

Teddington Direct River Abstraction

Preliminary Environmental Information Report Chapter 12 – Traffic and Transport

Volume: 1

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12. Traffic and Transport

12.1 Introduction

- 12.1.1 This chapter presents the Preliminary Environmental Information (PEI) relating to traffic and transport, to allow stakeholders and local communities to understand and develop and informed view of the likely significant environmental effects of the Teddington Direct River Abstraction Project (hereafter, 'the Project') at this stage of the Project. It should be read in conjunction with the description of the Project as presented in Chapter 2: Project Description.
- 12.1.2 The effects considered in this chapter should be read in conjunction with the following chapters, which also address potential environmental effects that are related to traffic and transport:
 - a. Chapter 11: Materials and Waste
 - b. Chapter 13: Air Quality
 - c. Chapter 14: Noise and Vibration
 - d. Chapter 15: Socioeconomics, Community, Access and Recreation
 - e. Chapter 16: Human Health
- 12.1.3 This chapter is supported by the following figures in Volume 2 of this PEI Report:
 - a. Figure 12.1: Overview of Affected Road Network and Construction Sites
 - b. Figure 12.2:
 - i. Overview of Affected Road Network and Construction Sites North (Sheet 1 of 2)
 - ii. Overview of Affected Road Network and Construction Sites South (Sheet 2 of 2)
 - c. Figure 12.3: Public Rights of Way
 - d. Figure 12.4: Cycle Routes
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 - ii. Construction Demand Traffic Volumes on Affected Road Network South (Sheet 2 of 2)
 - f. Figure 12.6:
 - i. Construction Workforce Access North (Sheet 1 of 2)
 - ii. Construction Workforce Access South (Sheet 2 of 2)

12.2 Legislation, policy and guidance

Legislation

- 12.2.1 There is no legislation specific to the environmental assessment of traffic and transport and associated effects.
- 12.2.2 However, there is legislation that covers the responsibility of local traffic authorities to manage their road network (section 16 of the Traffic Management Act 2004) that the Project needs to consider.

Traffic Management Act 2004 (as amended)

12.2.3 Section 16(1) of the Traffic Management Act 2004 highlights the following:

'It is the duty of a local traffic authority or a strategic highways company ("the network management authority") to manage their road network with a view to achieving, so far as may be reasonably practicable having regard to their other obligations, policies and objectives, the following objectives—

(a) securing the expeditious movement of traffic on the authority's road network; and

(b) facilitating the expeditious movement of traffic on road networks for which another authority is the traffic authority.'

12.2.4 It is necessary that the Environmental Statement (ES) traffic and transport chapter can demonstrate that the Project will not compromise the affected local authorities' duties under the Traffic Management Act 2004. This will include managing the traffic demand generated by the Project to be below the levels deemed to cause a significant effect through relevant mitigation where applicable.

National policy

National Policy Statement for Water Resources Infrastructure

12.2.5 The National Policy Statement (NPS) for Water Resources Infrastructure (Department for Environment, Food and Rural Affairs (Defra), 2023) sets out key aspects of policy relevant to traffic and transport. These are provided in Table 12.1.

Table 12.1 Key polic	y from the NPS f	for Water Resources	Infrastructure
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Paragraph	Requirement for the Applicant	How the Project addressed this
4.14.5	States that, 'If a project is likely to have significant transport implications, the applicant's Environmental Statement should include a transport appraisal'.	A preliminary assessment of the likely significant effects is addressed in Section 12.7 of this chapter in the PEI Report for the construction and operational phases, along with any cumulative effects where applicable.
4.14.6	Requires applicants to, 'consult National Highways, Network Rail and Highway Authorities as appropriate'.	The consultation and engagement outcomes and actions going forward are outlined in Section 12.3.
4.14.7	Requires applicants to, '…Prepare a construction management plan for construction stages and a travel plan for the operational stage of the infrastructure. Both should include demand management and monitoring measures to mitigate transport impacts'.	The provisional requirements are identified in the assessment methodology (Section 12.5 of this chapter) for a preliminary assessment in Section 12.7. Transport mitigation measures, including identifying the requirements for an outline construction traffic management plan, are addressed in Sections 12.4 and 12.7.
4.14.8	Suggests that, 'The assessment should also consider any possible disruption to services and infrastructure (such as road, rail, and airports)'.	The preliminary assessment (Section 12.7 of this chapter) considers traffic impacts in relation to their implications on the existing transport network discussed in Section 12.6.
4.14.9	Outlines that, 'If additional transport infrastructure is needed or proposed, it should always include good quality walking, wheeling and cycle routes, and associated facilities (changing/storage etc.) needed to enhance active transport provision'.	Transport mitigation measures, including the provision and/or facilitation of transport infrastructure for other modes, are addressed in Sections 12.4 and 12.7 of this chapter.
4.14.12	Details the requirements that could be included as possible demand management measures, such as, 'reduce the need to travel by consolidating trips', 'provide opportunities for shared mobility', and 'reroute to use parts of the network that are less busy'.	Demand management measures considered for construction traffic are discussed in Sections 12.4 and 12.7 of this chapter.

Paragraph	Requirement for the Applicant	How the Project addressed this
4.14.13	Details the requirement of mitigation that, 'All stages of the project should support and encourage a modal shift of freight from road to more environmentally sustainable alternatives, such as rail, cargo bike, maritime and inland waterways, as well as making appropriate provision for and infrastructure needed to support the use of alternative fuels including charging for electric vehicles'.	The different modal options for freight are considered in Section 12.5 of this chapter.
4.14.14	Highlights that, 'Regard should be given to the needs of freight at all stages in the construction and operation of the development including the need to provide appropriate facilities for Heavy Goods Vehicle drivers as appropriate'.	Requirements for freight are considered in Section 12.5 of this chapter.
4.14.15	States that, 'Where considerations are between rail, water-borne or road transport, rail and water-borne options are to be preferred over road transport options, where that option is safe and cost-effective'.	The range of transport modes that have been considered for freight are discussed in Section 12.5 of this chapter.
4.14.16	Highlights that, where Heavy Goods Vehicle (HGV) traffic is substantial, applicants should consider a series of mitigation measures such as, 'control numbers of Heavy Goods Vehicle movements to and from the site in a specified period during construction and operation where possible, and consider the impacts of alternative transport routes' and 'provide appropriate infrastructure needed to support vehicles that use alternative fuels (including electric vehicles)'.	Mitigation measures are considered and discussed in Sections 12.4 and 12.7 of this chapter.
4.14.17	States that 'Applicants should consider the DfT policy guidance "Water Preferred Policy Guidelines for the movement of abnormal indivisible loads" when preparing their application'.	The feasibility of using water for freight is addressed in Section 12.5 of this chapter.

National Planning Policy Framework

12.2.6 The National Planning Policy Framework (NPPF) outlines Government's planning policies for England and how they should be applied when creating local plans that supporting sustainable development. Key policies relevant to traffic and transport, as outlined in the NPPF (2024) (Ministry of Housing, Communities and Local Government, 2024), are provided in Table 12.2.

Table 12.2 NPPF requirements for traffic and transport

Paragraph	Requirement	How the Project addressed this
115a, 115b, 115d	 States that it should be ensured that: 'sustainable transport modes are prioritised taking account of the vision for the site, the type of development and its location safe and suitable access to the site can be achieved for all users [] any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree'. 	The range of transport modes that have been considered for freight are discussed in Section 12.5 of this chapter. Where any significant impacts on any given mode of transport are identified in Section 12.7 of this chapter in the PEI Report, required additional (secondary) mitigation measures to be taken forward by the developer and/or contractor are outlined to address these. This is in combination with the embedded design (primary) mitigation outlined in Section 12.4.
116	Requires development to be refused if it would cause 'an unacceptable impact on highway safety, or the residual cumulative impacts on the road network [] would be severe'.	As above.

Paragraph	Requirement	How the Project addressed this
117	Requires applicants to:	As above.
	 'give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second so far as possible – to facilitating access to high quality public transport [] 	
	 address the needs of people with disabilities and reduced mobility in relation to all modes of transport 	
	 create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles [] 	
	 allow for the efficient delivery of goods, and access by service and emergency vehicles []' 	

Designing for Deliveries (Freight Transport Association, 2016)

12.2.7 This guide updates the standards for latest vehicle changes, and the truck turning and manoeuvring for evaluating service areas and access roads. It has informed the layout of the construction compounds to permit all standard heavy goods vehicles to enter and exit the construction sites in first gear.

Regional policy

12.2.8 In addition to the national policy set out above, the Project must also have regard to relevant regional plans and policy. Key regional policies and guidance that are relevant to traffic and transport are outlined in Table 12.3. This table includes reference to the affected road network (ARN).

	Table 12.3 Regiona	I policies and	guidance for	traffic and	transport
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Policy / guidance document	Requirement	How the Project addressed this
The London Plan 2021 (Greater London Authority, 2021)	Policy T1 Strategic approach to transport states that all developments should ensure that any impacts on London's transport networks and supporting infrastructure are mitigated.	Transport mode options for freight are discussed in Section 12.5 of this chapter in the PEI Report. Management of freight vehicles, including scheduling, is also
	Policy T7 Para 10.7.1 identifies modal shift and the management of delivery times of freight to achieve sustainable freight movement.	addressed in this section. Assessment of potential transport impacts
	Policy T7-J outlines that developments must consider rail and water for transporting materials for their construction, whilst adopting design standards to support more sustainable construction vehicles and the movement of materials onto and offsite.	and mitigations measures are considered in Section 12.4 and Section 12.7 of this chapter.
	Policy T7-K stipulates the need for safe access for non-motorised users to be maintained throughout the construction phase of developments.	Provision for cycle parking is explored in Sections 12.4 and 12.7 of this chapter in the PEI Report
	Policy T5 Cycling – In Table 10.2, the minimum requirements for cycle parking provision are identified. For user class B2-B8 (general industrial, storage or distribution), one space per 500m ² gross external area (GEA) is required for long-stay, and one space per 1,000m ² (GEA) is required for short stay.	

Local policy

12.2.9 In addition to the national and regional policies set out above, the Project must also have regard to relevant local plans and policy. Key local policies and guidance that are relevant to traffic and transport are outlined in Table 12.4.

Table 12.4 Local policies for traffic and transport

Policy / guidance document	Requirement	How the Project addressed this
Hounslow Local Plan 2015-2030 (LBH, 2015)	Policy EQ2 focuses on Sustainable Design and Construction. Relevant elements include the promotion of these consistently in line with the London Plan's principles, using national standards to assess environmental credentials, applying national principles, and preparing sustainability statements.	Section 12.5 of this chapter in the PEI Report identifies how the principles from regional and national policies and guidance have been applied in the methods of assessing the Project's environmental impacts relating to traffic and transport.
Hounslow Local Plan 2020-2041 (Regulation 19 (LBH, 2024)	Expect development proposals to demonstrate freight movements have been considered during both construction and operation in accordance with Policy T7 of the London Plan.	The impact of construction traffic is assessed in Section 12.7 of this chapter.
London Borough of Hounslow Local Implementation Plan 3 (LBH, 2019)	Committed to a 10% reduction in the number of freight vehicles crossing from the borough into Central London between 07:00-10:00 by 2026.	The opportunity to time HGV deliveries outside of peak hours is highlighted to reduce adverse air quality impacts. These timings are identified in Section 12.4 of this chapter.
Richmond Local Plan (LBR, 2018)	Policy LP 10 – construction demolition works and excavations require the submission of Construction Management Statements. This applies to all major developments, basement and subterranean developments, developments for sites in confined locations or near sensitive receptors.	The impact of construction traffic is assessed in Section 12.7 of this chapter. Transport mode options for freight are discussed in Section 12.5 of this chapter.
	Policy LP 22 – Sustainable Construction Checklist completion is mandatory for all new non-residential development including conversions providing 100m ² or more floor area, including extensions over 100m ² . The policy also	The mitigation measures identified in Section 12.7 of this chapter include the production of a Construction Logistics Plan / Construction Traffic Management Plan. The contents of

Policy / guidance document	Requirement	How the Project addressed this
	highlights that provision is expected for the safe, efficient, and sustainable movement of people and goods, along with the availability of electric vehicle charging points and cycle parking facilities.	this deliverable will be informed by the Sustainable Construction Checklist.
	Policy LP 44 – Sustainable Travel Choices states that the council promotes safe, sustainable and accessible transport solutions, which minimise the impacts of development, and encourages the use of the River Thames for passenger transport, freight transport, servicing and the construction of developments. This would be through providing, improving or retaining relevant infrastructure such as wharfs, slipways and piers.	
	Furthermore, the policy requires proposed developments to demonstrate they do not have a severe impact on the operation, safety, or accessibility of the local or strategic road network and any impact is mitigated in accordance with para. 110d of the NPPF. All major developments will need to include a full transport assessment and travel plan completed in accordance with TfL guidance. The use of the River Thames is to be	
	encouraged for passenger and freight transport as well as servicing and construction of their development proposals, through the provision, improvement, or retaining of relevant infrastructure including wharfs, slipways and piers.	

Policy / guidance document	Requirement	How the Project addressed this
	Policy LP 45 – Parking Standards and Servicing requires new major developments involving freight movements and servicing needs to demonstrate that no severe impacts on the road network's efficient and safe operation occur, nor harm to nearby resident's living conditions. A Delivery and Serving Plan and a Construction and Logistics Plan are required to demonstrate this.Policy LP 10 – In clarifying Local Environmental Impacts, Pollution and Land Contamination, all major developments will be expected to submit Construction Management Statements.	
Richmond Local Plan 'The best for our borough' Draft for consultation (LBH, 2023)	The relevant policies relating to freight and construction in the Adopted Richmond Local Plan are retained in the Draft Local Plan. However, they appear in a different order:	The impact of construction traffic is assessed in Section 12.7 of this chapter in the PEI Report.
	 Policy 6 – Sustainable Construction Standards Policy 47 – Sustainable Travel Choices (Strategic Policy) 	Transport mode options for freight are discussed in Section 12.5 of this chapter.
	 Policy 48 – Vehicular Parking Standards, Cycle Parking, Servicing and Construction Logistics Management Policy 53 – Local Environmental Impacts 	The mitigation measures identified in Section 12.7 of this PEI Report include the production of a Construction Logistics Plan / Construction Traffic Management Plan. The contents of this deliverable will be informed by the Sustainable Construction Checklist.

Policy / guidance document	Requirement	How the Project addressed this
London Borough of Richmond upon Thames Construction Management Plan Guidance Notes (LBH, 2021)	This outlines the requirement for a construction management plan to be created for developments within the borough to demonstrate how the works will be constructed. It stipulates the need for any disproportionate impacts of construction traffic on the road network and local receptors to be mitigated.	The mitigation measures identified in Section 12.7 of this chapter include the production of a Construction Logistics Plan / Construction Traffic Management Plan. The contents of this deliverable will be informed by the Sustainable Construction Checklist.
Royal Borough of Kingston upon Thames – Core Strategy 2012 (RBK, 2012)	 Policy CS 5 (point C) addresses reducing the need to travel, highlighting the aim to retain the Aggregates Depot on Kingston Road, Tolworth for the provision of a strategic rail-based facility. Policy CS 7 addresses managing vehicle use, including promoting freight transport methods that are sustainable, efficient, and safe. Policy DM8 requires all new developments to support and promote sustainable modes of transport. Policy DM 9 requires all new developments to submit a Transport Assessment. 	The study area integrates locations of local suppliers (including the Aggregates Depot on Kingston Road, Tolworth) for goods and materials which considering HGV routing thus forming of the ARN. Assessment of potential transport impacts and mitigations measures are considered in Section 12.4 and Section 12.7 of this chapter.
Sustainable Transport SPD for Kingston 2013	Transport assessments need to consider the impact of a development's trip generation on surrounding transport services and infrastructure. The suitability of roads for HGV use needs to be considered, along with the assessment of safety concerns. Mitigation measures for any adverse effects will need to be provided.	Assessment of potential transport impacts and mitigations measures are considered in Section 12.4 and Section 12.7 of this chapter.
Kingston First Draft of Local Plan (RBK, 2023b)	Draft Policy KT3 highlights that the council will seek to protect existing and proposed transport	Potential significant impacts on any given mode of transport and

Policy / guidance document	Requirement	How the Project addressed this
	infrastructure from removal or severance, particularly for non-motorised users and public transportation.	mitigation measures are outlined in Section 12.7 of this chapter.
	Draft Policy KT5 addresses the need for developments generating significant vehicle movements for construction, operation, and occupation to: Mitigate transport impacts through assessments, management, logistics, and delivery plans; ensure on-site delivery unless safety and traffic affects are not experienced with off-street deliveries; prioritise low emission vehicles, cargo bikes, and rail transport; and reduce deliveries via storage, consolidated points, and servicing management. Draft Policy KT6 highlights that the council will support developments that use the River Thames for freight if it does not unacceptably impact sport	The production of a Construction Logistics Plan / Construction Traffic Management Plan is addressed among the mitigation measures identified in Section 12.7 of this chapter. The different modal options for freight are considered in Section 12.5 of this chapter.

Guidance

- 12.2.10 The traffic and transport assessment in the PEI Report has been informed by the following guidance:
 - a. Construction Logistics and Community Safety (CLOCS) is the National Standard for ensuring the safest construction vehicle journeys, reducing risk to vulnerable road users, improving air quality and congestion, and driving operational efficiencies.
 - b. TfL's Construction Logistics Planning Guidance which provides the framework for planning construction logistics to minimise environmental impact, road risk, congestion and cost. The guidance is implemented nationwide by CLOCS (CLOCS, 2021).
 - c. Considerate Constructors Scheme which aims to raise standards in worker wellbeing, community relations and environmental impact.
- 12.2.11 The guidance outlined above in paragraph 12.2.10 replaces the guidance in LBR's Construction Management Plan Guidance Notes, which was listed in the EIA Scoping Report (Chapter 18: Traffic and Transport), as the guidance is only applicable for planning applications for developments that are residential or for conversion to non-residential use (LBR, 2021).

Institute of Environmental Management and Assessment (IEMA) Environmental Assessment of Traffic and Movement

12.2.12 Key guidance relevant to traffic and transport, as set out by the Institute of Environmental Management and Assessment (IEMA) in their Environmental Assessment of Traffic and Movement (EATM) (IEMA, 2023), is outlined in Table 12.5.

Paragraph	Requirement	How the Project addressed this	
1.27	At early stages, there is a need to 'consider the forecast changes to baseline (magnitude of change/ impact), the relative value/sensitivity/importance of the affected asset/receptor and the scale, nature and significance of the effect (consequence)'.	The significance of any impacts relating to the future baseline with peak construction activity is examined in Section 12.7 of this chapter.	
1.28	At early stages, the following user groups should be considered in identifying populations that will be sensitive to changes in traffic conditions: non-motorised users, public right of way users, motorists and freight vehicles, public transport, and emergency services.	A range of transport user groups that interact with the ARN are identified in Section 12.6 of this chapter.	

Table 12.5 IEMA EATM guidance for traffic and transport

Paragraph	Requirement	How the Project addressed this
1.31	'The sensitive receptors within the agreed study area should be assigned to the nearest highway link, and the relationship with the highway environment examined to understand the sensitivity of those receptors to change.'	The assignment of sensitive receptors to road links has been outlined in Section 12.7 of this chapter.
2.13	'An important prerequisite of the environmental assessment is to determine the geographical boundaries of the assessment (the 'study area').'	The study area in Section 12.5 of this chapter identifies the preliminary scope for the assessment of transport impacts, which includes the ARN.
2.20	'In summary, it is recommended that, as a starting point, a 30% change in traffic flow represents a reasonable threshold for including a highway link within an environmental assessment. Where there are major changes in the composition of the traffic flow, say a much greater flow of HGVs, a lower threshold may be appropriate.'	The scope and methodology of the assessment is provided in Section 12.5 of this chapter. The preliminary assessment of likely significant effects is provided in Section 12.7 of this chapter.
2.21	'Normally, it would not be appropriate to consider links where traffic flows have changed by less than 10%, unless there are significant changes in the composition of traffic, e.g. a large increase in the number of HGVs.'	As above.
Section 2, Rule 1	The spatial scope of the assessment is to 'Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)'. This should not be applied to road safety and driver delay assessments.	As above.
Section 2, Rule 2	The spatial scope of the assessment is to 'Include highway links of high sensitivity where traffic flows have increased by 10% or more'. This should not be applied to road safety and driver delay assessments.	As above.
3.3	This paragraph states that 'these updated and replacement Guidelines address specific traffic and movement related impacts () including: Severance of communities; Road vehicle driver and passenger delay; Non- motorised user delay; Non-motorised amenity; Fear and intimidation on and by road users; Road user and pedestrian safety; and Hazardous/large loads'.	The method informing the scoring of these impacts is outlined in Section 12.5 of this chapter and applied to the preliminary assessment outlined in Section 12.7 of this chapter.

Design Manual for Roads and Bridges (DMRB)

- 12.2.13 Whilst the DMRB's guidance for Environmental assessment and monitoring (LA 104) (Highways England, 2020a), Noise and vibration (LA 111) (Highways England, 2020b) and Population and human health (LA 112) (Highways England, 2020c) provide guidelines on the impact area for environmental assessments, the ARN extends beyond the catchments identified in these documents. The geographical extent of the preliminary reporting of environmental effects in this chapter is therefore based on the extent of the ARN rather than these catchments.
- 12.2.14 DMRB LA 104 provides general descriptions describing the sensitivity of receptors (Table 3.2N, DMRB LA 104). However, a more detailed approach has been favoured whereby scoring has been developed and applied for each of the seven types of impacts identified in the IEMA EATM guidance. DMRB LA 104 provides a matrix system for qualitatively identifying the significance of an effect the score is determined by examining the magnitude of impacts against the sensitivity of the individual receptor.
- 12.2.15 DMRB LA 112 is primarily used for assessing and reporting on the environmental effects associated with highways projects. Whilst this does not include the Project, the guidance includes appropriate guidelines for the scoring of the sensitivity of Public Rights of Way (PRoW) receptors.

12.3 Consultation, engagement and scoping

- 12.3.1 An overview of the consultation and engagement for the Project to date is provided in Section 4.5 of Chapter 4: Approach to Environmental Assessment in this PEI Report. This includes engagement with environmental stakeholders, a Draft Water Resource Management Plan 2024 consultation, the autumn 2023 non-statuary public consultation, and public information events in autumn 2024.
- 12.3.2 Engagement has been ongoing with transport officers from the relevant local planning authorities and TfL. This will continue while developing the ES.
- 12.3.3 Table 12.6 presents the section of the Scoping Opinion (Planning Inspectorate (PINS), 2024) relating to traffic and transport, and the Applicant's response to those comments.

PINS ID reference	Comment	Response
Planning Inspectorate (ID 3.13.1)	The EIA Scoping Report (Thames Water, 2024) states that there are no direct rail connections to above ground sites and proposes to scope out effects to rail operation on that basis. It seeks to scope out effects from the construction workforce using passenger rail as it would be at a low level. Paragraph 2.2.40 of the EIA Scoping Report (Thames Water, 2024) provides predicted construction workforce numbers at Mogden STW, Ham Street and Tudor Drive. On the basis that there are no impact pathways to the operational railway and the numbers of construction workers predicted, the Inspectorate is content to scope this matter out.	Scoped out of the ES
Planning Inspectorate (ID 3.13.2)	The EIA Scoping Report (Thames Water, 2024) proposes to scope out road traffic impacts on receptors during the operational and maintenance phase as it is anticipated that there will be negligible additional traffic on the existing road network, due to no additional workers at Mogden STW and the infrequency of activities required at the other sites. The Inspectorate agrees with this approach and is content to scope this matter out for day-to-day operation and maintenance.	Scoped out of the ES

Table 12.6 Key scoping opinion comments for traffic and transport

PINS ID reference	Comment	Response
Planning Inspectorate (ID 3.13.3)	The ES should explain how consultation with the relevant consultation bodies has informed selection of an appropriate study area and methodology for assessing likely significant effects from traffic and transport. The Inspectorate's comments at ID 2.1.12 of this Opinion are relevant to this matter.	Section 12.5 outlines how HGV routes were identified on the available road network to access local and distant freight imports and exports. This includes applying feedback from LBR to exclude the A307 corridor through Petersham and Richmond from regular construction HGV use. The ES will provide any further updates following design changes or feedback from consulted parties. This will be used to assess the geography of the Project's significant effects.
Planning Inspectorate (ID 3.13.4)	A mixture of 2019 and 2022 data is proposed due to Covid-19 impacts, the Applicant should check whether 2023 data is available and compare this with the existing datasets to deduce the most appropriate baseline data to use in the assessment. Effort should be made to agree the location and method of traffic surveys with relevant consultation bodies.	Traffic count data from 2023 are now available for access. Where available at each traffic count site, these data replace older data from 2022 and 2019. Surveys will be undertaken at appropriate locations as agreed with the relevant consultation bodies and the collected data will inform the ES.
Planning Inspectorate (ID 3.13.5)	Consideration should be given for potential to transport hazardous or large loads via the river. Any likely significant effects arising from this activity should be assessed.	The Applicant does not currently anticipate any hazardous loads. Alternative modes, including river, are explored in Section 12.5 of this chapter. The impacts relating to significant effects are also addressed.

12.4 Embedded design (primary) mitigation and tertiary mitigation

Embedded design (primary) mitigation

12.4.1 The Applicant has undertaken an iterative process to avoid and/or reduce environmental impacts through the Project design. This is referred to as embedded design (primary) mitigation. Chapter 3: Consideration of Alternatives details the design alternatives that have been considered, including the environmental factors which have influenced the decision making.

- 12.4.2 Embedded design (primary) mitigation relevant to traffic and transport includes the following:
 - a. Whilst excavations arisings from shaft construction will be exported from each respective shaft site, all excavations arisings from the tunnelling works will be removed via the Mogden Sewage Treatment Works (STW). This site has a more direct access to the strategic road network (SRN), which will reduce HGV impacts at Ham Playing Fields and Burnell Avenue.
 - b. Tertiary treatment plant (TTP) Containment will be installed around chemical storage tanks for ferric sulphate to manage spills. This manages the magnitude of chemical spillages, thus reducing the need for emergency transport responses.
 - c. The design has evolved since the non-statutory consultation resulting in reductions to the number of intermediate shafts outside Mogden STW from five to one only (on Ham Playing Fields). This reduces the number of HGV movements on local roads.
 - d. Permanent concrete shaft caps are to be positioned below the ground surface. Permanent shaft capping below ground reduces the frequency of maintenance as there is less exposure to environmental factors (including factors such as weathering, vegetation growth, and animal interference or damage), and thus the associated transportation movements (including staff, materials and equipment).

Standard good practice (tertiary)

12.4.3 Standard good practice as outlined in the sections below for traffic and transport apply as a matter of course due to legislative requirements or standard sector practices.

Construction traffic management (tertiary)

- 12.4.4 For the construction of major developments, TfL expects a Construction Logistics Plan (CLP) to be developed in the early planning process stages to understand how the road network impacts from construction supply chains can be reduced (CLOCS, 2021). A draft Code of Construction Practice (CoCP) is provided in Appendix 4.3, outlining the embedded design (primary) mitigation and standard good practice (tertiary) measures for the Project. As outlined in Table 12.4 of this chapter, London boroughs typically require either a CLP or a Construction Traffic Management Plan (CTMP) and a Construction Workforce Travel Plan (CWTP). An outline CTMP and CWTP will be prepared for the ES. The contractor will be required to prepare detailed management plans (Appendix 4.2: Commitments Register, Provisional Commitment References (PCRs) 3, 81–87) according to TfL's and CLOCS CLP guidance.
- 12.4.5 CLOCS guidance highlights that plans of a regional scale should show strategic road networks that would most likely be used to access the site, identify freight delivery infrastructure such as consolidation centres, and take into consideration the local community (CLOCS, 2021).
- 12.4.6 This is addressed in this chapter by identifying the appropriate routes to the Transport for London Road Network (TLRN) and the National Highways' SRN

from the site access points by using roads that have direct access to the routes that are part of the London Lorry Control Scheme (LLCS). This chapter also identifies the appropriate routes to local suppliers of bulk aggregates that are supported by railhead facilities.

- 12.4.7 The CTMP will designate the local access routes to be used between the construction sites, LLCS permitted routes, and the TLRN to prevent any construction HGVs using unsuitable residential roads.
- 12.4.8 The LLCS controls the movement of HGVs on London roads during the prescribed hours of Monday to Friday from 21:00–07:00, Saturday 24:00–07:00, bank holidays, and from Saturday 13:00–Monday 07:00 (London Councils, 2025). LLCS permitted routes are routes not controlled by the scheme, where HGVs can travel at any time without needing permission to do so.
- 12.4.9 As the primary responsibility of traffic management on other public highways belongs to the local authorities, the selection of HGV routes in this preliminary stage is subject to outcomes of discussions with the relevant local authorities.

Construction workforce travel (tertiary)

- 12.4.10 A construction workforce travel plan (based on TfL guidance) will be prepared by the contractor to help implement any necessary travel demand measures and monitor them for compliance (PCR 85). As outlined in the CLP guidance, it is expected that the CWTP will include information relating to the workforce traveling to the construction sites (CLOCS, 2021). This includes stating the periods within the schedule where the highest numbers of the workforce are expected to travel to and from the site (page 45 of the CLP guidance). This chapter identifies the estimated maximum anticipated daily workforce volumes during the schedule and their durations. The cumulative total of these are added to the estimated maximum anticipated daily HGV movements on each road link. However, to address these impacts in the context of the current construction schedule, which is continuing to be developed, the traffic and transport chapter of the ES will explore workforce volumes during periods where HGV imports and exports are expected to be highest. The preliminary assessment of significant effects relating to HGV movements will also take into consideration the potential routing of construction workers to sites during the coinciding point in time.
- 12.4.11 Construction workers will be encouraged to travel from their places of residence to the closest rail stations to the construction sites in the first instance. However, given that the number of additional passengers using the closest rail stations and available rail routes is considered negligible, no further assessment of the construction workforce impact on passenger services will be undertaken. This has been acknowledged by the Planning Inspectorate with no further comments (see ID 3.13.1 in Table 12.6).
- 12.4.12 Journey times between the nearest railway stations and the sites by various modes have been identified in Section 12.7 of this chapter. This includes car journey times to allow the feasibility of shuttle bus routes between stations and the construction sites to be considered as the distance from the station to work

sites is too far for walking to be a realistic option. However, cycling could potentially be an option for workers that live locally and for workers who travel by train.

Public Rights of Way (tertiary)

12.4.13 Public Rights of Way (PRoW) on the local highway network need to be considered for significant effects for non-motorised users as a result of the additional construction vehicle movements relating to the Project. This is considered on-site in cases where there are any haul roads that intersect with an existing PRoW. Moreover, this is also considered off-site in cases where there are significant increases of traffic volumes at pedestrian conflict points along the ARN.

12.5 Assessment methodology

General approach

Approach and methodology

- 12.5.1 This section describes the method used for establishing the Project's baseline and the approach to the preliminary assessment of the significance of any potential effects of the Project on traffic and transport. This is informed by the estimated maximum anticipated daily construction demand expected on each section of the ARN.
- 12.5.2 The geographical scope of the assessment is based on the designated access routes that construction HGV traffic will likely be permitted to use for the delivery of materials, plant and equipment to site and for the removal of excavation arisings, construction waste and plant and equipment no longer required from the construction sites identified in Chapter 2: Project Description. This addresses the requirement in the CLOCS CLP guidance to identify road networks that are most likely to be used to access construction sites.
- 12.5.3 These routes inform the ARN that is outlined from paragraph 12.5.61 through to paragraph 12.5.68 and assessed in Section 12.7 of this chapter.
- 12.5.4 The construction workforce is anticipated to use any available routes to travel to and from the construction sites. The impact of the construction workforce traffic is assessed cumulatively with the construction HGVs on the ARN.
- 12.5.5 The general approach for this assessment in the PEI Report is to compare the construction traffic demand against current traffic flows, which then inform the magnitude of potential impacts on sensitive receptors. Since the traffic demand during the Project's construction phase is greater than that during the Project's operation and maintenance (where traffic volumes are negligible on the average day), the preliminary assessment of significant effects is based on the additional vehicle demand during construction to provide the worst case, though it will be for a limited time.

- 12.5.6 The methodology sets out the construction demand for HGV deliveries, HGV exports and workforce trips, which have been sourced and determined based on the Project's expected design quantities. These are translated to a daily level for each activity and works site. These are mapped against the construction schedule to understand the effect of concurrent activities and the estimated maximum anticipated daily volumes of HGV movements and workforce trips. A multimodal review has been conducted based on the Project design and the construction traffic demand generated by the Project's materials, equipment and waste. This informs the final construction vehicle origins and destinations considered in this assessment, which in turn has informed the routing of HGVs.
- 12.5.7 The construction demand is distributed according to the designated vehicle routes for HGV imports and exports and along indicative travel routes for the workforce. This allows direct comparison against existing traffic volumes (historical traffic data counts from the Department for Transport (DfT)), which informs the likely magnitude of impact assessment on each relevant part of the ARN in line with IEMA's EATM guidance. When compared against the sensitivity of receptors, the significance of the types of environmental effects can be determined. This section also provides a summary of what assessment will be undertaken as part of the traffic and transport chapter in the ES, based on the preliminary assessment.

Data collection

- 12.5.8 A desk study has informed the preliminary baseline assessment for this PEI Report. This has included information from the following sources:
 - a. Historic traffic count data DfT (DfT, 2024a)
 - b. Information on the road network (OpenStreetMap 2024; London Councils, 2024; TfL, 2024; DfT, 2024b)
 - c. Public transport routes and frequencies (TfL, 2023; TfL, 2025a; National Rail, 2023)
 - d. Existing PRoW routes (LBR, 2024; RBK, 2023a)
 - e. Existing cycling routes including TfL cycleways, Kingston Cycling Campaign routes and National Cycle Network (NCN) routes (TfL, 2025b; Kingston Cycle Campaign, 2024; Ordnance Survey 2025)
- 12.5.9 The DfT's historic traffic count data are available for the post-COVID restrictions years of 2022 and 2023 along with the most recent pre-COVID year, 2019. The most recent available year has been used but for road links where this is not available previous years have been considered.
- 12.5.10 The London Highway Assignment Model (LoHAM) is a strategic model which represents the movement of motorised highway trips on London's road network and surrounding areas (TfL, 2025c). It is expected that the outputs from the model will be used for the ES to provide baseline traffic flow information. LoHAM data include a greater number of road links than covered in the DfT dataset. These can be validated against additional traffic surveys which will be conducted to inform the final ES.

- 12.5.11 The forecast year of 2031 has been chosen for the future baseline as based on the current programme, this year reflects the peak construction year for all construction sites, except for Ham Playing Fields. Whilst Ham Playing fields has a peak construction year of 2030, the 2031 LoHAM model is still considered appropriate to use, considering no major changes in traffic are expected between within one year in the area.
- 12.5.12 In the ES the predicted future traffic flow data will be available from the LoHAM to provide a future baseline year during the proposed construction programme. To reflect traffic conditions during the peak year of construction activity, predicted traffic flows on the ARN will be extracted from the LoHAM for the relevant forecast year of assessment. For any sections of the ARN that are not covered by the model, traffic flows from automatic traffic counters (ATCs) will be adjusted with traffic growth rates embedded in the LoHAM applied to align with the modelled future baseline year.
- 12.5.13 In this PEI Report, the assessment of impacts on non-motorised users considers the volumes of motorised traffic vehicle movements that these users are exposed to along the ARN (paragraph 12.5.130). Professional judgement is applied for instances where these data are not provided by DfT. For the ES, PRoW surveys will be undertaken to inform the volumes of non-motorised users that use PRoW that will be affected by transport movements generated by the development on or off the identified sites. These will take place on each of the routes affected during both the weekday and weekend. This will inform the ES' baseline description.

Review of modal options

- 12.5.14 TfL's CLP guidance recommends a review of different modal options for the import of materials, plant and equipment for construction, the export of excavated material and construction waste, and removal of plant and equipment on completion.
- 12.5.15 Similarly, the following policies highlight the need to sufficiently consider water and rail freight options where feasible, as detailed in Table 12.1, Table 12.3 and Table 12.4:
 - a. NPS for Water Resources Infrastructure paragraph 4.14.15 (Defra, 2023)
 - b. Paragraph T7-J in The London Plan 2021 (Greater London Authority, 2021)
 - c. Policy CS 7 in Royal Borough of Kingston upon Thames Core Strategy 2012 (RBK, 2012)
 - d. Policies KT5 and KT6 in Kingston First Draft of Local Plan (RBK, 2023b)
- 12.5.16 This review explores the potential of using water transport and rail transport for the import of materials, plant and equipment for construction, the export of excavated material and construction waste, and removal of plant and equipment on completion.

- 12.5.17 There is no direct rail freight option due to the absence of suitable railway lines with direct access to the construction sites both north and south of the River Thames.
- 12.5.18 There are opportunities to access indirect rail and river freight for construction sites north and south of the River Thames. Therefore, a leg of the freight delivery trip could be carried out by an alternative mode such as rail or water. At the railhead or river wharf, the freight could be transferred onto road freight, typically HGVs. For the export of materials, this would be 'first-mile' of the freight trip, while for import of materials, this would be the 'last-mile' of the freight trip.
- 12.5.19 The opportunities for direct river freight at the Burnell Avenue and Ham Playing Fields sites located adjacent to the freshwater River Thames are considered.
- 12.5.20 The following options are considered for the Mogden STW site north of the River Thames:
 - a. Road Only
 - b. Road and River
 - c. Road and Rail
- 12.5.21 While the following options are considered for sites south of the River Thames:
 - a. Road Only
 - b. Direct River Access within the draft Order limits
 - c. Road and River
 - d. Road and Rail
- 12.5.22 The appropriate materials for river and rail freight are bulk or high-volume materials that are sourced from one location, e.g. aggregate from a quarry, precast segments from a manufacturer. This will allow the most efficient consolidation of freight for both incoming deliveries and materials removed from site.
- 12.5.23 Concrete aggregate deliveries (imports) and excavated arisings (exports) have been considered most appropriate for consideration within the assessment, with the relevant HGV quantities summarised in Table 12.7 below. These quantities have been estimated based on the Project's current preferred design. Any design developments and changes to the freight assumptions will be addressed in the ES.
- 12.5.24 Plant, equipment, low volume materials, and temporary materials will only be considered if the necessary freight transfer facilities are provided for the bulk materials considered above.
- 12.5.25 Only the excavation arisings from the tunnelling works, which are expected to be reusable London Clay, will be considered at this stage for export via road and rail. This excludes other excavation arisings from embankments, shafts, and treatment plant are likely to include a combination of different ground materials (i.e.: made ground), which may be unsuitable for reuse or possibly contaminated.

Any changes due to the design development, further soil investigations, and freight assumptions will be addressed in the ES.

Freight Imports and Exports	Mogden STW	Ham Playing Fields	Burnell Avenue	Tudor Drive
Concrete Deliveries (Aggregates, Readymix* and Precast Segments)	Readymix and pre-cast concrete (m3): 44,628 Bulk cement powder (t):5,362	Readymix and pre-cast concrete (m3): 763 Bulk cement powder (t):329	Readymix and pre-cast concrete (m3): 2,080 Bulk cement powder (t):902	Readymix and pre-cast concrete (m3): (to be updated at ES). Bulk cement powder (t):180
Excavated Arisings	136,668 m3	-	-	-

Table 12.7 Freight imports and exports considered for indirect rail freight (road and rail)

*Where applicable, it is assumed that Readymix is batched prior to last-mile transportation via HGV (i.e. at depot)

- 12.5.26 For readymix concrete that is batched by a supplier located by a railhead, only the 'last-mile' HGV trip is assessed, and the delivery of the concrete aggregates to the supplier by road or rail is scoped out of the assessment.
- 12.5.27 For the export of excavation arisings by road and rail, both the 'first-mile' HGV trip to the railhead and the train trip from the railhead to the mainline will be assessed in the ES.

Mogden STW

- 12.5.28 For Mogden STW, the Road Only option considers all freight by road to and from the SRN at M3 J1 at Sunbury-on-Thames via A316 Chertsey Road/Country Way. The effect on M3 and M25 is not considered since the increase in road traffic is negligible, as described further in Sections 12.6 and 12.7.
- 12.5.29 Similarly, the Road and River option considers the 'first-mile/last-mile' HGV trips by road to Carnwath Road (wharf) and by river to other wharfs on the tidal section of the River Thames.
- 12.5.30 Wharfs further afield have not been considered due to the additional distance by road between Mogden STW and these locations.
- 12.5.31 Furthermore, wharfs in the freshwater River Thames are not considered for Mogden STW due to the size of the barges required to navigate through the freshwater locks, the number of barge movements required to meet the construction demand, and the adverse impact of the loss of freshwater on upstream water levels during periods of low water.
- 12.5.32 The Road and Rail option considers the 'first-mile/last-mile' HGV trips by road to and from the railhead at Brentford Depot on Transport Avenue, Brentford via

Mogden Lane, A310 Twickenham Road, B454 Spur Road, B454 Syon Lane, and A4 Great West Road.

Construction sites south of the River Thames

- 12.5.33 For these sites, the Road Only option considers the most direct route from the sites to A307 Richmond Road and then south along A307 and A243 to the Hook Junction on A3 Kingston Bypass. The effect on A3 south of Kingston Bypass is not considered since the increase in road traffic is negligible, as described in Sections 12.6 and 12.7.
- 12.5.34 Direct river access for Burnell Avenue and Ham Playing Fields is considered in this review.
- 12.5.35 The Road and River option considers river freight to upstream wharves on the freshwater River Thames and then by road to the SRN, or river freight to downstream wharfs for the supply of materials or the disposal of excavated arisings.
- 12.5.36 The Road and Rail option considers the 'first-mile/last-mile' HGV trip by road to and from the railhead at Aggregates Depot, Kingston Road, Tolworth via A307 south, A243 Brighton Road, and A3 Kingston Bypass. Moreover, exploring the use of the Aggregates Depot in Tolworth directly addresses Policy CS 5 in Royal Borough of Kingston upon Thames – Core Strategy 2012, which aims to retain the depot for the provision of a strategic rail-based facility.

Road and river

- 12.5.37 The use of the Thames Water Wharf at Carnwath Road and Sunbury Depot, Wheatley's Elyot were considered for the import of suitable construction materials and for the export of excavated material by river, based on the experience of Thames Tideway.
- 12.5.38 The Carnwath Road Wharf is the closest wharf in the tidal River Thames accessible by road to Mogden STW. It is downstream of the Teddington and Richmond locks and located in the London Borough of Hammersmith and Fulham.
- 12.5.39 The wharf at Sunbury Depot, Wheatley's Elyot is the closest operational wharf on the freshwater River Thames upstream of the construction sites that have direct access to the River Thames, namely Burnell Avenue and Ham Playing Fields. It is upstream of the Molesey and Sunbury locks and located in the Borough of Spelthorne.
- 12.5.40 Table 12.8 shows the number of HGVs required for the import of construction materials and export of excavation arisings for the Mogden STW. The full breakdown including site setup works and removal and reinstatement works are provided later in this chapter in Table 12.16.

Table 12.8 HGVs required for	[•] Mogden STW for	construction	materials a	nd excavation
arisings				

Site	Activity	Total HGV movements (imports and exports)	
Mogden STW site – Western Work Area	West Side Embankment works	In: 2,139 Out: 2,139 Total: 4,278	
Mogden STW site – Western Work Area	Drive Shaft works	In: 1,424 Out: 1,424 Total: 2,848	
Mogden STW site – Eastern Work Area	East Side Embankment works	In: 2,570 Out: 2,570 Total: 5,140	
Mogden STW site – Eastern Work Area	Interception Shaft works	In: 614 Out: 614 Total: 1,228	
Mogden STW site	TTP and Ancillary Infrastructure	In: 4,056 Out: 4,056 Total: 8,112	
Mogden STW site	Tunnelling	In: 11,821 Out: 11,821 Total: 23,642	
	Total HGVs	In: 22,624 Out: 22,624 Total: 45,248	

- 12.5.41 There is no direct access from these wharfs to the Mogden STW site, where the bulk of construction activities occur, and all last-mile (import) / first-mile trips (export) would occur by HGVs on the local road network. The use of existing river transport facilities further afield does not reduce the number of HGVs travelling to and from the construction sites but rather displaces these HGV trips onto other road routes. This would result in an increase in the number of receptors along these routes, including more road users, residents, occupiers of commercial property, community facilities, and students and teachers at educational facilities in the local authority districts of Spelthorne and Hammersmith and Fulham.
- 12.5.42 These wharves were also considered against the guidelines for the transportation of any Abnormal Indivisible Loads (AILs) to sites, as required in paragraph 4.14.17 of the NPS for Water Resources Infrastructure (see Table 12.1) Water Preferred Policy Guidelines for the movement of AILs emphasises the importance of avoiding road transport for Special Order and VR1 category abnormal loads and considering alternative modes, such as water (National Highways, 2019).

12.5.43 The Tunnel Boring Machine (TBM) is not considered for import by water. Whilst Carnwath Road Wharf is the only location which could accommodate its size, it would still require road transport from the wharf to Mogden STW.

Direct river access at Burnell Avenue site

- 12.5.44 The use of the river freight to remove excavation arisings from the construction of the reception shaft, the construction of the connection to the Thames Lee Tunnel (TLT) and the outfall and intake structures has been considered.
- 12.5.45 It is most likely that the barges would travel downstream through Teddington and Richmond Locks to the tidal River Thames to suitable reception sites in the Thames Estuary for reuse or disposal.
- 12.5.46 The number of HGVs that will be removed from construction access routes to the Burnell Avenue site in the event that river freight is used for removal of excavation arisings is tabulated in Table 12.9. The full breakdown including site setup works and removal and reinstatement works are provided later in this chapter in Table 12.15.

Site	Activity	Total HGV movements
Burnell Avenue site – Main Work Area	Enabling Works	In: 76 Out: 76 Total: 152
	Connection Shaft	In: 230 Out: 230 Total: 460
	Reception Shaft	In: 285 Out: 285 Total: 570
	Outfall structure	In: 71 Out: 71 Total: 142
	Intake structure	In: 118 Out: 118 Total: 236
	Pipejack to Tudor Drive (for Tudor Drive option only)	In: 304 Out: 304 Total: 608
	Total HGVs	In: 1,084 Out: 1,084 Total: 2,168

Table 12.9 HGV movements to remove excavation arisings at Burnell Avenue

12.5.47 The potential number of barge movements that would be required to move the material by river is tabulated in Table 12.10. These quantities have been calculated based on the total volume of excavation arisings generated by the activities at the Burnell Avenue site. The total number of barges required to export these from the site based on a capacity of 220 tonnes per barge are thereafter determined. Based on the work rate in the programme, the import/export frequency refers to how often barges are filled and need to leave the site and be replaced with an empty barge.

Activity	Total barges required in works schedule (220t capacity assumed)	Import/export frequency
Enabling works	8	Every 10 to 11 working days
Connection shaft	24	Every 2 to 3 working days
Reception shaft	30	Every 2 to 3 working days
Outfall structure	8	Every 19 to 20 working days
Intake structure	13	Every 19 to 20 working days
Pipejack to Tudor Drive	32	Every 3 to 4 working days

Table	12.10 Barge	movements re	equired to	remove	excavation	arisings	at Burnell	Avenue

- 12.5.48 To enable the use of river freight at the Burnell Avenue site this would require the construction of a temporary marine load out facility. It is estimated that the construction of this facility would take four months and generate an additional 300 HGV movements approximately (150 in, 150 out) to the Burnell Avenue site's ARN during its setup and an additional 300 HGV movements approximately (150 in, 150 out) during its removal.
- 12.5.49 When considering the total HGVs required for the construction of the marine load out facility, this reduces the net number of HGV movements removed from the construction access routes to the Burnell Avenue site to 1,868 HGV movements (934 in, 934 out) over a longer construction period of eight months, which compares with 2,168 (1,084 in, 1,084out) total HGVs as shown in Table 12.9.
- 12.5.50 It is considered that the overall reduction on the number of HGV movements does not justify the additional adverse impacts. These include the impact of the construction of the marine load out facility on the riverbank and river ecology, the impact of the barge movements on river levels during periods of low water due to the operation of the two locks and on river navigation, and the longer construction period.
- 12.5.51 The use of a jack-up barge within the river at the Burnell Avenue site has also been considered for the construction of a cofferdam to facilitate the construction of the intake and outfall structures. This option would not require the construction
of a load out facility and therefore does not have the same adverse impacts discussed above.

- 12.5.52 Whilst there are positive net savings generated for the Burnell Avenue site with the use of a jack-up barge, the feasibility of the method will depend on the size of barge needed and whether barges are able to navigate along the freshwater River Thames and navigate through the locks.
- 12.5.53 For accessing wharfs further afield, the HGV movements removed would not be reduced, but rather displaced onto the local road network adjacent to the wharfs. For the nearest wharfs which have been identified, this displacement would enlarge the ARN to be considered and further expand the number of receptors affected by the Project.
- 12.5.54 Therefore, the use of the river for freight for the Burnell Avenue site activities will not be assessed further in this chapter.

Direct river access at Ham Playing Fields site

12.5.55 The use of the River Thames for freight access directly to the Ham Playing Fields has not been found to be feasible or practicable. Further details in Section 2.10 of Chapter 2: Project Description in this PEI Report (paragraph 2.10.12).

Summary

- 12.5.56 The option to use 'Road and River' does not reduce the number of HGV movements in and out of the Mogden STW construction site but displaces the HGV movements from suitable LLCS permitted routes to other routes less suited to accommodate HGV traffic. The overall HGV movements in the study area do not change but the extent of the ARN is increased, the number of receptors affected by the construction traffic is expanded and HGV traffic is shifted to routes in other boroughs not directly affected by the Project.
- 12.5.57 The option to use 'Road and River' could reduce the number of HGV movements in and out of the Burnell Avenue site. However, the extent of this reduction would be eroded by the additional HGV movements needed to construct and remove a temporary marine loading facility. This would also increase the duration of the construction programme and would have adverse impacts on river and riverbank ecology, water levels during periods of low water, and increased navigational risk for other river users. The use of a jack-up barge within the river at this site will be assessed as part of the ES if considered feasible following the development of the Project's design. Therefore, direct river access to the Burnell Avenue site has been excluded from this preliminary assessment.
- 12.5.58 Similarly, direct river access to the Ham Playing Fields site has been excluded due to the proximity of the adjacent riverbank's HV electrical utilities and the constraints on the space available in the works area for such facilities.
- 12.5.59 Alternatively, 'Road and Rail' uses rail depots that are within closer proximity to the construction sites than the motorways used to access the M25 boundary for accessing suppliers and waste disposal facilities further afield. This in turn

minimises the receptors exposed to the additional construction traffic associated with the Project.

12.5.60 Road and Rail will be taken forward for assessment in the ES. Any further developments in the assignment of imports and exports of materials, equipment and waste from the sites will be reflected in the ES.

Study area

- 12.5.61 This section addresses the requirement to establish a study area, as highlighted in paragraph 2.13 in the IEMA EATM guidance for traffic and transport. Moreover, as required in the Sustainable Transport Supplementary Planning Document for RBK (RBK, 2013), this addresses the impact that trips generated by the Project will have on surrounding transport infrastructure and services.
- 12.5.62 The study area has been identified based on which sections of the road network may be used to support the movements of construction vehicles. These are mapped in Volume 2 of this PEI Report for the whole area (Figure 12.1) and for the north and then south of the River Thames (Figure 12.2) and they comprise the ARN.
- 12.5.63 The motorised vehicle access points for the construction sites are as follows:
 - a. Mogden STW southern access gate- Mogden Lane/Rugby Road roundabout
 - b. Mogden STW northern access gate Oak Lane and Worton Road
 - c. Intermediate shaft at Ham Playing Fields Ham Street
 - d. Burnell Avenue construction site Burnell Avenue, with entry from Dysart Road, and exit via Beaufort Road
 - e. Tudor Drive construction site entry on Tudor Drive and exit on A307
- 12.5.64 The northern access at Mogden STW is expected to be used on very limited occasions when access to the southern entrance is restricted.
- 12.5.65 The study area for transport impacts includes all identified construction routes up to the SRN. No further assessment on the SRN will be required on the basis that no significant increase to the overall percentage of HGV traffic in relation to general traffic is to be expected as a result of the Project.
- 12.5.66 To consider multimodal freight options, the study area also includes construction routes to facilitate the potential use of local goods suppliers with access to railheads. HGVs would be used to transport deliveries to site for the last leg of transit and waste exports from site for the first leg of transit. The following facilities are captured in the study area:
 - a. Brentford Rail Depot Transport Avenue, Brentford (north of the River Thames, for Mogden STW)
 - b. Aggregates Depot, Kingston Road, Tolworth (south of the River Thames, for all other sites)
- 12.5.67 HGVs for construction deliveries are assumed to use the ARN routes identified in red in Figure 12.1 and Figure 12.2 in Volume 2 of this PEI Report. Routing for

LGVs and cars for the workforce during the Project's construction are identified separately on Figure 12.6 in Volume 2 of this PEI Report. The impact of workforce travel is assessed no further than the local authority boundaries which contain the ARN for HGVs: LBH, LBR, and RBK.

12.5.68 Construction vehicle routing for deliveries and waste exports are contained within the ARN marked in red in Figure 12.1 of Volume 2 of this PEI Report. The sequence of routing is outlined in paragraphs 12.5.105 and 12.5.112.

Construction vehicle assessment methodology

- 12.5.69 The importance of assessing transport-related impacts is highlighted in national policy, as presented in Section 12.2 of this chapter. For example, the NPS requires a transport appraisal to be prepared as part of the ES in cases where there are significant transport implications for a project (NPS, paragraph 4.14.5). Moreover, there is a need to demonstrate that the Project will not create an unacceptable impact on highway safety, nor a severe residual cumulative impact on the road network (NPFF, paragraph 115).
- 12.5.70 To quantify the demand that would generate impacts, the potential daily construction vehicle numbers have been identified based on the estimated demand for each relevant activity. These are directed to each site via the access points to the site as identified in paragraph 12.5.63. The movements have been broken down into the following categories:
 - a. Workforce movements (cars and LGV vans)
 - b. Deliveries and waste exports (HGVs)

Estimating workforce volumes

12.5.71 Assumptions have been made on the total workforce volumes per shift in line with the current understanding of the construction requirements according to the current design. This includes both the supervision and the undertaking of the works. These are summarised in Table 12.11.

Table 12.11	Construction	workforce	estimate	(per shift)
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Site	Activity	Estimated workforce (persons)
Mogden STW site –	West Side Embankment works	30
Western Work Area	Drive Shaft works	30
Mogden STW site -	East Side Embankment works	30
Eastern Work Area	Interception Shaft works	30
Mogden STW site	TTP and Ancillary Infrastructure	40
	Tunnelling	60
Ham Playing Fields site – Main Work Area	Intermediate Shaft	30
Burnell Avenue site	Enabling Works	30
– Main Work Area	Site Setup	20
	Reception Shaft	30
	Connection Shaft	30
	Outfall structure	20
	Intake structure	20
	Pipejack to Tudor Drive (for Tudor Drive option only)	20
Tudor Drive	Removal & reinstatement	30
	Removal & reinstatement – Planting and landscaping	20
	TLT Connection Shaft – Enabling Works	10
	TLT Connection- Main Works	30

- 12.5.72 Table 12.11 tabulates the total workforce estimate for each activity. The maximum construction workforce at each construction site will depend on the overlap of construction activities.
- 12.5.73 The estimate of maximum construction workforce is summarised in Table 12.12.

Table 12.12 Maximum construction workforce at the construction sites (per shift)

Construction site	Estimated workforce (persons)
Mogden STW site	100
Ham Playing Fields site	30
Burnell Avenue site	90
Tudor Drive site	30

12.5.74 Estimates in Table 12.12 are based on specialist knowledge of similar works delivered elsewhere and the current project design details.

12.5.75 The maximum construction workforce accessing the combined sites south of the River Thames is 120 as outlined in Table 12.13. This assumes the pipejacking option to Tudor Drive which results to higher workforce demand compared to the adit option and therefore constitutes the worst case in terms of workforce demand.

Table 12.13 Maximum construction workforce accessing all sites south of the River Thames

Peak period	Peak duration	Site	Activity	Estimated workforce count
2031 Q3	4 weeks	Burnell Avenue	Connection Shaft	30
			Outfall structure	20
			Intake structure	20
			Pipejack to Tudor Drive	20
		Tudor Drive	Main Works	30
		Total		120
2031 Q4	5 weeks	Ham Playing Fields	Intermediate Shaft site	30
		Burnell Avenue	Outfall structure	20
			Intake structure	20
			Pipejack to Tudor Drive	20
		Tudor Drive	Main Works	30
		Total		120

Estimating HGV volumes

- 12.5.76 These quantities are developed based on the total volumes of materials quantities that need to be transported to site to construct the Project's facilities according to the latest design. These are converted to HGV loads and doubled to account for the total HGV movements, including full deliveries to sites with empty loads from sites, along with full waste exports from sites and their empty loads to sites. For this preliminary assessment, HGVs transporting excavation arisings are assumed to each have a 15m³ load capacity, which translates to around 18 tonnes. Moreover, for the delivery of precast segments, an articulated truck would carry up to six segments per load. The sizes of HGVs used for other deliveries will depend on the type of material.
- 12.5.77 The total HGV quantities for each activity are aligned with the construction schedule activities. These are segmented into setup, main works (i.e. deliveries and excavation arisings) and site removal and reinstatement works. For each activity, the total quantities of the materials and equipment are averaged out across the duration of the activity.
- 12.5.78 Total movements are rounded up to the next even number so that the movements in and out are the same. It should be noted that the periods of works are indicative, applying scheduling and assumptions based on the current design and construction method.

Total HGV demand

12.5.79 summarises HGV demand quantities against the construction programme periods for sites north of the River Thames respectively.

12.5.80 Table 12.14 summarises HGV demand quantities against the construction programme periods for sites north of the River Thames respectively.

Table 12.14 Total construction HGV movements at Mogden STW

Site works	Site setup	Excavation	Deliveries (number)		Site removal and	Total	Period of
		arisings (number)	Concrete*	Other	reinstatement		works
Western works area – Embankment works	Included in main works	In: 2,077 Out: 2,077 Total: 4,154	Included in main works	In: 62 Out: 62 Total: 124	Included in main works	In: 2,139 Out: 2,139 Total: 4,278	2029 Q1 – 2029 Q3
Eastern works area – Embankment works	Included in main works	In: 1,120 Out: 1,120 Total: 2,240	In: 1,205 Out: 1,205 Total: 2,410	In: 245 Out: 245 Total: 490	Included in main works	In: 2,570 Out: 2,570 Total: 5,140	2029 Q1 – 2029 Q4
Western Works Area – Drive Shaft	In: 180 Out: 180 Total: 360	In: 1,186 Out: 1,186 Total: 2,372	In: 196 Out: 196 Total: 392	In: 42 Out: 42 Total: 84	In: 337 Out: 337 Total: 674	In: 1,941 Out: 1,941 Total: 3,882	2029 Q3 – 2032 Q1
Eastern Works Area – Interception Shaft	In: 91 Out: 91 Total: 182	In: 422 Out: 422 Total: 844	In: 130 Out: 130 Total: 260	In: 62 Out: 62 Total: 124	In: 86 Out: 86 Total: 172	In: 791 Out: 791 Total: 1,582	2029 Q4 – 2032 Q2
Tertiary Treatment Plant and Ancillary Infrastructure	In: 158 Out: 158 Total: 316	In: 1,433 Out: 1,433 Total: 2,866	In: 2,071 Out: 2,071 Total: 4,142	In: 552 Out: 552 Total: 1,104	In: 158 Out: 158 Total: 316	In: 4,372 Out: 4,372 Total: 8,744	2030 Q2 – 2032 Q2
Tunnelling	In: 147 Out: 147 Total: 294	In: 7,199 Out: 7,199 Total: 14,398	In: 4,231 Out: 4,231 Total: 8,462	In: 391 Out: 391 Total: 782	In: 147 Out: 147 Total: 294	In: 12,115 Out: 12,115 Total: 24,230	2030 Q2 – 2031 Q4
Eastern Works area – Planting and landscaping	Not applicable	Not applicable	Not applicable	Not applicable	In: 15 Out: 15 Total: 30	In: 15 Out: 15 Total: 30	2032 Q4 – 2032 Q4

Site works	Site setup	Excavation	Deliveries (number)		Site removal and	Total	Period of
		arisings (number)	Concrete*	Other	reinstatement		works
Total HGV movements North of the River Thames	In: 576 Out: 576 Total: 1,152	In: 13,437 Out: 13,437 Total: 26,874	In: 7,833 Out: 7,833 Total: 15,666	In: 1,354 Out: 1,354 Total: 2,708	In: 743 Out: 743 Total: 1,486	In: 23,943 Out: 23,943 Total: 47,886	2030 Q2 – 2032 Q4

*Concrete deliveries include aggregates, readymix and precast segments

12.5.81 Table 12.15 summarises the total HGV quantities against the construction programme periods for south of the River Thames. It should be noted that the enabling works at Burnell Avenue primarily concerns the utility diversions and public rights of way diversions that will be required to conduct the main works at the Burnell Avenue site.

Site works	Site setup	Excavation	Deliveries (number)		Site	Total	Period of	
		arisings (number)	Concrete*	Other	removal and reinstateme nt		works	
Ham Playing Fields site: Intermediate Shaft	In: 335 Out: 335 Total: 670	In: 263 Out: 263 Total: 526	In: 73 Out: 73 Total: 146	In: 142 Out: 142 Total: 284	In: 345 Out: 345 Total: 690	In: 1,158 Out: 1,158 Total: 2,316	2030 Q3 – 2031 Q4	
Ham Playing Fields site : Total HGV movements	In: 335 Out: 335 Total: 670	In: 263 Out: 263 Total: 526	In: 73 Out: 73 Total: 146	In: 142 Out: 142 Total: 284	In: 345 Out: 345 Total: 690	In: 1,158 Out: 1,158 Total: 2,316	2030 Q3 – 2031 Q4	
Burnell Avenue site: Enabling Works	In: 20 Out: 20 Total: 40	In: 76 Out: 76 Total: 152	Included in setup	In: 145 Out: 145 Total: 290	In: 20 Out: 20 Total: 40	ln: 261 Out: 261 Total: 522	2030 Q3 – 2030 Q4	
Burnell Avenue site: All site setup	In: 450 Out: 450 Total: 900	Included in setup	Included in setup	Included in setup	Not applicable	In: 450 Out: 450 Total: 900	2030 Q4 – 2031 Q1	
Burnell Avenue site: Reception Shaft	Included in setup	In: 285 Out: 285 Total: 570	In: 59 Out: 59 Total: 118	In: 212 Out: 212 Total: 424	Included in removal and reinstateme nt	In: 556 Out: 556 Total: 1,112	2031 Q1 – 2031 Q2	
Burnell Avenue site: Connection shaft	Included in setup	In: 230 Out: 230 Total: 460	In: 46 Out: 46 Total: 92	Not applicable	Included in removal and reinstateme nt	In: 276 Out: 276 Total: 552	2031 Q2 – 2031 Q3	
Burnell Avenue site: Intake structure	Included in setup	In: 118 Out: 118 Total: 236	In: 66 Out: 66 Total: 132	In: 113 Out: 113 Total: 226	Included in removal and reinstateme nt	In: 297 Out: 297 Total: 594	2031 Q1 – 2032 Q1	
Burnell Avenue site: Outfall structure	Included in setup	In: 71 Out: 71 Total: 142	In: 24 Out: 24 Total: 48	In: 112 Out: 112 Total: 224	Included in removal and reinstateme nt	In: 207 Out: 207 Total: 414	2031 Q2 – 2031 Q4	
Burnell Avenue site: Pipejack to Tudor Drive	In: 90 Out: 90 Total: 180	In: 304 Out: 304 Total: 608	In: 72 Out: 72 Total: 144	Not applicable	In: 90 Out: 90 Total: 180	In: 556 Out: 556 Total: 1,112	2031 Q3 – 2031 Q4	
Burnell Avenue site: Removal & reinstatement	Not applicable	Not applicable	Not applicable	Not applicable	In: 470 Out: 470 Total: 940	In: 470 Out: 470 Total: 940	2032 Q1 – 2032 Q2	

Table 12.15 Total construction HGVs south of the River Thames

Site works	Site setup	Excavation	Deliveries (number)		Site	Total	Period of
		arisings (number)	Concrete*	Other	removal and reinstateme nt		works
Burnell Avenue site: Removal & reinstatement – Planting and landscaping	Not applicable	Not applicable	Not applicable	Not applicable	In: 50 Out: 50 Total: 100	In: 50 Out: 50 Total: 100	2032 Q4 – 2032 Q4
Burnell Avenue site: Total HGV movements	In: 560 Out: 560 Total: 1120	In: 1,084 Out: 1,084 Total: 2,168	In: 267 Out: 267 Total: 534	In: 582 Out: 582 Total: 1,164	In: 630 Out: 630 Total: 1,260	In: 3,123 Out: 3,123 Total: 6,246	2030 Q3 – 2032 Q4
Tudor Drive site: Enabling Works	In: 50 Out: 50 Total: 100	Included in setup	Included in setup	In: 50 Out: 50 Total: 100	In: 50 Out: 50 Total: 100	In: 150 Out: 150 Total: 300	2030 Q3 – 2031 Q1
Tudor Drive site: Main Works	ln: 112 Out: 112 Total: 224	ln: 131 Out: 131 Total: 262	In: 22 Out: 22 Total: 44	In: 130 Out: 130 Total: 260	In: 112 Out: 112 Total: 224	In: 507 Out: 507 Total: 1,014	2031 Q2 – 2032 Q1
Tudor Drive site: Total HGV movements	In: 162 Out: 162 Total: 324	ln: 131 Out: 131 Total: 262	In: 22 Out: 22 Total: 44	In: 180 Out: 180 Total: 360	In: 162 Out: 162 Total: 324	In: 657 Out: 657 Total: 1,314	2030 Q3 – 2032 Q1
Total HGV movements South of the River Thames	In: 1,057 Out: 1,057 Total: 2,114	In: 1,478 Out: 1,478 Total: 2,956	In: 362 Out: 362 Total: 724	In: 904 Out: 904 Total: 1,808	In: 1,137 Out: 1,137 Total: 2,274	In: 4,938 Out: 4,938 Total: 9,876	2030 Q3 – 2032 Q4

*Concrete deliveries include aggregates, readymix and precast Segments

- 12.5.82 North of the River Thames, it is estimated that activities at Mogden STW would generate a total of 47,886 total HGV movements, or around 23,943 into the site and 23,943 out of the site.
- 12.5.83 For activities at sites located south of the River Thames, it is estimated that HGV movements generated per site would be:
 - a. Ham Playing Fields 2,316 total HGV movements, or 1,158 into the site and 1,158 out of the site
 - b. Burnell Avenue around 6,246 total HGV movements, or 3,123 into the site and 3,123 out of the site
 - c. Tudor Drive site around 1,314 total HGV movements, or 657 into the site and 657 out of the site if the option to use the pipejacking method is adopted.
- 12.5.84 The TLT connection using the pipejacking to Tudor Drive is included since it generates a higher HGV demand than the alternative adit option at Burnell Avenue.

Daily HGV demand

12.5.85 Table 12.16 summarises the daily construction HGV demand for each activity and their respective construction programme periods for Mogden STW, located north of the River Thames.

Site works	Site setup	Excavation	Deliveries	(number)	Site removal	Period of
		arısıngs (number)	Concrete*	Other	and reinstatement	works
Western works area – Embankment works	Included in main works	In: 21 Out: 21 Total: 42	Included in main works	In: 1 Out: 1 Total: 2	Included in main works	2029 Q1 – 2029 Q3
Eastern works area – Embankment works	Included in main works	In: 7 Out: 7 Total: 14	ln: 7 Out: 7 Total: 14	In: 2 Out: 2 Total: 4	Included in main works	2029 Q1 – 2029 Q4
Western Works Area – Drive Shaft	In: 5 Out: 5 Total: 10	In: 9 Out: 9 Total: 18	In: 2 Out: 2 Total: 4	In: 1 Out: 1 Total: 2	In: 12 Out: 12 Total: 24	2029 Q3 – 2032 Q1
Eastern Works Area – Interception Shaft	In: 5 Out: 5 Total: 10	In: 5 Out: 5 Total: 10	In: 2 Out: 2 Total: 4	In: 1 Out: 1 Total: 2	In: 5 Out: 5 Total: 10	2029 Q4 – 2032 Q2
Tertiary Treatment Plant and Ancillary Infrastructure	In: 4 Out: 4 Total: 8	In: 4 Out: 4 Total: 8	In: 5 Out: 5 Total: 10	In: 2 Out: 2 Total: 4	In: 6 Out: 6 Total: 12	2030 Q2 – 2032 Q2
Tunnelling	In: 2 Out: 2 Total: 4	In: 23 Out: 23 Total: 46	In: 14 Out: 14 Total: 28	In: 2 Out: 2 Total: 4	In: 4 Out: 4 Total: 8	2030 Q2 – 2031 Q4
Eastern Works Area – Planting and landscaping	Not applicable	Not applicable	Not applicable	Not applicable	In: 1 Out: 1 Total: 2	2032 Q4 – 2032 Q4

Table 12.16 Daily construction HGV movements at Mogden STW

12.5.86 Plate 12.1 provides an overview of the daily HGV movements across the construction programme for activities north of the River Thames. It is anticipated that a daily maximum of 100 HGV movements (50 in and 50 out) to the site could occur at one time, during the period where activities associated with tunnelling operations, and construction of the TTP and ancillary infrastructure works occur concurrently. An average of 62 HGV movements (32 in and 32 out) are anticipated, excluding the interval between 2032 Q2 and 2032 Q4 caused by the seasonal requirements of planting and landscaping.



Plate 12.1 Total construction HGV movements north of the River Thames

12.5.87 Table 12.17 summarises the daily construction HGV demand for each activity and their respective construction programme periods for the combined sites south of the River Thames.

Site works	Site setup	Excavation	Deliveries	(number)	Site removal	Period of
		arisings (number)	Concrete*	Other	and reinstatement	works
Ham Playing Fields site: Intermediate Shaft site	In: 9 Out: 9 Total: 18	In: 4 Out: 4 Total: 8	In: 2 Out: 2 Total: 4	In: 3 Out: 3 Total: 6	In: 9 Out: 9 Total: 18	2030 Q3 – 2031 Q4
Burnell Avenue site: Enabling Works	In: 2 Out: 2 Total: 4	In: 2 Out: 2 Total: 4	Included in setup	In: 3 Out: 3 Total: 6	In: 2 Out: 2 Total: 4	2030 Q3 – 2030 Q4
Burnell Avenue site: All site setup	In: 12 Out: 12 Total: 24	Included in setup	Included in setup	Included in setup	Not applicable	2030 Q4 – 2031 Q1
Burnell Avenue site: Reception Shaft	Included in setup	ln: 5 Out: 5 Total: 10	ln: 1 Out: 1 Total: 2	In: 4 Out: 4 Total: 8	Included in removal and reinstatement	2031 Q1 – 2031 Q2
Burnell Avenue site: Connection Shaft	Included in setup	In: 4 Out: 4 Total: 8	ln: 1 Out: 1 Total: 2	Not applicable	Included in removal and reinstatement	2031 Q2 – 2031 Q3
Burnell Avenue site: Intake structure	Included in setup	ln: 1 Out: 1 Total: 2	ln: 1 Out: 1 Total: 2	In: 1 Out: 1 Total: 2	Included in removal and reinstatement	2031 Q1 – 2032 Q1
Burnell Avenue site: Outfall structure	Included in setup	In: 1 Out: 1 Total: 2	ln: 1 Out: 1 Total: 2	In: 1 Out: 1 Total: 2	Included in removal and reinstatement	2031 Q2 – 2031 Q4
Burnell Avenue site: Pipejack to Tudor Drive	In: 5 Out: 5 Total: 10	In: 6 Out: 6 Total: 12	In: 2 Out: 2 Total: 4	Not applicable	In: 5 Out: 5 Total: 10	2031 Q3 – 2031 Q4
Burnell Avenue site: Removal & reinstatement	Not applicable	Not applicable	Not applicable	Not applicable	In: 8 Out: 8 Total: 16	2032 Q1 – 2032 Q2
Burnell Avenue site: Removal & reinstatement – Planting and landscaping	Not applicable	Not applicable	Not applicable	Not applicable	In: 3 Out: 3 Total: 6	2032 Q4 – 2032 Q4
Tudor Drive site: Enabling Works	In: 3 Out: 3 Total: 6	Included in setup	Included in setup	In: 2 Out: 2 Total: 4	In: 3 Out: 3 Total: 6	2030 Q3 – 2031 Q1
Tudor Drive site: Main Works	In: 6 Out: 6 Total: 12	In: 1 Out: 1 Total: 2	ln: 1 Out: 1 Total: 2	In: 1 Out: 1 Total: 2	In: 4 Out: 4 Total: 8	2031 Q2 - 2032 Q1

Table 12.17 Daily construction HGV movements sites south of the River Thames

12.5.88 Plate 12.2 provides an overview of the daily HGV movements across the construction programme for activities at the Ham Playing Fields site. The site would generate an average of 18 daily HGV movements (nine in, nine out) throughout the period of works at the site. Due to the planting season constraints, there would be an interval of seven to eight months between the end of the main works on site and the remedial and reinstatement works.



Plate 12.2 Total construction HGV movements for Ham Playing Fields site

12.5.89 Plate 12.3 provides a HGV profile for the works at Burnell Avenue. A maximum of 32 combined total HGV movements (16 in, 16 out) would occur firstly where Reception shaft and Intake structure works occur concurrently, and secondly Connection shaft, Intake structure, Outfall structure and pipejack to Tudor Drive works occur concurrently. Both of these would each occur for less than one month. The pipejack to Tudor Drive activity would generate 16 HGV movements (eight in, eight out) during the activity's main works; however, similar daily volumes would be reached when considering the cumulative effect of other activities at the site.



Plate 12.3 Total construction HGV movements for Burnell Avenue site

12.5.90 Plate 12.4 provides a profile for daily HGV movements for the TLT connection works from the Tudor Drive site. A peak of six total HGVs per day (three in, three out) is reached during the enabling works, whereas a peak of 12 HGVs per day (six in, six out) is reached during the site setup period for the main works for between one to two months in 2031 Q2.



Plate 12.4 Total construction HGV movements for Tudor Drive site

12.5.91 Plate 12.5 provides an overview of the daily HGV movements across the construction programme for activities south of the River Thames. It is anticipated that a daily maximum of total of 48 HGV movements (24 in and 24 out) will travel to the sites south of the River Thames. This would occur over a two-week duration, whilst there are another ten weeks where there are more than a total of 40 daily HGV movements (20 in and 20 out). This occurs during the brief period where works at the Ham Playing Fields site, Burnell Avenue site (setup) and the Tudor Drive site (enabling works) take place concurrently. An average 28 HGV movements (14 in and 14 out) are anticipated, excluding the interval between 2032 Q2 and 2032 Q4 caused by the seasonal requirements of planting and landscaping.



Plate 12.5 Total construction HGV movements south of the River Thames

12.5.92 The estimated maximum anticipated total daily demand due to activities occurring at the same time and their durations are addressed in Section 12.7 of this chapter (summarised in Table 12.29).

Abnormal loads

- 12.5.93 The number of AILs has not been identified at this stage, apart from the delivery of the TBM at Mogden STW, and its subsequent removal from Burnell Avenue. The number of movements is expected to be low and infrequent.
- 12.5.94 The movement of all AILs will be controlled through the National Highways Electronic Service Delivery for Abnormal Loads (ESDAL) process, managed by National Highways.
- 12.5.95 The ESDAL system makes this process easier for hauliers, structure owners, highway authorities and the police:
 - a. Plan your route and check its suitability for your load
 - b. Get full details of all the organisations and authorities you need to notify before you travel
 - c. Notify the police, highways and bridge authorities of your AIL movements around the road network
 - d. Submit your notifications
 - e. Get advance notice of any possible route problems
 - f. Save vehicle details and routes for future use

- 12.5.96 Furthermore, the impact of AILs on the ARN will be managed by both the timing of the deliveries and temporary road closures to avoid any conflicts between AILs and other road users.
- 12.5.97 This will reduce the impact of large loads on Rugby Road, B361 Whitton Road, A316 Chertsey Road, the affected TLRN and SRN in the north, and Burnell Avenue, Dysart Road, Beaufort Road, Dukes Avenue, A307, A243, TLRN and SRN in the south.

Hazardous materials

- 12.5.98 At this stage, no hazardous materials have been identified. However, there is a possibility that excavation arisings from made ground at the Mogden STW site could be contaminated and possibly assessed as hazardous.
- 12.5.99 The probability of contaminated materials in the intermediate shaft excavation at the Ham Playing Fields site and reception shaft excavation and pipe-jacking excavation for the TLT connection at the Burnell Avenue site is low.
- 12.5.100 Any contaminated materials will need to be handled according to standard practice as set out in The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (as amended).
- 12.5.101 Standard practice involves proper classification and appropriate packaging, suitable vehicle selection and driver certification and route planning to minimise risks.
- 12.5.102 This will reduce the impact of hazardous / large loads on Rugby Road, B361 Whitton Road, A316 Chertsey Road, the affected TLRN and SRN in the north, and Burnell Avenue, Dysart Road, Beaufort Road, Dukes Avenue, A307, A243, TLRN and SRN in the south.

Scenarios considered

- 12.5.103 This PEI Report examines the following scenarios for construction traffic impacts north of the River Thames:
 - a. Southern access gate this assumes HGVs and staff will access the site via the southern access gate at Mogden STW. This will examine the worst case maximum daily traffic volume on each section of the ARN. The highest construction demand from likely routing options on each section of the road network will be assessed.
 - b. Northern access gate during short periods where the southern access gate is closed, this assumes HGVs and staff will access the site via the northern access gate. This will also examine the worst-case maximum daily traffic volume on each section of the ARN. Where applicable, the highest construction demand from the likely routing options on each section of the road network will be assessed.
- 12.5.104 Thereafter, this PEI Report examines the worst case on the ARN south of the River Thames. The A3 corridor, its slip roads, and A240 are tabulated twice to demonstrate that the maximum construction traffic volumes on these road links will differ depending on whether the railhead depot in Tolworth is used.

Construction vehicle routing

- 12.5.105 Chapters 1 and 2 of the IEMA EATM guidance for traffic and transport outline the spatial scoping requirements for the environmental assessment. The construction routing therefore covers the geography of the study area to and beyond the point where the criteria set out in these rules outlined in Rule 1 and Rule 2 under Section 2 of the guidance (see Table 12.5 of this chapter) are met.
- 12.5.106 There are three routing options:
 - a. Option A all deliveries and exports travel to and from the SRN (i.e. M25) and no railhead facilities are used.
 - b. Option B some deliveries and exports travel to and from the Brentford Depot to use the railhead facilities, with HGV movements using the shortest route via Mogden Lane, A310, B454 and A4 corridors.
 - c. Option C some deliveries and exports travel to and from the Brentford Depot to use the railhead facilities, with HGV movements routed via Rugby Road, B361 Whitton Road, A316 Chertsey Road, A310 London Road/Twickenham Road, B454 and A4 corridors.
- 12.5.107 It should be noted that routing options B and C are only being considered as suitable for deliveries of concrete (aggregates, readymix and precast segments) to Mogden STW and exports of excavation arisings from the tunnelling works, which are discussed in the review of multimodal options in the assessment methodology (paragraphs 12.5.37 to 12.5.43). Other excavation arisings are excluded to avoid the potential risk of double handling contaminated material in made ground. All other deliveries and exports would be assigned to routing option A.
- 12.5.108 The northern access at Mogden STW is expected to be used on very limited occasions when access to the southern entrance is restrictedAll construction traffic would be diverted to the gate accessed from Oak Lane, which is picked up from the A310 corridor via Worton Road.
- 12.5.109 There are variations of construction traffic demand for each routing option, but the maximum likely demand has been assessed.

- 12.5.110 Covering all routing options, the ARN north of the River Thames (for Mogden STW) is as follows:
 - a. Local access options to Mogden STW: Rugby Road/B361 Whitton Road, or Mogden Lane/A310 Twickenham Road/A310 London Road
 - b. Routing option A To SRN: A316 Chertsey Road, and M3 (SRN)
 - c. Routing options to Brentford Rail Depot
 - i. Routing option B (suitable materials only): Mogden Lane, A310 Twickenham Road (north), B454 Spur Road/B454 Syon Lane, A4 Great West Road, and Transport Avenue
 - ii. Routing option C (suitable materials only): Rugby Road, B361 Whitton Road, A316 Chertsey Road, A310 Twickenham Road (south and north), B454 Spur Road/B454 Syon Lane, A4 Great West Road, and Transport Avenue
- 12.5.111 The northern access gate is accessed from Oak Lane, via Worton Road and A310. Construction traffic movements towards Brentford will continue north along the A310. HGV movements to the M25 via the M3 (SRN) would be routed south along the A310 corridor and thereafter travel west along the A316 corridor (thus bypassing Mogden Lane used in option B and Rugby Road used in options A, B and C).
- 12.5.112 Plate 12.6 and Plate 12.7 provide an overview of the ARN and the routing for HGVs accessing construction sites north of the River Thames. The ARN is also provided in Figure 12.2 in Volume 2 of this PEI Report.



Plate 12.6 Overview of ARN and construction sites - north of the River Thames



Plate 12.7 Overview of the local ARN and construction sites – north of the River Thames

12.5.113 The ARN south of the River Thames includes:

- a. Local access for Ham Playing Fields: Ham Street, Riverside Drive and Dukes Avenue
- b. Local access for Burnell Avenue: Burnell Avenue, Dysart Avenue, Beaufort Road and Dukes Avenue
- c. Local access for Tudor Drive: Park Road and Tudor Drive via A308 London Road(HGVs into site) and A307 Richmond Road (HGVs exiting site) (to be confirmed)
- d. Routing option to M25 via A3: A307 Corridor (south of Dukes Avenue), A243 corridor, and A3 Kingston Bypass
- e. To Railhead Depot, Tolworth: A240 Kingston Road
- 12.5.114 The local access for Burnell Avenue would operate in a gyratory one-way manner along Burnell Avenue, Dysart Avenue, Beaufort Road and part of Dukes Avenue.
- 12.5.115 The following would only be used in exceptional circumstances, if agreed between LBR and the awarded contractor:
 - a. Alternative local access options for Ham Playing Fields: Ham Street and Sandy Lane, or Ham Street and Ham Common.
 - b. Routing option to M25 via M3: A307 Corridor (north of Dukes Avenue), A316 Chertsey Road

12.5.116 These construction routing options on the ARN can be viewed in Plate 12.8 and Plate 12.9, as well as Figure 12.2 in Volume 2 of this PEI Report also provides a map of the ARN for sites south of the River Thames.







Plate 12.9 Overview of the local ARN and construction sites – south of the River Thames

12.5.117 The following constraints have been identified on the construction routing:

- a. The LLCS controls the movement of HGVs on London roads during the prescribed hours of Monday to Friday from 21:00–07:00, Saturday 24:00–07:00, bank holidays, and from Saturday 13:00 to Monday 07:00. LLCS permitted routes are not controlled by the scheme, where HGVs can travel at any time without needing permission to do so.
- b. A traffic calming measure on Sandy Lane presents a vehicle width restriction for HGVs. It currently supports access to buses with a width of 2.47m (Alexander Dennis, 2024).

Construction workforce distribution

- 12.5.118 For the purposes of this PEI Report, broad assumptions have been made on the distribution of workforce trips on the ARN based on the general geography of their assumed origins.
- 12.5.119 Local Authority Districts (LADs) within a 60-minute travel distance have been identified. Based on the available LAD population working in construction across the 2021 Census, the percentage of construction workers from each individual LAD was calculated. These percentages were then applied to the estimated maximum anticipated daily number of total workers to identify the number of worker trips from each LAD who would potentially commute to the construction sites.
- 12.5.120 The preferred workforce vehicle routes were determined based on travel times and distances between LADs and the sites. It is not guaranteed that these routes

will be taken due to the autonomous nature of workforce travel. If additional information is available, the method for understanding workforce trips may be revised in the final ES.

12.5.121 Sustainable travel assumptions such as car sharing and shuttle buses are not applied to the preliminary assessment in order to generate a more conservative estimate of the potential workforce trips that will use the road network. Sustainable travel relating to workforce trips is considered further in Section 12.8 of this chapter.

Assessing the significance of effects

- 12.5.122 In line with paragraph 1.27 in IEMA's EATM guidelines, this assessment considers the effects on transport users based on their magnitude of impacts relative to the baseline, the sensitivity of the receptors (i.e. transport users) and the scale of the significance of any effects.
- 12.5.123 The magnitude of construction impacts is based on the distribution and quantities of vehicle movements to and from the construction sites. To determine the significance of the impacts, these are considered relative to the baseline traffic conditions.
- 12.5.124 In the IEMA EATM guidance, Rule 1 (Geographic extent spatial scope) and paragraph 2.20 highlight that assessments for environmental and population impacts are expected to include road links where traffic flows will increase by more than 30%, or the number of HGVs would increase by more than 30%.
- 12.5.125 Additionally, Rule 2 (Geographic extent spatial scope) and paragraph 2.21 highlight that environmental and population impacts for sensitive groups and locations should be examined if flows increase by 10% or more along a road link, along with any road links that would experience large increases in HGVs. These criteria are suitable for defining the scope of assessment for receptors along the ARN, including severance, pedestrian delay, and fear and intimidation in this PEI Report. The maximum changes in traffic volumes are considered in identifying this scope.
- 12.5.126 Receptors have not been considered along the ARN south of Tudor Drive given that the criteria above are not anticipated to be met across most types of environmental impacts that are relevant to traffic and transport. Whilst the guidance highlights that the above criteria should not be used to descope these roads for assessing road safety and driver delay impacts, these impacts can still be descoped for the major roads south of the River Thames in light of the strong provision of crossing and cycling facilities (see Section 12.6 of this chapter) and the minimal changes in traffic volumes as outlined under Estimated maximum anticipated daily changes (see Section 12.7 of this chapter).
- 12.5.127 Material suppliers with access to railheads are not located in the vicinity of the construction sites, however it is expected that trips to and from these suppliers will have a limited impact on minor roads on the local ARN. It is however

expected to reduce vehicle miles generated from the project as these sites can be accessed prior to reaching the SRN.

Determining the sensitivity of receptors

- 12.5.128 Paragraph 1.31 in IEMA's EATM guidelines advises to assign sensitive receptors in the study area to the nearest road link as a basis to examine the significance of their impacts. It highlights the need to distinguish between higher and lower sensitivity receptors. For example, lower sensitivity for pedestrians would be present on road links if there are adequate footways and crossing facilities, whereas road links with high concentrations of sensitive locations (i.e. schools, hospitals, tourist attractions) will be considered highly sensitive (IEMA, 2023).
- 12.5.129 In this PEI Report, the sensitivity of receptors associated with key amenities alongside the ARN are evaluated against the criteria detailed below. The combined evaluation is used to make a qualitative assessment of the sensitivity (Low, Medium, High).
 - a. Footway provision whether footways are provided with sufficient kerbing and segregation from the motor highway at best, or are entirely absent at worst
 - Crossing provision whether controlled crossings prioritising pedestrians are provided along desire lines at best, or no forms of crossing facilities nor dropped kerbing and tactile paving have been provided at worst
 - c. Pedestrian concentrations where they are relatively low at best, or very high at worst. Desktop analyses and professional judgement are used to inform these ratings.
 - d. Collisions in the most recent three-year period of available data without COVID-19 restrictions, sensitivity is lowest where there are no collisions within 100m of the receptor's access on the ARN and is highest where there are multiple accident clusters (3–4 accidents within 100m) within 100m of the receptor's access on the ARN.
 - e. Highways and junction capacity on a Tuesday (weekday) around 08:00 and 18:00, sensitivity is highest where typical traffic speeds identified on Google Maps appear as slowest with high congestion and is lowest where traffic speeds appear as fastest with low or no congestion.
- 12.5.130 The sensitivity of PRoW is summarised in Table 12.18. Whilst the Project's current design does not anticipate changes to the composition of motorways or trunk roads, the IEMA EATM guidance refers to the criteria in DMRB LA 112 (Highways England, 2020c) as a helpful basis for assessment of PRoW sensitivity.

Value (sensitivity) of receptor/ resource	Typical description walking, cycling and horse riding (WCHR) only (DMRB LA 112)
Very high	National routes with frequent daily commuter or recreational use, regular use by vulnerable users and with little or no potential for diversion. Joins or alongside roads with greater than 16,000 vehicles per day.
High	Regional routes with frequent daily commuter or recreational use and with limited potential for diversion. Joins or alongside roads with 8,000 to 16,000 vehicles per day.
Medium	PRoW mainly for recreational use and where alternative routes are available. Joins or alongside roads with 4,000–8,000 vehicles per day.
Low	PRoW mainly for recreational use and which are scarcely used or fallen into disuse. Joins or alongside roads with fewer than 4,000 vehicles per day.
Negligible	N/A

Table 12.18 Sensitivity of receptors: Public Rights of Way

Determining the magnitude of impacts

- 12.5.131 Paragraph 3.3 of the IEMA EATM guidance identifies the key impacts that are most important when assessing the magnitude of traffic impacts from an individual development. The impacts and levels of magnitude are applied below as appropriate:
 - a. Severance the perceived community division caused by major transport infrastructure, separating people from places and other people. Changes in traffic of less than 30%, 30–59%, 60–89% and >90% are regarded as resulting in negligible, slight (or minor), moderate and substantial (or major) changes in severance, respectively.

Driver delay – traffic delays to non-development traffic on the network surrounding a development site. Delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. The quantitative thresholds in the classifications provided in

- b. Table 12.19 are not applied in this PEI Report chapter but will be considered more fully in the ES when usage data will be available. For the PEI Report qualitative professional judgement has been applied.
- c. Pedestrian delay delay experienced by non-motorised users when crossing roads. This is only significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. The IEMA EATM guidance highlights that an increase in total traffic of approximately 30% can double the delay experienced by pedestrians attempting to cross a road and would be considered 'major'. To differentiate between the magnitude of impact, it is appropriate to consider whether pedestrian crossings are available for use. Major roads are not assessed in the PEI Report as it is not anticipated that total traffic volumes will increase above 30%, and these routes are supported by pedestrian controlled crossings, including signalised junctions, pelican/puffin, and zebra crossings. Such impacts would be classified as negligible and not need to be assessed further.
- d. Non-motorised user (NMU) amenity relative journey pleasantness for nonmotorised users, which can be affected by traffic flow, composition, and pavement width/separation from traffic. An indicative threshold for judging the significance of changes in pedestrian amenity is where the traffic flow (or its HGV component) is halved or doubled. It is, therefore, considered that a change in the traffic flow of -50% or +100% would produce a 'major' change in pedestrian amenity. Increments can be identified within these thresholds of change to understand the magnitude of this impact on the ARN, as associated with the construction traffic demand. These increments have been aligned with the increments for severance as appropriate.
- e. Fear and intimidation perceptions of fear or intimidation experienced by non-motorised users which is created by moving objects. Table 3.3 within the IEMA EATM guidance (IEMA, 2023) provides four thresholds: high (major), medium (moderate), low (minor) and negligible. The scoring approach provided has been simplified and adapted for the PEI Report to appropriately assess the magnitude of such impacts linked to the additional construction demand. The approach will be refined further in the ES.
- f. Road safety the potential impact of a development on collision rates. This assessment considers the implications of additional traffic from the development and local circumstances such as the volume of existing accidents in the vicinity of the sections of the local roads affected by the development's traffic, or factors which may elevate or lessen risks of accidents. On road links where the baseline traffic flows are low, the assessment will also consider the actual number of additional vehicles. While the percentage increase might be greater than 30%, the increase in the number of vehicles is low. Furthermore, the assessment of magnitude considers the additional numbers of HGVs, local speed limits, the severity of collisions along the road link, the vehicle types involved in collisions, and road safety measures.
- g. Hazardous/large loads the transportation of large loads which are associated with the construction, operation or decommissioning of a development. For the ES, estimates will be made of the number of abnormal loads and their timing within the construction schedule. A qualitative assessment based on professional judgement is used in the PEI Report to assess their implications upon local circumstances. AIL movements will be infrequent and any magnitude of impact would be limited to a marginal proportion of the schedule of construction works (i.e. days). Standard AILs

(i.e. movement of plant and equipment) will be transported to the site on an irregular basis, whilst AILs (i.e. the TBM) would each have one movement into the works boundary and one movement out of the works boundary. It is anticipated that the TBM will arrive via B361 Whitton Road, Rugby Road and the departure of the TBM will be via Burnell Avenue, Beaufort Road / Dysart Avenue, Dukes Avenue. There are no hazardous materials currently anticipated to be delivered to the construction sites. Similarly, at this stage, no contaminated material in the excavation arisings has been identified. Any removal of hazardous excavation arisings will be handled and removed as per The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (as amended).

12.5.132 Table 12.19 outlines the criteria that is being used for determining the likely magnitude of the Project's traffic and transport impacts. As outlined in paragraph 12.5.131, qualitative professional judgement is applied at this PEI Report stage where the necessary quantitative data is not available. Assessment for each site will consider the part of the ARN with the highest impact, respective to the individual impact identified.

Table 12.19 Magnitude of impact criteria

Type of impact	Negligible	Minor	Moderate	Major
Severance	<30% Total traffic Volume (TV) increase	30-59% TV increase	60-89% TV increase	+90% TV increase
Driver delay	No Volume over Capacity Ratio (VCR) classification change for key road links	1 VCR class change to "approaching capacity" for key road links and/or junctions	2 VCR class change, or 1 VCR class change to "at capacity" or higher for key road links and/or junctions	3 VCR class change, or 2 VCR class change to "above capacity" for key road links and/or junctions
Pedestrian delay	< 30% increase in traffic volumes, with pedestrian controlled crossings.	< 30% increase in traffic volumes, without formal pedestrian crossings.	> 30% increase in traffic volumes, with formal pedestrian controlled crossings.	> 30% increase in traffic volumes, without formal pedestrian crossings.
NMU amenity	Traffic flow change <30%	Traffic flow change of 30% to 59%	Traffic flow change of 60% to 89%	Traffic flow change of 100% or more
Fear and intimidation	Total volume of traffic is high, with high HGV volumes: • <400 vehicle increase in average 18hr all vehicle flow; and/or <500 heavy vehicle increase in total 18hr heavy vehicle flow	Volume of traffic is low or moderate, with low or moderate HGV volumes: • <400 vehicle increase in average 18hr AV all vehicle flow; and/or • <500 increase in total 18hr heavy vehicle flow	 >400 vehicle increase in average 18hr all vehicle flow; and/or <500 increase in total 18hr heavy vehicle flow 	 >400 vehicle increase in average 18hr all vehicle flow; and/or >500 HV increase in total 18hr heavy vehicle flow

Type of impact	Negligible	Minor	Moderate	Major
Road safety	 Very low or no recent collisions Traffic flow change 	 Low-moderate recent collisions Traffic flow change 	 Moderate recent collisions Traffic flow change 	 High recent collisions Traffic flow change
	<30%	<30%	>30%	>30%
	 Other criteria i.e.: number of additional HGVs, speed limits, severity of collisions, vehicle types involved in collisions, road safety measures 	 Other criteria i.e.: number of additional HGVs, speed limits, severity of collisions, vehicle types involved in collisions, road safety measures 	 Other criteria i.e.: number of additional HGVs, speed limits, severity of collisions, vehicle types involved in collisions, road safety measures 	 Other criteria i.e.: number of additional HGVs, speed limits, severity of collisions, vehicle types involved in collisions, road safety measures
Hazardous / large loads	Qualitative assessment based on professional judgement to be applied.			

Determining the likely significant effects

- 12.5.133 To determine the overall significance of effects, the combination of the receptor sensitivity and magnitude of impact are applied through the matrix outlined in Table 12.20 which is broadly based upon Table 3.8.1 of DMRB LA 104 (Highways England, 2020a). Whilst the DMRB guidance addresses preliminary environmental assessments for projects modifying trunk roads and motorways, the principles are transferrable to this PEI Report. At this preliminary stage, it is considered appropriate to simplify the sensitivity matrix provided in Table 3.8.1 of DMRB LA 104. The levels of sensitivity have been grouped into three main groups when determining significance of impacts against their magnitude. Moreover, the table does not retain the 'No change' column for magnitude of impact as it is not applicable to the assessment of roads affected by changes in traffic volumes.
- 12.5.134 This preliminary assessment flags any effects that score Moderate or Major significance and thereafter considers how the effect can be managed through additional (secondary) mitigation and enhancement measures.

Magnitude					
		Negligible	Minor	Moderate	Major
Sensitivity	Negligible/Low	Negligible	Negligible	Slight	Moderate
	Medium	Negligible	Slight	Moderate	Major
	High/Very High	Slight	Moderate	Major	Major

Table 12.20 Significance of effect

Operation and maintenance

12.5.135 The operation and maintenance of the Project will generate a minimal trip demand in addition to any existing trips associated with the current activities at Mogden STW and the wider network maintenance. These impacts are not assessed further given they are deemed negligible. The scale of these impacts is covered in . TDRA – Vol no.1 – Preliminary Environmental Information Report Chapter 12 Traffic and Transport

12.5.136 Table 12.21.

Table 12.21 Trip demand during operation

Project Stage	Activity	Access	Frequency	Trip demand
Operation	Project operations: TTP / ancillary infrastructure	Once every 1–2 years, late summer and autumn months.	Inspections by existing TW operatives would be required prior to operating the Project. The pre-operation inspections for each of these activities are expected to generate a demand of no more than one vehicle on a given day, which would be an LGV.	
				One delivery of chemicals is expected to the TTP per week during full operation, which would be via a HGV tanker.
	Outfall, intake and TLT connection	Burnell Avenue	Once every 1–2 years, late summer and autumn months	Inspections would be required prior to operating the Project. The pre-operation inspections for each of these activities are expected to generate a demand of no more than one vehicle on a given day, which would be an LGV.

Project Stage	Activity	Access	Frequency	Trip demand
Maintenance	Recycled water conveyance tunnel and shafts	All sites	Accessed for inspections and maintenance once every 5–10 years	During the inspection period, no more than one vehicle trip to site would be expected, which would be via a car or LGV.
	Recycled water conveyance tunnel and shafts (balancing tanks)	All sites	Accessed for inspections and maintenance once every 5–10 years	During the inspection period, no more than one vehicle trip to site would be expected, which would be via a car or LGV.
	TTP / ancillary infrastructure	Mogden STW	Continuous	When not operating in full (i.e. during drought), the TTP will continue running at reduced levels to maintain its operability. The vehicle demand generated is expected to be negligible and not exceed that generated when the plant is fully operating.
	Outfall, intake and TLT connection Avenue	Burnell Avenue	Once a week	This would require no more than one LGV trip to the site per week.
			Annual inspection	This would require two to three Thames Water staff to visit, each using up to three LGVs over a couple of days.
Assumptions and limitations

- 12.5.137 The key parameters and assumptions used in this preliminary assessment are outlined in this section. The preliminary assessment has used and continues to use a precautionary principle. When there is limited information about the Project, the worst-case scenario is used at this stage.
- 12.5.138 Upon finalisation of the Project's design, key parameters and assumptions will be reviewed and updated accordingly. Any notable changes since this preliminary assessment will be highlighted, noted and explained in the ES.
- 12.5.139 The following assumptions have been incorporated to determine the construction vehicle estimates:
 - a. The quantities of materials and equipment to construct the facilities are estimated based on the size of each key element of the designs. This primarily concerns the shaft and tunnelling construction activities at all sites. Mogden STW includes additional activities, namely embankment works and TTP works.
 - b. The quantities are converted to daily construction vehicle movements. The average number is determined by taking each activity's total number of vehicle movements required and dividing them by the number of working days required to complete the activity. These may be subject to change on submission of the ES as more details on the design will be available.
 - c. Total activity figures and daily figures are rounded up to the next even number to make complete return HGV trips.
 - d. Workforce staff estimates have been informed by inputs from a construction advisory specialist. These may be subject to change on submission of the ES as more details on the design will be available.
 - e. The workforce figures identified for each activity are assumed to be the same regardless of the stage of works, whether setup, main works, or site removal and reinstatement works.
 - f. The identified suppliers with railhead facilities are assumed to facilitate the importing of concrete (aggregates, readymix and precast segments) deliveries and the exporting of reusable excavation arisings generated by the TBM excavation as part of their existing operations. The use of these sites are subject to discussions and agreements with the operators of these facilities.
- 12.5.140 Construction works will be programmed, where practicable, to adhere to standard working hours of the host local authorities:
 - a. Monday to Friday
 - i. All three LPAs: 08:00 to 18:00
 - b. Saturday
 - i. LBH: 09:00 to 13:00
 - ii. LBR and RBK: 08:00 to 13:00

- 12.5.141 Certain activities will need to be conducted outside of the standard working hours. Examples of such activities include:
 - a. Shaft sinking will require a 12-hour working day to provide adequate time to safely complete the excavation and lining sequence.
 - b. Tunnelling work at the Western Work Area as well as access to the interception and intermediate shafts for health and safety reasons will require a 24-hour, seven days a week operation. Once the TBM starts, it should not be stopped for extended periods to prevent issues such as ground squeezing around the TBM leading to it becoming trapped.
 - c. TLT connection activities at Tudor Drive and Burnell Avenue sites will require 24/7 construction working as per the TBM above where activities should not be stopped.
 - d. Long duration concrete pours associated with the storm tanks and the TTP.
 - e. Utility diversion works subject to the requirements of the provider
 - f. Construction site and equipment maintenance and upkeep including replacement of plant and equipment
 - g. Emergency response
- 12.5.142 Additional works may also need to be undertaken outside of the standard working hours and would be developed in consultation with the local planning authority depending on the location and nature of the activity. Nonetheless, due to the proximity of some shaft locations to residential areas, night-time work and workforce travel would be carefully considered and restricted as far as possible.
- 12.5.143 Deliveries of construction materials and removal of excavated materials to and from all above ground sites will not occur 24/7. Standard HGV deliveries and exports would be scheduled to occur Monday–Friday between 08:00 and 18:00. However, hours before 08:00 and after 18:00 could be considered if preferable to avoid network traffic peak periods. It is also expected that deliveries will occur on Saturdays between 09:00 and 13:00. Whilst Saturdays have not been included within the assessment in this PEI Report, it is expected that deliveries will be made at a similar rate to those during equivalent weekdays (i.e. Friday mornings up to early afternoon). The reduced working hours means that Saturdays would have around half the number of daily deliveries compared to a full weekday. Saturday deliveries will be specifically addressed in the ES where necessary.

Further assessment within the ES

- 12.5.144 The ES will present further refinements of the assumptions presented in this PEI Report.
- 12.5.145 The following will also be included in the ES:
 - a. Future baseline for the ARN based on TfL's LoHAM and complemented with traffic surveys
 - b. NMU surveys
 - c. Quantities of AILs

d. An updated assessment of significant effects on transport users where appropriate in light of new transport baseline data or changes to the construction traffic demand

12.6 Baseline conditions

- 12.6.1 The requirement to forecast the changes in the future baseline (see paragraph 1.27 in IEMA EATM guidance) depends on the development of an initial future baseline to assess the additional construction traffic movements against. This PEI Report currently uses 2023 or the latest available count point data if 2023 data are not available from DfT to inform the current baseline for preliminary assessment. In the ES, this will be replaced with the data in the 2031 LoHAM model along with new traffic surveys to cover any remaining gaps in data.LoHAM is TfL's strategic model of London's road network and its surrounding area. It represents motorised highway trips on the network by incorporating routing choices and congestion.
- 12.6.2 Each works area and site has an identified potential route coming in from the SRN, TLRN, and accessing the site through residential areas. These routes would be used by HGVs which would typically be delivering materials for the construction of the Project as well as removing excavated waste generated from the construction sites.
- 12.6.3 For the construction phase, where aggregates are sourced through suppliers with access to railheads (i.e. in Brentford for sites north of the River Thames and Tolworth for sites south of the River Thames), such construction vehicles may not require access to the SRN.

Existing baseline road traffic conditions

- 12.6.4 DfT has traffic count records at several points along the ARN. Annual Average Daily Traffic (AADT) flows depict the average number of traffic movements through a particular count point across the given year, subsequently depicting an average day.
- 12.6.5 Traffic count data by the DfT have been used to establish traffic conditions on the ARN. Where the latest year of traffic data, 2023, are unavailable data from previous years have been used avoiding 2020 and 2021 survey years as these were affected by the COVID-19 restrictions.
- 12.6.6 Table 12.22 and Table 12.23 tabulate the baseline percentage of HGVs counted. These tables have identified locations on the ARN where no DfT counts are available. As outlined in paragraph 12.6.1, these gaps will be addressed with data from the LoHAM model and new traffic surveys in the ES as required.

Table 12.22 Motorised vehicle movements at key count points available on the ARN, 2023 (AADT) – north of the River Thames

Location	Total vehicles	Two- wheeled motor vehicles	Cars and taxis	Buses and coaches	Light Goods Vehicles	Heavy Goods Vehicles	Heavy Goods Vehicles (%)
A310 London Road, between A316 Chertsey Road and Crane Avenue	20,493	580	15,813	617	2,955	527	2.6%
A310 Twickenham Road, between Dawes Avenue and Cleveland Road	20,493	580	15,813	617	2,955	527	2.6%
A310 Twickenham Road, between B363 St Johns Road and Linkfield Road	20,621	602	15,544	605	3,282	588	2.9%
A4 Great West Road, between Transport Avenue and A3002 Boston Park Road	49,486	1,464	39,061	422	6,629	1,911	3.9%
A316 Chertsey Road, between B361 Whitton Road and B358 Hospital Bridge Road	45,921	1,066	36,774	238	6,679	1,164	2.5%
A316 Country Way, between B391 Hounslow Road and M3 / Sunbury Cross	68,872	845	56,022	274	9,733	1,997	2.9%

Table 12.23 Motorised vehicle movements at key count points available on the ARN, 2023* (AADT) – south of the River Thames

Location	Total vehicles	Two- wheeled motor vehicles	Cars and taxis	Buses and coaches	Light Goods Vehicles	Heavy Goods Vehicles	Heavy Goods Vehicles (%)
Riverside Drive, between Croft Way and Dukes Avenue	2,395	23	2,136	22	199	15	0.6%
A307 Richmond Road, between Richmond Park Road and Kings Road	19,383	585	15,247	377	2,789	384	2.0%

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Location	Total vehicles	Two- wheeled motor vehicles	Cars and taxis	Buses and coaches	Light Goods Vehicles	Heavy Goods Vehicles	Heavy Goods Vehicles (%)
A307 Cromwell Road, between A307 Richmond Road and A307 Queen Elizabeth Road	27,939	1,178	20,714	1,603	3,770	673	2.4%
A308 Sopwith Way, between A308 Wood Street and Kingsgate Road A307	28,426	854	22,827	677	3,600	467	1.6%
A307 Fairfield North, between A307 Wheatfield Way and A308 London Road	23,705	718	17,768	1,125	3,726	368	1.6%
A308 London Road, between A307 Fairfield North and A2043 Cambridge Road	20,895	969	15,210	1,801	2,366	548	2.6%
A308 London Road, between A2043 Cambridge Road and A238 Coombe Road	17,882	589	13,705	1,160	2,134	295	1.6%
A307 Wheatfield Way, between Orchard Road and Brook Street	30,400	1,152	24,170	559	3,910	608	2.0%
A307 Portsmouth Road, between Uxbridge Road and Catherine Road	12,831	503	11,054	249	893	133	1.0%
A243 Hook Road, between Tolworth Road and Hook Junction	20,938	792	16,922	120	2,741	362	1.7%
A3 Hook Underpass, between Hook Junction and A3 Esher Bypass / Esher Common	88,354	1,241	67,097	136	16,766	3,114	3.5%
A3 Kingston Bypass, between Tolworth Roundabout and Hook Junction	105,642	1,524	84,725	238	15,592	3,563	3.4%

*All DfT data in this table reflect the year 2023, except for the 'Riverside Drive, between Croft Way and Dukes Avenue' count point, which reflects the year 2019.

Active modes

Existing baseline conditions for active modes

- 12.6.7 There are movements of NMUs such as pedestrians and cyclists which intersect the ARN. These can be initially identified based on defined routes utilised by these road users.
- 12.6.8 The following cycle routes intersect the ARN between access points of the construction sites and the SRN and the railhead depots:
 - a. TfL routes: C40 (A310 Twickenham Road), C28 (along A307 Corridor, from A307 High Street / A307 Portsmouth Road to A243 Brighton Road), C29 (A308 Sopwith Way / A307 Wood Street / A307 Clarence Street A307 Wheatfield Way), and C30
 - b. Kingston Cycle Campaign Routes: Thames Riverside and Richmond Park (A307 Upper Ham Road/A307 Richmond Road, and A307 Wood Street), Surbiton Parks and Greens (A243 Upper Brighton Road), (Blue (A307 Richmond Road/A307 Wood Street, A307 Queen Elizabeth Road/A307 Clarence Street/A307 Wheatfield Way, Red: Berrylands – Richmond Park (A307 Richmond Road/A307 Queen Elizabeth Road), Purple: University – Ham (A307 Wood Street/A307 Wheatfield Way), Green: Surbiton – Teddington Lock (A307 Wood Street/A307 Kingston Hall Road), and - Pink: Portsmouth Road – Kingston Bridge (A307 High Street)
 - c. NCN Route 4: Hampton Court to Putney Bridge/Shakespeare Cycleway/Thames Valley (Riverside Drive)
- 12.6.9 Figure 12.4 in Volume 2 of this PEI Report provides a map of cycling routes. This includes any of the above routes where they interact with the local ARN, which sits between the site accesses and major roads.
- 12.6.10 Segregation and priority measures for cyclists are mostly along these corridors, with any gaps facilitated with controlled pedestrian crossings which cyclists can dismount and wheel across if desired. This protects cyclists from other motorists including the vehicle traffic generated by the development's construction, operation and maintenance. Nonetheless, these matters are included in this preliminary assessment until clarity is provided on which parts of the ARN will exceed the traffic volume increase thresholds discussed above.
- 12.6.11 PRoW are footpaths, bridleways and byways where the public have a right to pass at all times. There are no PRoWs that link or intersect the ARN for the sites north of the River Thames. Figure 12.3 in Volume 2 of this PEI Report identifies and labels the PRoW that are linked to or intersect local roads within the ARN south of the River Thames up to the A307 corridor.

Public transport

Buses

12.6.12 For Mogden STW, which is located north of the River Thames, eight bus routes were identified on the ARN with an hourly frequency of four services or greater, as shown in Table 12.24.

12.6.13 For sites south of the River Thames, 14 routes operate on the ARN at a frequency of four services per hour or greater, as shown in Table 12.24. In multiple cases, this can be primarily attributed to buses from the bus station on A307 Cromwell Road. It should be noted that the buses leaving the station are assigned priority by signals to re-enter the carriageway, of which all construction traffic must comply with.

Table 12.24 Bus services on	construction routes nort	th and south of the River	Thames
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Bus service	Route	Typical frequency (minimum)	ARN – North (to M25 J12 or Transport Avenue, Brentford) or South (to M25 J10 or A240 Kingston Road, Tolworth)
110 (TfL)	School Road – Hammersmith Bus Station	4 per hour	North
267 (TfL)	Hammersmith Bus Station – South Road / Fulwell	4 per hour	North
281 (TfL)	Tolworth Station – Hounslow Bus Station	4 per hour	North
E2 (TfL)	Greenford Broadway – Brentford Bus Depot	6 per hour	North
H20 (TfL)	Twickenham Tesco – Civic Street	5 per hour	North
H22 (TfL)	The Bell – West Middlesex Hospital	4 per hour	North
H37 (TfL)	Hounslow / Blenheim Centre – Manor Road	7 per hour	North
H91 (TfL)	Hounslow West Station – Hammersmith Bus Station	5 per hour	North
65/N65 (TfL)	Brook Street – Ealing Broadway Station	6 per hour	South
371 (TfL)	Manor Road / Sainsbury's – Kingston Hall Road	5 per hour	South
65 (TfL)	Brook Street – Ealing Broadway Station	6 per hour	South
57 (TfL)	Fairfield Bus Station – Atkins Road / New Park Road	4 per hour	South
71 (TfL)	Chessington World of Adventures – Cromwell Road Bus Station	5 per hour	South
85 (TfL)	Putney Bridge Station – Kingston Hall Road	6 per hour	South
111 (TfL)	Heathrow Central Bus Station – Cromwell Road Bus Station	11 per hour	South

Bus service	Route	Typical frequency (minimum)	ARN – North (to M25 J12 or Transport Avenue, Brentford) or South (to M25 J10 or A240 Kingston Road, Tolworth)
131 (TfL)	Fairfield Bus Station – Tooting Broadway Station	6 per hour	South
213 (TfL)	Fairfield Bus Station – Sutton Bus Garage	4 per hour	South
281 (TfL)	Hounslow Bus Station – Tolworth Tower	4 per hour	South
285 (TfL)	Heathrow Central Bus Station – Cromwell Road Bus Station	5 per hour	South
K1 (TfL)	New Malden Station – Cromwell Road Bus Station	5 per hour	South
K2 (TfL)	Kingston Hospital – Hook Parade	5 per hour	South
K3 (TfL)	Roehampton Vale / Asda – Esher High Street or Trinity School	4 per hour	South

Source: Transport for London, 2025 (correct as of 17 July 2023, except for routes 281, H91 and E2 which were obtained on 12 February 2025)

Rail

- 12.6.14 Kingston Railway Station provides rail services to central London and Shepperton to the west of London. The gyratory roads to the east and south of the station's access point form part of the ARN with HGV routing to sites south of the River Thames. Both of these sections of road are facilitated with controlled pedestrian crossings across junctions that are raised to the kerb level.
- 12.6.15 The priority of pedestrians entering and exiting the station on activation of traffic signals would be unaffected by the construction traffic generated by the Project. Syon Lane Railway Station is located along Syon Lane, which forms part of the ARN for HGV movements between Mogden STW and Brentford Rail Depot. Access to the station for pedestrians is supported by a signalised pelican crossing, which grants pedestrians right-of-way across the highway to navigate between the bus stops on either side of the carriageway and the entrance to Syon Lane Railway Station. The priority of pedestrians on activation of traffic signals would be unaffected by the construction traffic generated by the Project.
- 12.6.16 Table 12.25 outlines the frequency of the rail services during key periods for these stations.

Origin	Destination	Peak average (inbound and outbound)				
		06:00–19:00 average	AM peak: 07:00–09:00 average	PM peak: 18:00–19:00		
Syon Lane	London Waterloo	3	4	4		
	Weybridge	3	3	4		
Kingston Railway Station	London Waterloo	4	4	4		
	Shepperton	2	2	2		

Table 12.25 Rail services on construction routes

Source: National Rail (2023)

Data collection

Road traffic

12.6.17 Average annual traffic flows are the average total number of vehicle movements for a day in a given year. These are provided in an AADT format over a 24-hour period, which is required for air quality assessments in Chapter 13: Air Quality. Similarly, these are provided in an Annual Average Weekday Traffic (AAWT) format over an 18-hour period for traffic noise assessments in Chapter 14: Noise and Vibration. For the ES, these data will be obtained for the ARN and shared with air quality and noise assessment specialists to reflect traffic conditions in the future baseline year comparison scenarios.

The impacts will be explored at the locations identified in Table 12.26 and

12.6.18 Table 12.27. Given the ARN up to and including the linked LLCS permitted routes fall within district-wide Air Quality Management Areas, it is noted that the threshold of 25 additional HGVs is exceeded in all potential scenarios and route distribution options.

Table 12.26 HGV traffic impacts on local ARN by routing option – north of the River Thames

ARN road link	Routing Option A	Routing Option B	Routing Option C	Northern access gate route (used by exception)
Rugby Road/B361 Whitton Road	\checkmark	\checkmark	\checkmark	×
Mogden Lane	×	\checkmark	×	×
A316 Chertsey Road (west of B361 Whitton Road) for M3 and M25	~	\checkmark	\checkmark	\checkmark
A316 Chertsey Road (east of B361 Whitton Road) for A310 London Road	×	×	\checkmark	\checkmark
A310 (south: London Road / Twickenham Road)	×	×	\checkmark	\checkmark
A310 (central: Twickenham Road)	×	\checkmark	\checkmark	Route option- dependent
Oak Lane and Worton Road (between Oak Lane and A310 Twickenham Road)	×	×	×	\checkmark
A310 (north: Twickenham Road) and B454 Spur Road / Syon Lane	×	\checkmark	\checkmark	Route option- dependent
B454 Spur Road / Syon Lane	×	\checkmark	\checkmark	Route option- dependent
A4 Great West Road	×	\checkmark	\checkmark	Route option- dependent
Transport Avenue	×	\checkmark	\checkmark	Route option- dependent

Table 12.27 HGV traffic impacts on local ARN by routing option – south of the River Thames

ARN road link	Ham Playing Fields site	Burnell Avenue site	Tudor Drive site
Ham Street (between Riverside Drive and Sandy Lane) / Sandy Lane	*	×	×
Ham Street (between Riverside Drive and Sandy Lane) / Sandy Lane	*	×	×
Riverside Drive and Dukes Avenue (between Riverside Drive and Beaufort Road)	\checkmark	×	×
Burnell Avenue / Dysart Avenue / Beaufort Road	*	\checkmark	×
Dukes Avenue (between Dysart Avenue and Beaufort Road)	\checkmark	\checkmark	×
Dukes Avenue (between Dysart Avenue and A307 Richmond Road)	\checkmark	\checkmark	×
Tudor Drive / Park Road	×	×	\checkmark
A308 London Road	×	×	\checkmark
A307 Corridor, north of Dukes Avenue	*	*	*
A316 Chertsey Road for M3	*	*	*
A307 Corridor, south of Dukes Avenue	\checkmark	\checkmark	\checkmark
A243 Brighton Road / A243 Hook Road	\checkmark	\checkmark	\checkmark
A3 Kingston Bypass	\checkmark	\checkmark	\checkmark
A240 Kingston Road	\checkmark	\checkmark	\checkmark

*By exception – no regular HGV movements are anticipated throughout the works

Non-motorised users

- 12.6.19 The latest IEMA EATM guidance highlights that the following information should be collected:
 - a. The location, the type of route, and its geographical extent
 - b. The frequency of use within the study area
- 12.6.20 A desktop study of PRoW maps provided by the local authorities has been used to review the location, type and geographical extent of each PRoW.
- 12.6.21 To establish the frequency of use, surveys will be conducted for sites south of the River Thames up to the A307 corridor. In addition to the PRoW listed in Table 12.18, it is expected that the ES will consider affected PRoW along any additional parts of the ARN where applicable and appropriate. For example, if severance, pedestrian delay and/or intimidation thresholds for assessment are

exceeded on associated sections of the wider ARN compared to their status in the baseline, the associated PRoW will be included in the assessment.

- 12.6.22 Table 12.28 below summarises the locations of NMU surveys to be considered. It should be noted that the table below identifies local PRoW routes across different Project design options and construction traffic routing options. If any options are scoped out at the time of the EIA, the surveys for the associated NMUs along these routes will not be required.
- 12.6.23 These locations are also provided on the map shown in Figure 12.3 in Volume 2 of this PEI Report.

Name	Survey locations	Sensitive to scheme design/routing
PRoW 100	1x from Riverside Drive	Yes
PRoW 118	1x from Ham Street	Yes
PRoW 119	1x from Ham Street	Yes
PRoW 134	1x from Ham Street Car Park	Yes
PRoW 111	2x from Sandy Lane – 1 on north side, 1 on south side	Yes
PRoW 112	1x on Sandy Lane	Yes
National Trail	On-route, by Burnell Avenue reception shaft location	Yes

Table 12.28 Survey locations for pedestrians, cyclists and horse-riders

12.7 Preliminary assessment of likely significant effects

Future baseline

Road traffic

- 12.7.1 This PEI Report considers the effects of construction demand against existing DfT count point data from the year 2023 (where available). It compares the predicted construction traffic demand against the current baseline traffic flows.
- 12.7.2 In the ES the effects of the construction traffic demand will be considered against estimated future traffic flow data which will be available from the 2031 LoHAM traffic model. Traffic surveys will be conducted to cover any outstanding gaps. Due to the expected increase in background traffic, the magnitude of the effects will be reduced since the construction traffic demand is fixed. Therefore, the PEI Report assessment is more conservative, and acceptable at this stage.
- 12.7.3 This section sets out the likely significant effects on traffic and transport during construction. The assessment assumes that embedded design (primary) mitigation and standard good practice (tertiary) measures in the draft CoCP

(Appendix 4.3) are in place, and the results of the assessment then inform the need for any additional (secondary) mitigation requirements during construction.

Construction traffic demand

- 12.7.4 The preliminary assessment of the construction traffic effects is based on the comparison of the construction traffic demand against the road traffic data referenced in paragraph 12.7.1 to determine the percentage increase in overall traffic volume and percentage increase in HGV volumes.
- 12.7.5 The overall construction traffic volume is the sum of the daily construction HGV demand and the daily workforce commuting trips.
- 12.7.6 The assessment for each road link is based on the combination of the maximum level of HGV movements likely to be experienced on that road link and the maximum workforce commuting trips.
- 12.7.7 The maximum number of HGV movements is the estimated worst case for that road link depending on the routing options described in paragraphs 12.5.106 and 12.5.113 in Section 12.5 of this chapter.
- 12.7.8 The maximum number of workforce commuting trips is described in Section 12.5 of this chapter and summarised in Table 12.12.

In combination effects with climate change

- 12.7.9 In general, climate change is expected to lead to an increase in temperatures, with a greater frequency of hotter, drier summers and warmer, wetter winters. Climate change is also expected to lead to sea level rise which will affect tide levels and associated flood risk within the tidal River Thames as far west as Teddington Weir. Further information on projected changes in climate parameters is provided in Chapter 18: Climate Change. Projected future changes in climate (e.g. increase in temperatures) have the potential to interact with effects identified within some environmental aspects and exacerbate or diminish their impact. Such combined impacts are termed In-Combination Climate Impacts.
- 12.7.10 As the operational traffic and transport assessment has been scoped out of the ES the assessment is only concerned with impacts during construction. Construction is planned to start in 2029 and the Project is expected to be operational by 2033. Therefore, it is not anticipated that significant climate change impacts will have an effect within this construction timeframe as outlined in Appendix 18.1: In-Combination Climate Impacts.

Construction Assessment

- 12.7.11 The preliminary assessment is primarily driven by the absolute change or percentage change in HGV movements on each road link, and the sensitivity of the receptors along the road link.
- 12.7.12 The key environmental impacts assessed as listed in paragraph 3.3 of the IEMA EATM guidance are as follows:
 - a. Severance
 - b. Driver delay
 - c. Pedestrian delay
 - d. NMU amenity
 - e. Fear and intimidation
 - f. Road safety
 - g. Hazardous/large loads
- 12.7.13 The magnitude of these impacts is based on varying levels of changes in total traffic and HGV volumes as described in Section 12.5 of this chapter.

Estimated maximum anticipated daily construction demand – effects on the ARN

- 12.7.14 The changes in total traffic volumes on the various road links in the ARN are described below.
- 12.7.15 Where no baseline traffic data are available in recent years (2023, 2022 and 2019), the assessment is qualitative and based on professional judgement.
- 12.7.16 In the ES, the assessment will be based on the predicted future baseline in 2031 that will be extracted from the LoHAM. North of the River Thames

Estimated maximum HGV daily demand at access

12.7.17 The estimated maximum anticipated daily numbers of HGV movements to and from each site's access gate are summarised in Table 12.29. It should be noted that each of these would not occur throughout the duration of the schedule of works and are not all concurrent.

Maximum HGV movements to site	Mogden STW	Ham Playing Fields	Burnell Avenue	Tudor Drive
Anticipated maximum	In: 50 Out: 50 Total: 100	In: 9 Out: 9 Total: 18	In: 16 Out: 16 Total: 32	In: 6 Out: 6 Total: 12
Duration (weeks)	65	33	5	5

Table 12.29 Estimated maximum anticipated daily HGV movements to each site

12.7.18 The maximum numbers of staff entering each site access point on a given day are outlined in Table 12.12 and Table 12.13 in Section 12.5 of this chapter.

HGV demand by road link

- 12.7.19 The total traffic volume and HGV volumes for Mogden STW are based on the worst case for each road link as described in the routing options A, B, and C (see paragraph 12.5.106), and the alternative routing to the northern access gate to be used during infrequent periods in the calendar year where access at the southern access gate is closed for short periods(see paragraph 12.5.108).
- 12.7.20 These volumes across the ARN are summarised in Table 12.30 and mapped in Figure 12.5 in Volume 2 of this PEI Report (worst-case demand on each road link). A range has been provided for the northern access to note the smallest and largest anticipated total HGV volumes depending on whether routing option A, B or C is implemented by the contractor during the use of the northern access gate.

Table 12.30 Estimated maximum anticipated daily HGV movements (in and out) north of the River Thames

Road segment name	Maximum anticipated construction demand: HGVs						
	Option A	Option B	Option C	Northern access (range)	Worst case for each road link		
Rugby Road and B361 Whitton Road	100	16	100	N/A*	100		
A316, West of B361	100	16	16	16-100	100		
Mogden Lane	N/A*	84	N/A*	N/A*	84		
A316, between B361 and A310	N/A*	N/A*	84	84–100	100		
A310 (south: London Road / Twickenham Road)	N/A*	N/A*	84	84–100	100		
A310 (central: Twickenham Road)	N/A*	84	84	84–100	100		
Worton Road (between Oak Lane and A310 Twickenham Road)	N/A*	N/A*	N/A*	100	100		
Oak Lane	N/A*	N/A*	N/A*	100	100		
A310 (north: Twickenham Road) and B454 Spur Road / Syon Lane	N/A*	84	84	84	84		
A4 Great West Road, between B454 and Transport Avenue	N/A*	84	84	84	84		
Transport Avenue	N/A*	84	84	84	84		
A4 Great West Road, east of Transport Avenue to Great West Road spur	N/A*	84	84	84	84		
Great West Road spur	N/A*	42	42	42	42		
A4 Great West Road, between Great West Road Spur	N/A*	42	42	42	42		

*No construction HGV demand is generated as this road link is not used for this selected routing option

Construction workforce demand by road link

12.7.21 The demand for workforce trips on the road network affected by construction HGVs are provided in Table 12.31. The indicative distribution of workforce movements are illustrated on Figure 12.6 in Volume 2 of this PEI Report. This assumes that staff driving to work will not be able to access the southern access gate to Mogden STW when it is closed and thus must also be diverted to the northern access gate. Further clarification on workforce routing will be provided in the ES.

Table 12.31 Estimated maximum	anticipated daily	/ workforce	movements	(in and out) north
of the River Thames					

Road segment name	Southern access gate open – cumulative	Northern access gate use (southern access gate closed) – cumulative	Maximum (all access options)
Gate: Mogden STW	200	200	200
Rugby Road	128	0	128
B361 Whitton Road	134	8	134
Mogden Lane	0	0	0
A316 Chertsey Road, West of B361	58	6	58
A316 Chertsey Road, between B361 and A310	84	14	84
A316 Country Way, between B391 Hounslow Road and M3 / Sunbury Cross	56	50	56
A310 (south: LondonA310 (south: London Road / Twickenham Road)	0	0	0
A310 (central: Twickenham Road)	0	0	0
Worton Road (between Oak Lane and A310 Twickenham Road)	0	34	34
Oak Lane	0	200	200
A310 (north: Twickenham Road) between A3004 South Street and Worton Road	0	34	34
A310 (north: Twickenham Road) and B454 Spur Road / Syon Lane	0	0	0
A4 Great West Road, between B454 and Transport Avenue	8	50	50
A4 Great West Road, east of Transport Avenue to Great West Road spur	8	50	50
A4 Great West Road, between Great West Road Spur	8	50	50

Estimated maximum anticipated daily changes – Southern access gate routing (worst case)

- 12.7.22 In terms of the ARN, there are a number of parts that are not covered in the latest traffic count dataset provided by DfT. Locally to Mogden STW, this includes Rugby Road, B361 Whitton Road, Mogden Lane, and A316 Chertsey Road between B361 Whitton Road and A310 London Road. In Brentford, this includes the B454 corridor, Transport Avenue and routing off A4 Great West Road. For assessment in the ES, traffic data will need to be extracted from TfL's LoHAM.
- 12.7.23 At the observed count points, the increase in total vehicle flows does not exceed 1%.
- 12.7.24 The largest change in HGV flows was noted along A310 London Road, increasing by a range of 15–20% at most, which is considered negligible (<30%). Increases in HGV volumes do not exceed 10% along the A316 corridor, and do not exceed 5% where observed on A4 Great West Road.
- 12.7.25 Across all observed traffic count points, HGVs make up fewer than 5% of total vehicles when including the site's estimated maximum anticipated daily construction demand. This is a percentage point change that is smaller than +1.0 in all cases.
- 12.7.26 Table 12.32 provides a full summary of the quantitative traffic impacts caused by the construction traffic. This table identifies locations on the ARN where no DfT counts are available. As outlined in paragraph 12.6.1, these gaps will be addressed with data from the LoHAM model and new traffic surveys in the ES as required.

Table 12.32 ARN's traffic conditions with the estimated maximum anticipated daily HGV volumes and associated workforce movements – north of the River Thames – southern access gate

Location	Change in total vehicle flows (% change)	Change in total HGV flows (% change)	HGV % of all vehicles	Percentage point change
A310 London Road, between A316 Chertsey Road and Crane Avenue	<1%	15-20%	0-5%	<1
A310 Twickenham Road, between Dawes Avenue and Cleveland Road	<1%	15-20%	0-5%	<1
A310 Twickenham Road, between B363 St Johns Road and Linkfield Road	<1%	12.5-15%	0-5%	<1
A4 Great West Road, between Transport Avenue and A3002 Boston Manor Road	<1%	2.5-5%	0-5%	<1
A316 Chertsey Road, between B361 Whitton Road and B358 Hospital Bridge Road	<1%	7.5-10%	0-5%	<1
A316 Country Way, between B391 Hounslow Road and M3 / Sunbury Cross	<1%	5-7.5%	0-5%	<1

Estimated maximum anticipated daily changes – Northern access gate routing (when southern access gate is closed, worst case)

- 12.7.27 Construction traffic will have to use the northern access gate to Mogden STW occasionally when there is an operational requirement to restrict access through the southern access gate (see paragraph 12.5.108). In assessing the ARN associated with this closure, the worst case considers the maximum volume of HGVs generated on each road link when considering the access via Oak Lane and Worton Road via the three main routing options: A, B, C.
- 12.7.28 In addition to the missing data at the sections of the ARN flagged in paragraph 12.7.22, it should also be noted that there are no traffic counts provided along Oak Lane and Worton Road. For assessment in the ES, a traffic survey will be required on Oak Lane whilst data from TfL's LoHAM will be needed for Worton Road off A4 Great West Road.
- 12.7.29 In terms of the ranges of changes in total vehicles, changes in total HGVs, concentrations of HGVs and percentage point changes in HGV concentrations, these are the same as those identified when the southern access gate is open.
- 12.7.30 Table 12.33 provides a full summary of the quantitative traffic impacts caused by the construction traffic. This table identifies locations on the ARN where no DfT

counts are available. As outlined in paragraph 12.6.1, these gaps will be addressed with data from the LoHAM model and new traffic surveys in the ES as required.

Table 12.33 ARN's traffic conditions with the estimated maximum anticipated daily HGV
volumes and associated workforce movements – north of the River Thames – northern
access gate

Location	Change in total vehicle flows (% change)	Change in total HGV flows (% change)	HGV % of all vehicles	Percentage point change
A310 London Road, between A316 Chertsey Road and Crane Avenue	<1%	15-20%	0-5%	<1
A310 Twickenham Road, between Dawes Avenue and Cleveland Road	<1%	15-20%	0-5%	<1
A310 Twickenham Road, between B363 St Johns Road and Linkfield Road	<1%	12.5-15%	0-5%	<1
A4 Great West Road, between Transport Avenue and A3002 Boston Manor Road	<1%	2.5-5%	0-5%	<1
A316 Chertsey Road, between B361 Whitton Road and B358 Hospital Bridge Road	<1%	7.5-10%	0-5%	<1
A316 Country Way, between B391 Hounslow Road and M3 / Sunbury Cross	<1%	5-7.5%	0-5%	<1

South of the River Thames

HGV demand by road link

12.7.31 For the Ham Playing Fields, Burnell Avenue and Tudor Drive sites, there is the possibility that the railhead off A240 Kingston Road in Tolworth could be used to deliver concrete aggregates, readymix concrete and precast segments. Depending on whether the facility is used, the estimated maximum anticipated daily HGV volumes would differ along the A3 corridor, its slip roads and along A240 Kingston Road. The maximum traffic volumes on each road link are provided for both cases with and without the use of the facility, as summarised in Table 12.34. The worst-case maximum flows by road link are mapped in Figure 12.5 in Volume 2 of this PEI Report.

Table 12.34 Estimated maximum anticipated daily HGV movements (in and out) south of the River Thames

Road segment name	Maximum anticipated construction dema HGVs		
	Case 1: all to SRN	Case 2: to SRN or railhead	Maximum (all cases)
Ham Street N	18	18	18
Riverside Drive and Dukes Avenue W	18	18	18
Burnell Avenue and Beaufort Road	16	16	16
Dysart Avenue	16	16	16
Dukes Avenue C	30	30	30
Dukes Avenue E	42	42	42
A307 Richmond Road, between Tudor Drive and Kingston Fire Station	42	42	42
A307 Richmond Road, between Kingston Fire Station and Acre Road	45	45	45
Tudor Drive and Park Road	6	6	6
A308 London Road	6	6	6
A307 Richmond Road, between Kingsgate Road and Sopwith Way	24	24	24
A307 Richmond Road (S), Cromwell Road and Queen Elizabeth Road	27	27	27
Fairfield North	24	24	24
Clarence Street, Wood Street, and Sopwith Way	27	27	27
A307 Kingsgate Road	21	21	21
A308 Sopwith Way	6	6	6
A307 Wheatfield Way then A307 southwards, and A243 (N)	48	48	48
A243 Upper Brighton Road (S) and Hook Road	48	48	48
Hook Rise North W	24	24	24
Hook Rise South W	24	24	24
Kingston Bypass C	96	92	96
Hook Rise North E	48	46	48
Hook Rise South E	48	46	48
A240 Kingston Road	0	12	12

Road segment name	Maximum anticipated construction demand: HGVs			
	Case 1: all to SRN	Case 2: to SRN or railhead	Maximum (all cases)	
Kingston Bypass W and Hook Underpass	48	44	48	

Construction workforce demand by road link

12.7.32 Workforce trips on the road network affected by construction HGVs are provided in Table 12.35. These are unaffected by the HGV routing options pursued. The assessment is based on the cumulative total of maximum volumes across all sites, including the Mogden STW site. The geography of the workforce routes are shown in Figure 12.6 in Volume 2 of this PEI Report.

Table 12.35 Estimated maximum anticipated daily workforce movements (in and out) south of the River Thames

Road segment name	Cumulative – all sites (including Mogden STW site southern access gate traffic)	Cumulative – all sites (including Mogden STW site northern access gate traffic)	Maximum anticipated construction demand: workforce LGVs and cars
Gate: Ham Playing Fields site	60	60	60
Gate: Burnell Avenue site	180	180	180
Gate: Tudor Drive site	60	60	60
Dysart Avenue	180	180	180
Dukes Avenue E	180	180	180
A307 Richmond Road, between Tudor Drive and Kingston Fire Station	102	104	104
A307 Richmond Road, between Kingston Fire Station and Acre Road	70	72	72
A308 London Road	0	0	0
A307 Richmond Road, between Kingsgate Road and Sopwith Way	0	0	0
A307 Richmond Road (S), Cromwell Road and Queen Elizabeth Road	35	36	36
Fairfield North	35	36	36

Road segment name	Cumulative – all sites (including Mogden STW site southern access gate traffic)	Cumulative – all sites (including Mogden STW site northern access gate traffic)	Maximum anticipated construction demand: workforce LGVs and cars
A307 / A308 Clarence Street, Wood Street	15	15	15
A307 / A308 Sopwith Way (W)	35	36	36
A307 Kingsgate Road	0	0	0
A307 Wheatfield Way, between Fairfield North and Fairfield Road	30	30	30
A307 Wheatfield Way, from Fairfield Road to A307 Kingston Hall Road	6	6	6
A243 Hook Road, between Tolworth Road and Hook Junction	24	24	24
Kingston Bypass C	2	2	2
Hook Rise North E	0	0	0
Hook Rise South E	0	0	0
Kingston Bypass W and Hook Underpass	2	2	2
Tudor Drive (west)	72	72	72
Ham Street N	60	60	60

Estimated maximum anticipated daily changes

- 12.7.33 DfT traffic count data were obtained from 2023 surveys across all available locations, except for the survey on Riverside Drive which was conducted in 2019. There are no traffic surveys along the following local highways: Ham Street, Dukes Avenue, Dysart Road, Burnell Avenue, Beaufort Road, Tudor Drive and Park Road. Moreover, no data are provided at any point along the section of A240 Kingston Road which HGVs would use. A combination of traffic surveys and data from TfL's LoHAM model will be required for the final assessment to be outlined in the ES.
- 12.7.34 It should be noted that there is no difference in the degrees of change for the identified ranges along the A3 and its slip roads.
- 12.7.35 The percentage increase in total traffic volumes does not exceed 1% across all observed count points and routing options on the ARN. Whilst this includes Riverside Drive, it should be noted that this traffic count was taken further south along Riverside Drive, meaning that it is not yet known whether such impacts

would be greater further north, which is nearer to its junction with Ham Street. This will be assessed fully in the ES.

- 12.7.36 The total percentage increase in HGV volumes would be greatest along Riverside Drive (>100%) and minor on A307 Portsmouth Road (30–50%).
 Increases in HGV concentrations would be negligible (10–12.5% or lower) across the rest of the observed traffic counts.
- 12.7.37 In all cases, HGVs including the estimated maximum anticipated daily flows would make up no more than 5% of total traffic volumes at the observed count point locations. These would translate to percentage point increases that are smaller than +1.0. Table 12.36 provides a full summary of the quantitative traffic impacts caused by the construction traffic on the minor roads south of the River Thames. This table identifies locations on the ARN where no DfT counts are available. As outlined in paragraph 12.6.1, these gaps will be addressed with data from the LoHAM model and new traffic surveys in the ES as required.

Table 12.36 ARN's traffic conditions with the estimated maximum anticipated daily HGV volumes and associated workforce movements volumes – south of the River Thames

	Changes to traffic with maximum construction activity (worst case by road link)				
Location	Change in total vehicle flows (% change)	Change in total HGV flows (% change)	HGV % of all vehicles	Percentage point change	
Riverside Drive, between Croft Way and Dukes Avenue	<1%	100%+	0-5%	<1	
A307 Richmond Road, between Richmond Park Road and Kings Road	<1%	10-12.5%	0-5%	<1	
A307 Cromwell Road, between A307 Richmond Road and A307 Queen Elizabeth Road	<1%	2.5-5%	0-5%	<1	
A308 Sopwith Way, between A308 Wood Street and Kingsgate Road A307	<1%	1-2.5%	0-5%	<1	
A307 Fairfield North, between A307 Wheatfield Way and A308 London Road	<1%	5-7.5%	0-5%	<1	
A308 London Road, between A307 Fairfield North and A2043 Cambridge Road	<1%	1-2.5%	0-5%	<1	
A308 London Road, between A2043	<1%	1-2.5%	0-5%	<1	

	Changes to traffic with maximum construction activity (worst case by road link)				
Cambridge Road and A238 Coombe Road					
A307 Wheatfield Way, between Orchard Road and Brook Street	<1%	7.5-10%	0-5%	<1	
A307 Portsmouth Road, between Uxbridge Road and Catherine Road	<1%	30-50%	0-5%	<1	
A243 Hook Road, between Tolworth Road and Hook Junction	<1%	12.5-15%	0-5%	<1	
SRN only					
A3 Hook Underpass, between Hook Junction and A3 Esher Bypass / Esher Common	<1%	1-2.5%	0-5%	<1	
A3 Kingston Bypass, between Tolworth Roundabout and Hook Junction	<1%	2.5-5%	0-5%	<1	
SRN and Tolworth Depot					
A3 Hook Underpass, between Hook Junction and A3 Esher Bypass / Esher Common	<1%	1-2.5%	0-5%	<1	
A3 Kingston Bypass, between Tolworth Roundabout and Hook Junction	<1%	2.5-5%	0-5%	<1	

Significance of impacts

Sensitivity of receptors

- 12.7.38 Receptors have been selected based on whether they are directly accessed from the ARN. This would generate the highest significance of impact rating for the section of the ARN. Subsequently, other receptors with lower levels of sensitivity would not exceed this level of significance of impact.
- 12.7.39 Additionally, sensitive receptors were scoped in for consideration for roads with 350 existing HGVs or more, according to DfT traffic data. The maximum additional HGVs from the Project would cause an increase in HGVs below 30% for any road with 350 HGVs or more. The 30% threshold has historically distinguished between Negligible and Slight changes in traffic (paragraph 2.20 in IEMA EATM guidance). Subsequently, as the Project's HGVs would not significantly change such traffic concentrations, all roads with 350 existing HGVs

or more have been scoped out of the assessment of significant effects for sensitive receptors. This will be re-evaluated in the ES.

- 12.7.40 The sensitivity score is based on footway provision, crossing provision, pedestrian concentrations, collisions and traffic flows.
- 12.7.41 Allianz Stadium Twickenham is the main receptor located on Rugby Road, with its entrance facing the Rugby Road / B361 Whitton Road junction. It generated a 'high' sensitivity score primarily due to the high volumes of motorised traffic on a typical weekday at 08:00 and 18:00 on Rugby Road, the high pedestrian traffic on event days, as well as multiple collision clusters (four or more within 100m) of the access point from the ARN between 2017–2019. There is good provision of pedestrian footways and priority crossing infrastructure along this section of the ARN.
- 12.7.42 Adjacent to A316 Chertsey Road is access to Harlequins Rugby Football Club. This generated a 'medium' sensitivity score due to its high concentrations of pedestrians on event days, and very high volumes of motorised traffic on a typical weekday at 08:00 and 18:00 on A316. Furthermore, there is only a left in/ left out access; a footbridge is provided to cross the A316 Chertsey Road; and no collisions were observed within 100m of the access point from the ARN.
- 12.7.43 Mogden Lane generated a 'medium' sensitivity rating due to the presence of Tesco supermarket (retail). Though the crossing provision is limited to uncontrolled islands and tactile paving is not consistently provided at crossing points, it is understood that access to the supermarket is primarily obtained via private vehicle rather than by foot. This suggests that pedestrian concentrations are limited within the vicinity of its access point from the highway. , Three collisions were identified within 100m of access to the receptor along Mogden Lane (two serious collisions, one slight). Motorised traffic volumes on a typical weekday at 08:00 and 18:00 is moderate at worst.
- 12.7.44 The 'medium' sensitivity score on Dukes Avenue is primarily triggered by Malden Oaks School and Tuition (education). Pedestrian crossing provision is available to access the bus stop on the other side of the highway; however, it is uncontrolled, and motorists have priority. Pedestrian concentrations are expected to be generated at the start and end of the learning day. Two collisions were identified within 100m of the receptor on Dukes Avenue (one serious, one slight). Motorised traffic volumes on a typical weekday at 08:00 and 18:00 are moderate at worst.
- 12.7.45 The 'medium' sensitivity score on Sandy Lane is derived from Sandy Lane Playground, the most sensitive receptor on the road. Whilst pedestrian infrastructure provision is generally sufficient, pedestrian concentrations could be moderate at most, whilst one serious accident was observed within 100m of the access point. Motorised traffic on a typical weekday at 08:00 and 18:00 is generally low.
- 12.7.46 The 'medium' sensitivity score for the section of Ham Street between the River Thames and Riverside Drive, is based on access to King George's Fields, other

recreational activities, and Ham House and Garden. Pedestrian provision is limited to one side of the footway, which is on the opposite side to the access point for King George's Fields, and no formal crossing provision was identified. However, traffic volumes are expected to be very low. Pedestrian concentrations are expected to be moderate at most and horses are known to also use it for transfer between paddocks and stables nearby (although no frequency information is available for this). No collisions were identified within 100m of access along the concerned ARN.

- 12.7.47 The 'medium' sensitivity rating on Riverside Drive is primarily triggered by Riverside Drive Playground, which is located south of Ham Playing Fields. Katey's Nursery and Preschool is located at Richmond and Kew Football Club which has off-street parking that can accommodate school drop off and pick-up. No crossing facilities are provided to access the playground from the other side of the carriageway, whilst the side of the carriageway with the playground does not have any footway in the vicinity of its access gate. Pedestrian volumes are understood to be low or moderate. No vehicle collisions were observed within 100m of access to the playground.
- 12.7.48 The sensitivity scores and ratings are summarised in Table 12.37.

Table 12.37 ARN sensitivity

ARN Section	ARN Road	Receptor	Sensitivity rating
North of the River Thames	Rugby Road/B361 Whitton Road	Allianz Stadium, Twickenham (including England Rugby, Virgin Active, and London Twickenham Stadium Hotel) (Leisure)	High
North of the River Thames	A316 Chertsey Way	Harlequins Rugby Football Club (Twickenham Stoop Stadium) (Leisure)	Medium
North of the River Thames	Mogden Lane	Tesco (Retail)	Medium
South of the River Thames	Dukes Avenue	Malden Oaks School and Tuition (Education)	Medium
South of the River Thames	Dukes Avenue	Ham Dental Practice (Healthcare)	Medium
South of the River Thames	Sandy Lane	Grey Court School (Education)	Medium
South of the River Thames	Sandy Lane	Sandy Lane Playground	Medium
South of the River Thames	Ham Street	King George's Field (Leisure)	Medium
South of the River Thames	Ham Street	National Trust – Ham House and Garden (Leisure)	Medium
South of the River Thames	Riverside Drive	Riverside Drive Playground (Recreation)	Medium
South of the River Thames	Riverside Drive	Richmond and Kew Football Club (Ham Playing Fields) (Leisure)	Medium
South of the River Thames	Riverside Drive	Katey's Nursery and Pre- School (Ham Playing Fields) (Education)	Low

12.7.49 Sensitivity ratings have been assessed for the PRoW in Table 12.38. These have been selected in line with the ratings outlined in Table 12.18 (Section 12.5 of this chapter). Based on existing traffic counts and qualitative assessments using professional judgement, it is not expected that there would be more than 4,000 vehicles travelling along the associated road network where most of these PRoW join onto. PRoW 112 and the National Trail however are frequently used, whereby PRoW 112 joins onto Sandy Lane which is reported to have more than 4,000 daily vehicles and the National Trail continues to be used despite the availability of alternative and more direct routes for walking.

Table 12.38 PRoW sensitivity assessment

Name	Survey locations	Sensitivity					
North of the River Thames							
	No PRoW identified						
South of the River Thames							
PRoW 100	1x from Riverside Drive	Low					
PRoW 118	1x from Ham Street	Low					
PRoW 119	1x from Ham Street	Low					
PRoW 134	1x from Ham Street Car Park	Low					
PRoW 111	2x from Sandy Lane – 1 on north side, 1 on south side	Low					
PRoW 112	1x on Sandy Lane	Medium					
National Trail	On-route, by Burnell Avenue reception shaft location	Medium					

Magnitude of impacts

Based on

Table 12.19 in Section 12.5 of this chapter, the magnitude of each environmental impact is assessed in light of the maximum anticipated total volumes of total HGV and workforce vehicle movements during the construction period. The magnitude of these impacts are summarised in

12.7.50 Table 12.39.

- 12.7.51 Severance impacts are expected to be 'negligible' across most road links as it is not anticipated that increases in total traffic volumes would exceed 30% on major roads. Based on a qualitative assessment using professional judgement, it is expected that such impacts could be minor on Ham Street and Riverside Drive, given that it cannot be ruled out whether traffic volume increases would exceed 30%, yet they are not expected to exceed 60%.
- 12.7.52 Driver delays are expected to be 'negligible' or 'minor' where applicable. Whilst VCR classifications are not available at this time, the maximum volumes of traffic are expected to be absorbed within standard signalised traffic light cycles north of the River Thames, whilst they are anticipated to be single-digit figures on an hourly basis south of the River Thames.
- 12.7.53 Pedestrian delay impacts are expected to be of a 'negligible' magnitude for all receptors accessed from the ARN north of the River Thames. There is greater variation south of the River Thames ranging from negligible to moderate as there are minor roads with and without sufficient provision of formal crossings. They are 'minor' for the National Trail / National Cycle Network route due to the additional traffic along Burnell Avenue (which is anticipated to experience an increase in total traffic below 30%), of which the pedestrians diverted from this route will encounter. It is anticipated that they would need to cross the junction providing direct access to the Burnell Avenue site, which currently has no formal crossing provided.
- 12.7.54 The magnitude of NMU amenity impacts are expected to be 'minor' or lower for all receptors due to the limited potential degree of increase in total traffic volumes along the ARN.
- 12.7.55 Fear and intimidation impacts are expected to be 'minor' or 'negligible' across all key amenities across the ARN due to the increase in traffic volumes falling below 400 total vehicles or 500 HVs across the ARN.
- 12.7.56 The magnitude of potential adverse road safety impacts are 'minor' or 'negligible' except for Rugby Road / B361 Whitton Road and Ham Street. Road safety impacts are expected to have a 'moderate' magnitude along Rugby Road / B361 Whitton Road due to the existing collision clusters in its vicinity between 2017 and 2019. Ham Street could also have a 'moderate' magnitude because of the existing volume of collisions during the observed period.
- 12.7.57 A temporary adverse impact for hazardous / large loads would occur on the rare instances where AILs would be transported along the ARN. No impacts are anticipated along Sandy Lane and Ham Street (south of Riverside Drive junction) as it is not anticipated that any AIL would travel along the road due to its width restrictions. Similarly, no AILs will be routed along Mogden Lane since they would be routed along Rugby Road / B361 Whitton Road. Due to the infrequency and timing of these movements, 'minor' impacts are expected along residential road links that connect the construction sites to the A-roads to south of the River Thames. There are 'negligible' impacts on Rugby Road / B361 Whitton Road

since it connects the existing STW works and the Allianz Stadium to A316 Chertsey Road, all A-roads and SRN.

Table 12.39 Magnitude of impacts

Affected amenities by road	Severance	Driver delay	Pedestrian delay	NMU amenity	Fear and intimidation	Road safety	Hazardous / large loads	
North of the River Thames								
Allianz Stadium, Twickenham (Leisure) – Rugby Road/B361 Whitton Road	Negligible	Minor	Negligible	Negligible	Minor	Minor	Negligible	
Harlequins Rugby Football Club (Twickenham Stoop Stadium) (Leisure) – A316 Chertsey Way	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	
Tesco (Retail) – Mogden Lane	Negligible	Minor	Negligible	Negligible	Minor	Slight	None	
South of the River Thames								
Malden Oaks School and Tuition (Education) – Dukes Avenue	Negligible	Minor	Minor	Negligible	Minor	Minor	Minor	
Ham Dental Practice (Healthcare) – Dukes Avenue	Negligible	Minor	Minor	Negligible	Minor	Minor	Minor	
Grey Court School (Education) – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Minor	Minor	None	
Sandy Lane Playground – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Minor	Minor	None	
PRoW 111 – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Minor	Minor	None	
PRoW 112 – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Minor	Minor	None	
King George's Field (Leisure) – Ham Street	Minor	Minor	Moderate	Minor	Minor	Moderate	Minor	
National Trust – Ham House and Garden (Leisure) – Ham Street	Minor	Minor	Moderate	Minor	Minor	Moderate	Minor	

Affected amenities by road	Severance	Driver delay	Pedestrian delay	NMU amenity	Fear and intimidation	Road safety	Hazardous / large loads
Riverside Drive Playground (Recreation) – Riverside Drive	Minor	Minor	Negligible	Negligible	Minor	Minor	Minor
Richmond and Kew Football Club (Ham Playing Fields) (Leisure) – Riverside Drive	Minor	Minor	Negligible	Negligible	Minor	Minor	Minor
Katey's Nursery and Pre- School (Ham Playing Fields) – Riverside Drive	Minor	Minor	Negligible	Negligible	Minor	Minor	Minor
PRoW 100 – Riverside Drive	Minor	Minor	Negligible	Negligible	Minor	Minor	Minor
National Trail / National Cycle Network Route*	Negligible	None	Negligible	Minor	Minor	Minor	Minor

*This considers the impact of the route diversion along Burnell Avenue.

Significance of effects

- 12.7.58 The significance of all environmental effects on the identified road links on the ARN are assessed in Table 12.40, as per the guidance in Table 12.20 in Section 12.5 of this chapter.
- 12.7.59 The significance of effects relating to severance are anticipated to be 'negligible' or 'slight' across the ARN in light of the low or medium sensitivity of the identified road links and their negligible or minor magnitude of impacts. With the embedded mitigation only, the National Trail / National Cycle Network route would experience an adverse effect of 'moderate' significance given that the on-site haul routing for construction vehicles could intersect the existing alignment of these routes, yet access to the remainder of the route is not entirely severed as a temporary diversion will be provided during the works.
- 12.7.60 The significance of driver delay effects would be 'negligible' or 'slight' in most cases due to the minimal changes to traffic conditions that the additional construction traffic are anticipated to cause. However, they would be moderate for Allianz Stadium receptor along Rugby Road / B361 Whitton Road in the instances of major events, whereby higher volumes of pedestrian and motorized traffic are expected. No impact would be experienced along the National Trail / National Cycle Network route as they do not form part of the public highway network with motorized vehicle traffic.
- 12.7.61 The significance of effects relating to pedestrian delay are anticipated to be negligible or slight across the ARN due to the anticipated minimal increase in total traffic volumes (<30%). The exception are amenities along Ham Street, which could experience a 'moderate' significance for this effect due to the lower traffic volumes associated with this no-through section of the street.
- 12.7.62 The significance of NMU amenity effects are anticipated to be 'slight' or 'negligible' in most cases due to the anticipated minimal increase in total traffic volumes which are expected to be below a 60% increase. The exception is the National Trail / National Cycle Network route which has a 'moderate' significance of effect as it could be exposed to traffic volumes associated with the new haul route that could intersect the route compared with a very low anticipated baseline.
- 12.7.63 Fear and intimidation is expected to generate 'negligible' or 'slight' significant effects as the increase in total vehicle flows across the majority of the affected road network is expected to be below 400 in an day (18-hour period). However, the Allianz Stadium amenity along Rugby Road / B361 Whitton Road was given a 'moderate' significance rating as this threshold may be triggered by the maximum HGV volumes combined with the anticipated workforce, particularly during 24-hour activities where more than one shift would arrive and depart from the Mogden STW site in one day.
- 12.7.64 The effects for road safety are considered significant ('moderate' significance) for Allianz Stadium along Rugby Road / B361 Whitton Road, as well as King George's Fields and National Trust – Ham House and Garde which are both
located along Ham Street. For Rugby Road / B361 Whitton Road, this is primarily driven by the 'high' sensitivity of the Allianz Stadium receptor during major event days. The amenities along Ham Street could experience a moderate effect in light of the 'moderate' magnitude of impact for road safety, which is driven by the potential for total traffic volumes to exceed an increase of 30%, along with the presence of existing accidents and limited road safety mitigation in place. All other amenities identified along the ARN would experience 'negligible' or 'slight' effects.

12.7.65 Hazardous and large loads are expected to generate effects of 'slight' or 'negligible' significance for most amenities across the affected road network. This is due to the infrequency of such activities occurring and the presence of mitigation to safely and effectively manage the movement of abnormal and hazardous loads. No significant effects are anticipated for amenities along Mogden Lane, Sandy Lane, and Ham Street (south of junction with Riverside Drive) as no AILs or hazardous loads are anticipated to use these routes.

Table 12.40 Significance of effects assessment

Affected amenities by road	Severance	Driver delay	Pedestrian delay	NMU amenity	Fear and intimidation	Road safety	Hazardous / large loads		
North of the River Thames									
Allianz Stadium, Twickenham (Leisure) – Rugby Road/B361 Whitton Road	Slight	Moderate	Slight	Slight	Moderate	Moderate	Slight		
Harlequins Rugby Football Club (Twickenham Stoop Stadium) (Leisure) – A316 Chertsey Way	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible		
Tesco (Retail) – Mogden Lane	Negligible	Slight	Negligible	Negligible	Slight	Slight	Negligible*		
South of the River Tha	ames								
Malden Oaks School and Tuition (Education) – Dukes Avenue	Negligible	Slight	Slight	Negligible	Slight	Slight	Slight		
Ham Dental Practice (Healthcare) – Dukes Avenue	Negligible	Slight	Slight	Negligible	Slight	Slight	Slight		
Grey Court School (Education) – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Slight	Slight	Negligible*		
Sandy Lane Playground – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Slight	Slight	Negligible*		
PRoW 111 – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible*		

Affected amenities by road	Severance	Driver delay	Pedestrian delay	NMU amenity	Fear and intimidation	Road safety	Hazardous / large loads
PRoW 112 – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Slight	Slight	Negligible*
King George's Field (Leisure) – Ham Street	Slight	Slight	Moderate	Slight	Slight	Moderate	Slight
National Trust – Ham House and Garden (Leisure) – Ham Street	Slight	Slight	Moderate	Slight	Slight	Moderate	Slight
Riverside Drive Playground (Recreation) – Riverside Drive	Slight	Slight	Negligible	Negligible	Slight	Slight	Slight
Richmond and Kew Football Club (Ham Playing Fields) (Leisure) – Riverside Drive	Slight	Slight	Negligible	Negligible	Slight	Slight	Slight
Katey's Nursery and Pre-School (Ham Playing Fields) (Education) – Riverside Drive	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Slight
PRoW 100 – Riverside Drive	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Slight
National Trail / National Cycle Network Route	Negligible	Negligible*	Slight	Slight	Slight	Slight	Slight

*No effects currently anticipated

- 12.7.66 No 'major' effects are identified for traffic and transport. The highest grade of effects considered significant are 'moderate', which occurs for three amenities along the ARN including Ham Street and Rugby Road / B361 Whitton Road, along with the National Trail / National Cycle Network route.
- 12.7.67 Additional measures to mitigate these impacts are described in Section 12.8.

Cumulative effects

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

12.8 Additional (secondary) mitigation and enhancement measures

- 12.8.1 Mitigation measures are defined in Chapter 4: Approach to Environmental Assessment. Embedded design (primary) mitigation and standard good practice (tertiary) specific to this aspect are provided in Section 12.4 of this chapter. Moreover, this section references the PCR numbers identified in Appendix 4.2: Commitments Register where appropriate.
- 12.8.2 A CTMP will be developed by the contractor to manage the movement of HGVs. This is expected to include the planning and implementation of the following for managing HGV movements:
 - a. Consult local authorities and other stakeholders as appropriate on HGV routes. The contractor will implement these routes and monitor compliance (PCR 3).
 - b. Provide diversions, signage, and lighting for severed PRoW (PCR 80)
 - c. Implement temporary markings and restrictions for HGV access to Major Road Network (PCR 82)
 - d. HGVs will be routed to and from the SRN via local routes using the most direct reasonably practicable designated freight routes (PCR 83)
 - e. Adhere to LLCS restrictions for HGV routes (Monday–Friday from 21:00– 07:00 including bank holidays, and Saturday 13:00 to Monday 07:00, unless registered to the LLCS and permission is obtained from local councils). It is not expected that HGV traffic will occur during these restricted hours except for AILs which are subject to daytime movement restrictions. (PCR 84)
 - f. Provide temporary mitigation for significant adverse severance impacts on PRoW (PCR 86)
 - g. Driver vehicle standards, logistics and vehicle planning, implementation and monitoring to be developed in line with recommendations included in CLOCs (PCR 121)
 - h. Good practice mitigation may include conducting road safety audits to reduce any impacts during construction (DMRB GG 119 Road safety audit compliant (National Highways, 2025)). (PCR 87)
- 12.8.3 To reduce safety risks associated with the additional HGV movements, all HGV drivers would be expected to undergo health and safety awareness training.

Where appropriate on parts of the ARN local to the construction sites, the contractor may require HGV drivers to travel at speeds below the observed speed limits which will further reduce risks of collisions. Though the existing speed limits on Rugby Road / B361 Whitton Road, Ham Street, Riverside Drive, Dysart Avenue, Burnell Avenue, Beaufort Road, and Dukes Avenue are 20 mph.

- 12.8.4 It is anticipated that during major events at the Allianz Stadium no deliveries would take place at Mogden STW and no materials would be removed utilising the available capacity of stockpiling excavation material within the site. This would significantly reduce the risks of conflict with the increased pedestrian traffic during such periods as well as reducing road safety risks, this would significantly minimize the magnitude of delay for motorists along Rugby Road and B361 Whitton Road.
- 12.8.5 The CTMP is also committed to address the following in relation to the Project's construction workforce:
 - a. Improve road markings and parking restrictions on minor roads with direct access to construction sites may be implemented where appropriate and reasonably practicable to prevent construction vehicles from being parked at inappropriate locations that could impact NMUs and local residents, and to allow safe unobstructed use by construction vehicles (PCR 81)
 - b. Prepare and implement construction workforce travel plan to help implement any necessary travel demand measures and monitor them for compliance (PCR 85)

Workforce travel – car sharing

- 12.8.6 An effective way of reducing the impact of commuting by car is by car sharing. This can lead to significant carbon savings from this activity alone. In 2021, DfT reported a car occupancy rate of 1.14 for commuting trips (DfT, 2021). The report explains that increasing the car occupancy rate from 1.55 to 1.7 could save nearly 3 million tonnes of carbon a year by 2030 (DfT, 2021). This increase represents a rate of 0.15, or almost 10%. It would be recommended to adopt a more ambitious car share target in the CTMP of 1.5 persons per vehicle.
- 12.8.7 Car sharing at construction sites could be incentivised by limiting on-site parking to those who are carrying two or more occupants.
- 12.8.8 The final proposed car sharing rate will be confirmed and assessed in the ES.

Workforce travel – multimodal travel

12.8.9 Whilst the assessment of significant effects considered a worst case for workforce trips, whereby sustainable modes were not reflected, it is essential that opportunities for sustainable travel are identified to mitigate these impacts. This is supported by the NPS for Water Resources Infrastructure policy requirement in paragraph 4.14.7, along with the NPPF's policy requirements in paragraphs 115a–115c (see Table 12.2).

- 12.8.10 The car journey time is considered to provide an idea of what the journey times would be for a shuttlebus service between the stations. Cycle journey times have been provided, demonstrating that journey times can be faster for pedal cyclists compared to cars. Due to this, there may be commuters who would prefer to cycle between the rail stations and the sites.
- 12.8.11 Table 12.41 summarises the provision of services at the stations identified as appropriate for consideration in this PEI Report

Table 12.41 Access to train stations

Station	Locations served	Cycle journey time (AM peak)	Car journey time (AM peak)
Hounslow East London Underground Station	To the west: London Heathrow Airport (Terminals 2, 3, 5); To the east: Cockfosters	7 minutes (Mogden STW northern access gate), 9 minutes (Mogden STW southern access gate)	9 minutes (Mogden STW northern access gate), 14 minutes (Mogden STW southern access gate)
Hounslow Railway Station	To the south-west: Weybridge; To the east: London Waterloo	7 minutes (Mogden STW northern and southern access gates)	7 minutes (northern and southern access gate)
Richmond Railway Station and Richmond Underground Station	To the west: Reading; To the east: Upminster	12 minutes (Mogden STW southern access gate), 17 minutes (Burnell Avenue access)	14 minutes (Mogden STW southern access gate), 24 minutes (Burnell Avenue access)
Twickenham Railway Station	To the west: Reading; To the east: London Waterloo	7 minutes (Mogden STW Access)	7 minutes (Mogden STW southern access gate), 12 minutes (Mogden STW northern access gate)
Kingston Railway Station	To the west: Shepperton; To the east: Central London	9 minutes (Burnell Avenue access)	14 minutes (Burnell Avenue access)

Source: OpenRouteService, 2024 (accessed Sept 2024)

12.8.12 It should be noted that Richmond and Kingston railway stations have services connecting between them, meaning that any workforce moving from Mogden STW north of the River Thames to sites south of the River Thames that commute via these stations can navigate easily between them for pursuing shuttle bus options.

Cycle parking facilities

12.8.13 It is anticipated that the development will provide cycle parking to facilitate an agreed modal share target for pedal cyclists. The Contractor would outline this target in their CWTP. Cycle parking would be secure and protected from wet weather.

Enhancement measures

12.8.14 Since the impacts of the Project are only related to construction and are temporary, there are no opportunities for enhancements.

12.9 Summary of residual likely significant effects

The preliminary assessment of the likely significant effects of the construction traffic excluded the additional mitigation and enhancement measures. The implementation of these measures reduces the likely effects as summarised in

- 12.9.1 Table 12.42.
- 12.9.2 The changes in the assessment of significance are described below for each effect.
- 12.9.3 The implementation of the CTMP includes the provision of temporary mitigation and providing diversions, signage and lighting for severed routes for NMUs. The effects relating to severance for the National Trail / National Cycle Network subsequently become 'negligible'.
- 12.9.4 The significance of driver delay effects are downgraded from 'moderate' to 'slight' for Allianz Stadium along Rugby Road / B361 Whitton Road through the implementation of the CTMP and CTWP. This includes the management of HGV movements on event days to minimise the magnitude of impacts caused by congestion levels.
- 12.9.5 The significance of pedestrian delay effects are downgraded from 'moderate' to 'slight' for amenities on Ham Street. This would occur through the implementation of health and safety awareness training for HGV drivers and speed management measures. For the National Trail / National Cycle Network route, the significance of pedestrian delay is downgraded from 'slight' to 'negligible' through the provision of diversions, signage and lighting for severed routes as part of the CTMP.
- 12.9.6 The NMU amenity effects for the National Trail are downgraded from 'slight' to 'negligible' as journey pleasantness is enhanced through the commitments to be implemented through a CTMP. This includes the provision of a diversion, signage and lighting for the severed route, along with improving road markings and implementing parking restrictions to limit the impact of construction vehicle parking for NMUs and local residents. These procedures will be sensitive to the variations in NMU volumes, reallocating priority to them outside of these short intervals.
- 12.9.7 Fear and intimidation effects for the Allianz Stadium amenity along Rugby Road / B361 Whitton Road are downgraded from 'moderate' to 'slight' when additional mitigation is implemented. This includes a CWTP which would reduce the number of daily workforce trips, which otherwise could trigger the quantitative threshold for 'significance', and thus control the total additional traffic volumes along the road used to access Mogden STW site.
- 12.9.8 Road safety effects for amenities along Rugby Road / B361 Whitton Road and Ham Street are reduced from 'moderate' to 'slight'. These occur through the implementation of a CTMP with good practice mitigation along with speed management measures and health and safety awareness training for HGV drivers where the contractor identifies these as appropriate. Moreover, the implementation of a logistics strategy/plan which aligns with the requirements of CLOCS will help to reduce the likely significance of the residual effect for road safety for these local roads.

12.9.9 Due to the embedded mitigation for the infrequent movement of abnormal and hazardous loads, there are no significant effects associated with hazardous / large loads for amenities along the ARN. The residual effects thus remain insignificant, being graded as 'slight' or less.

12.9.10 Table 12.42 summarises the residual likely significant effects.

Table 12.42 Summary of residual likely significant effects

Affected amenities by road	Severance	Driver delay	Pedestrian delay	NMU amenity	Fear and intimidation	Road safety	Hazardous / large loads
North of the River Thames							
Allianz Stadium, Twickenham (Leisure) – Rugby Road/B361 Whitton Road	Slight	Slight	Slight	Slight	Slight	Slight	Slight
Harlequins Rugby Football Club (Twickenham Stoop Stadium) (Leisure) – A316 Chertsey Way	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Slight
Tesco (Retail) – Mogden Lane	Negligible	Slight	Negligible	Negligible	Slight	Slight	Negligible*
South of the River Thames	;						
Malden Oaks School and Tuition (Education) – Dukes Avenue	Negligible	Slight	Slight	Negligible	Slight	Slight	Slight
Ham Dental Practice (Healthcare) – Dukes Avenue	Negligible	Slight	Slight	Negligible	Slight	Slight	Slight
Grey Court School (Education) – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Slight	Slight	Negligible*
Sandy Lane Playground – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Slight	Slight	Negligible*
PRoW 111 – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible*
PRoW 112 – Sandy Lane	Negligible	Negligible	Negligible	Negligible	Slight	Slight	Negligible*

Affected amenities by road	Severance	Driver delay	Pedestrian delay	NMU amenity	Fear and intimidation	Road safety	Hazardous / large loads
King George's Field (Leisure) – Ham Street	Slight	Slight	Slight	Slight	Slight	Slight	Slight
National Trust – Ham House and Garden (Leisure) – Ham Street	Slight	Slight	Slight	Slight	Slight	Slight	Slight
Riverside Drive Playground (Recreation) – Riverside Drive	Slight	Slight	Negligible	Negligible	Slight	Slight	Slight
Richmond and Kew Football Club (Ham Playing Fields) (Leisure) – Riverside Drive	Slight	Slight	Negligible	Negligible	Slight	Slight	Slight
Katey's Nursery and Pre- School (Ham Playing Fields) (Education) – Riverside Drive	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Slight
PRoW 100 – Riverside Drive	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Slight
National Trail / National Cycle Network Route	Negligible	Negligible*	Negligible	Negligible	Slight	Slight	Slight

*No effects currently anticipated

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As demonstrated in

12.9.11 Table 12.42, the implementation of embedded design mitigation, tertiary mitigation and additional mitigation and enhancement measures shows that there are no significant residual effects relating to Traffic and Transport from the Project.

12.10 Next steps

- 12.10.1 In the next stage of the Project, a more detailed assessment of traffic and transport impacts will be completed. This will include establishing the future baseline for the ARN using traffic flows extracted from TfL's LoHAM model and complemented with traffic surveys on key locations as agreed with relevant authorities.
- 12.10.2 NMU surveys will also be undertaken adjacent to the most sensitive receptors.
- 12.10.3 Further engagement with the local transport authorities and TfL will take place to agree the methodology for the transport assessment to be undertaken if required as part of developing the ES.
- 12.10.4 The quantities, routing and timing arrangements of AILs will be estimated, presented and reviewed.
- 12.10.5 The assessment of significant effects on transport users will be updated where appropriate in light of new transport baseline data or changes to the construction traffic demand volumes and routing.

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