road/ B361 Whitton Road; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route	
		NMU amenity – Allianz Stadium – Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route	
		Fear and intimidation – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Sandy Lane Playground, Public Right of Way (PRoW) 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route	
		Road safety – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Grey Court School, Sandy Lane Playground, PRoW 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields); and National Trail/National Cycle Network Route	
		Hazards/large loads – Allianz Stadium – Rugby Road/ B361 Whitton Road; Harlequins Rugby Football Club (Twickenham Stoop Stadium); Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); and National Trail/National Cycle Network Route	
Local road network	Socioeconomics, Community, Access and Recreation	Effects on community amenity at all sites. Effects on accessibility and severance at Ham Playing Fields site. Effects on recreation at Burnell Avenue (Open Space and users of the River Thames).	To be presented in the ES however, minor adverse ef identified on accessibility a severance at Ham Playing site

t	Effect interactions
cant)	Multiple effects relating to the use of open space and National Trail at Burnell Avenue site, however, effects relate to same impact, so no intra-project cumulative effect. No other socioeconomics, community, access and recreation effects will interact with traffic and transport effects to generate an interaction effect.
fects nd Fields	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions	
Terrestrial Ecology	Air Quality	Effects of vehicle exhaust emissions, NRMM and generator emissions, dust and odour.	Neutral (Not Significant)	No effect interaction identified at	
Terrestrial Ecology	Noise and Vibration	Effects of vibration associated with piling of embankment and platform foundations at Mogden Eastern Work Area Effects of night-time TBM operation at Mogden STW Western Work area. Effects of daytime embankment piling and daytime TTP foundations at Mogden STW Eastern Work Area. Effects of daytime intake and outfall cofferdam piling and night-time construction of connection to TTP at Burnell Avenue site.	Significant adverse	this stage. To be reviewed once air quality, townscape and visual and water resource and flood risk assessment is completed at ES stage.	
Terrestrial Ecology	Townscape and Visual	For townscape and visual, residual effects are considered as those assessed during operation in year 15 when the mitigation planting is established. However, there would potentially be likely significant effects on townscape character during construction, particularly where directly affected by the presence of construction activity and vegetation removal. There would potentially be likely significant effects on views during construction, particularly where of high sensitivity and in close proximity to the above ground construction works.	To be presented in ES		
Terrestrial Ecology	Water Resources and Flood Risk	Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area). Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Playing Fields site, Burnell Avenue site and Tudor Drive site. Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site. Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site. Effects of permanent retaining wall on groundwater flows and levels at Mogden STW. Effects of fluvial obstruction from river intake and any site infrastructure that could encroach into the floodplain on off-site developed areas at Burnell Avenue site.	Moderate adverse (Significant)		
Aquatic Ecology	Air Quality	Effects of vehicle exhaust emissions, NRMM and generator emissions, dust and odour.	Neutral (Not Significant)	No effect interaction identified at this stage. To be reviewed once	
Aquatic Ecology	Noise and Vibration	Effects of vibration associated with piling of embankment and platform foundations at Mogden Eastern Work Area Effects of night-time TBM operation at Mogden STW Western Work area. Effects of daytime embankment piling and daytime TTP foundations at Mogden STW Eastern Work Area. Effects of daytime intake and outfall cofferdam piling and night-time construction of connection to TTP at Burnell Avenue site.	Significant adverse	and flood risk assessment is completed at ES stage.	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effec
Aquatic Ecology	Water Resources and Flood Risk	Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area).	Moderate adverse (significa
		Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Playing Fields site, Burnell Avenue site and Tudor Drive site.	
		Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site.	
		Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site.	
		Effects of permanent retaining wall on groundwater flows and levels at Mogden STW. Effects of fluvial obstruction from river intake and any site infrastructure that could encroach into the floodplain on off-site developed areas at Burnell Avenue site.	
Built historic assets	Air Quality	Effects of vehicle exhaust emissions, NRMM and generator emissions, dust and odour.	Neutral (Not Significant)
Built historic assets	Noise and Vibration	Effects of vibration associated with piling of embankment and platform foundations at Mogden Eastern Work Area Effects of night-time TBM operation at Mogden STW Western Work area.	Significant adverse
		Effects of daytime embankment piling and daytime TTP foundations at Mogden STW Eastern Work Area.	
		Effects of daytime intake and outfall cofferdam piling and night-time construction of connection to TTP at Burnell Avenue site.	
Built historic assets	Traffic and Transport	Severance – Allianz Stadium - Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust - Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route	Slight adverse (Not Signific
		Driver delay – Allianz Stadium - Rugby Road/ B361 Whitton Road; Tesco - Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields))	
		Pedestrian delay – Allianz Stadium – Rugby Road/ B361 Whitton Road; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route	
		NMU amenity – Allianz Stadium – Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route	
		Fear and intimidation – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Sandy Lane Playground, Public Right of Way (PRoW) 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route	
		Road safety – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice);	

ect	Effect interactions
cant)	
	No effect interaction identified at this stage. To be reviewed once air quality assessment is completed at ES stage.
icant)	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect
		Sandy Lane (Grey Court School, Sandy Lane Playground, PRoW 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields); and National Trail/National Cycle Network Route	
		Hazards/large loads – Allianz Stadium – Rugby Road/ B361 Whitton Road; Harlequins Rugby Football Club (Twickenham Stoop Stadium); Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); and National Trail/National Cycle Network Route	
Built historic assets	Ground Conditions and Contaminated Land	Potential contamination of Principal aquifer in the superficial geology when constructing the drive shaft where the historical landfill and embankment are located.	Minor adverse (Not Signific
Below ground archaeology	Ground Conditions and Contaminated Land	Potential contamination of Principal aquifer in the superficial geology when constructing the drive shaft where the historical landfill and embankment are located.	Minor adverse (not significa
Below ground archaeology	Water Resources and Flood Risk	Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area). Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Plaving Fields site. Burnell Avenue site and Tudor Drive site.	Moderate adverse (significa
		Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site.	
		Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site.	
		Effects of permanent retaining wall on groundwater flows and levels at Mogden STW. Effects of fluvial obstruction from river intake and any site infrastructure that could encroach into the floodplain on off-site developed areas at Burnell Avenue site.	
Townscape character areas	Air Quality	Effects of vehicle exhaust emissions, NRMM and generator emissions, dust and odour.	Neutral (not significant)
Townscape character areas	Noise and Vibration	Effects of vibration associated with piling of embankment and platform foundations at Mogden Eastern Work Area	Significant adverse
		Effects of night-time TBM operation at Mogden STW Western Work area. Effects of daytime embankment piling and daytime TTP foundations at Mogden STW Eastern Work Area.	
		Effects of daytime intake and outfall cofferdam piling and night-time construction of connection to TTP at Burnell Avenue site.	
Townscape character areas	Traffic and Transport	Severance – Allianz Stadium - Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust - Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route	Slight adverse (Not Signific
		Driver delay – Allianz Stadium - Rugby Road/ B361 Whitton Road; Tesco - Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and Riverside	

t	Effect interactions
ant)	
ant)	No effect interaction identified at this stage. To be reviewed once water resources and flood risk assessment is completed at ES
ant)	stage.
	No effect interaction identified at this stage. To be reviewed once air quality and townscape and visual assessment are completed at ES stage.
ant)	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
		Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)) Pedestrian delay – Allianz Stadium – Rugby Road/ B361 Whitton Road; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle		
		NMU amenity – Allianz Stadium – Rugby Road/ B361 Whitton Road; Ham Street (King George's Field, National Trust – Ham House and Garden); and National Trail/National Cycle Network Route		
		Fear and intimidation – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Sandy Lane Playground, Public Right of Way (PRoW) 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields)); and National Trail/National Cycle Network Route		
		Road safety – Allianz Stadium – Rugby Road/ B361 Whitton Road; Tesco – Mogden Lane; Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); Sandy Lane (Grey Court School, Sandy Lane Playground, PRoW 112); Ham Street (King George's Field, National Trust – Ham House and Garden); Riverside Drive (Riverside Drive Playground, Richmond and Kew Foodball Club (Ham Playing Fields); and National Trail/National Cycle Network Route		
		Hazards/large loads – Allianz Stadium – Rugby Road/ B361 Whitton Road; Harlequins Rugby Football Club (Twickenham Stoop Stadium); Dukes Avenue (Malden Oaks School and Tuition, Ham Dental Practice); and National Trail/National Cycle Network Route		
Townscape character areas	Townscape and Visual	For townscape and visual, residual effects are considered as those assessed during operation in year 15 when the mitigation planting is established.	To be presented in ES	
		However, there would potentially be likely significant effects on townscape character during construction, particularly where directly affected by the presence of construction activity and vegetation removal.		
		There would potentially be likely significant effects on views during construction, particularly where visual receptors are of high sensitivity and in close proximity to the above ground construction works.		
Surface water features and bodies	Water Resources and Flood Risk	Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area).	Moderate adverse (Significant)	No effect interaction identified at this stage. To be reviewed once water resources and flood risk
		Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Playing Fields site, Burnell Avenue site and Tudor Drive site.		assessment and air quality assessment are completed at ES
		Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site.		stage.
		Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site.		
		Effects of permanent retaining wall on groundwater flows and levels at Mogden STW.		
		Effects of fluvial obstruction from river intake and any site infrastructure that could encroach into the floodplain on off-site developed areas at Burnell Avenue site.		

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
Surface water features and bodies	Air Quality	Effects of vehicle exhaust emissions, NRMM and generator emissions, dust and odour.	Neutral (Not Significant)	
Surface water features and bodies	Ground Conditions and Contaminated Land	Potential contamination of Principal aquifer in the superficial geology when constructing the drive shaft where the historical landfill and embankment are located.	Minor adverse (Not Significant)	
Groundwater	Water Resources and Flood Risk	 Effects of groundwater flows and levels on Taplow Member (Principal aquifer) and Kempton Park Gravel Member at Mogden STW (Eastern Work Area and Western Work Area). Effects of groundwater flows and levels on Kempton Park Gravel Member (Secondary A aquifer) at Ham Playing Fields site, Burnell Avenue site and Tudor Drive site. Effects of fluvial damage or mobilisation of plant, equipment and materials on construction works at Ham Playing Fields site. Effects of fluvial obstruction from the cofferdam on off-site developed areas at Burnell Avenue site. Effects of permanent retaining wall on groundwater flows and levels at Mogden STW. Effects of fluvial obstruction from river intake and any site infrastructure that could encroach into the floodplain on off-site developed areas at Burnell Avenue site. 	Moderate adverse (Significant)	The potential adverse effects of cofferdam construction and the effects of potential contamination of the Principal aquifer at the drive shaft are at different locations so they would not interact.
Groundwater	Ground Conditions and Contaminated Land	Potential contamination of Principal aquifer in the superficial geology when constructing the drive shaft where the historical landfill and embankment are located.	Minor adverse (Not Significant)	

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During Operation

19.5.4 Table 19.8 presents minor, moderate and major residual effects during operation, which have been identified in each aspect chapter of this PEI Report. Where sensitive receptors/receptor groups are not likely to experience effect interactions, they have been omitted from the assessment.

Table 19.8 Potential effect interactions during operation

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions	
Construction workers	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction	
Construction workers	Noise and Vibration	There are no residual effects during operation.	n/a	identified at this	
Construction workers	Water Resources and Flood Risk	There are no residual effects during operation.	n/a	other effects for potential effects in	
Construction workers	Socioeconomics, Community, Access and Recreation	Effects on community amenity (Mogden STW, Ham Playing Fields site and Burnell Avenue site). Effects on recreation (Ham Playing Fields site and users of the River Thames at Burnell Avenue). Effects on the economy (route wide).	To be presented in ES. Major beneficial on Economy (route wide).	relation to socioeconomics, community, access and recreation to interact with.	
Construction workers	Ground Conditions and Contaminated Land	There are no residual effects during operation.	n/a	-	
Construction workers	Human Health	There are no residual effects during operation.	n/a		
NMU routes and public open space	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction identified at this	
NMU routes and public open space	Socioeconomics, Community, Access and Recreation	Effects on community amenity (Mogden STW, Ham Playing Fields site and Burnell Avenue site). Effects on recreation (Ham Playing Fields site and users of the River Thames at Burnell Avenue). Effects on the economy (route wide).	To be presented in ES. Major beneficial on Economy (route wide).	stage. To be reviewed once socioeconomic, community, access and recreation and townscape and visual assessment	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
NMU routes and public open space	Human Health	There are no residual effects during operation.	n/a	are completed at ES stage.
NMU routes and public open space	Water Resources and Flood Risk	There are no residual effects during operation.	n/a	
NMU routes and public open space	Townscape and Visual	There would potentially be likely significant effects on townscape character during operation, particularly in connection with the intake and outfall structures and where trees would be removed. There would be likely significant effects on views, particularly where the loss of vegetation would adversely affect the character of the view, and from viewpoints in close proximity to the intake and outfall.	To be presented in ES	
NMU routes and public open space	Traffic and Transport	There are no residual effects during operation.	n/a	_
Local residents Community facilities receptors	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction identified at this stage. To be
Local residents Community facilities receptors	Noise and Vibration	There are no residual effects during operation.	n/a	socioeconomics, community, access and recreation and
Local residents Community facilities receptors	Water Resources and Flood Risk	There are no residual effects during operation.	n/a	townscape and visual assessment

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
Local residents Community facilities receptors	Socioeconomics, Community, Access and Recreation	Effects on community amenity (Mogden STW, Ham Playing Fields site and Burnell Avenue site). Effects on recreation (Ham Playing Fields site and users of the River Thames at Burnell Avenue). Effects on the economy (route wide).	To be presented in ES. Major beneficial on Economy (route wide).	are completed at ES stage.
Local residents Community facilities receptors	Human Health	There are no residual effects during operation.	n/a	
Local residents Community facilities receptors	Traffic and Transport	There are no residual effects during operation.	n/a	
Local residents Community facilities receptors	Ground Conditions and Contaminated Land	There are no residual effects during operation.	n/a	
Local residents Community facilities receptors	Townscape and Visual	There would potentially be likely significant effects on townscape character during operation, particularly in connection with the intake and outfall structures and where trees would be removed. There would be likely significant effects on views, particularly where the loss of vegetation would adversely affect the character of the view, and from viewpoints in close proximity to the intake and outfall.	To be presented in ES	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
Local road network	Traffic and Transport	There are no residual effects during operation.	n/a	No effect interaction identified at this
Local road network	Socioeconomics, Community, Access and Recreation	Effects on community amenity (Mogden STW, Ham Playing Fields site and Burnell Avenue site). Effects on recreation (Ham Playing Fields site and users of the River Thames at Burnell Avenue). Effects on the economy (route wide).	To be presented in ES. Major beneficial on Economy (route wide).	stage. There are no other effects for potential effects in relation to socioeconomics, community, access and recreation to interact with.
Terrestrial Ecology	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction identified at this
Terrestrial Ecology	Noise and Vibration	There are no residual effects during operation.	n/a	stage. To be reviewed once
Terrestrial Ecology	Townscape and Visual	There would potentially be likely significant effects on townscape character during operation, particularly in connection with the intake and outfall structures and where trees would be removed.	To be presented in ES	townscape and visual assessment is completed at ES stage.
		There would be likely significant effects on views, particularly where the loss of vegetation would adversely affect the character of the view, and from viewpoints in close proximity to the intake and outfall.		
Terrestrial Ecology	Water Resources and Flood Risk	There are no residual effects during operation.	n/a	
Aquatic Ecology	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction identified at this
Aquatic Ecology	Noise and Vibration	n/a	stage. There are no	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions	
Aquatic Ecology	Socioeconomics, Community, Access and Recreation	Effects on community amenity (Mogden STW, Ham Playing Fields site and Burnell Avenue site). Effects on recreation (Ham Playing Fields site and users of the River Thames at Burnell Avenue). Effects on the economy (route wide).	To be presented in ES. Major beneficial on Economy (route wide).	other effects for potential effects in relation to socioeconomics, community, access and recreation to interact with.	
Aquatic Ecology	Water Resources and Flood Risk	There are no residual effects during operation.	n/a		
Built historic assets	Noise and Vibration	There are no residual effects during operation.	n/a	No effect interaction identified at this stage.	
Built historic assets	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction identified at this stage.	
Built historic assets	Traffic and Transport	There are no residual effects during operation.	n/a	No effect interaction identified at this stage.	
Built historic assets	Ground Conditions and Contaminated Land	There are no residual effects during operation.	n/a	No effect interaction identified at this stage.	
Below ground archaeology	Ground Conditions and Contaminated Land	There are no residual effects during operation.	n/a	No effect interaction identified at this stage.	
Below ground archaeology	Water Resources and Flood Risk	Effect of cofferdam construction at Burnell Avenue site resulting in fluvial flood risk	To be presented in ES	There are no other effects for potential effects in relation to	

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions
				water resources and flood risk to interact with.
Townscape character areas	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction identified at this
Townscape character areas	Noise and Vibration	There are no residual effects during operation.	n/a	stage. There are no other
Townscape character areas	Traffic and Transport	There are no residual effects during operation.	n/a	townscape and visual effects to
Townscape character areas	Townscape and Visual	There would potentially be likely significant effects on townscape character during operation, particularly in connection with the intake and outfall structures and where trees would be removed. There would be likely significant effects on views, particularly where the loss of vegetation would adversely affect the character of the view, and from viewpoints in close proximity to the intake and outfall.	To be presented in ES	interact with.
Surface water features and bodies	Water Resources and Flood Risk	There are no residual effects during operation.	n/a	No effect interaction identified at this stage.
Surface water features and bodies	Air Quality	Effects of odour at Mogden STW.	Neutral (Not Significant)	No effect interaction identified at this stage.

Sensitive receptor/ receptor group	Environmental aspect	Description of effect	Significance of effect	Effect interactions	
Groundwater	Water Resources and Flood Risk	There are no residual effects during operation.	n/a	No effect interaction identified at this	
	Ground Conditions and Contaminated Land	There are no residual effects for ground conditions and contaminated land during construction.	n/a	stage. There are no other effects for potential water resources and flood risk effects to interact with.	

Summary

19.5.5 At this stage, no intra-project effect interaction has been identified between the environmental aspects for each sensitive receptor/ receptor group during the construction phase or operation phase of the Project.

Inter-project cumulative effects

- 19.5.6 The shortlisted cumulative developments are summarised in Table 19.9.
- 19.5.7 For the purposes of this PEI Report, a high level CEA has been undertaken using professional judgement and knowledge of similar projects in addition to information known about each cumulative scheme. The final assessment of cumulative effects will be undertaken as part of the CEA provided in the ES.

Table 19.9 The aspect ZoI which overlap with the shortlisted developments

Development name (identification	Summary of the development	Distance from the Project	Does the aspect zone of influence overlap with the other development? (Y/N)								
(identification (ID))			Water Resources and Flood Risk	Aquatic Ecology	Terrestrial Ecology	Historic Environment	Townscape and Visual	Ground Conditions and Contaminated Land	Air Quality	Noise and Vibration	Socioeconomics, Community, Access and Recreation
ID 1 – Heathrow Airport (TR020003)	Heathrow Airport expansion proposed to accommodate a third runway	8km (Mogden STW)	Ν	Ν	Y	Ν	Ν	Ν	Ν	Ν	Ν
ID 2 – River Thames Scheme- Transfer of Water (WA02002)	Upgrades to weirs at Sunbury, Molesey and Teddington along sections of River Thames through Thorpe and Chertsey	0m (Burnell Avenue site)	Y	Y	Y	Y	Y	Y	Y	Y	Y
ID 3 – High Speed Two (2) Rail (London - West Midlands) Act 2017	New railway line from Northolt to Old Oak Common	1.2km (Tunnel)	Y	Y	Y	Ν	Y	Ν	Ν	Ν	N

Development name	Summary of the development	Distance from the Project	Does the aspect zone of influence overlap with the other development? (Y/N)								
(identification (ID))			Water Resources and Flood Risk	Aquatic Ecology	Terrestrial Ecology	Historic Environment	Townscape and Visual	Ground Conditions and Contaminated Land	Air Quality	Noise and Vibration	Socioeconomics, Community, Access and Recreation
ID 4 – Cambridge Road Estate Redevelopment Site, Kingston upon Thames (20/03077/FUL)	A mixed use development, including demolition of existing buildings and erection of up to 2,170 residential units, office and retail/commerce floorspace, and public open space.	2.5km (Tudor Drive site)	Ν	Ν	Y	Ν	Y	Ν	Ν	Ν	Ν

Development name	Summary of the development	Distance from the Project	ance Does the aspect zone of influence overlap with the other development? (Y/N)								
(ID)) ID 5 – Ham Close, Ham			Water Resources and Flood Risk	Aquatic Ecology	Terrestrial Ecology	Historic Environment	Townscape and Visual	Ground Conditions and Contaminated Land	Air Quality	Noise and Vibration	Socioeconomics, Community, Access and Recreation
ID 5 – Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site, Ham (22/1442/FUL)	Demolition of buildings on-site and change of use within Ham Close for a mixed-use redevelopment comprising 452 residential homes up to 6 storeys, Community and leisure facilities up to 3 storeys, Maker Labs of up to 2 storeys, Basement car park, Provision of on-site cycle and vehicle parking, space, landscaping, new pedestrian and cycle accesses and internal routes	950m (Ham Playing Fields site)	Y	Y	Y	Ν	Y	Ν	Y	Ν	N

Development name (identification (ID))	Summary of the development	Distance from the Project	 Does the aspect zone of influence overlap with the other development? (Y/N) 								
			Water Resources and Flood Risk	Aquatic Ecology	Terrestrial Ecology	Historic Environment	Townscape and Visual	Ground Conditions and Contaminated Land	Air Quality	Noise and Vibration	Socioeconomics, Community, Access and Recreation
ID 6 – Commerce Industrial Estate, Commerce Road, Brentford TW8 8LE (P/2023/0234; 00297/R/P15)	Demolition of all existing buildings and structures and the part reconstruction of an existing overhanging warehouse building and the erection of seven buildings (ranging 5-10 storeys).	2.5km (Mogden STW)	Ν	Ν	Y	Ν	Y	Ν	Ν	Ν	Ν

Water resources and flood risk

- 19.5.8 The ZoI for water resources and flood risk is 2km, which will cover the potential cumulative effects on water resource and flood risk receptors, including surface water features and bodies and groundwater. The cumulative developments within the ZoI with potential to generate cumulative effects are:
 - a. ID 2 River Thames Scheme
 - b. ID 3 High Speed Two (HS2) Rail
 - c. ID 5 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site

During construction

- 19.5.9 It is assumed other developments will follow good industry practice during construction, such as management of construction works and surface water runoff.
- 19.5.10 The River Thames Scheme (ID 2) draft Order limits adjoin with the Project. It is anticipated that construction for the River Thames Scheme (ID 2) will take place from winter (late) 2026 to 2032, which would include upgrades to Teddington Weir that could have combined effects on flood management if construction activities coincide with the Project. This may increase the likelihood of flooding during extreme weather if not coordinated. This will be investigated further and reported on within the ES, but with liaising on timings and mitigation measures, it is anticipated that cumulative effects on construction flood risk will be neutral (not significant).
- 19.5.11 The River Thames Scheme (ID 2) also upgrades to Teddington Weir, which has the potential to have a combined effect on water quality due to the potential for a contamination risk from the River Thames Scheme and the Project. It is assumed the River Thames Scheme will follow good industry practice during construction so the cumulative effect would be neutral (not significant).
- 19.5.12 Mitigation measures for the Project have been documented within the draft Code of Construction Practice (CoCP), which will be developed further and included within the ES.
- 19.5.13 Cumulative effects on surface water and groundwater during construction are therefore likely to be neutral (not significant).

During operation

- 19.5.14 It is assumed that all relevant cumulative developments will include an appropriate drainage design/strategy to manage and treat surface water runoff and ensure there is no increase in flood risk, as would be required by planning policy and the Lead Local Flood Authority.
- 19.5.15 The construction of a new weir complex as part of the River Thames Scheme (ID 2) with radial gates through Teddington Lock Island is anticipated to

increase the flow capacity at Teddington Weir. It is expected to reduce flood levels upstream of Teddington Lock by nearly 0.2m (Environment Agency, 2024). This could lower the flood risks for Burnell Avenue site if the River Thames Scheme is completed. This is considered an opportunity as the design for the Project assumes the River Thames Scheme (ID 2) may not be implemented, so it is based on levels prior to operation of River Thames Scheme (ID 2).

- 19.5.16 The River Thames Scheme's (ID 2) proposed new multi-species fish pass may result in different flow current pathways locally at Teddington Weir. This may affect the mixing of the Project outfall's discharge into the River Thames resulting in a potential water quality issue. This will be investigated further at the ES stage through water modelling.
- 19.5.17 Redevelopment projects such as Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site (ID 5) will result in an increase in impermeable surfaces, potentially increasing surface water runoff and impacting flood defences. To ensure flood risk does not increase elsewhere, the Flood and Water Management Act 2010 requires built development to implement mitigation using methods such as sustainable drainage systems.
- 19.5.18 It is considered that the cumulative effects on surface water during operation would be neutral (not significant).
- 19.5.19 Cumulative effects will also be reported on in the Water Framework Directive assessment undertaken as part of the ES.

Aquatic ecology

- 19.5.20 The Zol for aquatic ecology is 2km, which will cover the potential cumulative effects on aquatic ecology receptors. The cumulative developments within the Zol with potential to generate cumulative effects are:
 - a. ID 2 River Thames Scheme
 - b. ID 3 HS2 Rail
 - c. ID 5 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site

During construction

19.5.21 As outlined in paragraph 19.5.10, the River Thames Scheme (ID 2) draft Order limits adjoin with the Project, with a construction period anticipated between winter 2026 to 2032. The construction works for the River Thames Scheme (ID 2) and the Project have the potential to have a combined effect on aquatic ecology receptors, where the construction activities are concurrent. The combined effect of construction activities could result in a contamination risk, however, it is assumed the River Thames Scheme will follow good industry

practice during construction so the cumulative effect would be neutral (not significant).

During operation

- 19.5.22 When operational, the River Thames Scheme's (ID 2) proposed new multispecies fish pass may result in different flow current pathways locally at Teddington Weir, which may affect the mixing of the Project outfall's discharge into the River Thames. This will be investigated further at the ES stage through water modelling.
- 19.5.23 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site (ID 5) will result in an increase in impermeable surfaces, potentially increasing surface water runoff. This might result in a potential water quality issue, which could affect aquatic ecology receptors if this drains into the River Thames.

Terrestrial ecology

- 19.5.24 The ZoI for terrestrial ecology is up to 10km for SACs with bats as a qualifying feature. The majority of sensitive receptors for terrestrial ecology have a ZoI of up to 2km as shown in Table 19.3. The cumulative developments within the ZoIs with potential to generate cumulative effects on terrestrial ecology receptors are:
 - a. ID 1 Heathrow Airport
 - b. ID 2 River Thames Scheme
 - c. ID 3 HS2 Rail
 - d. ID 4 Cambridge Road Estate Redevelopment site
 - e. ID 5 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site
 - f. ID 6 Commerce Industrial Estate
- 19.5.25 The in-combination effects for SACs with bats as a qualifying feature have been completed as part of the Habitats Regulations Assessment Screening in Appendix 7.1.
- 19.5.26 As outlined in Chapter 7: Terrestrial Ecology, the baseline for this environmental aspect is still being developed, informed by ongoing ecological surveys. As such, it is not possible to confirm the significance of potential cumulative impacts (excluding SACs with bats as a qualifying feature). A full assessment of cumulative effects will be presented in the ES. This will review the above projects for potential overlapping spatial and temporal interactions with the Project. Where there is the potential for overlapping to occur, the relevant important terrestrial ecological features will be identified and the overlapping development will be taken forward for cumulative effects where the Project has a

neutral effect, so this assessment will only consider residual effects reported as being of minor adverse or greater significance.

During construction

- 19.5.27 At this stage it not possible to confirm the significance of any potential cumulative impacts and these will be explored in the ES once the ecological baseline characterisation has been completed. However, it is possible that the following inter-project cumulative effects may arise in relation to the Project.
- 19.5.28 Heathrow Airport (ID 1) is located 8km from Mogden STW site. Given the distance to the Project and lack of protected and notable species and habitats recorded within the ZoI, an inter-project cumulative effect is not considered likely to occur. In addition, no lighting is proposed adjacent to the River Thames, therefore, the Project will have a negligible effect on commuting bats that use the river to navigate. A cumulative effect may arise on terrestrial ecology (foraging bats) if there is an overlap in the two projects' ZoIs. A cumulative effect is only possible if this is the case, and also if the construction periods for both Projects occur at the same time.
- 19.5.29 The River Thames Scheme (ID 2) is adjacent to the Project. There is a potential impact on riparian mammals as a result of the River Thames Scheme, however, the effects of the Project are either negligible or no change, therefore there is no potential for the Project to contribute towards a cumulative inter-project effect on riparian mammals.
- 19.5.30 The majority of the HS2 Rail (ID 3) within the 10km Zol of the Project is situated underground, however, there will be significant above ground works at Old Oak Common and Green Park Way. There is limited connectivity between HS2 and the Project, however, due to the duration of construction and significance of HS2 Rail, some cumulative effects relating to commuting bats may arise.
- 19.5.31 Due to the proximity of Cambridge Road Estate redevelopment (ID 4) to the Project (2.5km from Tudor Drive) and its surrounding habitat (densely urban area with little natural habitat), it is not considered likely that an inter-project cumulative effect will occur.
- 19.5.32 The Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site (ID 5) development is 950m from the Project's Ham Playing Fields site. There is potential for cumulative effects to arise on protected and notable species and habitats, including bats and badgers. The local bat and badger populations may use both the draft Order limits and the other development's site for foraging and the loss of these areas could therefore result in a cumulative effect if the construction periods are concurrent.
- 19.5.33 There is not anticipated to be an inter-project significant cumulative effect between the Commerce Industrial Estate (ID 6) and the Project due to the distance between the cumulative developments and the lack of protected and notable species and habitats recorded within the ZoI of the Project.

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During operation

19.5.34 It is also assumed that all other relevant cumulative developments would follow good industry practice in terms of operational management and maintenance works, and that any operational impacts would be mitigated on site to avoid residual effects on ecological features. This will be explored further in the ES once the characterisation of the ecological baseline for the Project has been completed.

Historic environment

- 19.5.35 The ZoI for historic environment is 500m. The cumulative development within the ZoI with potential to generate cumulative effects is ID 2 River Thames Scheme.
- 19.5.36 Cumulative historic environment impacts can be either physical or as a result of changes to setting. Impacts on setting result from where the observer is able to see two or more developments from one key view, or sequential where two or more views are affected.

During construction

- 19.5.37 The River Thames Scheme (ID 2) includes modifications to the Teddington Weir and construction of a 20m long by 20m wide channel through Teddington Lock Island. These works will be located within Teddington Lock Conservation Area, the Ham Lands Archaeological Priority Area and within the setting of the Grade II listed Teddington Footbridge. In the PEI Report for the River Thames Scheme (ID 2) the assessment identifies temporary effects to the built historic assets, Teddington Lock Conservation Area and Grade II listed Teddington Footbridge during the construction period only.
- 19.5.38 Due to the limited and temporary visual impact of the River Thames Scheme (ID 2) proposals and the distance of the proposed work from the Project, it is considered the cumulative effects would be neutral (not significant).

During operation

- 19.5.39 In terms of below ground archaeology, impacts are limited to the construction phase, therefore it is considered the cumulative effects would be neutral (not significant) during operation.
- 19.5.40 In terms of built heritage assets, the potential for cumulative effects will be considered further in the ES.

Townscape and visual

- 19.5.41 The ZoI for townscape and visual is 2.5km, which will cover the potential cumulative effects on townscape and visual receptors. The cumulative developments within the ZoI with potential to generate cumulative effects are as follows:
 - a. ID 2 River Thames Scheme
 - b. ID 3 HS2 Rail
 - c. ID 4 Cambridge Road Estate Redevelopment Site
 - d. ID 5 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site
 - e. ID 6 Commerce Industrial Estate
- 19.5.42 Townscape and visual effects will be further assessed in the ES. Potential interproject cumulative effects during construction and operation are described below.

During construction

- 19.5.43 Significant inter-project cumulative effects during construction have the potential to occur with the Project and the River Thames Scheme (ID 2) and Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site (ID 5).
- 19.5.44 Weir capacity improvements, fish passes and the temporary construction compound associated with the River Thames Scheme would potentially have shared townscape and visual receptors with the Project in the vicinity of Teddington Lock.
- 19.5.45 It is unlikely that Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site (ID 5) has any shared visual receptors with the Project due to intervening built development. However, it does potentially share Townscape Character Area E1 which could give rise to cumulative effects.

During operation

19.5.46 The potential for inter-project cumulative effects during operation are the same as during construction at this stage.

Ground conditions and contaminated land

19.5.47 The ZoI for ground conditions and contaminated land is 500m, which will cover the potential cumulative effects on ground conditions and contaminated land receptors. The cumulative development within the ZoI with potential to generate cumulative effects is ID 2 – River Thames Scheme.

During construction

19.5.48 The River Thames Scheme (ID 2) has reported there to be significant adverse effects associated with the permanent loss of arable and pasture farmland during the construction phase. This is not applicable to the Project as there is no farmland to be affected. Accordingly, it is considered that there would be no change (not significant).

During operation

19.5.49 As operational effects for ground conditions and contaminated land have been scoped out of the EIA for the Project, it is considered that the cumulative effects would be no change (not significant) on ground conditions and contaminated land receptors during operation of the Project and the River Thames Scheme (ID 2) cumulative developments.

Materials and waste

19.5.50 The ZoI for materials and waste uses the draft Order limits, the region of London and South East of England.

During construction

19.5.51 The assessment of effects of the Project on Materials and Waste inherently considers potential waste generation from other developments that needs to be disposed of to inert landfill sites. The cumulative effect is therefore no change (not significant).

During operation

19.5.52 The operational waste generation has been scoped out for the operational phase. It is considered that there would be no change (not significant) on interproject cumulative effects.

Traffic and transport

- 19.5.53 There is no set ZoI for traffic and transport as this assessment considers the local road networks that could be affected by the Project, which is not constrained by a specific distance. All developments in the short list have been considered:
 - a. ID 1 Heathrow Airport
 - b. ID 2 River Thames Scheme
 - c. ID 3 HS2 Rail
 - d. ID 4 Cambridge Road Estate Redevelopment site
 - e. ID 5 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site
 - f. ID 6 Commerce Industrial Estate

During construction

- 19.5.54 If construction of Heathrow Airport (ID 1) coincides with the Project, the potential cumulative effect is limited since the main access routes differ between the two projects. The M4 and M25 will be used for Heathrow Airport development and A316/M3 and A3 for the Project. Therefore, the cumulative effect is considered to be neutral (not significant).
- 19.5.55 The River Thames Scheme (ID 2) construction peaks in 2030, whereas the Project peaks in 2031. Although both sites will use the M3 for construction access, the cumulative effect is likely to be neutral (not significant) considering the capacity of this section of the M3.
- 19.5.56 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site (ID 5) HGV traffic is permitted to use Ham Street between the construction site and Sandy Lane, to A307 Richmond Road. The Project will restrict HGV traffic at Ham Playing Fields to Riverside Drive, so there are no cumulative impacts on Ham Street (south of Riverside Drive) and Sandy Lane. If the construction programmes overlap, there could be HGV traffic impacts on A307 Richmond Road, south of Dukes Avenue, and other routes to A3 Kingston Bypass. The magnitude of combined HGV traffic on A307 Richmond is negligible in comparison to the existing HGV traffic on this route.
- 19.5.57 Cambridge Road Estate Redevelopment site (ID 4) construction is anticipated to overlap with the Project. The cumulative effect will be neutral (not significant) as the construction HGVs for the projects will use different access routes.
- 19.5.58 There are not anticipated to be cumulative effects arising between HS2 Rail and the Project as the main construction access routes differ between the two projects. HS2 will use the A40.
- 19.5.59 Commerce Industrial Estate (ID 6) is under construction. If it is not complete prior to construction commencing for the Project, there could be cumulative effects on A4 Great West Road. Commerce Industrial Estate (ID 6) HGVs are likely to travel east from Boston Manor Road to access A4 Great West Road, the closest London Lorry Control Scheme (LLCS) permitted HGV route to the development. There could be cumulative impact on A4 Great West Road however, the magnitude of this impact is negligible in comparison to the level of HGV traffic using the route.
- 19.5.60 If the HGVs from Commerce Industrial Estate (ID 6) travel west along A315 London Road to access A4 Great West Road via Syon Lane, the two developments will share Syon Lane. The magnitude of the HGVs on Syon Lane from the two developments will be minor (not significant).
- 19.5.61 If the HGVs from Commerce Industrial Estate (ID 6) travel west along A315 London Road and south along A310 Twickenham Road to access A316 Chertsey Road, a LLCS permitted HGV route. However, the magnitude of the combined number of construction HGVs on A310 Twickenham Road is

negligible in comparison to the level of existing HGV traffic on A310. Similarly, any cumulative impact on A316 Chertsey Road is negligible.

During operation

19.5.62 As operational effects for traffic and transport have been scoped out of the Project, it is considered there will be no change (not significant).

Air quality

- 19.5.63 The ZoI for air quality is 1km, which will cover the potential cumulative effects on air quality receptors. The cumulative developments within the ZoI with potential to generate cumulative effects are:
 - a. ID 2 River Thames Scheme
 - ID 5 Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site

During construction

- 19.5.64 There is the potential for cumulative effects during construction from fugitive emissions from construction activities, and from the movement of construction vehicles.
- 19.5.65 Construction dust will be managed through mitigation and communication with the River Thames Scheme (ID 2) and Ham Close, Ham Village Green, Car Park to east of Ham Village Green and part of Woodville Day Centre Site and St Richard's Church of England Primary School Site (ID 5) where appropriate. Nearby construction sites are assumed to operate to a similar level of good practice in accordance with their own CEMPs. This would make any cumulative effect neutral (not significant).
- 19.5.66 If construction of the River Thames Scheme (ID 2) coincides with the Project, there is the potential for the total number of HGVs on the road network to cause a cumulative impact on air quality. The air quality assessment provided as part of the ES will inherently consider cumulative effects insofar as traffic data include traffic movements associated with committed developments.

During operation

19.5.67 As operational effects for air quality have been scoped out of the Project, it is considered that there would be no change (not significant) during operation of the Project and the cumulative developments.

Noise and vibration

19.5.68 The ZoI for noise and vibration is 500m, which will cover the potential cumulative effects on noise and vibration receptors (including construction workers, local residents, community facilities, terrestrial ecology, aquatic ecology, built heritage assets and townscape character areas). The cumulative

development within the ZoI with potential to generate cumulative effects is ID 2 – River Thames Scheme.

During construction

- 19.5.69 There are potential for inter-project cumulative effects from construction noise arising on receptors due to the construction period overlapping between the River Thames Scheme (ID 2) and the Project.
- 19.5.70 It is assumed that the River Thames Scheme (ID 2) will also adopt best practicable means as industry-standard working practices during their construction phase and that these mitigation measures would be documented within a CEMP. It is also assumed that noise and vibration levels will comply with set limits in accordance with the applicable guidance. Therefore, it is considered the cumulative effects would be neutral (not significant).

During operation

19.5.71 No operational inter-project cumulative effects are anticipated with the River Thames Scheme (ID 2), therefore the cumulative effect would be no change (not significant).

Socioeconomics, community, access and recreation

19.5.72 The ZoI for socioeconomics, community, access and recreation is 500m, which will cover the cumulative effects on construction workers, NMUs and public open space, local residents, community facilities, the economy and local road network. The cumulative development within the ZoI with potential to generate cumulative effects is ID 2 – River Thames Scheme.

During construction

- 19.5.73 The combined effects of construction activities taking place in proximity to the River Thames Scheme (ID 2) has the potential to result in significant effects on recreational use of the River Thames at Burnell Avenue.
- 19.5.74 The combined effects of air quality, townscape and visual, noise and vibration, and traffic and transport due to concurrent construction activities associated with both projects have the potential to result in moderate or major adverse (significant) effects. This will be investigated further and reported on within the ES.

During operation

19.5.75 The River Thames Scheme (ID 2) has potential adverse effects on the commercial viability (the economy) of businesses and recreational use of places where the water environment is changing. The inter-project cumulative effects will be explored further at ES stage to understand the potential effects.

Human health

19.5.76 There is potential for cumulative effects to arise from the Project in combination with other developments in the vicinity of the Project. The shortlisted cumulative developments are all located within the local community study area. It is not considered likely that cumulative effects would arise for the majority of human health receptors (including construction workers, NMUs and public open space, local residents, and community facilities).

During construction

- 19.5.77 Construction projects and redevelopments are typical in urban areas such as London and the majority of the population in the local community study area would expect to encounter more than one development within a kilometre from their neighbourhoods.
- 19.5.78 The River Thames Scheme (ID 2) will have effects on the Teddington Weir area where capacity improvements to the weir are proposed. This has potential to give rise to cumulative effects in relation to health determinants under the following themes:
 - a. Recreation, social participation and access to green and blue infrastructure
 - b. Residential amenity and community wellbeing
 - c. Biophysical environment
- 19.5.79 The populations most likely to be exposed to these cumulative effects would be residents of the wards of Ham, Petersham and Richmond Riverside; Tudor; Hampton Wick and South Teddington; and Teddington. Groups likely to be affected would be recreational users of the River Thames at this location, residents of nearby houseboats, active travellers and other users of the Thames Path National Trail, National Cycle Network Route 4 and other nearby public rights of way and green space on the Burnell Avenue side of the River Thames.
- 19.5.80 The human health assessment will be developed further to assess the nature and scale of inter-project cumulative effects on communities, and relevant subpopulations and vulnerable groups. The assessment will be reported in the forthcoming ES.

During operation

19.5.81 There are not anticipated to be significant inter-project cumulative effects on human health receptors during operation of the Project. The cumulative developments would therefore be no change (not significant).

19.6 Additional (secondary) mitigation and enhancement measures

Embedded design (primary) and standard good practice measures (tertiary)

19.6.1 Relevant embedded design (primary) and good practice measures (tertiary) are listed within each of the preceding aspect chapters and are not repeated here.

Intra-project cumulative effects

19.6.2 Measures to avoid, prevent, reduce or offset any potential significant intraproject cumulative effects will be identified and described in the ES. While the measures identified in the aspect chapters of this PEI Report would help to reduce potential cumulative effects, there may be a need for additional (secondary) mitigation to further mitigate any significant cumulative effects.

Inter-project cumulative effects

19.6.3 Measures to avoid, prevent, reduce or offset significant inter-project cumulative effects will be identified and described in the ES. While the measures identified in the aspect chapters of this PEI Report would help to reduce potential cumulative effects, there may be a need for additional (secondary) mitigation to further mitigate any significant cumulative effects. This is likely to require collaboration and cooperation with third-party developers to gain a better understanding of the proposed developments, the likely significant effects and the potential need for mitigation.

19.7 Summary of residual likely significant cumulative effects

19.7.1 The ES stage will outline the significant residual cumulative effects once the significant cumulative effects and mitigation measures are confirmed.

19.8 Next steps

- 19.8.1 Aspect assessments will be updated for the ES taking account of the developed design, further baseline information and comments received from Statutory Consultation and through ongoing stakeholder engagement.
- 19.8.2 The sensitive receptors identified for the intra-project CEA for each aspect will be re-examined and any changes will be reflected in the intra-project cumulative effect matrix. An intra-project effects assessment will then be undertaken and reported in the ES.
- 19.8.3 Stages 1 and 2 of the CEA will be repeated to update the long and short lists of other developments. This update will apply the same criteria as for the PEI Report to produce an updated short list that will be shared with the local planning authorities and Marine Management Organisation for comment. Once finalised, information regarding the shortlisted developments will be collected and used as the basis for the CEA in the ES.

19.9 References

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