

17. CUMULATIVE EFFECTS

17.1 Introduction

17.1.1 This chapter presents the findings to date of the cumulative effects of the Scheme. Such an assessment is a requirement of the Environmental Impact Assessment (EIA) Directive and Schedule 4, Part 1 of the Infrastructure Planning (EIA) Regulations 2009 (*'EIA Regulations'*) (amended 2012).

17.1.2 The term 'cumulative' in respect of impacts or effects is not defined in either the EIA Directive or the EIA Regulations. However, Design Manual for Roads and Bridges (DMRB) Volume 11, Section 2, Part 5 (Ref 17-1) identifies two types of cumulative impact:

- the combined action of different environmental topic-specific impacts upon a single resource/receptor, which are termed 'in combination' effects (synergistic); and
- the combined action of a number of different projects, cumulatively with the project being assessed, on a single resource/receptor, which are termed 'cumulative' effects (additive). This can include multiple impacts of the same or similar type from a number of projects upon the same receptor/resource.

17.1.3 This chapter summarises the cumulative effects that arise from the Silvertown Tunnel with other non-Silvertown Tunnel projects and interaction between effects. An assessment of in-combination effects of the Scheme (for example, changes in air quality, noise levels and visual impact) on individual receptors will be provided in the Environmental Statement (ES) for the Scheme.

17.1.4 All drawings referenced within this chapter are presented in Volume 2 of the PEIR and all appendices referenced in this chapter are presented in Volume 3.

17.2 National Road and Rail Networks: National Policy Statement (NN NPS)

17.2.1 The NN NPS paragraph 4.3 states that the Examining Authority and the Secretary of State (SoS) should take into account a development's potential adverse impacts, including any longer-term and cumulative

adverse impacts. Paragraph 4.15 refers to the information to be provided as part of an ES, including cumulative effects. The ES also needs to provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (paragraph 4.16) and the Examining Authority should consider how the cumulative effects and interaction between effects may affect the environment even when they may be considered acceptable on an individual basis with mitigation in place (paragraph 4.17). Cumulative effects have been considered in each of the individual topic chapters of this Preliminary Environmental Information Report (PEIR) and are summarised below. The interactions between effects will be assessed in the final ES.

- 17.2.2 NN NPS paragraph 4.55 states that the Secretary of State should be satisfied that:

'the effects of existing sources of pollution in and around the project are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits.'

- 17.2.3 Potential pollution and amenity concerns are addressed in Chapter 6 Air Quality, Chapter 9 Terrestrial Ecology, Chapter 10 Marine Ecology, Chapter 12 Geology and Soils, Chapter 14 Noise and Vibration and Chapter 15 Townscape and Visual and Chapter 16 Water Environment. Where relevant, each of these chapters considers existing sources of pollution as part of their assessment.

- 17.2.4 The methodology for assessing cumulative effects used in this PEIR has followed guidance in DMRB Volume 11, Section 2, Part 5 (Ref 17-1), *'Environmental Impact Assessment: A guide to good practice and procedures'*. The methodology has also been informed by responses in the EIA Scoping Opinion received from the Planning Inspectorate (PINS) in July 2014 and professional judgment.

17.3 Methodology

- 17.3.1 The Planning Inspectorate (PINS), advised in the Scoping Opinion received in July 2014 that the cumulative effects assessment should consider reasonably foreseeable major developments in the area that are:

- under construction;
- permitted application(s) not yet implemented;

- submitted application(s) not yet determined;
 - all refusals subject to appeal procedures not yet determined;
 - projects on the National Infrastructure's programme of projects; and
 - projects identified in the relevant development plan (and emerging development plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited (Ref 17-2).
- 17.3.2 A list of proposed developments to be considered in the assessment of cumulative effects was compiled through searches of local authority planning portals for planning applications; a review of allocated and proposed sites in local plans; and direct consultation with local authorities whose areas are predicted to be affected by the Scheme.
- 17.3.3 Rejected planning applications that are not subject to appeal have not been considered, as their implementation is not considered to be reasonably foreseeable.
- 17.3.4 The list of developments to be considered in the cumulative impact assessment is presented in Volume 3 of the PEIR, Appendix 17.A and was last updated in June 2015. The locations of the developments are shown on Drawing 17.1 and 17.2, located in Volume 2 of the PEIR. The list will be updated in consultation with local authorities prior to the completion of the ES.
- 17.3.5 A cumulative impact assessment study area has been selected for each environmental topic. Developments from Appendix 17.A have been identified within that study area and screened in relation to the potential effects, taking into consideration the location, timing, nature and scale of the development. Consideration has then been given to whether these developments would lead to changes in the existing baseline situation and result in cumulative effects during the construction and/or operation of the Scheme. The results are considered in Chapters 6 to 16, and are summarised in Table 16-1.
- 17.3.6 The traffic model for the Scheme has taken into account other transportation schemes as well as future predicted traffic growth as a result of new, major development. The developments and growth scenarios included in the traffic forecasting are outlined in the Preliminary Transport Assessment. The air quality and noise assessments, which are

based on future traffic projections, therefore incorporate the cumulative effects of other transportation schemes and population growth as an inherent part of their assessment.

17.4 Consultation

- 17.4.1 The relevant local planning authorities have been contracted to request the list of projects to be considered in the assessment of cumulative effects. Where responses have been received they have been incorporated into the PEIR. Further consultation will be undertaken during the statutory s.42 consultation and any additional projects identified will be included in the ES.

17.5 Study Area

- 17.5.1 DMRB Volume 11, Section 2, Part 5 (Ref 17-1), states that the study area for the assessment should be defined on a topic-by-topic basis reflecting the scheme in question and the area over which significant effects can reasonably be thought to have the potential to occur from both the Scheme and in combination with other schemes. On this basis, as noted above, development information is provided within a 1km radius of the Limit of Land to be Acquired or Used (LLAU). However each environmental topic has defined a specific study area (defined within Chapters 6 to 16) and has only considered developments of relevance. For example, aquatic ecology is only concerned with in-river development, development adjacent to the river or development discharging into the river, therefore all other land-based developments have been excluded.
- 17.5.2 The preliminary Transport Assessment is based on modelling using the Transport for London's (TfL's) strategic highway models that covers London and its surrounding area. These models are developed using population and employment forecasts which are partly based on the Greater London Authority (GLA) employment and population forecasts, based on the employment and housing projections set out in the London Plan 2015. As a result the models are considered inherently cumulative as they take into account a level of future growth and development across London. Traffic associated with developments beyond the 1km radius are also inherently included. Therefore, topics such as air quality, noise, effects on all travellers, which are based on future traffic projections cover a much wider study area.

17.6 Assessment of effects

Cumulative versus 'base case'

- 17.6.1 The list of 'base case' developments and cumulative developments (Table 17A-1 and Table 17A-2 in Volume 3 of the PEIR, Appendix 17.A) are based on best available knowledge regarding the status of each development. This is based on the review of planning application documentation and drawing on information from local authorities and PINS where appropriate. The Mayor's London Development Database has also been used to identify whether permitted planning applications have started construction.
- 17.6.2 The developments for assessment have been differentiated into those to be assessed as part of the 'base case' (i.e. future year 'without Silvertown tunnel' scenario) and those assessed as part of the cumulative effects assessment.
- 17.6.3 The base case is discussed earlier in Chapter 5 and Figure 5.1. It includes developments that are programmed to be completed and partially (if built out in phases) or fully operational during construction of the Scheme. This is proposed on the basis that these developments will be in place when Scheme construction is taking place and therefore it is appropriate to assume their presence in the base case (i.e. 'without Silvertown Tunnel project' scenario).
- 17.6.4 The assessment of cumulative effects meanwhile considers those developments that are programmed to be under construction or operational at the same time as the Silvertown Tunnel project. The results of the cumulative effects assessment are presented in individual topic chapters and summarised in Table 17-1.
- 17.6.5 A quantitative assessment has been undertaken where appropriate. For instance, the strategic modelling work undertaken for the assessment of transport effects includes allowances for population and employment growth, based on the projections in the London Plan 2015, and is therefore inherently cumulative.
- 17.6.6 For those topics where a quantitative assessment is not appropriate i.e. Chapter 7 Community and Private Assets, Chapter 8 Cultural Heritage, Chapter 9 Terrestrial Ecology, Chapter 10 Marine Ecology, Chapter 12 Geology and Soils, Chapter 13 Materials, Chapter 15 Townscape and Visual and Chapter 16 Water, a qualitative evaluation has been carried out using professional judgement to consider whether these other developments would be likely to elevate the effects identified.

Table 17-1 Cumulative Effects Summary

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
6 Air Quality	<p>Construction cumulative effects will be considered in the ES when the construction assessment has been finalised.</p>	<p>The traffic data used in the operational road traffic air quality assessment has taken into account other transportation schemes as well as future predicted traffic growth from new, major development. Therefore, transportation schemes and population growth are an inherent part of the Air Quality assessment.</p> <p>During operation, the Scheme has the potential to impact traffic flows and therefore change emissions and air quality levels on the local road network. Measures will be investigated to reduce the impact on air quality.</p>
7 Community and Private Assets	<p>Construction of the Scheme over a four year period will overlap with other development schemes. These developments have the potential to contribute to an adverse cumulative impact during construction in relation to amenity (disturbance and nuisance from construction activities) and potential demand and supply for construction materials and workforce.</p> <p>In relation to employment, the Thames Tideway Tunnel is another significant infrastructure scheme which would have a requirement for similarly specialist construction/tunnelling workers over a longer period of</p>	<p>The Scheme is located within an area of considerable potential urban development, with proposals at both the northern and southern ends of the Scheme for mixed-use and residential development in the London Boroughs of Newham, Tower Hamlets and the Royal Borough of Greenwich. The proposals will bring additional population to east London, together with additional employment, community and other service facilities. There are not anticipated to be significant cumulative effects on community and private assets, due to the urban nature of the area, the way in which development and redevelopment</p>

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
	<p>time. There may therefore be an impact on the availability of specialist labour, however given the Schemes location, in central London and with specialist training centres nearby (such as the Tunnelling and Underground Construction Academy), the impact is not considered to be significant from a cumulative perspective.</p>	<p>continues to take place, and the opportunities that such development presents for new community and employment facilities.</p>
<p>8 Cultural Heritage</p>	<p>No impacts to the settings of heritage assets as a result of the Scheme have been identified and, therefore, there are no potential cumulative impacts.</p> <p>Cumulative impacts to heritage assets could occur as a result of the combination of impacts as a result of the Scheme and other developments. No impacts to the settings of heritage assets as a result of the Scheme have been identified and, therefore, there are no potential cumulative settings impacts. There may be some potential for other developments to cause physical impacts to the archaeological and palaeoenvironmental deposits identified and predicted to be at risk of moderate adverse effects in this assessment as a result of the Scheme. However, further information is required on the other developments in order to assess these potential cumulative physical impacts and this will be undertaken in the ES.</p>	<p>No impacts to the settings of heritage assets as a result of the Scheme have been identified and, therefore, there are no potential cumulative impacts.</p> <p>No impacts on archaeological and palaeoenvironmental deposits have been identified during operation, therefore there will be no cumulative effects.</p>

Silvertown Tunnel Preliminary Environmental Information Report

Chapter 17 Cumulative Effects

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
9 Terrestrial Ecology	Overall, the cumulative effects of all proposed developments would be a possible minor additional disturbance to breeding birds through visual and noise disturbance during construction. However, the area is already highly developed and therefore any change in impact is likely to be minimal.	Overall, the cumulative effects of all proposed developments during operation would be a possible minor additional disturbance to breeding birds through visual and noise disturbance. However, the area is already highly developed and therefore any change in impact is likely to be minimal.
10 Marine Ecology	Construction of the Scheme over a four year period will overlap with other development schemes including the Charlton Barge Yard and Greenwich Master Plan. These developments have the potential to contribute to an adverse cumulative impact as they includes improvements to the river wall and a ferry jetty terminal and demolition and construction of a new jetty. Potential cumulative effects during construction on marine ecology receptors include noise disturbance, habitat loss and water quality.	The marine related works are temporary and as such cumulative effects during the operation phase of the Scheme are not considered further.
11 Effects on all Travellers	Developments that are planned or consented in the vicinity of the tunnel portals, but not yet constructed in the opening year 2021, will generate construction traffic	The traffic model for the Scheme has taken into account other transportation schemes as well as future predicted traffic growth from new, major development. The developments and growth scenarios included in the traffic forecasting are outlined in the Preliminary Transport Assessment. Therefore the

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
	<p>flows that will cumulatively impact on the road network during construction of the Scheme.</p> <p>Where possible, information on expected construction traffic was sourced directly from the respective Transport Assessments (TA) for each development. Sites were excluded in cases where construction is expected to be completed before 2018, as construction traffic associated with such sites would not conflict with the current assumed works programme for the Silvertown Tunnel. In cases where construction traffic details were not included in a TA or the information provided was not clear, assumptions were made to estimate the number of vehicle movements. Where routes to be used by construction traffic were specified in TAs, the traffic generated by these specific schemes was assigned accordingly.</p> <p>The quantitative assessment has shown that the impact of the total two-way cumulative development and Silvertown Tunnel construction traffic movements is less than a 2% increase of the 2021 traffic flows without the Scheme on all links assessed. It is therefore considered that the cumulative impact is negligible.</p>	<p>cumulative effects of other developments, transportation schemes and population growth are an inherent part of the operational assessment of Effects on all Travellers which consider the outputs of the traffic model for the reference case and 2021/2036 flows.</p>

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
	<p>In addition to the cumulative impact of additional construction traffic on the highway network, the land developments on both sides of the River Thames will have a potential cumulative impact on views from the road during construction.</p>	
<p>12 Geology and Soils</p>	<p>The assessment has identified that off-site impacts on the Scheme would be limited due to the mitigation measures implemented via the Greenwich Peninsula Remediation Strategy. Disposal of contaminated and uncontaminated soils to landfill would be avoided through the implementation of Materials Management Plans. Therefore, provided that the requirements of the relevant policy and legislation relating to land contamination and remediation are adopted in design and appropriate mitigation measures are applied, it is considered that there will be no significant cumulative impacts during construction.</p>	<p>Following the implementation of mitigation measures. No impacts on geology and soils have been identified, therefore there will be no cumulative effects.</p>
<p>13 Materials</p>	<p>The depletion of finite natural resources e.g. aggregate for construction will result from the Scheme and other developments. The sensitivity of the UK supply of key construction materials is assessed to be low as there is low scarcity of these materials. It is not possible to provide a quantitative assessment of the embodied</p>	<p>At present, there is uncertainty regarding the operation and maintenance activities required for the Scheme. As such, details of the materials required and the wastes for these activities will be incorporated into the assessment as further information becomes available.</p>

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
	<p>carbon of the materials required for the Scheme plus other developments however, it is reasonable to assume that it will have a major impact in line with the assessment undertaken for the scheme alone.</p> <p>The requirement to dispose of construction, demolition and excavation (CD&E) waste from the Scheme and other developments will result in a permanent reduction in landfill capacity within reasonable proximity of the Scheme. A total of approximately 828,000 tonnes of waste are predicted to be produced within the study area in 2021. When combined with the 756,054.74 tonnes of waste estimated to be produced by the Scheme the predicted total is 1,584,055 tonnes which represents 40% of current capacity. However there is adequate waste management infrastructure capacity within the study area for the majority of waste arisings from the Scheme in conjunction with predicted CD&E waste arisings. It is assumed that all consented schemes within the study area will be required to meet the requirements of relevant legislation and local policies. This will include adherence to the waste hierarchy and a target of at least 70% recovery of wastes generated (as per the Waste Framework Directive). As such it is assumed that waste arisings from consented schemes will be segregated and sent for composting, recycling or for further segregation and sorting at a materials</p>	

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
	<p>recovery facility. As such this impact is assessed as having a minor cumulative impact.</p>	
<p>14 Noise and Vibration</p>	<p>Cumulative construction noise impacts would be localised to within 300m of the Scheme redline boundary.</p> <p>On the northern side of the Scheme within the Borough of Newham the Hoola development is the only development within 300m and this is forecast for completion at the end of 2016 two years before construction of the Scheme would begin and as such cumulative construction noise impacts on the northern side of the Scheme are considered to be Neutral.</p> <p>On the southern side of the Scheme there is anticipated to be large scale redevelopment along the Greenwich Peninsula during the construction phase of the Scheme. It is likely that these developments would employ mitigation measures to minimise the noise impact upon the local area and as such cumulative construction noise impacts in Greenwich would be considered to be Slight Adverse.</p>	<p>The traffic data used in the operational road traffic noise assessment has taken into account other transportation schemes as well as future predicted traffic growth as a result of new, major development. Therefore the cumulative effects of other developments, transportation schemes and population growth are an inherent part of the Noise and Vibration assessment.</p> <p>The assessment of the scheme in the long term indicates that there would be negligible, or no-change, in road traffic noise at the majority of receptors in the day time, with some receptors experiencing a decrease in traffic noise. Moderate adverse impacts would occur at the east tower of the Hoola development due to an increase in percentage of Heavy Goods Vehicles (HGVs).</p>

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
<p>15 Townscape and Visual Amenity</p>	<p>A number of planning applications for high-rise residential and mixed use development are pending or have been approved in the London Borough of Newham, within the scheme locality. These developments would introduce successive phases of construction work within the Scheme locality, ultimately increasing the density of the local urban area. Additional visual receptors, principally residential properties, would also be introduced. The construction of the Scheme would be perceived in the context of a developing urban area and would not be at odds with the characteristics of this townscape. As a result there are not anticipated to be significant cumulative townscape and visual effects. Greenwich Masterplan sets the framework for large-scale urban regeneration of the Greenwich Peninsula, including over 10,000 dwellings, offices, retail and leisure facilities. Planned (but not consented) developments that form part of the updated 2015 masterplan proposals include retail, commercial and transport interchange proposals, near the southern tunnel portal. The construction of the Scheme would not be at odds with this developing townscape context, as a result there are not anticipated to be significant cumulative townscape and visual effects.</p>	<p>The northern end of the Scheme falls within a strategic development site, identified by the London Borough of Newham Council, where the Council intend to plan for mixed-use development as well as infrastructure such as the Silvertown Tunnel. However proposals have not yet been developed and therefore cannot be assessed at this stage. In addition, a number of planning applications for high-rise residential and mixed use development have been approved in the London Borough of Newham and within the scheme locality, comprising the Former Goswell Bakeries and Vacant Warehouses Site (Planning Application 13/01461/FUL), north-west of the Royal Victoria Docks; 26 to 34 Tidal Basin Road (Planning Application 13/01873); and Site We8 at Tidal Basin Road (Planning Application 10/00369/FUL). In addition, planning approval is pending with regard to the redevelopment of Hercules Wharf, Castle Wharf and Union Wharf, Orchard Place, London Borough of Tower Hamlets, for high-rise, mixed use development. These developments would introduce further large-scale built form within the Scheme locality and increase the density of the urban area. Additional visual receptors, principally residential properties, would also be introduced. The Scheme would be perceived in the context of a developing urban area, with increasing density, and would not be at odds with the characteristics of this townscape. As a result there are not anticipated to be significant cumulative townscape and visual effects.</p>

PEIR Chapter	Construction cumulative effects	Operation cumulative effects
		<p>Greenwich Masterplan (Planning Application 02/2903/O, approved in 2004) sets the framework for large-scale urban regeneration of the North Greenwich peninsula, including over 10,000 dwellings, offices, retail and leisure facilities. Planned (but not consented) developments that form part of the masterplan include retail/commercial, film studio, parking, and transport interchange proposals, near the southern tunnel portal. The Scheme would not be at odds with this developing townscape context, as a result there are not anticipated to be significant cumulative townscape and visual effects.</p>
<p>16 Water Environment</p>	<p>Many of the developments within 1km of the red line boundary have the potential to influence water environment receptors common to the Scheme and the potential for cumulative impacts has therefore been assessed and is outlined below.</p> <p>All committed or planned developments would be expected to be subject to stringent construction phase pollution prevention control measures, such as those outlined in Volume 3 of the PEIR, Appendix 4A, Preliminary Code of Construction Practice (CoCP) such that there would be no cumulative temporary impacts on the water quality of local waterbodies that have the potential to receive runoff from construction work areas.</p>	<p>During their operational phases the developments will be required to comply with policies, for example, those set out in the London Plan, which encourage adoption of sustainable drainage systems (SuDS) and require that surface water drainage systems are designed to achieve betterment (i.e. a reduction in existing rates and volumes of runoff). Adoption and compliance with these policies will therefore result in a cumulative beneficial impact in terms of decreasing inflows to the existing sewer network and reducing surface water flood risk across the study area. There is also potential for SuDS to deliver higher quality discharges, with potential for a cumulative net benefit in terms of an improvement in the quality receiving waterbodies.</p>

17.7 Limitations of assessment

17.7.1 As described in Section 17.6 several cumulative assessments are limited to a qualitative assessment, based on professional judgement.

17.8 Summary

Construction

17.8.1 Construction of the Scheme over a four year period will overlap with other development schemes listed in Volume 3 of the PEIR Appendix 17.A, for example the approved Greenwich Peninsula Masterplan (15/0716/O) and the Thames Tideway Tunnel. These developments have the potential to contribute to an adverse cumulative impact during construction in relation to amenity (disturbance and nuisance from construction activities) and potential demand and supply for construction materials and workforce.

17.8.2 In relation to employment, the Thames Tideway Tunnel will be another significant infrastructure scheme which would have a requirement for similarly specialist construction/tunnelling workers over a longer period of time. There may therefore be a negative impact on the availability of specialist labour during construction however given the Schemes location, in central London and with specialist training centres nearby (such as the Tunnelling and Underground Construction Academy) the potential cumulative impact should be limited.

17.8.3 However in relation to all other elements of the assessment through the application of suitable mitigation identified in the Scheme there is not considered to be a significant cumulative impact during construction.

Operation

17.8.4 During operation the cumulative effects of all proposed developments during operation would be a possible minor additional disturbance to breeding birds through visual and noise disturbance. However, the area is already highly developed and therefore any change in impact is likely to be minimal.

17.8.5 The traffic data used in the operational road traffic noise, air quality and effects on all travellers assessments has taken into account other transportation schemes as well as future predicted traffic growth as a result of new, major development. Therefore the cumulative effects of

other developments, transportation schemes and population growth are an inherent part these assessments.

- 17.8.6 The assessment of the scheme in relation to long term noise and vibration indicates that there would be negligible, or no-change, in road traffic noise at the majority of receptors in the day time, with some receptors experiencing a decrease in traffic noise. Moderate adverse impacts would occur at the east tower of the Hoola development due to an increase in percentage of HGVs. Air quality levels on the local road network will also be impacted by the traffic flows. Measures will be investigated to attempt to reduce the impact on air quality.