



RIVER CROSSINGS: SILVERTOWN TUNNEL

SUPPORTING TECHNICAL DOCUMENTATION

INTRODUCTORY ENVIRONMENTAL ASSESSMENT REPORT

Hyder Consulting

October 2014

This Introductory Environmental Assessment Report summarises the environmental work undertaken to date as part of the EIA process for the proposed Silvertown Tunnel and presents an early indication of the potential impacts of the proposal and the mitigation measures being considered.

This report is part of a wider suite of documents which outline our approach to traffic, environmental, optioneering and engineering disciplines, amongst others.

We would like to know if you have any comments on our approach to the environmental assessment, the potential impacts we have identified and mitigation we have suggested. To give us your views, please respond to our consultation at www.tfl.gov.uk/silvertown-tunnel.

Please note that consultation on the Silvertown Tunnel is running from October – December 2014



This report (or note) forms part of a suite of documents that support the public consultation for Silvertown Tunnel in Autumn 2014. This document should be read in conjunction with other documents in the suite that provide evidential inputs and/or rely on outputs or findings.

The suite of documents with brief descriptions is listed below:-

- **Silvertown Crossing Assessment of Needs and Options**

This report sets out in detail, the need for a new river crossing at Silvertown, examines and assesses eight possible crossing options and identifies the preferred option.

- **Outline strategy for user charging at Blackwall and Silvertown Tunnels**

This note sets out TfL's emerging approach to charging at Blackwall and Silvertown Tunnels.

- **Silvertown Tunnel Traffic Forecasting Report**

This report presents the traffic impacts that the Silvertown Tunnel would have on the highway network.

- **Silvertown Tunnel Introductory Transport Assessment**

This report presents the existing transport network and travel demand and assesses the transport impacts of the proposed Silvertown Tunnel.

- **Silvertown Tunnel Outline Business Case, including:**

- **Economic Assessment Report**
- **Distributional Impact Appraisal**
- **Social Impact Assessment**

Sets out the evidence for intervening in the transport system to address the issues of congestion and road network resilience at the Blackwall Tunnel.

- **Silvertown Tunnel Introductory Environmental Assessment Report**

This report summarises the environmental work undertaken to date and presents an early indication of the potential impacts of the proposal and the mitigation measures being considered.

- **Silvertown Tunnel Introductory Equalities Impact Assessment Report**

This report presents an early indication of the potential impacts of the proposal on gender, race and age groups. It also outlines potential mitigation measures to encourage a positive impact.

- **Silvertown Tunnel Introductory Health Impact Assessment Report**

This report presents an early indication of the potential impacts of the proposal on health and wellbeing. It also outlines potential mitigation measures to encourage a positive impact.

Transport for London

Silvertown Tunnel

Introductory Environmental Assessment Report



Hyder Consulting (UK) Limited
2212959
10 Medawar Road
The Surrey Research Park
Guildford
Surrey GU2 7AR
United Kingdom

Tel: +44 (0)1483 803 000


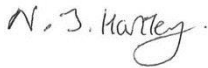
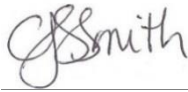
Fax: +44 (0)1483 532 801
www.hyderconsulting.com



Transport for London

Silvertown Tunnel

Introductory Environmental Assessment Report

Author	Petya Georgieva	
Checker	Nicky Hartley	
Approver	Caroline Soubry-Smith	
Report No	0005-UA005651-UE31U-01	
Date	October 2014	

This report has been prepared for Transport for London in accordance with the terms and conditions of appointment for Silvertown Tunnel dated 5th March 2013. Hyder Consulting (UK) Limited (2212959) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

CONTENTS

Non-Technical Summary	i
1 Introduction	1
1.1 The Purpose and Structure of this Report	1
2 The Scheme	2
2.1 Background to the Scheme	2
2.2 Scheme Objectives.....	5
2.3 The Scheme	5
2.4 Traffic Forecasting.....	9
2.5 The Rochdale Envelope	10
2.6 Scheme Timescales	11
2.7 Alternatives Considered.....	12
2.8 Development of the Preferred Scheme	14
3 EIA Background and Proposed Methodology	15
3.1 The EIA Process.....	15
3.2 The EIA Regulatory Context.....	15
3.3 Scope of the EIA.....	16
3.4 Methodologies	18
3.5 Assessment of Effects	19
4 Consultation.....	20
4.1 Consultation Undertaken to Date.....	20
4.2 Further Consultation to be Undertaken.....	21
5 Air Quality	23
5.1 Introduction.....	23
5.2 Regulatory and Policy Framework.....	23
5.3 Assessment Work Undertaken to Date.....	25
5.4 The Existing Environment.....	32
5.5 Potential Significant Effects	51
5.6 Further Assessment Work to Be Undertaken	53
6 Community and Private Assets	57
6.1 Introduction.....	57
6.2 Regulatory and Policy Framework.....	57
6.3 Assessment Work Undertaken to Date.....	61
6.4 The Existing Environment.....	62
6.5 Potential Significant Effects	75

	6.6	Further Assessment Work to Be Undertaken	77
7		Cultural Heritage.....	79
	7.1	Introduction.....	79
	7.2	Regulatory and Policy Framework.....	79
	7.3	Assessment Work Undertaken to Date.....	80
	7.4	The Existing Environment.....	81
	7.5	Potential Significant Effects	85
	7.6	Further Assessment Work to be Undertaken.....	86
8		Ecology and Nature Conservation.....	88
	8.1	Introduction.....	88
	8.2	Regulatory and Policy Framework.....	88
	8.3	Assessment Work Undertaken to Date.....	92
	8.4	The Existing Environment.....	98
	8.5	Potential Significant Effects	100
	8.6	Further Work to Be Undertaken	102
9		Effects on all Travellers	103
	9.1	Introduction.....	103
	9.2	Regulatory and Policy Framework.....	103
	9.3	The Existing Environment.....	104
	9.4	Potential Significant Effects	108
	9.5	Further Assessment Work to be Undertaken.....	113
10		Geology and Soils	115
	10.1	Introduction.....	115
	10.2	Regulatory and Policy Framework.....	115
	10.3	Assessment Work Undertaken to Date.....	120
	10.4	The Existing Environment.....	121
	10.5	Potential Significant Effects	123
	10.6	Further Assessment Work to Be Undertaken	125
11		Materials	127
	11.1	Introduction.....	127
	11.2	Regulatory and Policy Framework.....	127
	11.3	Assessment Work Undertaken to Date.....	132
	11.4	The Existing Environment.....	135
	11.5	Potential Significant Effects	137
	11.6	Further Assessment Work to Be Undertaken	139
12		Noise and Vibration	141
	12.1	Introduction.....	141
	12.2	Regulatory and Policy Framework.....	141
	12.3	Assessment Work Undertaken to Date.....	143
	12.4	The Existing Environment.....	145
	12.5	Potential Significant Effects	146
	12.6	Further Assessment Work to Be Undertaken	147
13		Townscape and Visual	149
	13.1	Introduction.....	149
	13.2	Regulatory and Policy Framework.....	149
	13.3	Work Undertaken to Date	150
	13.4	The Existing Environment.....	151

13.5	Potential Significant Effects	151
13.6	Further Assessment Work to be Undertaken.....	153
14	Water Environment.....	154
14.1	Introduction.....	154
14.2	Regulatory and Policy Framework.....	154
14.3	Assessment Work Undertaken to Date.....	157
14.4	The Existing Environment.....	157
14.5	Potential Significant Effects	158
14.6	Further Assessment Work to Be Undertaken	161
15	Conclusions and Next Steps	163
	Abbreviations	164
	Glossary of Terms	167
	References.....	171
	Appendices	175

Non-Technical Summary

This Introductory Environmental Assessment Report summarises the environmental work done to date as part of the Environmental Impact Assessment process for the proposed Silvertown Tunnel ("the Scheme"), and presents an early indication of the potential impacts of the Scheme and the mitigation measures that we are considering.

Air Quality

This topic considers the potential effects of the proposed Scheme on air quality during both construction and operation. The size of the study area is yet to be defined and will be determined following a review of the proposed construction activities and duration. Further consultation with Local Authorities and Natural England will take place to discuss the proposed methodology and identify nitrogen sensitive sites that could potentially be affected.

The East London Highway Assignment Model is being used to generate traffic data and information on current levels of air quality has been gathered from online resources, Defra and Local Authorities. Following a review of existing air quality data, gaps were identified and 75 additional NO₂ diffusion tubes have been distributed to help improve understanding of current conditions. Monitoring data will be collected over a twelve month period.

Future levels of air quality (NO₂ and PM₁₀) will be estimated using traffic forecasts for the opening year of the scheme (2021). We will assess how the Scheme would impact on sensitive receptors located near roads affected by the scheme (using the criteria defined in the Design Manual for Roads and Bridges). The assessment will consider the impact of the Scheme on Air Quality Management Areas and Air Quality Focus Areas.

During construction, air quality could be impacted temporarily as a result of dust from construction activity and emissions from construction traffic. Dust would be managed through a Construction Environmental Management Plan and implementing measures such as wheel washes, covering materials during storage and transport and keeping a tidy site. A travel plan would be implemented to ensure the most economical use of construction vehicles and river transport to minimise traffic movements.

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 attempt to reduce the impact on air quality; user charging would influence the attractiveness of the scheme and therefore air quality levels.

Emissions from traffic concentrated around the tunnel portals and from the tunnel ventilation system could impact on air quality around the tunnel portals. The ventilation system will be carefully considered in order to mitigate air quality impacts.

Community and Private Assets

This topic looks at impacts on commercial and residential developments as well as providing an overview of the local economy of the three Boroughs of Greenwich, Newham and Tower Hamlets. Social and community facilities have been identified including areas of public open space, education and healthcare facilities, community centres, leisure and entertainment facilities and places of worship. A study area of approximately 1km from the

scheme has been defined and information has been gathered through site visits, desk top research and consultation with the host Boroughs.

Permanent land take is minimal and confined to small areas of safeguarded land. Impacts on landtake and land use are not anticipated to be significant. There is potential for levels of community severance to be improved as a result of improved traffic movement and reduced congestion.

Construction activity (noise and disruption) is likely to impact local residents, businesses and visitors to the area. Communication with local businesses and residents will be key, along with the establishment of a Code of Construction Practice to ensure disruption is kept to a minimum and any adverse impacts are mitigated.

At present the land uses in the immediate vicinity of the Scheme mainly comprise derelict land and industrial premises. Proposals for future development within the Greenwich Peninsula and Silvertown will lead to a significant increase in population in these areas. The programme for the Scheme is currently being considered in conjunction with these proposed construction areas in order to avoid conflict.

Cultural Heritage

This topic looks at the impact on heritage assets such as listed buildings, conservation areas and archaeological remains. Information has been gathered through consultation with Greater London Archaeological Advisory Service, the local Boroughs, desk based studies and site walk over survey. A study area of 1km from the scheme has been defined.

Excavations associated with construction of the Scheme and associated working areas could impact potential subsurface archaeological remains particularly land surfaces and peat deposits dating from the Mesolithic to Bronze age periods. There is also a possibility of relatively shallow post-medieval remains relating to industrial development.

The likely potential for archaeological remains could be further understood by field surveys and if necessary mitigated by carrying out archaeological excavations in advance of development and watching briefs during construction.

Ecology and Nature Conservation

This topic assesses the impacts of the Scheme on ecology and nature conservation.

Ecological receptors are identified and assessed through desk studies and surveys. A study area of 2km from the Scheme has been defined and a phase 1 habitat survey was undertaken in November 2013 and March 2014. Surveys specific to invertebrates, reptiles, black redstart and bats were undertaken in spring/summer 2014. Further work will involve identifying species and habitats as a result of the surveys and assessing their value and significance.

Potential impacts that could arise would be temporary disturbance of habitats during the construction period. Noise and visual disturbance and pollution from runoff could potentially impact on foraging and nesting birds and the River Thames Site of Importance for Nature Conservation. Mitigation would be implemented to ensure that construction (site clearance) in these areas is undertaken outside of nesting season, work sites are visually screened and run off is prevented.

Permanent impacts would be in the form of loss of existing habitat for birds, invertebrates and reptiles through land take. If species are impacted as a result of unavoidable land take, suitable replacement habitat would be created.

Effects on all Travellers

The topic assesses the potential effects of the Silvertown Tunnel on vehicle travellers, cyclists and pedestrians. Data regarding the existing environment in the vicinity of the scheme has been gathered and strategic cross river links have been identified including current capacity and reliability.

Beneficial impacts for all road users including overheight vehicles are identified with regard to reduced journey times, increased reliability and reduced congestion levels at peak times. Beneficial impacts for public transport users are related to enhancements of the bus services and more cross-river opportunities.

The pedestrian routes to Dock Road and along Millennium Way are anticipated to be diverted during construction. The existing Boord Street footbridge will be demolished as part of the works. A temporary or permanent replacement bridge would be in place at all times. Minor temporary route diversions are likely to occur along the off-street cycle route linking the Lower Lea Crossing and Tidal Basin Road around the south of roundabout. Cycle access to Dock Road from the roundabout will be closed. The alternative cycle access routes are via the Silvertown Way and North Woolwich Road, or alternatively via The Crystal and through a shared path tunnel under Silvertown Way.

Mitigation measures include appropriate signage of alternative pedestrian and cycle access routes. Coordinated information campaign will be undertaken targeting the affected routes, stations and stops. User charging on both Silvertown and Blackwall Tunnels is being proposed as a way to manage traffic levels and prevent congestion on the surrounding network as a result of the new crossing.

Geology and Soils

This topic considers the potential impacts to geological and soil resources, human health and controlled waters. The study area comprises an area of 500m around the Scheme. Ground conditions have been established using previous Ground Investigation studies and Contamination Assessments from recent nearby developments. A Ground Investigation study involving trial boreholes and a geophysical survey will be undertaken from October 2014 to January 2015 to further inform the assessment.

Surface water and groundwater resources as well as construction workers and nearby residential/commercial premises could potentially be impacted by construction activity in the form of dust, disturbance of contaminated land such as landfill/Made Ground and the mobilisation of contaminants in the soil or creation of new contaminant pathways and contaminated run off.

Every effort would be made to avoid impacts from contaminated soil through damping down and covering of spoil and lorries during transportation of material to minimise airborne dust. Contaminated land would be treated and the Scheme would be designed to reduce the need for materials to be imported and to minimise waste. Construction would adhere to a good site management plan, a Construction Code of Practice and Environment Agency Guidelines.

It is not anticipated that permanent impacts on geology and soils would result from the Scheme.

Materials

This topic addresses potential impacts resulting from waste management and the use of resources during construction, and operation of the Scheme. At the current stage of design, detailed information is not yet available in order to determine the quantities of waste arising from both construction and operation.

Once the design progresses the assessment will forecast the types and volume of waste, provide suggestions to design out and minimise waste and to confirm procedures for storing and transporting waste.

Potential impacts associated with waste from the scheme could be that site conditions may differ from those assumed during design putting increased pressure on waste management and disposal facilities. Ground investigation works are currently being undertaken to reduce the uncertainty of ground conditions. Where possible, excavated materials will be re-used on-site.

The transportation of waste materials would produce carbon emissions and release contaminants into the air. The use of materials with low embodied carbon as well as the use barges along the river where possible for transportation of materials will reduce the likely environmental effects. A Transport Management Plan will be implemented to specify route and timing restrictions to ensure minimal impact on the local highway network.

Flooding could occur as a result of inappropriate materials and waste storage. A Site Waste Management Plan and a Construction Environmental Management Plan will ensure materials and waste are stored safely.

No permanent impacts have been identified at this stage but will be investigated when design details are available.

Noise and Vibration

This topic considers the potential road traffic noise effects as a result of the Scheme. The existing noise conditions and the potential road traffic noise effects during the operation of the Scheme are considered.

At this stage of the Scheme design potential construction noise and vibration effects have not been considered.

Short term noise surveys have been undertaken at three locations within close proximity to the nearest residential dwellings to the Scheme. Noise levels vary across the study area with some locations already exceeding the World Health Organisation guideline community noise values.

Initial road traffic noise calculations indicate that the potential for noise impacts as a result of the Scheme could occur at the tunnel portals. Mitigation measures such as low noise surfacing or noise barriers will be investigated to minimise the noise impacts on the surrounding area.

Townscape and Visual

This topic considers the townscape and visual implications of the Scheme. The study area extends 500m from the scheme as effects are anticipated to be localised and centred on the proposed tunnel portals together with associated highway links. Work to date has involved a desk top study and a field survey.

The land surrounding both the southern and northern portals is currently characterised by highway corridors, light industrial/commercial areas and derelict land. It is considered that these townscapes would be able to accommodate the proposed change, with scope for enhancement. In terms of visual amenity, nearby sensitive visual receptors include users of tourist routes (such as Emirates Air Line and National Cycle Route 13) and residential properties.

Construction activities, stockpiling of material/spoil and heavy vehicle movements could cause temporary disruption to townscape and views however construction best practice such as targeted use of hoarding would be used to limit disruption to townscape and visual amenity.

In terms of permanent impacts, the Scheme design is being carefully considered in order that the proposals would be integrated with the local townscape and, where possible, opportunities are taken to enhance townscape and visual amenity.

Water Environment

This topic identifies and assesses impacts on water quality, drainage and flood risk. The study area has been identified as areas within 500m of the scheme. Data has been obtained through a number of published documents from Boroughs and the Environment Agency and a site walkover was undertaken in May 2014.

The majority of the Scheme is located within Flood Zone 3, defined as having high probability of flooding and is classed as being in an 'Area Benefitting from Defences'. The flood defences along the Thames provide a standard of protection of a 1 in 1000 chance event. The main source of flooding to the Scheme is from a breach of existing defences.

Temporary works during construction could result in the following impacts; construction works could be at risk from flooding. Signing up for EA flood warnings is a potential mitigation measure as well as ensuring that flood risk is included as part of the health and safety procedure and that construction workers are aware of potential risks.

Construction work may cause heavily silted or contaminated runoff to nearby water bodies. Drainage discharge would be treated prior to entry into the water environment. We would adhere to the EA's Pollution Prevention Guidelines and a Construction Environmental Management Plan. Current drainage arrangements would be improved.

Once the tunnel is operational, due to its location within Flood Zone 3, the tunnel will always carry a risk of flooding. The scheme would introduce impermeable surfaces which may increase both the risk of surface water flooding on site and flood water levels downstream. However, it is understood that currently there is failure of current drainage system in Silvertown. The development proposes to fix and improve this. It is believed that once this has been done the drainage system will be able to cope with the additional increase in surface water so will not increase surface water flood risk on site or downstream of the site.

Going forward further consultation will be held with the EA to agree drainage arrangements and flood protection. Additional information will be gathered from the local Borough's, the EA and Thames Water to supplement the existing baseline information. A flood risk assessment will be prepared to support the ES.

Next Steps

Comments made through the consultation process will be reviewed by the engineering and environmental design teams. Where appropriate, we will consider the need for further study of environmental impacts, modifications of the Scheme, and the further development of mitigation measures.

Once the reference design for the scheme is complete, further assessment of its environmental effects will be undertaken to establish those likely effects and necessary mitigation proposals. The assessment will be reported in a Preliminary Environmental Information Report, which will form part of the statutory consultation on the Scheme.

Comments received at this consultation will be considered, and an Environmental Statement for the proposed scheme will be prepared to accompany the application for a Development Consent Order.

This Report also provides information relating to assessment methodology that will be used to prepare both the PEIR and the ES. The ES will be subject to an independent peer review.

1 Introduction

1.1 The Purpose and Structure of this Report

1.1.1 The purpose of this Introductory Environmental Assessment Report is to inform the public consultation of the Scheme to be undertaken in Autumn 2014. The report:

- Describes the Scheme, including construction details and timescales.
- Sets out the proposed scope and methodology for the Environmental Impact Assessment (EIA).
- Describes the environmental baseline data collection work undertaken to date.
- Describes the existing environment, based on the information collected.
- Identifies further work to be undertaken to complete the EIA.
- Provides a high level/initial assessment of the likely environmental effects of the Scheme.
- Outlines the range of mitigation measures that will be considered to avoid, reduce or offset environmental impacts.

1.1.2 This Report is not intended to constitute a formal Environmental Statement (ES) for the Scheme, but will be used to inform the public consultation and will feed into the ongoing EIA work which is being undertaken as the detailed design of the Scheme is progressed.

1.1.3 It is also not intended to constitute a formal Preliminary Environmental Information Report for the Scheme required by Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009. This will be prepared for submission at the next stage of consultation.

2 The Scheme

2.1 Background to the Scheme

- 2.1.1 The London Plan highlights the potential of London's Thames Gateway to deliver substantial growth. Twelve Opportunity areas in east London together cover 9,000 hectares of land, and have capacity for 200,000 jobs and 120,000 homes. To bring forward development on this scale requires substantial infrastructure investment. In relation to transport there has been extensive investment in new public transport including extensions to the Docklands Light Rail, the creation and expansion of London Overground services and the present construction of Crossrail. However, similar levels of investment have not been made in relation to the road network.
- 2.1.2 There are only three road vehicle crossings of the River Thames in London east of Tower Bridge (the Rotherhithe and Blackwall Tunnels and the Woolwich Ferry). Each of them suffers capacity restrictions leading to delays and unreliability issues not only on the crossings themselves but also on the surrounding local road network. In addition the tunnels have vehicle size constraints and dangerous goods restrictions on them causing long diversions for some freight vehicles and severely limiting cross river bus services. The latter has a significant impact on the size of labour catchment areas, it should not be forgotten that outside central London the bus is by far the most important public transport mode with over 2 billion trips a year.
- 2.1.3 Of the three crossings the most important is the Blackwall Tunnel which provides over two thirds of cross river vehicle capacity and also suffers from the highest level of congestion and reliability problems.
- 2.1.4 The Draft National Policy Statement for the National Road and Rail Networks states "Transport is an engine for growth. Well-connected and high performing road and rail networks with sufficient capacity are vital to meet the country's long term needs and support a prosperous economy." By inference the lack of such connections and capacity is a major barrier to economic growth. The Mayor's Transport Strategy (MTS) published in 2010 sets out the transport strategy for London. This includes the strategy for delivering the transport infrastructure needed to accommodate growth in the east sub-region, which is a key part of the London Plan's strategic vision.
- 2.1.5 The MTS identifies a wide range of policies and proposals to support this growth. It is based around three key policy areas:
- Better co-ordination and integration of planning and transport
 - Providing new capacity
 - Managing the demand to travel
- 2.1.6 The Mayor and TfL have identified potential options to address the problem of poor cross-river connectivity and capacity and have shortlisted those which are considered to be practical to construct, are environmentally acceptable, are in suitable locations, and which will be affordable. The MTS sets out a

commitment to take forward a package of new river crossings for east and southeast London which includes:

- Local links to improve connections for pedestrians and cyclists. Emirates Air Line, a new cable car connection between the Royal Docks and North Greenwich, opened in summer 2012.
- Gallions Reach Ferry. A new vehicle ferry at Gallions Reach between Beckton and Thamesmead. This would improve connectivity and could replace the Woolwich Ferry (this is the subject of a separate study and if taken forward would be consented as a self-contained project).
- A fixed link at Silvertown. This would relieve congestion at the Blackwall Tunnel by providing an alternative route between the Royal Docks, Isle of Dogs, Lower Lea Valley and Greenwich Peninsula. This is the Scheme the subject of this Initial Environmental Assessment Report.

2.1.7 In accordance with MTS and London Plan policy, a series of technical reports were commissioned by TfL to develop a fixed link at Silvertown. The following studies have informed the Scheme development:

- *The New Thames River Crossing: Greenwich to Silvertown – Highways (Alignment and Interfaces) Report* was commissioned in 2009 to investigate a link to connect the A102 on the Greenwich Peninsula to the Tidal Basin roundabout on the A1020 (Silvertown Way). A tunnel crossing and a lifting bridge crossing were considered.
- *The New Thames River Crossing: Network Development and Forecasting Report (2010)* documented some preliminary traffic modelling work to confirm the case for the development of a new river crossing connecting the Greenwich Peninsula and Silvertown. As part of this study, some early concepts for the alignments of the highway interfaces were developed.
- *Silvertown Crossing Study: Tunnel Engineering Report (2012 and revised 2013)* which looked specifically at the tunnel alignment and outline engineering principles, including geotechnical aspects. Historical geotechnical investigation data from the cable car project was analysed and further geotechnical data was gathered in 2011 and 2012 to inform the study.
- *Silvertown Crossing: Highways Options and Feasibility Design* reports were produced in 2012 that investigated options for the northern and southern tie in points. A further report, *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations*, was published in 2013.
- *Needs and Options Report (2014)* provides a detailed analysis of the need for a new river crossing at Silvertown and outlines the objectives to be met by this element of the River Crossings programme.
- *Introductory Transport Assessment (2014)* presents the existing conditions in terms of transport provision and demand. It also assesses the construction and operational impacts of the Scheme on transportation.
- *Outline strategy for user charging at Blackwall and Silvertown Tunnels (2014)* sets out TfL's emerging approach to charging including reasons for

proposing a user charge, charging proposals, and the anticipated effects of charging.

- *Traffic Forecasting Report (2014)* provides a review of the highway traffic forecasts for the proposed project including the new Silvertown Tunnel road crossing and the introduction of user charges at this new crossing and the adjacent Blackwall Tunnel
- *Outline Business Case (2014)* examines the reason for intervention, possible solutions and the costs and benefits of the preferred option.

- 2.1.8 A new crossing at Silvertown has extensive national, London-wide and local policy support, in particular it is a key element in the London Plan and the Mayor's Transport Strategy, and has been designated as a Nationally Significant Infrastructure Project by the Secretary of State for Transport under section 35 of the Planning Act 2008.
- 2.1.9 The existing river crossings in east London do not cater adequately for current cross river road traffic movement; they are at or over capacity and there are severe resilience problems, particularly at the Blackwall Tunnel. While rail based public transport, walking and cycling are important, road travel (including local bus services) is also vital for the proper functioning of the London Thames Gateway area, and growth predictions are for significant increases in road travel and congestion. A solution to relieve congestion and improve resilience in the area around the Blackwall Tunnel will ensure that the significant growth planned in the area can be catered for and supported. Delays are caused not only by an excess of demand, but also by the need to close the Blackwall Tunnel at short notice for a variety of reasons from overheight vehicles to break downs.
- 2.1.10 A detailed log records the time, duration and type of every incident in the tunnels and on the immediate approaches. During 2013 there were only 10 days with no recorded incidents northbound and 35 days southbound. In total incidents in the tunnel or its approaches are estimated to have caused 160,000 hours of delays to vehicles in 2013 at an economic cost well in excess of £1.5m.
- 2.1.11 London Thames Gateway is one of the most deprived areas not only of London but of the whole of the UK and as highlighted above the lack of good transport connections and capacity is a major barrier to the economic growth which is needed in this wider area.
- 2.1.12 Bus travel is highly important in outer London and is the dominant public transport mode. There are 47 bus routes which cross the river west of Vauxhall Bridge and only a single route crossing the river east of Tower Bridge. A new crossing with much improved reliability offers the opportunity to recast services in the area to radically improve cross river journeys opening up new employment as well as leisure services. TfL have commenced looking at how bus routes can be revised or extended to take up the opportunities that the new crossing would offer.
- 2.1.13 In relation to economic activity, a survey of businesses (WSP, May 2014) in the local area found two thirds are concerned about the constraints and disruptions placed on them by poor reliability of cross-river journey times. As a result 83%

of businesses expect the East London River Crossings Package¹ to generate a strong positive economic effect.

Woolwich Ferry Replacement

- 2.1.14 There is a need to address the fact that the Woolwich Ferry is nearing the end of its operating life and to consider if and how it should be replaced. Whilst public consultations to date have addressed both the Silvertown Tunnel and Woolwich Ferry replacement, the two are now being progressed separately. It is currently unknown what form a Woolwich Ferry replacement project will take; all options remain under review. Consultation on options was undertaken from July 2014 to September 2014.

2.2 Scheme Objectives

- 2.2.1 Taking account of the draft NPS for National Networks, Mayoral policy as set out in the London Plan and MTS, information gathered from the assessment of needs (including the latest information on population growth) and responses to consultation, the following are identified and adopted as the project objectives for the Silvertown crossing:

- PO1: to improve the resilience of the river crossings in the highway network in east and southeast London to cope with planned and unplanned events and incidents
- PO2: to improve the road network performance of the Blackwall Tunnel and its approach roads
- PO3: to support growth in east and southeast London by providing improved cross-river transport links for business and services (including Public Transport)
- PO4: to integrate with local and strategic land use policies
- PO5: to minimise any adverse impacts of any proposals on health, safety and the environment
- PO6: to ensure where possible that any proposals are acceptable in principle to key stakeholders, including affected boroughs
- PO7: to achieve value for money

2.3 The Scheme

- 2.3.1 The Scheme would provide a dual two-lane connection between the A102 Blackwall Tunnel Approach on Greenwich Peninsula and the Tidal Basin roundabout junction on the A1020 Lower Lea Crossing/Silvertown Way by means of twin tunnels under the River Thames. The tunnels would be designed with a circular cross section, and would be connected by pedestrian cross passages to facilitate intervention in an emergency. The new tunnel would be

¹ Defined in the survey as a new tunnel at Silvertown (with no height restrictions); a new ferry, tunnel or bridge at Gallions Reach, or an upgrade to existing Woolwich Ferry

built to a specification that would be large enough to carry vehicles of all sizes. Pedestrians and cyclists would not be able to use the Silvertown Tunnel for safety reasons. They would, however, be able to make use of the nearby Emirates Air Line.

2.3.2 The Scheme layout and application site boundary is shown in Drawing 1.1. The Scheme would pass under the River Thames, in land that has been safeguarded for this purpose.

2.3.3 The Scheme will include new junctions to link the tunnels into the existing road network, and new portal buildings to house the infrastructure necessary to operate the tunnel, including ventilation equipment.

2.3.4 The speed limit within the tunnel and on the approach roads would be 30mph.

Northern Highway Arrangement

2.3.5 The Scheme would include a number of changes to the road network on the north side of the tunnel, to link the tunnel to the existing road network. These changes are:

- Creating a new signal-controlled roundabout at the Tidal Basin roundabout, to create a link between the Silvertown Tunnel approach roads, Dock Road and the Lower Lea Crossing.
- Temporarily closing the existing junction of Dock Road with the Lower Lea Crossing, and realigning Dock Road so that it links with the new Tidal Basin roundabout.
- Introducing new pedestrian and cycle facilities within the new Tidal Basin Roundabout.
- Creating a new Tunnel services building over the mouth of the new Silvertown Tunnel to house ventilation equipment and other vital tunnel infrastructure.

2.3.6 The northern highway arrangement is shown on Drawing 2.1.

Southern Highway Arrangement

2.3.7 The Scheme would include a number of changes to the existing road network on the south side, on the immediate approach to the new tunnel. These changes are:

- Widening the A102 Blackwall Tunnel Approach road in order to create new access routes to the Silvertown Tunnel portals.
- Demolishing the existing footbridge over the A102 near the junction with Boord Street, to allow for the A102 Blackwall Tunnel Approach to be widened. The footbridge would be replaced with a new structure.
- Building a new flyover to take southbound traffic exiting the Blackwall Tunnel over the northbound approach to the Silvertown Tunnel.
- Introducing new signage to direct motorists either to the Blackwall Tunnel or to the Silvertown Tunnel, depending on their final destination.

- Creating a new tunnel services building over the mouth of the new Silvertown Tunnel to house ventilation equipment and other vital tunnel infrastructure.

2.3.8 The southern highway arrangement is shown on Drawing 2.2.

2.3.9 Further details about the Scheme are provided in the *Interim Reference Design Report* (Atkins, 2014).

Highway Drainage

2.3.10 The Greenwich Peninsula has been identified as being in a flood risk area but is currently protected by river walls. The *London Regional Flood Risk Assessment* (2009) identifies that these walls may need to be raised beyond 2030. Both the Silvertown Tunnel and the Blackwall Tunnel will have a particular risk as their portals and ventilation shafts are within the tidal Thames flood risk zone.

2.3.11 In addition to the flood risk from the tidal Thames, the permeability of the flood plain alluvial layers makes groundwater infiltration a possible risk. This would be mitigated by constructing all carriageways that are below the water table in concrete “troughs”, which comprise diaphragm walls and concrete ground slabs, to provide an impermeable barrier which will prevent groundwater infiltration.

2.3.12 Pollution control measures in the form of oil interceptors or other agreed facilities would be integral to the Scheme drainage system.

2.3.13 Drainage sumps at the tunnel portal would provide an intercept and storage for surface water run-off, as well as a reception chamber for water being pumped back from the low-point in the tunnel. Surface run-off would be collected via gullies or a combined drainage kerb system and collected in the sump, from where it would be pumped to an elevation from where it can be gravity drained to an outfall. Any spillages in the tunnel would be contained for safe removal to avoid discharges into the drainage.

2.3.14 It is assumed that in addition to the drainage sump at the portal, an attenuation system would be required in the form of oversized carrier drains adjacent to the carriageway for the catchment area falling towards the portal. A flow-control device would control the outfall rate into the portal sump. A second attenuation system would be provided to store surface water from the remaining catchment area.

Tunnel Design

2.3.15 The proposed design comprises twin bored tunnels. Intervention cross-passages would be required for the emergency services.

2.3.16 The main bores would be constructed by a tunnel boring machine and would have a lining of reinforced pre-cast concrete segments.

Lighting

2.3.17 Tunnel lighting would be designed in accordance with BD 78/99 and BS 5489 Part 2.

- 2.3.18 On the tunnel approaches lighting would be provided to current TfL Standards. Detail of this would be developed during the subsequent design stages.

Demolition and Land Take

- 2.3.19 Based upon the current Scheme design it is not anticipated that there would be a requirement for any property demolition. However, this is being reviewed as the Reference design is being progressed.
- 2.3.20 The extent of the permanent and temporary works and associated land take for the Scheme is shown on Drawing 1.1.

Waste

- 2.3.21 Excavated material from tunnelling activity, the construction of the portals and general construction waste would be generated during the construction period. Excavated material from tunnelling activity would predominantly be removed from the site where the tunnel boring machine enters the ground and from the area of the cut and cover and open cut portals located at the northern and southern ends of the tunnel at Silvertown and the Greenwich Peninsula respectively. The close proximity of the site to the River Thames provides the opportunity to remove waste by river transport and thereby reduce lorry movements on local roads. However disposal by road transport remains an option at this stage.
- 2.3.22 The Silvertown TBM will produce a volume of spoil for disposal of 550,000m³ or 840,000 tonnes. The Silvertown works site has a dedicated quay facility at Thames Wharf, from which the majority of excavated material from both tunnel bores and some from the highways works can be transported away. For a number of similar construction projects, Wallasea Island has been the designated disposal site for the spoil generated, as part of the Royal Society for the Protection of Birds (RSPB) project to transform the whole island into a wetland habitat..
- 2.3.23 As part of the development of the Scheme design an Outline Site Waste Management Plan will be prepared that will be updated as the Scheme Reference design is produced.

Barge/Wharfage Details

- 2.3.24 To minimise disruption to the highway network, and reduce carbon emissions, river facilities are currently being considered for delivery of tunnel segments and other bulk materials to the site and removal of spoil via Thames Wharf. The proximity of the river and wharf make river transport a logical option.
- 2.3.25 Spoil would travel by conveyer from the tunnel to a storage site and would then transfer through a loading bunker and conveyer to river transport at Thames Wharf.
- 2.3.26 The tunnel segments would be off-loaded from the barge by a crawler crane and placed in a designated segment storage stack area. Segments would be moved from the storage area by a gantry crane to the tunnel.

Landscaping

- 2.3.27 Landscaping details will be developed during the next phase of design. Cost allowance for this has been made within the current estimates.

User Charging

- 2.3.28 The introduction of user charging on Blackwall and Silvertown Tunnels will play a fundamental part in covering the cost of Silvertown Tunnel and as a key traffic management measure (refer to the user charging report for more information 'Outline strategy for user charging at Blackwall and Silvertown Tunnels (2014)').
- 2.3.29 As both Blackwall and Silvertown Tunnels will be operated as a single crossing, it is essential that both tunnels are charged. By charging Silvertown but not Blackwall tunnel, their close proximity would mean that queuing from the 'free' crossing would obstruct access to the charged crossing and result in no real improvement to the current situation. Managing traffic effectively would also be very difficult.
- 2.3.30 Although it is also relatively close to Blackwall, the Rotherhithe Tunnel serves a different set of destinations and is unlikely to be affected significantly by the traffic changes made by the Silvertown Tunnel. Currently there are no plans to introduce a user charge to the Rotherhithe Tunnel.
- 2.3.31 The user charging for the Scheme is under development and the Outline Strategy for user charging at Blackwall and Silvertown Tunnels will be subject to public consultation. The user charging model sets out broad working assumptions and once adopted for the Scheme will feed into the traffic modelling scenarios assessed in the ES as the charging arrangements would impact upon the demand and traffic flows.

2.4 Traffic Forecasting

- 2.4.1 As set out in the Traffic Forecasting Report (TfL, 2014), TfL has used the London Regional Demand Model (LoRDM) to forecast the demand and traffic impacts of several options to provide new river crossings in east and southeast London. LoRDM uses population and employment figures (as contained in the Mayor's 2009 London Plan) as well as assumptions from Government on economic growth to predict overall travel demand on both the public transport and the highway network. The LoRDM model also estimates highway and public transport network conditions. On the highway side, LoRDM includes TfL's River Crossings Highway Assignment Model (RXHAM) which represents the highway network in detail to determine the strategic routing of trips between their origins and destinations.
- 2.4.2 The results of this traffic modelling have been used to inform specific environmental topic assessments that are set out in this report.
- 2.4.3 The Silvertown Tunnel scheme is evaluated against an assumed future 2021 reference case ("Do-Minimum") scenario. The reference case model represents an estimate of likely transport patterns in the future without the introduction of the Silvertown Crossing project. While proposals for new river crossings to the

east of Silvertown are outside the scope of this assessment, the Reference case includes an assumption that the Woolwich ferry will be replaced (retained as a free service with 30% additional capacity)². It also incorporates predicted changes in population, employment (as contained in the Mayor's 2009 London Plan) and committed changes to transport networks.

- 2.4.4 A "central case" model has been developed to represent the Silvertown Tunnel Scheme ("Do-Something") scenario (2021) which forms the basis for the assessment within this report. Other key elements of the central case are:
- Twin tunnels creating a dual two-lane cross-river connection
 - One lane in each direction used by any type of vehicle, the other by buses and good vehicles only
 - User charging to manage demand for the Blackwall and Silvertown Tunnels and their approach routes
 - Dimensional standards in the Silvertown Tunnel providing access to all vehicle types including double-decker buses and normal maximum height goods vehicles
- 2.4.5 It is assumed for the purpose of this assessment that the Woolwich Ferry continues to operate, albeit as a new ferry with 30% extra capacity and charges consistent with the Blackwall and Silvertown Tunnels.
- 2.4.6 Following feedback from the consultation, traffic modelling scenarios to feed into the final assessment will be agreed. Further modelling will be undertaken with updated population and employment figures that have been forecast as part of the Mayor's document "Further Alterations to the London Plan". In addition, work will examine the impact of different charges applied to Silvertown Tunnel, Blackwall Tunnel and Woolwich Ferry, as well as the impact of different development assumptions on the transport network.

2.5 The Rochdale Envelope

- 2.5.1 PINS Advice Note 9: '*Using the 'Rochdale Envelope'*' provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008. The advice note acknowledges that there may be parameters of a Scheme's design that are not yet fixed and, therefore, it may be necessary for the ES to assess likely worst case variations to ensure that the likely significant environmental effects of the Scheme have been assessed.

² **For the purpose of traffic modelling, the reason for this assumption is that by 2031 Woolwich Ferry would need to either be upgraded at its existing location or replaced with a new crossing. Other crossings east of Silvertown Tunnel are subject to a separate decision-making process. If the Woolwich Ferry were to be upgraded at its existing location, the modelling assumes that it would be charged to ensure consistency with the Blackwall, Silvertown and Dartford Crossings. The assumption about the existing and potential future capacity of the Woolwich Ferry has little material impact on the forecasts for Silvertown Tunnel.*

2.5.2 Within this Report, the early concept design for the Scheme is presented. The Scheme is to be developed further through the Reference Design and this will form the basis for the DCO application. Within the Reference Design there will need to be sufficient flexibility to provide the future Design and Build contractor with sufficient scope for value engineering through innovative design and/or construction techniques. Therefore, when presenting the Scheme design in the ES and the accompanying environmental assessment, the requirements of Advice Note 9 will be reflected to ensure that the likely significant effects of the Scheme are assessed. Furthermore, the reference design will be informed by the EIA with the design as part of the iterative co-operation between the designers and the environmental specialists.

2.6 Scheme Timescales

2.6.1 An indicative construction programme has been developed which indicates a construction period of approximately 4-5 years. This construction programme has been developed to enable safe construction whilst minimising disruption to the travelling public.

2.6.2 The highway infrastructure works would require a shorter timeframe than the tunnelling work although the phasing of the highway works is considerably more sensitive due to their interface with the existing highway.

2.6.3 The construction phasing of the Scheme has been informed by the following parameters:

- The site compound and construction areas necessary for the construction of the tunnel itself
- The need to minimise disruption as far as practicable to the strategic traffic route through the Blackwall Tunnel
- The need to maintain local connections particularly access to the O2 Arena
- The planning of temporary works to facilitate construction including ramps to accommodate level changes

2.6.4 The construction programme currently assumes that the twin bore tunnel would be first driven from Silvertown to Greenwich, with a rotation of the tunnel boring machine at Greenwich to reverse its direction and the driving of the machine back to Silvertown, after which it would be dismantled.

2.6.5 The Silvertown side of the Scheme has been selected for the initial driving of the tunnel boring machine as it has more space and can be readily serviced by barge or by road for delivery of segments and would allow spoil removal by ship. There are constraints associated with the DLR viaduct and the Cable Car north immediate tower but these are capable of being overcome.

2.6.6 The current construction programme assumes that some enabling works would commence during 2017/2018 including service diversions. The current construction programme also assumes that the tunnel would be bored seven days per week although it is possible that working hours could be the subject of a DCO requirement. The assumptions made regarding the construction

programme will be clearly outlined in the ES to ensure that the worst case scenario is assessed.

2.7 Alternatives Considered

2.7.1 The full range of possible options for additional river crossings in east London was presented as part of the East London River Crossings consultation in 2012/13.

2.7.2 The following options which were presented as part of that consultation were not taken forward in the option assessment due to their geographic location:

- Woolwich Ferry (Option C2)
- Gallions Reach Ferry (Option C3)
- Woolwich lifting bridge (Option D5)
- Woolwich Tunnel (Option D6)
- Thames Gateway Bridge (Option D7)
- Local bridge at Gallions Reach (Option D8)
- Local tunnel at Gallions Reach (Option D9)

2.7.3 As set out in the Silvertown Crossing Assessment of Needs and Options, a new river crossing is needed at Blackwall. The assessment identifies how the Blackwall Tunnel forms part of London's strategic road network whereas the Woolwich Ferry (and accordingly, any subsequent replacement) connects the local road network. Similarly the options listed above, along with others which have subsequently been identified, are examined as part of the East of Silvertown Needs and Options report (TfL, 2014) which formed part of the River Crossings programme consultation (July to September 2014) and are not directly related to meeting the strategic highway objectives at Blackwall. While options located further afield, such as a new Lower Thames Crossing (DfT, 2013) (in the vicinity of the Dartford Crossing) could also address a strategic need, they would not resolve the resilience problems at the Blackwall Tunnel and would require HGVs in particular, to take very lengthy diversionary routes.

2.7.4 The river crossing options that have been assessed against the project objectives listed in section 2.2.4 are:

- Do Nothing (Option A)
- Manage demand and maximise public transport use (Option B)
 - Congestion charging at Blackwall Tunnel (Option B1)
 - DLR extension to Falconwood (Option B2)
- Lower cost road crossings (Option C)
 - Silvertown Ferry (Option C1)
- Higher cost road crossings (Option D)
 - Blackwall Tunnel third bore (Option D1)
 - Silvertown lifting bridge (Option D2)
 - Silvertown bored tunnel (Option D3)

- Silvertown immersed tunnel (Option D4)

2.7.5 As set out in the analysis Silvertown Crossing: Assessment of Needs and Options, the Silvertown Tunnel options (bored or immersed) located in the safeguarded area between the Greenwich Peninsula and the Royal Docks, are the only options that fully address all three project objectives. Both tunnel options provide comprehensive solutions to relieve congestion and address the severe resilience problems that exist now at the Blackwall Tunnel and provide additional capacity to ensure that the growth planned in the area can be accommodated and supported.

2.7.6 For detailed information regarding the options assessment refer to the Silvertown Crossing: Assessment of Needs and Options Report (2014).

Silvertown Tunnel Options

2.7.7 The next stage of the design development process was to consider in further detail alternative construction/design options for the Silvertown Tunnel. The options considered were:

- Immersed tube 'Base' Option – long option with on-site casting
- Immersed tube A Option – long option with off-site casting
- Immersed tube B Option – shortened option with on-site casting
- Immersed tube A+B Option – shortened option with off-site casting
- Bored 'Base' Option – long option with cross-passages at 350m spacing
- Bored C Option – shortened option with cross-passages at 350m spacing
- Bored D Option – shortened option with cross-passages at 100m spacing
- Bored E Option – long option with cross-passages at 100m spacing

2.7.8 The options were appraised to determine the potential environmental risks (Hyder Consulting, 2013) as well as the deliverability of each option from an environmental perspective.

2.7.9 The comparative assessment of immersed tube against bored tube showed that the immersed tube option poses higher environmental risks resulting from the additional land take and excavation works required for the construction phase, the construction methods which will be used and the vertical alignment of the immersed tube tunnel. Higher environmental risks were identified with regards to:

- Land take
- Loss of archaeological assets
- Temporary loss of habitats
- Deterioration of water quality, elevated suspended sediments in the river and the loss of intertidal mudflats
- Contamination of controlled waters

- Large volumes of waste and fewer opportunities to re-use key waste materials
- Changes to water level, flow paths and dynamics and the movement of sediment within the River Thames

2.7.10 The Silvertown Tunnel Options Study (2013) also concluded that the environmental risks associated with the shortened options are higher than the long options due to their being reduced cut and cover sections on the south side of the River Thames; the close proximity of sensitive receptors to the open cut road; and construction design changes of Millennium Way. Higher environmental risks were identified with regards to:

- Permanent land take
- Severance
- Noise
- Deterioration in townscape character

2.7.11 The 'long' bored tunnel was selected as the preferred option.

2.7.12 A bored Silvertown Tunnel, in conjunction with user charging at both it and the Blackwall Tunnel is being progressed as a standalone scheme and is proposed by TfL to be the subject of an application for a Development Consent Order. Further options are being considered in a separate study for a replacement of the Woolwich Ferry in light of the consultation responses received to date (refer to Section 2.1). This will require separate authorisation.

2.8 Development of the Preferred Scheme

2.8.1 Consultation to date has shown broad support for a tunnel at Silvertown. The factors that have influenced the design to date and the current preferred alignment have been site constraints rather than consultation. The design may be subject to further modifications to address responses to the pre-application consultation on the Scheme.

3 EIA Background and Proposed Methodology

3.1 The EIA Process

3.1.1 Environmental Impact Assessment (EIA) is an on-going process, the aim of which is to optimise the environmental performance of the project, within engineering and economic constraints. The main stages in the EIA are as follows:

- 1 Data Review - draw together and review available data
- 2 Scoping - identify significant issues and determine the subject matter to be assessed in the EIA
- 3 Baseline Surveys - undertake baseline surveys and monitoring to identify existing baseline conditions
- 4 Consultation - seek responses from consultees and the public in relation to key environmental issues, methodology adopted and design approaches
- 5 Assessment and iteration - assess likely effects of the Scheme, evaluate alternatives, provide feedback to design team on significant impacts, incorporate mitigation, assess effects of mitigated development
- 6 Preparation of the ES and the Non-Technical Summary

3.1.2 This Report presents the findings of stages 1-3 of the above list, and is intended to inform stage 4 onwards.

3.2 The EIA Regulatory Context

3.2.1 The EIA Regime in Europe is governed by European Council Directive No 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment. This directive is implemented for Nationally Significant Infrastructure Project (NSIPs) in the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 as amended by the Infrastructure Planning Environmental Impact Assessment (Amendment) Regulations 2012.

3.2.2 The Marine Works Environmental Impact Assessment Regulations 2007 as amended are also relevant to the Scheme given the requirement for a marine licence under the Marine and Coastal Access Act 2009.

3.2.3 Amendments to the EIA Directive 2011/92/EU have been made, and the new Environmental Impact Assessment (EIA) Directive (2014/52/EU) came into force on 15 May 2014. Although not yet transposed into UK legislation, the changes of the new EIA Directive will be taken into account in the assessment of the Scheme.

3.2.4 Following a request from the Mayor, the Secretary of State for Transport designated the Scheme a nationally significant infrastructure project and, by exercising her powers under the Planning Act 2008, directed that the Scheme be treated as a development for which a DCO is required.

- 3.2.5 In December 2013 the National Road and Rail Networks: Draft National Policy Statement (NPS) was published for consultation. The consultation on this draft NPS closed on 26 February 2014. The draft NPS has informed the Scheme design and its environmental assessment.

3.3 Scope of the EIA

- 3.3.1 An EIA Scoping Report has been issued to PINS along with a request for an EIA Scoping Opinion in accordance with Regulation 8(3) of the Regulations. The following environmental topics were proposed to be considered in the scope of assessment:

- Air Quality
- Community and Private Assets
- Cultural Heritage
- Ecology and Nature Conservation
- Effects on All Travellers
- Geology and Soils
- Materials
- Noise and Vibration
- Townscape and Visual
- Water Environment
- Cumulative

- 3.3.2 A Scoping Opinion was received in July 2014, and the comments in the Opinion have been considered, and are set out in Appendix 3A. Where possible we have covered the required scope in this Report, or indicated where further work will be necessary or where further consultations are required to agree the detail of the scope.

- 3.3.3 A separate climatic factors topic will not be included within the ES. Instead, climatic factors will be considered in the Air Quality (carbon), Materials (selection of materials in the design process) and the Water Environment (flood risk mitigation and adaptation) assessments. Climate adaptation will be considered as part of the Scheme description, for example through drainage design.

- 3.3.4 Whilst no other topics will be scoped out of the EIA there are elements of certain broader environmental topics that will be scoped out of the assessment that are listed below:

- Air quality – odour will be scoped out of the assessment as this is not relevant to a highways scheme and any potential odour impacts generated through the movement of contaminated materials during construction would be managed through the use of a Construction Environmental Management Plan (CEMP) and adherence to task specific method statements.

- Community and Private Assets – effects on agricultural land will be scoped out of the assessment as there is no agricultural land within the vicinity of the Scheme and therefore no impacts are expected in terms of land-take, husbandry, severance or accommodation works to agricultural land. However impacts of off-site materials disposal on agricultural land will be considered. The Scheme is also unlikely to give rise to any impacts on Waterway Restoration Projects as the tunnel will be constructed at such a depth that it would not directly impact on the River Thames. However, the need for wharfage as part of the Scheme for transportation of materials will be reviewed.
- Effects on All Travellers - previous assessment of the Scheme has confirmed that there are no bridleways in the study area. Therefore, given the urban nature of the Scheme and the lack of evidence of equestrian use, this sub topic will not be assessed.
- Geology and Soils – Effects on agricultural land and agricultural soils will be scoped out of the assessment in view of the entirely urban environment of the Scheme’s location. Effects on geological designated sites will also be scoped out of the assessment as the scoping exercise confirmed the absence of local geological sites in the study area.
- Materials - The potential environmental effects associated with the extraction and transport of primary raw materials, and the manufacture of products will be scoped out of the assessment. This is consistent with the guidance in Interim Advice Note 153/11. The environmental impacts associated with extraction of raw materials and manufacture of products is outside the scope of this assessment as they are already likely to have been subject to environmental assessment as part of the consent/permitting process. For this reason the assessment focuses on the use of materials in the Scheme itself.

3.3.5 The above scope has been agreed through review of the general points included in the Scoping Opinion provided by PINS.

Health Impact Assessment

3.3.6 A Health Impact Assessment (HIA) will be prepared in parallel to the ES. There will be significant links between the HIA and many of the environmental topic assessments. Scoping of the HIA will commence in autumn 2014.

Habitats Regulations Assessment Screening

3.3.7 The nearest European Sites to the Scheme are the Lee Valley Special Protection Area (SPA) (approximately 8km north west of the application boundary), the Thames Estuary and Marshes SPA and Ramsar, the western most point of which is location approximately 15km east of the application site, and Epping Forest Special Area of Conservation (SAC) which is approximately 7km north of the Scheme. Further details regarding these sites and their qualifying interests are provided in Section 6.6. In accordance with the requirements of PINS Advice Note 10: *Habitats Regulations Assessment relevant to nationally significant infrastructure projects*, screening for likely significant effects will be undertaken (alone or in-combination with other

projects). Based on current information it is considered unlikely that there will be significant effects and so this report is likely to take the form of a 'No Significant Effects Report'. Consultation will occur with Natural England.

Energy Strategy

- 3.3.8 In parallel to the Scheme development an Energy Strategy is being prepared to inform decisions in relation to the design. This will be submitted with the DCO application. This assessment will also draw upon policy in the London Plan and associated Supplementary Planning Guidance.

Sustainability Statement

- 3.3.9 A Sustainability Statement will also be produced to support the DCO application. This will identify key sustainability themes including: economic and social infrastructure; energy use; transport; natural resource use and waste; health and well-being; air and noise. The statement will bring together all key aspects and effectively describe the sustainability principles relevant to the Scheme and how it will address them. This will be developed using TfL's Sustainability toolkit and will also draw upon policy in the London Plan and associated Supplementary Planning Guidance.

3.4 Methodologies

- 3.4.1 Methodologies used in this report vary between topics, depending on the level of information available. The methods used for each topic are set out in the subsequent chapters 5 to 14, along with a description of further work to be undertaken and the methodologies to be used.

Guidance

- 3.4.2 The development and design of major highways projects are governed by guidance set out in the Design Manual for Roads and Bridges (DMRB). EIA guidance for highway projects is provided in Volume 11 with environmental design guidance in Volume 10. This is supplemented by a number of Interim Advice Notes (IANs) that provide more up-to-date and detailed guidance in relation to certain environmental topic assessments. Where appropriate, the work undertaken to date, and presented in this report, has followed this guidance. The DMRB and IANs are published by the Department for Transport.
- 3.4.3 Some topics also have discipline-specific guidance which has been followed. Where this is the case, this is referenced in the relevant topic chapter.

Study Areas

- 3.4.4 The study areas for each environmental topic are defined in chapters 5 to 14. The study area for each topic is defined based on the geographical scope of the potential impacts relevant to the topic or the information required to assess the impacts, as well as topic specific guidance provided in the DMRB and consultation with stakeholders.

Baseline Data Gathering

- 3.4.5 The baseline environment needs to be defined to allow the assessment of changes that would be made by the Scheme. For the assessment of environmental effects the baseline needs to be the situation immediately before the implementation of the Scheme. Therefore, as a result of the time lag between the time of preparing the ES and the implementation of the Scheme, the identification of the baseline requires the description of the existing situation coupled with a prediction of how it is likely to change during that time lag in the absence of the Scheme. This forecasting of the baseline environment is often referred to as the 'future baseline'.

3.5 Assessment of Effects

- 3.5.1 The assessment of effects involves comparing a scenario with the Scheme against one without the Scheme over time. The absence and presence of a Scheme are referred to as the 'Do-Minimum' and 'Do-Something' scenarios respectively.
- 3.5.2 This Report presents a high-level assessment of the potential impacts of the proposals, and identifies the range of mitigation measures that may be considered to avoid, reduce, and compensate for these impacts.
- 3.5.3 After the public consultation, and as the design progresses, a more detailed assessment of the impacts of the scheme will be undertaken in accordance with the methods set out in the EIA Scoping Report (Report no. 0002-UA005651-UE31R-03-F, June 2014) and the Secretary of State's Scoping Opinion (July 2014). The findings of these more detailed assessments will be set out in the ES.
- 3.5.4 There may be a requirement for a range of mitigation measures and as the Scheme develops these will be discussed with statutory consultees and third parties. Only those mitigation measures whose implementation will be secured through requirements of the DCO will be considered in the ES.

4 Consultation

4.1 Consultation Undertaken to Date

- 4.1.1 The consultations outlined below have already been undertaken on the Scheme (and its earlier iterations).

February to March 2012 Consultation

- 4.1.2 In February and March 2012 TfL ran an informal four week consultation on proposals to enhance highway river crossings in east and southeast London. The consultation proposed a new highway tunnel at Silvertown to ease congestion and provide additional resilience at Blackwall, and a new vehicle ferry at Gallions Reach, to improve connectivity and potentially replace the Woolwich Ferry which is nearing the end of its operational life.
- 4.1.3 Information about the proposals was made available online, along with a consultation questionnaire which included both closed and open questions. Both members of the public and stakeholders were invited to give their views, either by filling out the online questionnaire or by post or email. The consultation was advertised in a range of local and pan-London press titles, including the Evening Standard, Metro and City AM. TfL published a press release to mark the start of the consultation and issued a tweet to its (then) 20,000 followers. TfL also emailed a range of stakeholders to announce the start of the consultation to over 400,000 members of the public who had registered to receive email updates. Finally the consultation was promoted via a series of 'promo' slots on the TfL web page.
- 4.1.4 Almost 3,900 responses were received from across London although the response rate was higher in areas more likely to be affected by the proposals. The consultation identified that there was strong support for a new tunnel at Silvertown (80% of respondents supported the Scheme) although concerns were also raised regarding the traffic and environmental impacts. The consultation questionnaire included space for respondents to record any general comments they had. Around two per cent of respondents raised concerns over noise or air quality at Blackwall or Silvertown, a further two per cent expressed concerns over noise or air quality from traffic accessing a Gallions Reach ferry and one per cent suggested that TfL should consider more environmentally friendly crossings. A number of stakeholders also suggested the use of charging to manage demand for the crossings.
- 4.1.5 The results of the consultation are presented in further detail in a report to the Mayor on the 2012 Consultation (July, 2012). The consultation demonstrated that there was widespread support for TfL to continue to develop the Silvertown tunnel proposals, and so these were taken forward.
- 4.1.6 The consultation also showed that there were a range of views as to what new crossing(s) should replace the existing Woolwich ferry. Finally a common theme raised was that TfL should publish further information as to how the new crossings would be funded. These themes were developed further in the consultation held from October 2012 – February 2013.

October 2012 to February 2013 Consultation

- 4.1.7 A further consultation event was run between 29 October 2012 and 1 February 2013 for 14 weeks. This consultation presented a number of alternative options for replacing the Woolwich ferry and proposed a new user charge as a means for funding and managing demand for the new crossings.
- 4.1.8 This consultation sought the views of the public and stakeholders on six issues:
- Introduction of a new tunnel at Silvertown
 - Replacement of the Woolwich Ferry with a new service
 - Provision of a new ferry service at Gallions Reach
 - Provision of a new bridge/tunnel at Gallions Reach by 2031 (if a ferry service does not adequately address the areas transport needs)
 - Provision of a new bridge/tunnel at Gallions Reach by 2021 (instead of a ferry)
 - Tolling/charging of the Blackwall Tunnel and any other new crossings introduced
- 4.1.9 The consultation included the issue of nearly 200,000 information letters to local addresses, two separate emails to approximately 350,000 customers in TfL's customer services database, and advertising in London-wide and local press titles and on the DLR network. Twelve consultation roadshow events were held at locations around the affected areas. The consultation was publicised to a large number of stakeholders, including relevant Local Authorities, political representatives and transport campaign groups.
- 4.1.10 There were 6,400 questionnaire responses and around 80 stakeholder responses. There was over 70% support for each of the fixed link (bridge/tunnel) options, with the strongest support for the Silvertown Tunnel (77%). There was also 'in principle' support from the two host boroughs (Greenwich and Newham). The main concerns expressed (including to an extent by Newham Council) were around traffic impacts and potential air quality impacts.
- 4.1.11 Further details of the consultation are documented in the River Crossings Consultation Report (April, 2013).

4.2 Further Consultation to be Undertaken

- 4.2.1 This Report has been prepared to accompany what is a further non-statutory consultation to present the preferred Scheme, taking place in October 2014.
- 4.2.2 A statutory consultation event is planned for Summer 2015. The statutory consultation with the local community will be informed by and conducted in accordance with a Statement of Community Consultation (SoCC) which will be prepared by TfL in consultation with the host London Boroughs in advance of the statutory consultation.
- 4.2.3 The SoCC will be prepared in accordance with the requirements of the Planning Act 2008 and following the guidance contained in the Planning Inspectorate

Advice Note 16 'The developer's pre application consultation, publicity and notification duties'.

- 4.2.4 A Preliminary Environmental Information Report (PEIR) will also be prepared for the statutory consultation in accordance with Planning Act 2008 requirements. The PEIR will build upon and further update the information contained in this Report to reflect any changes to the Scheme, additional information and any relevant consultation responses received during this non-statutory consultation.
- 4.2.5 Following the conclusion of the statutory consultation, the PEIR will be developed into a full ES to reflect any further changes to the Scheme, additional information and any relevant consultation responses received during the statutory consultation.
- 4.2.6 During the preparation of the both the PEIR and the ES, consultation will be held with a range of organisations to inform the methodologies used in the assessment and to collate baseline data. Details of all consultation and how this has informed the environmental assessment will be presented in the ES. Statements of Common Ground will also be prepared during the preparation of the ES.

5 Air Quality

5.1 Introduction

5.1.1 This chapter considers the effects of the Scheme on air quality. The baseline conditions and the potential for air quality effects during the construction and operation of the Scheme are considered. Air quality effects have not been quantified at this stage. This chapter has been prepared by Hyder Consulting (UK) Ltd.

5.2 Regulatory and Policy Framework

5.2.1 A summary of the legislation and guidance documents relevant to air quality are provided in Table 5-1 below.

Table 5-1 Air Quality Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
<i>Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe 2008/50/EC</i> (Council of European Communities, 2008)	The 2008 ambient air quality directive (2008/50/EC) sets legally binding limits for concentrations of major air pollutants. It merges and replaces the majority of previous EU air quality legislation and incorporates the 4th daughter directive.
<i>Part IV of The Environment Act 1995</i>	Sets provisions for protecting air quality in the UK and for local air quality management. It requires UK Government to produce a national Air Quality Strategy (AQS) which contains standards, Air Quality Objectives and measures for improving ambient air quality and defines Local Air Quality Management (LAQM).
<i>Statutory Instruments No. 1001, the Air Quality Standards Regulations</i> (The Stationery Office Ltd, 2010)	The Air Quality (Standards) Regulations 2010 transpose into English law the requirements of Directives 2008/50/EC and 2004/107/EC on ambient air quality.
<i>Statutory Instruments No. 928, the Air Quality (England) Regulations 2000</i> (The Stationery Office Ltd, 2000)	The Air Quality (England) Regulations 2000 set national objectives for local authorities in England.
<i>Statutory Instruments No. 3043, the Air Quality (England) (Amendment) Regulations 2002</i> (The Stationery Office Ltd, 2002)	The Air Quality (England) (Amendment) Regulations 2002 amend the Air Quality (England) Regulations 2000 which set the air quality objectives for England.
<i>The Air Quality Strategy for England, Scotland, Wales and Northern Ireland</i> (Department for the Environment, Food and Rural Affairs (Defra), 2007)	The strategy sets out a way forward for work and planning on air quality issues and sets air pollution standards to protect people's health and the environment.
<i>The National Planning Policy Framework (NPPF)</i> (Department	The NPPF replaces previous Planning Policy Statements, including PPS23 on Planning and Pollution Control. The NPPF outlines a set of core land-use

Policy/Legislation	Summary of Requirements
for Communities and Local Government, 2012)	planning principles that should underpin both plan making and decision-taking. The principle relating to air quality states that “ <i>the planning system should contribute to and enhance the natural and local environment by...preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.</i> ”
<i>The National Planning Practice Guidance – Air Quality</i> (Department for Communities and Local Government, 2014)	The Government has revised and updated national planning practice guidance to support the NPPF in order to make it more accessible. The guidance includes advice relating to; planning and air quality, the role of Local Plans with regard to air quality, when air quality is likely to be relevant to a planning decision, what should be included within an air quality assessment and how impacts on air quality can be mitigated.
<i>Clearing the Air: The Mayor’s Air Quality Strategy, Greater London Authority</i> (Greater London Authority, 2010),	The Mayor of London has set out a detailed air quality strategy in order to deliver the required reductions in particulate matter less than 10 microns in diameter (PM ₁₀) and nitrogen dioxide (NO ₂) concentrations to meet the EU limit values. The policies and measures within the strategy comprise both transport and non-transport measures. Measures relevant to development proposals include: “Policy 6 – Reducing emissions from construction and demolition sites. Policy 7 – Using the planning process to improve air quality. Policy 8 – Maximising the air quality benefits of low to zero carbon energy supply for London and air quality impacts. Policy 9 – Energy efficient buildings”.
<i>The London Plan Spatial Development Strategy for Greater London</i> (Mayor of London, 2011)	The plan sets out the spatial development strategy for Greater London and brings together the geographic and locational aspects of the Mayor’s other strategies, including the Mayor’s Air Quality Strategy. Policy 7.14 (‘Improving Air Quality’) stipulates a number of air quality considerations which should be addressed in any development proposal. An alteration has been made in relation to the supporting text of the ‘Improving Air Quality’ policy in the Revised Early Minor Alterations (REMA), which now refers to paragraphs 120 and 124 of the NPPF, rather than the PPS 23 (Planning and Pollution Control). However, there is no material change to the policy or supporting text of ‘The London Plan’.
<i>The Control of Dust and Emissions during Construction</i>	The SPG sets out how impacts on air quality can be minimised during the construction phase of

Policy/Legislation	Summary of Requirements
<i>and Demolition Supplementary Planning Guidance (SPG)</i> (Mayor of London, 2013)	development and advises on necessary mitigation measures. It focuses on the following five areas: demolition; earthworks; construction; trackout; and non-road mobile machinery (NRMM).
<i>Sustainable Design and Construction SPG</i> (Mayor of London, 2014)	The section of the SPG relating to air quality provides guidance on the following key areas: <ul style="list-style-type: none"> ▪ assessment requirements; ▪ construction and demolition; ▪ design and occupation; ▪ air quality neutral policy for buildings and transport; and ▪ emissions standards for combustion plants.
<i>Local Air Quality Management Technical Guidance LAQM.TG(09)</i> (Department for the Environment, Food and Rural Affairs (Defra), 2009)	The document provides technical guidance in relation to Local Authorities' obligations to review and assess air quality. It also provides guidance on air quality modelling.
<i>Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1 (HA207/07)</i> (Highways Agency, 2007)	The DMRB, and associated Interim Advice Notes (IANs), provide guidance on the assessment of the impacts that road projects may have on air quality.
<i>National Road and Rail Networks: Draft National Policy Statement</i> (Department for Transport (DfT), 2013)	The Secretary of State will use this national policy statement as the primary basis for making decisions on development consent applications for national networks nationally significant infrastructure projects in England. The document states that an assessment of impacts should be undertaken " <i>where the project is likely to have significant air quality impacts (both on and off-scheme)</i> ". The document also outlines what should be included in the ES.

5.3 Assessment Work Undertaken to Date

Consultation

- 5.3.1 Initial consultation has been undertaken with Officers responsible for air quality in those boroughs that could be affected by the Scheme in order to obtain baseline data. At the time of the initial consultation, the air quality study area was unknown; however impacts were not expected outside the area covered by the Applicant's East London Highway Assignment Model (ELHAM), which is the model used to generate the traffic data for use in the air quality assessment. The size of the relevant study area will be determined following review of the proposed construction works, including activities and duration. Additionally consultation regarding assessment methodologies was undertaken with TfL to ensure that a robust and relevant approach was utilised.

5.3.2 The following local authorities are located within the boundary of the ELHAM and accordingly were requested to provide baseline data for use in the air quality assessment:

- London Borough of Barking and Dagenham;
- London Borough of Bexley;
- London Borough of Bromley;
- London Borough of Croydon;
- London Borough of Enfield;
- Royal Borough of Greenwich;
- London Borough of Hackney;
- London Borough of Haringey;
- London Borough of Havering;
- London Borough of Islington;
- London Borough of Lambeth;
- London Borough of Lewisham;
- London Borough of Newham;
- London Borough of Redbridge;
- London Borough of Southwark;
- London Borough of Tower Hamlets;
- London Borough of Waltham Forest;
- Brentwood Borough Council;
- Dartford Borough Council;
- Sevenoaks District Council; and
- Thurrock Council.

Study Area

Construction Vehicle Emissions

5.3.3 As the construction phase is expected to last for more than six months, then, in accordance with *DMRB Volume 11, Section 3, Part 1 HA 207/07 Air Quality* (Highways Agency, 2007), traffic management measures and the effect of the additional construction vehicles will be assessed as a discrete air quality impact exercise once details of traffic flows are available. A 200m study area around the potentially affected highway network is proposed for air quality impacts associated with road traffic for the construction phase.

Construction Dust Emissions

5.3.4 The study area in terms of construction dust will be within 350m of the site boundary for human receptors, within 50m of the site boundary for ecological receptors and within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s) (for both human and

ecological receptors), in accordance with the *Guidance on the Assessment of Dust from Demolition and Construction* (The Institute of Air Quality Management (IAQM), 2014).

Operational Vehicle Emissions

- 5.3.5 In accordance with *DMRB Volume 11, Section 3, Part 1 HA 207/07 Air Quality* (Highways Agency, 2007), the study area for the operational impacts has been determined using the criteria outlined in the guidance. There are two main assessments undertaken; the localised assessment (where impacts of the Scheme are determined at receptor locations) and the regional assessment (which determines the impact of the Scheme on emissions). The localised assessment takes into account any affected roads which meet any of the following criteria:
- Road alignment will change by 5m or more;
 - Daily traffic flows will change by 1000 Annual Average Daily Traffic (AADT) or more;
 - Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more;
 - Daily average speed will change by 10km/hr or more; or
 - Peak hour speed will change by 20km/hr or more.
- 5.3.6 All sensitive receptors within 200m of an affected road will be included in the localised assessment. Roads which do not meet any of the localised DMRB criteria as a result of the Scheme are scoped out of the assessment as it can be inferred that the change in air quality at adjacent receptors will be negligible.
- 5.3.7 The regional air quality assessment will be undertaken at a later stage to inform the ES, and the study area will take into account all roads meeting the following criteria:
- A change of more than 10% in AADT;
 - A change of more than 10% in the number of HDVs (24 hour AADT); and
 - A change in daily average speed of more than 20km/hour.
- 5.3.8 Emissions associated with the tunnel ventilation system will be modelled once details of the ventilation design is known, and the impact of the emissions on receptors will define the extent of the modelled study area.
- 5.3.9 The preliminary study area for the localised operational assessment is presented in Drawing 5-1.

Consultation

- 5.3.10 Consultations with local authorities regarding the air quality study area and the general air quality assessment methodology were undertaken in September 2014. Discussions were undertaken in order to ensure that the localised air quality assessment would encompass any areas of particular concern (if any) that the study area defined by DMRB would not necessarily cover. Examples include localised air pollution hotspots and sensitive receptors. As of September

2014, discussions had been undertaken with the Royal Borough of Greenwich and the London Borough of Newham.

Collation of Baseline

5.3.11 Baseline information on air quality has been collected from the following sources:

- Online map and aerial photograph resources (<https://maps.google.co.uk>, www.magic.gov.uk and digital Ordnance Survey mapping);
- Defra UK Air website (<http://uk-air.defra.gov.uk/>)
- Local Authorities' websites;
- Local Authorities' Officers responsible for air quality;
- London Air Quality Network (<http://www.londonair.org.uk>);
- Greater London website (<http://data.london.gov.uk/datastore>) – London Atmospheric Emissions Inventory GIS files and Air Quality Focus Area data;
- Kent Air website (<http://www.kentair.org.uk>); and
- Essex Air website (<http://www.essexair.org.uk/>).

5.3.12 Following a review of the existing air quality monitoring data, gaps were identified. Subsequently, a monitoring campaign was commissioned in January 2014, and will continue for a twelve month period, in order to supplement the existing air quality data. NO₂ diffusion tubes have been installed at 75 sites in accordance with best practice guidance across the following Boroughs:

- London Borough of Barking and Dagenham;
- London Borough of Bexley;
- Royal Borough of Greenwich;
- London Borough of Havering;
- London Borough of Newham;
- London Borough of Redbridge;
- London Borough of Tower Hamlets;
- London Borough of Waltham Forest;
- Dartford Borough Council; and
- Thurrock Council.

5.3.13 Drawing 5-1 depicts the monitoring locations, as well as the existing local authority air quality monitoring sites. This monitoring data provides information regarding the current baseline of NO₂ concentrations. In addition to the monitoring data TfL have predicted pollutant concentrations across London using the emissions built up in the LAEI.

High Level Assessment of Emissions

- 5.3.14 Prior to undertaking the air quality assessment for the ES, an initial set of modelled traffic data was generated to give an indication of the potential impacts of the Scheme. The localised study area (Drawing 5-1) was determined based on the changes in traffic data against the localised DMRB assessment criteria as detailed in the 'study area' section above. The changes in emissions were calculated for all roads within the localised study area to determine whether there would be a decrease or increase in emissions as a result of the Scheme (Drawing 5-2).
- 5.3.15 This information has been used to provide additional information in relation to the potential Scheme impacts; it does not determine whether or not the Scheme impacts on air quality will be significant as the high level assessment predicts the change in emission rates for the roads within the preliminary study area, rather than change in concentration of pollutants at receptor locations. The determination of Scheme significance will be made following finalisation of the assessment scenarios and the consequent detailed air quality assessment. The change in air quality concentrations at receptors within the study area will be used to make a judgement of the Scheme's significance on air quality.

Key Environmental Receptors and their Value

Construction and Operational Vehicle Emissions

- 5.3.16 *DMRB Volume 11, Section 3, Part 1 HA 207/07 Air Quality* (Highways Agency, 2007) does not provide a method for assessing the 'value' or 'sensitivity' of receptors to pollutants emitted by construction vehicles during the construction phase and traffic during the operational phase. DMRB states that "all existing and planned properties where people might experience a change in local air quality" should be identified and assessed. In addition DMRB states "particular attention should be paid to the locations of the young, the elderly and other susceptible populations such as schools and hospitals". In effect, the guidance considers those non-residential locations where the occupying population would have a lower tolerance to poor air quality to be sensitive receptors. Additionally the guidance suggests that all residential properties should be considered sensitive owing to the occupants' long term exposure.
- 5.3.17 In addition to the land use types detailed above, the impact of the Scheme on ecological receptors will be assessed. The following ecological designations are recommended for assessment in terms of nitrogen deposition in *DMRB Volume 11, Section 3, Part 1 HA 207/07 Air Quality* (Highways Agency, 2007):
- Special Areas of Conservation (SACs);
 - Special Protection Areas (SPAs);
 - Sites of Special Scientific Interest (SSSIs); and
 - Ramsar sites.
- 5.3.18 Ecological sites within 200m of affected roads will be considered in the assessment.

Construction Dust

5.3.19 The *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) provides guidance on determining the sensitivity of different types of receptors to dust soiling, health effects and ecological effects, as presented in Table 5-2.

Table 5-2 Guidance on the Sensitivity of Types of Receptor to Dust Soiling, Health Effects and Ecological Effects *Guidance on the Assessment of Dust from Demolition and Construction (The Institute of Air Quality Management, 2014)*

	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Sensitivities of People to Dust Soiling Effects	<ul style="list-style-type: none"> ▪ users can reasonably expect to enjoy a high level of amenity; or ▪ the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. ▪ indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms. 	<ul style="list-style-type: none"> ▪ users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or ▪ the appearance, aesthetics or value of their property could be diminished by soiling; or ▪ the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. ▪ indicative examples include parks and places of work. 	<ul style="list-style-type: none"> ▪ the enjoyment of amenity would not reasonably be expected; or ▪ property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or ▪ there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. ▪ indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.
Sensitivities of People to the Health Effects of PM₁₀	<ul style="list-style-type: none"> ▪ locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a 	<ul style="list-style-type: none"> ▪ locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a 	<ul style="list-style-type: none"> ▪ locations where human exposure is transient. ▪ indicative examples include public footpaths, playing fields, parks and shopping streets.

	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
	<p>relevant location would be one where individuals may be exposed for eight hours or more in a day).</p> <ul style="list-style-type: none"> Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of the assessment. 	<p>relevant location would be one where individuals may be exposed for eight hours or more in a day).</p> <ul style="list-style-type: none"> indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation. 	
Sensitivities of Ecological Receptors to Dust Effects	<ul style="list-style-type: none"> locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. indicative examples include a SAC designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings. 	<ul style="list-style-type: none"> locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition. indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features. 	<ul style="list-style-type: none"> locations with a local designation where the features may be affected by dust deposition. indicative example is a local Nature Reserve with dust sensitive features.

5.3.20 All receptors within the construction dust study area will be assessed within the assessment.

Assumptions/Limitations

- 5.3.21 The high level emissions assessment has been undertaken using future year traffic data in the opening year of 2021. The data presented is subject to change as TfL continue to evaluate various tolling and tunnel management strategies which would affect the composition of the traffic datasets. The preferred traffic data scenarios should be finalised ahead of the detailed air quality assessment to be undertaken in 2015.
- 5.3.22 The high level assessment is based on traffic data that is subject to change therefore the changes in emissions as a result of the scheme are for indicative purposes only.

5.4 The Existing Environment

Air Quality Management Areas (AQMAs)

- 5.4.1 Part IV of the Environment Act 1995 sets out the principles of Local Air Quality Management (LAQM) and includes provision for a national Air Quality Strategy (AQS). It is a requirement of the Act that local authorities review current and future air quality within their areas, and assess whether air quality objectives are being achieved or are likely to be achieved. Where it is anticipated that an air quality objective will not be met, it is a requirement of the Act that an AQMA be declared. Many local authorities declared their entire administrative area an AQMA to reflect the extent of the action required to meet the objectives. Where an AQMA is declared, the local authority is obliged to produce an Action Plan in pursuit of the achievement of the air quality objectives.
- 5.4.2 Locations of AQMAs as of April 2014 have been obtained from Defra. Those AQMAs that are within the boundary of the preliminary localised study area (determined following the methodology stated in section 5.3) are presented in Table 5-3 and in Drawing 5-3.

Table 5-3 Designated AQMAs

Local Authority	AQMA ID	AQMA Description	Objective AQMA Designated for	
			NO ₂	PM ₁₀
Dartford Borough Council	Dartford AQMA No.2	An area encompassing London Road, Dartford.	Yes (Annual mean)	No
Bexley, London Borough of	Bexley AQMA	The whole borough of Bexley.	Yes (Annual mean)	Yes (Both 24-hour and annual mean)
Dartford Borough Council	Dartford AQMA No.3	An area encompassing Dartford Town and a number of approach roads.	Yes (Annual mean)	No

Local Authority	AQMA ID	AQMA Description	Objective AQMA Designated for	
			NO ₂	PM ₁₀
Dartford Borough Council	Dartford AQMA No.1	A corridor approximately 250m wide along the A282 Dartford Tunnel Approach Road from junction 1a to 300m south of junction 1b.	Yes (Annual mean)	Yes (24-hour mean)
Newham, London Borough of	Newham AQMA	Main roads within the borough.	Yes (Annual mean)	Yes (24-hour mean)
Thurrock Council	Thurrock AQMA	Consists of 15 separate areas, comprising several ribbons, clusters and isolated properties which are close to the busiest roads in Thurrock. All 15 areas are declared with respect to NO ₂ , four of these are also declared with respect to PM ₁₀ .	Yes (Annual mean)	Yes (24-hour mean)
Lewisham, London Borough of	Lewisham AQMA	The AQMAs for the Borough of Lewisham consist of four large AQMAs and a series of ribbon roads.	Yes (Annual mean)	Yes (24-hour mean)
Southwark, London Borough of	Southwark AQMA	An area encompassing the entire northern part of the borough, extending from Rotherhithe to Walworth and Camberwell and up to the boundary on the River Thames. The area is along the A2, A200, A215 and A202 south to the A205.	Yes (Annual mean)	Yes (24-hour mean)
Greenwich, London Borough of	Greenwich AQMA	The whole borough.	Yes (Annual mean)	Yes (24-hour mean)
Tower Hamlets, London Borough of	Tower Hamlets AQMA	The whole borough.	Yes (Annual mean)	Yes (24-hour mean)

5.4.3 At this stage, the study area is preliminary; therefore additional AQMAs may be identified as potentially being affected once the final study area has been confirmed.

Air Quality Focus Areas (AQFAs)

5.4.4 AQFAs are areas identified by TfL and Greater London Authority (GLA) as locations that exceed the EU annual mean limit value for NO₂ where there is high human exposure. The areas are defined to address air quality concerns at

the borough level within the LAQM review process and to forecast air pollution trends. AQFAs allow those local authorities with borough-wide NO₂ based AQMAs to better pinpoint air quality hotspots.

5.4.5 There are 187 AQFAs in London. These are locations that not only exceed the EU annual mean limit value for NO₂ but are also locations with high human exposure. The Focus Areas were defined to address concerns raised by boroughs within the LAQM review process and forecasted air pollution trends. This is not an exhaustive list of London's hotspot locations, but where the GLA believe the problem to be most acute.

5.4.6 Those AQFAs that are within the boundary of the preliminary localised study area are presented in Table 5-4 and in Drawing 5-3.

Table 5-4 Designated AQFAs

Air Quality Focus Area ID	Sub-Region	Borough	Description
38	East	Newham	Barking Road A124 from Canning Town to Wallend/Barking
40	East	Greenwich	Woolwich and Woolwich Arsenal A205 Woolwich Rd/A206 Plumstead Road
41	East	Greenwich	Blackwall Tunnel at Southern Approach Road and Westcombe Park
42	East	Greenwich	Sun-in-the-Sands junction A102/A2 Shooters Hill and Charlton Road Roundabout
46	East	Lewisham	New Cross Gate and New Cross
55	East	Greenwich	Westthorne Avenue A205
63	East	Tower Hamlets	Blackwall A13 East India Dock Road/Aspen Way/Blackwall Tunnel
179	East	Newham	Canning Town Silvertown Way
180	East	Newham	Newham Way A13 and Prince Regent Lane
187	Central	Southwark	Lower Road A200 Surrey Quays

5.4.7 At this stage, the study area is preliminary, therefore additional AQFAs may be identified as potentially being affected once the study area has been confirmed.

London Atmospheric Emissions Inventory

5.4.8 The London Atmospheric Emissions Inventory (LAEI) is a database containing geographically referenced datasets of emission sources, pollutants and estimates of the quantities of these pollutants emitted in the Greater London atmosphere. The emission estimates contained are based on emission factors and activity data estimated, or where possible measured for the base year.

Projected emissions for future years are calculated for future years including 2015 and 2020.

- 5.4.9 The LAEI has been used to create pollutant concentration maps at a resolution of 20 metres x 20 metres, which give the predicted baseline and future baseline concentrations across Greater London and the study area. Plate 5-1 shows LAEI-based annual mean NO₂ concentrations in the vicinity of the Silvertown Tunnel in 2010.

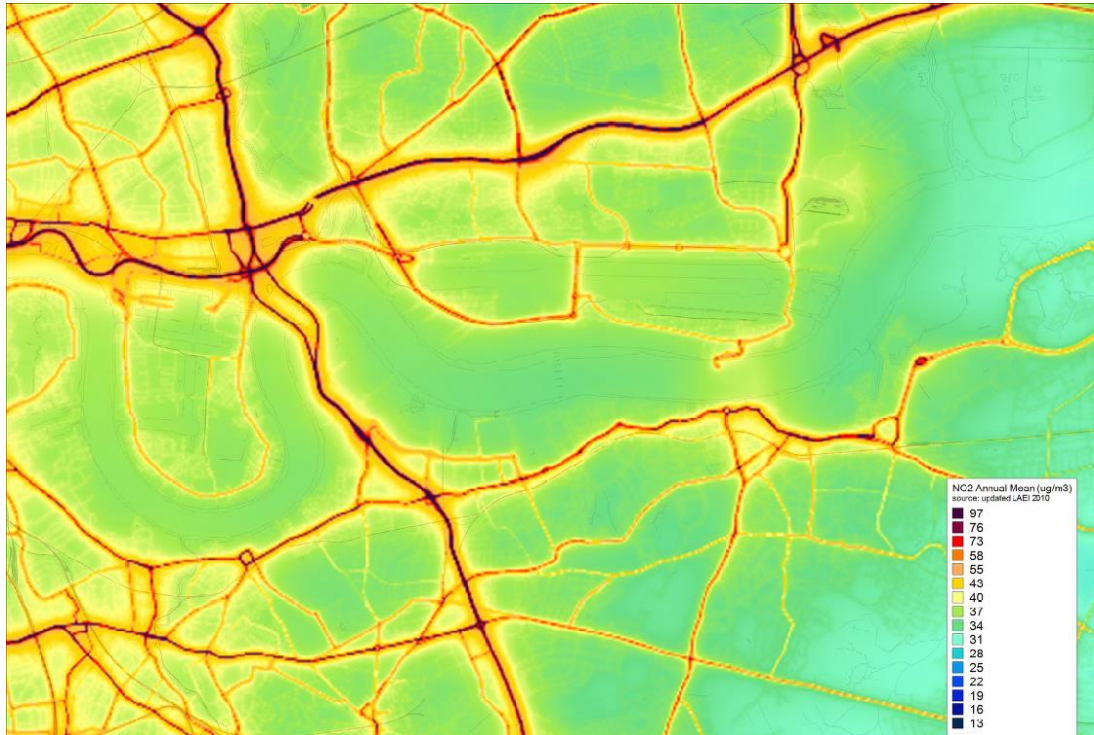


Plate 5-1: LAEI 2010 Annual Mean Concentrations of NO₂ in the Vicinity of the Silvertown Tunnel

- 5.4.10 Plate 5-1 demonstrates that the areas with the highest concentrations of NO₂ appear to be located in Poplar adjacent to the A13 and along the main arterial roads. These locations were expected to exceed the annual NO₂ air quality objective (40µg/m³) in 2010. Exceedence is predicted up 100m from the centreline of the A13, A102 Blackwall approach, and A206.
- 5.4.11 Plate 5-2 shows LAEI-based annual mean concentrations of PM₁₀ in the vicinity of the Silvertown Tunnel in 2010.

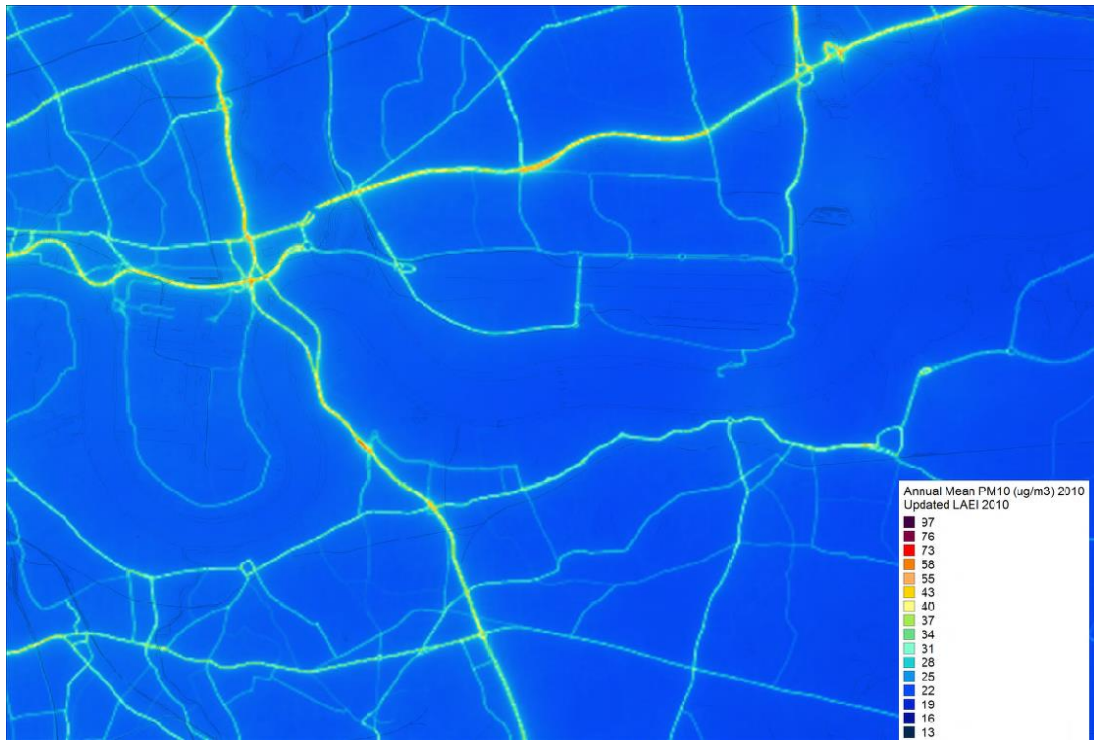


Plate 5-2: LAEI 2010 Annual Mean Concentrations of PM₁₀ in the Vicinity of the Silvertown Tunnel

5.4.12 Plate 5-2 shows that PM₁₀ concentrations in 2010 were generally well below the annual mean PM₁₀ air quality objective (40µg/m³) except at kerbside locations.

Existing Monitoring Data

5.4.13 Local authorities undertake air quality monitoring in their area of jurisdiction. This can include both passive monitoring (such as diffusion tubes) and automatic monitoring. These sites are displayed in the various sheets of Drawing 5-1.

Diffusion Tube Monitoring Data

5.4.14 Table 5-5 provides a summary of the bias adjusted (and where necessary, annualised) NO₂ concentrations monitored by diffusion tubes for 2012 for each of the local authorities within the preliminary study area (carried out by local authorities). Table A (Appendix 5A) presents the concentrations for each monitoring location.

Table 5-5 Local Authority Diffusion Tube Data Summary

Local Authority*	Annual Average Concentration 2012 (µg/m ³) – Number of Tubes in Each Concentration Band				
	<20	>=20 to <30	>=30 to <40	>=40 to <50	>=50
Dartford Borough Council	0	5	23	11	5

London Borough of Bexley	0	8	15	15	10
London Borough of Lewisham	0	3	15	7	9
London Borough of Newham	0	0	1	6	14
Royal Borough of Greenwich	0	3	6	17	16
Thurrock Council	0	5	21	13	9

*London Borough of Tower Hamlets ceased to monitor using diffusion tubes in 2011. Data for Southwark are not provided.

- 5.4.15 As indicated in Table 5-5 and the 2012 LAEI NO₂ concentration maps, the majority of sites recorded an exceedence of the annual NO₂ air quality objective (40µ/m³) in 2012.

Automatic Monitoring Data

- 5.4.16 Tables 5-6 and 5-7 overleaf present a summary of the continuous automatic monitoring data for 2012 (traffic data base year) undertaken by local authorities for monitoring locations close to / within the preliminary study area.
- 5.4.17 Bold indicates exceedences of the annual mean air quality objective (40µg/m³), or hourly mean air quality objective (200µg/m³) not to be exceeded more than 18 times a year
- 5.4.18 Table 6-6 shows that the majority of local authorities recorded an exceedence of the annual NO₂ air quality objective in 2012. In addition, the London Boroughs of Dartford and Greenwich recorded exceedences of the hourly mean objective.

Table 5-6 Local Authority Automatic Monitoring Data Summary (2011-2013) – NO₂

Local Authority	Monitoring Station	x	y	Annual Average NO ₂ Concentration 2011 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2012 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2013 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)
Dartford Borough Council	Bean Interchange Roadside	558622	172752	53	3	96	55	7	98	43	0	99
	St Clements Roadside	558525	174709	54	14	99	56	26	99	53	21	99
	Town Centre Roadside	554117	173852	40	0	99	43	0	96	49	16	84.6
London Borough of Bexley	Belvedere Suburban	549975	179064	26	0	95	27	0	99	26	0	99
	Belvedere West Urban Background	548259	179473	24	0	98	25	0	96	24	0	94
	Erith Industrial	552234	177690	Data Capture <10%			25	0	70	28	0	99
	Slade Green Suburban	551860	176376	29	0	87	29	0	96	28	0	99
London Borough of Lewisham	Loampit Vale Roadside	537911	175838	Opened in 2012			63	16	45	57	26	98
	Catford Urban Background	537675	173689	51	0	100	51	2	99	48	3	100

Local Authority	Monitoring Station	x	y	Annual Average NO ₂ Concentration 2011 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2012 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2013 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)
	New Cross Roadside	536241	176932	51	0	94	50	0	97	51		98
London Borough of Newham	Cam Road Roadside	538661	183969	48	0	96	43	0	94	Closed during 2013		
	Wren Close Urban Background	539889	181469	39	0	94	39	0	98	Closed during 2013		
Royal Borough of Greenwich	A206 Burrage Grove Roadside	544084	178881	43	1	100	45	1	97	45	0	100
	Blackheath Hill Roadside	538141	176710	48	1	100	48	0	100	48	1	86
	Eltham Suburban	543978	174655	23	0	91	22	0	95	21	0	97
	Fiveways Sidcup Road A20 Roadside	543582	172653	47	0	85	52	1	88	58	7	95
	Millennium Village Industrial Background	540169	178999	33	0	95	37	2	93	38	2	75

Local Authority	Monitoring Station	x	y	Annual Average NO ₂ Concentration 2011 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2012 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2013 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)
	Plumstead High Street Roadside	545560	178526	42	0	92	39	0	98	37	0	98
	Trafalgar Road Roadside	538960	177954	42	0	99	44	0	94	41	0	99
	Westthorne Avenue Roadside	541885	175016	44	0	100	44	0	100	46	4	100
	Woolwich Flyover Roadside	540200	178367	67	6	99	71	27	92	64	8	100
	Falconwood Roadside	544997	175098	42	7	97	47	21	100	51	11	94
Thurrock Council	Calcutta Road, Tilbury Roadside	563900	176282	40	0	95	39	0	99	34	0	99
	London Road (Grays) Urban Background	560900	177700	28	0	89	28	0	98	27	0	97
	London Road (Purfleet) Roadside	556698	177937	62	4	98	63	7	90	63	4	97

Local Authority	Monitoring Station	x	y	Annual Average NO ₂ Concentration 2011 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2012 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)	Annual Average NO ₂ Concentration 2013 (µg/m ³)	Exceedences of the Hourly Mean (200µg/m ³)	Data Capture (%)
	Stanford-le-Hope Roadside	569356	182736	34	0	99	33	0	93	28	0	96
London Borough of Tower Hamlets	Blackwall Roadside	538290	181452	63	0	92	61	0	94	58	0	99
	Mile End Road Roadside	535927	182221	57	0	96	60	2	99	61	1	97
	Poplar Urban Background	537509	180867	34	0	80	33	0	99	33	0	49 (closed during 2013)
	Victoria Park Urban Background	536487	184238	No data			33	0	41	33	0	97
London Borough of Southwark	A2 Old Kent Road Roadside	534844	177515	46	9	73	53	6	80	58	6	94

Table 5-7 Local Authority Automatic Monitoring Data Summary (2011-2013) – PM₁₀

Local Authority	Monitoring Station	x	y	Annual Average PM ₁₀ Concentration 2011(µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2012 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2013 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)
Dartford Borough Council	Bean Interchange Roadside	558622	172752	24	12	98	21	9	97	21	5	98
	St Clements Roadside	558525	174709	28	31	98	22	8	98	24	13	95
	Town Centre Roadside	554117	173852	27	20	97	24	16	95	28	22	81
London Borough of Bexley	Belvedere FDMS Suburban	549975	179064	25	25	82	19	12	98	19	8	99
	Belvedere West Urban Background	548259	179473	21	16	97	19	8	97	20	5	96
	Belvedere West FDMS Urban Background	548259	179473	19	12	92	16	7	90	18	3	89
	Erith Industrial	552234	177690	26	2	9	27	38	93	28	33	99
	Manor Road East	552239	177691	24	2	8	22	3	28	33	56	98

Local Authority	Monitoring Station	x	y	Annual Average PM ₁₀ Concentration 2011(µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2012 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2013 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)
	Gravimetric Industrial											
	Manor Road West Gravimetric Industrial	551999	177742	29	38	83	27	39	92	33	53	93
	Slade Green Suburban	551860	176376	18	4	98	19	5	92	20	5	99
London Borough of Lewisham	Loampit Vale Roadside	537911	175838	No Data			24	3	46	28	19	95
	Mercury Way Industrial	535806	177612	23	24	92	22	20	94	24	13	96
	New Cross Roadside	536241	176932	26	18	94	26	15	56	23	15	99
London Borough of Newham	Cam Road Roadside	538661	183969	29	16	70	27	12	73	33	14	25
	Wren Close Urban Background	539889	181469	27	14	65	21	5	46	No Data		
Royal Borough	A206 Burrage	544084	178881	28	30	94	27	28	90	28	18	64

Local Authority	Monitoring Station	x	y	Annual Average PM ₁₀ Concentration 2011(µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2012 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2013 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)
of Greenwich	Grove Roadside											
	Blackheath Roadside	538141	176710	32	41	99	28	26	99	30	29	86
	Eltham Suburban	543978	174655	23	20	94	20	9	90	No Data		
	Fiveways Sidcup Road A20 Roadside	543582	172653	30	26	77	30	24	66	31	31	67
	Millennium Village Industrial	540169	178999	25	25	95	23	20	94	26	20	76
	Plumstead High Street Roadside	545560	178526	22	15	90	21	8	54	20	3	56
	Trafalgar Road Roadside	538960	177954	23	18	99	23	16	98	23	8	100
	Westhorne Avenue Roadside	541885	175016	23	25	97	20	16	97	24	17	90

Local Authority	Monitoring Station	x	y	Annual Average PM ₁₀ Concentration 2011(µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2012 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2013 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)
	Woolwich Flyover Roadside	540200	178367	35	37	99	33	33	95	32	26	99
	Falconwood FDMS roadside	544997	175098	No Data			26	27	96	30	28	75
Thurrock Council	London Road (Grays) Urban Background	560900	177700	25	25	83	18	10	98	19	4	95
	London Road (Purfleet) Roadside	556698	177937	28	24	97	24	14	97	27	20	99
	Stanford-le-Hope Roadside	569356	182736	23	18	95	23	15	81	24	16	78
London Borough of Tower Hamlets	Blackwall Roadside	538290	181452	28	32	94	26	24	95	28	24	92
	Poplar Urban Background	537509	180867	23	16	98	22	14	99	24	6	49

Local Authority	Monitoring Station	x	y	Annual Average PM ₁₀ Concentration 2011(µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2012 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)	Annual Average PM ₁₀ Concentration 2013 (µg/m ³)	Exceedences of the 24 Hour Mean (50µg/m ³)	Data Capture (%)
	Victoria Park Urban Background	536487	184238	No Data			18	2	43	22	7	80
London Borough of Southwark	A2 Old Kent Road Roadside	534844	177515	27	31	80	25	19	82	27	28	78

5.4.20 Bold indicates exceedences of the annual mean air quality objective (40µg/m³), or 24-hour mean air quality objective (50µg/m³) not to be exceeded more than 35 times a year.

5.4.21 As indicated in Table 5-7, there were no exceedences of the annual PM₁₀ air quality objective in 2012. In addition, other than the London Borough of Bexley, there were no recorded exceedences of the 24-hour mean objective.

Additional Monitoring Data

5.4.22 A monitoring campaign was commissioned by TfL in January 2014, and will continue for a twelve month period, in order to supplement the existing local authority passive and continuous air quality data. The final collated Hyder and local authority dataset will be used to validate the dispersion model, which will be used to assess the Scheme.

5.4.23 NO₂ diffusion tubes have been installed at 75 sites in accordance with best practice guidance across several London Boroughs. The sites were located on those roads where local authorities had poor monitoring coverage and where the Scheme was expected to affect traffic composition and behaviour.

5.4.24 The average raw concentration at each site was bias adjusted and annualised in accordance with guidance detailed in LAQM (TG (09)). A bias adjustment factor of 0.78 was calculated by calculating the ratio between the recorded concentrations of the co-located triplicate diffusion tubes and the automatic monitor at Belvedere West.

5.4.25 Average results from the first six months' monitoring are presented in Table 5-8, the six month of monitoring has been adjusted to an equivalent 2012 annual mean concentration using a factor of 1.14 calculated from the period mean/annual mean ratios at five background automatic monitors within 25km of the study area. Annualisation has been undertaken to make the data compatible with the model verification year of 2012. New bias adjustment and annualisation factors will be calculated and applied once the monitoring campaign has concluded, therefore it should be noted that the data presented in Table 5-8 is subject to change.

Table 5-8 Hyder Consulting Air Quality Monitoring Data January – July NO₂ 2014

Site No.	Site Name	X	Y	Data Capture (Over 6 Month Monitoring Period)	Average Concentration (µg/m ³)	Annualised Bias-Adjusted Concentration (µg/m ³) to 2012
1	A13/Douglas Road	540295	181768	100%	76.8	68.7
2	Douglas Road	540302	181791	100%	55.8	49.9
3	Douglas Road/Kildare Road	540299	181841	100%	46.1	41.2

Site No.	Site Name	X	Y	Data Capture (Over 6 Month Monitoring Period)	Average Concentration ($\mu\text{g}/\text{m}^3$)	Annualised Bias-Adjusted Concentration ($\mu\text{g}/\text{m}^3$) to 2012
4	Shooters Hill Road	540302	181791	100%	52.2	46.7
5	Victoria Dock Road/Tarling Road	539896	180842	83%	44.2	39.5
6	Hanover Avenue/Fitzwilliam Mews	540180	180371	100%	44.8	40.0
7	Hanameel Street South/Silvertown Way	540641	180148	100%	47.4	42.4
8	Hanameel Street North	540636	180192	83%	44.5	39.8
9	Bradfield Road	540626	180055	100%	47.6	42.6
10	Bisson Road	538284	183463	100%	43.8	39.2
11	Jersey Road	541060	181491	100%	42.5	38.0
12	Stephen's Road	539411	183525	83%	42.5	38.0
13	Collier Close	543694	180899	100%	38.3	34.2
14	Strait Road	542937	180912	100%	40.3	36.0
15	Ridgwell Road	541445	181866	100%	54.3	48.5
16	A13 Slip Road	542739	182119	100%	57.2	51.1
17	Greengate Street	540737	182923	100%	52.0	46.5
18	Richard House Drive	542032	181082	100%	34.9	31.2
19	Connaught Road	541939	180194	100%	42.1	37.6
20	Oxleas	543748	181309	100%	34.7	31.0
21	Burges Road	543425	183913	100%	47.1	42.1
22	247a Wanstead Park Road	542649	187015	100%	44.5	39.8
23	Blaney Crescent	543609	182738	83%	44.8	40.1
24	Romford Road	541047	185091	100%	64.7	57.8
25	241 Lavender Place	543587	185259	100%	46.9	41.9
26	Alfred Gardens	545603	183461	100%	55.6	49.7
27	Dalemain Mews	540260	180329	100%	44.4	39.7
28	Blackwall Way	538494	180390	100%	47.4	42.4

Site No.	Site Name	X	Y	Data Capture (Over 6 Month Monitoring Period)	Average Concentration ($\mu\text{g}/\text{m}^3$)	Annualised Bias-Adjusted Concentration ($\mu\text{g}/\text{m}^3$) to 2012
29	Dickson Road	542464	175593	100%	49.8	44.6
30	Scrattons Terrace North	547752	183529	100%	43.7	39.1
31	Scrattons Terrace South	547742	183479	100%	41.2	36.9
32	Purfleet Road	555350	179894	100%	45.7	40.9
33	A1112	550721	184263	100%	38.1	34.1
34	New Road	551010	182847	100%	47.0	42.1
35	Crescent Road	540988	190427	100%	51.6	46.1
36	Poppleton Road	539474	187856	100%	54.3	48.5
37	Downsell Road/High Road Leyton	538420	185629	100%	58.4	52.2
38	Parsloes Avenue	547933	185599	83%	38.2	34.2
39	Glenister Street	543451	179951	100%	38.6	34.5
40	Winifred Street	542756	180020	100%	42.4	37.9
41	Pier Road	543321	179863	100%	55.1	49.3
42	Woodman Street	543727	180071	100%	39.2	35.0
43	Moseley Row	539762	178987	67%	48.3	43.2
44	Corner of Tunnel Avenue/Blackwall Lane	539532	178859	83%	56.2	50.3
45	Pilot busway on corner of Becquerel Street	539831	179181	100%	45.1	40.3
46	Tunnel Avenue cul-de-sac	539568	178765	83%	51.0	45.6
47	Lane off Tunnel Avenue	539732	178646	100%	43.4	38.8
48	Mercers Close	539732	178585	100%	43.3	38.7
49	Denford Street	539775	178290	100%	49.1	43.9
50	Glenforth Street	539773	178396	100%	39.8	35.6
51	Woolwich Road near Denham Street	540025	178291	100%	62.7	56.1

Site No.	Site Name	X	Y	Data Capture (Over 6 Month Monitoring Period)	Average Concentration ($\mu\text{g}/\text{m}^3$)	Annualised Bias-Adjusted Concentration ($\mu\text{g}/\text{m}^3$) to 2012
52	Woolwich Road	540337	178361	100%	79.5	71.1
53	Farmdale Road	540278	178275	100%	61.7	55.1
54	Lancey Close	542008	178984	100%	64.0	57.2
55	Blackheath/Shooters Hill Road (A2)	540015	176876	83%	78.0	69.8
56	Maud Cashmore Way	542879	179156	100%	40.5	36.2
57	Charles Grinling Walk	543193	178874	100%	36.9	33.0
58	St John's Road	550745	178503	100%	33.4	29.8
59	Falmouth Gardens	541556	189245	100%	41.4	37.0
60	Maximfeldt Road South	551054	178236	100%	48.3	43.2
61	Maximfeldt Road North	551105	178282	100%	40.0	35.7
62	McCudden Road	554850	175698	100%	40.6	36.3
63	Oakfield Lane	553158	172562	100%	45.3	40.5
64	Heathwood Walk No's 1-8	551201	173213	100%	31.0	27.7
65	Sewell Road	547248	180050	100%	36.8	32.9
66	Glenlea Road (1)	543371	175056	100%	39.8	35.6
67	Tile Kiln Lane	550319	172750	83%	21.4	19.1
68	Grantham Road	543213	186103	83%	46.3	41.4
69	Glenlea Road (2)	543530	175196	100%	43.4	38.8
70	Topley Street	541474	175415	100%	41.6	37.2
71	Will Crooks Gardens	541718	175296	100%	43.3	38.8
72	Harrier Mews	544996	179519	100%	39.4	35.2
73	Marathon Way	545590	179903	50%	32.6	29.1
74	New Cross Gate*	536243	176934	100%	63.1	49.3
75	Bexley Business Academy*	548460	179470	100%	28.3	22.1

*Average of triplicates

- 5.4.26 Bold indicates exceedences of the annual mean air quality objective (40µg/m³)
- 5.4.27 As indicated in Table 5-8, a number of sites exceeded the annual NO₂ air quality objective (40µg/m³) during the first six months of monitoring.

5.5 Potential Significant Effects

- 5.5.1 Based on the information available to date, the potential significant effects that could arise from construction and operation of the proposals include dust and vehicle emissions during the construction phase and vehicle emissions during the operation of the Scheme. There is also the potential for cumulative effects occurring as a result of other projects in the vicinity of the Scheme. These effects, potential receptors and possible mitigation / enhancement measures are summarised in Table 5-9.

Table 5-9 Air Quality Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	Air quality impacts as a result of construction traffic emissions. Construction traffic has the potential to have a temporary impact on traffic flows and hence change emissions on the local road network. This may therefore impact on air quality at receptors as a result of the change in traffic flows during the construction period.	All sensitive receptors within the construction vehicle emissions study area (i.e. all receptors within 200m of roads considered affected by construction traffic).	Mitigation measures could include the implementation of a travel plan for the construction phase, which would ensure the most economical use of construction vehicles / barges, thus keeping the number of construction vehicles to a minimum.
	Air quality impacts as a result of construction dust. Dust is likely to be generated throughout the construction phase, which may temporarily affect receptors within the study area.	All receptors within the construction dust study area (i.e. within 350m of the site boundary for human receptors, within 50m of the site boundary for ecological receptors and within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from	The construction dust emissions would be controlled through adherence to a CEMP comprising air quality controls based on advice provided in <i>The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance (SPG)</i> (Mayor of London, 2013). The types of mitigation measures required are dependent on the relevant risk categories identified in the construction dust assessment. Typical mitigation measures include ensuring a clean

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
		the site entrance(s) for large sites, up to 200m from medium sites and 50m from small sites (for both human and ecological receptors)).	and tidy site is maintained at all times, use of wheel washes to prevent transfer of mud onto roads and effective storage of materials (use of covers, sealed containers).
Permanent Impacts	Air quality impacts as a result of traffic emissions. The Scheme has the potential to change traffic flows and hence change emissions on the local road network. The change in emissions may therefore impact on air quality at receptors. As indicated by the high level assessment of emissions (Drawing 5-2), the Scheme is predicted to result in both decreases and increases in emissions, resulting in both beneficial and adverse impacts at receptor locations.	Sensitive receptors within the localised study area (i.e. receptors within 200m of roads considered affected by the Scheme).	The impacts of the Scheme would be dependent on the change in traffic flows. Should the impact of the Scheme be significant, mitigation measures shall be investigated to attempt to reduce the Scheme impacts. There are limited mitigation measures to control emissions from vehicles as a result of the Scheme; however the attractiveness of the Scheme (and therefore the number of vehicles using it) could be influenced by user charges. Ventilation of the tunnel can be designed in order to mitigate any significant impact on receptors close to the tunnel portals.
Cumulative Impacts	Air quality impacts as a result of traffic emissions. The Scheme and other projects taking place at the same time have the potential to generate traffic flows and hence change emissions on the local road network. This may therefore have an impact on air quality at receptors caused by emissions attributable to changes in traffic flows as a result of the Scheme and other projects combined.	Sensitive receptors within the localised study area (i.e. Receptors within 200m of roads considered affected by the Scheme).	The impacts of the Scheme would be dependent on the change in traffic flows. Should the impact of the Scheme be significant, mitigation measures shall be investigated to attempt to reduce the Scheme impacts. There are limited mitigation measures to control emissions from vehicles as a result of the Scheme; however the attractiveness of the Scheme could be influenced by user charges.

5.6 Further Assessment Work to Be Undertaken

Further Baseline Data Collation

5.6.1 Initial screening of the traffic data has indicated that the following local authorities are likely to be affected by the Scheme from an air quality perspective:

- London Borough of Bexley;
- Royal Borough of Greenwich;
- London Borough of Lewisham;
- London Borough of Newham;
- London Borough of Southwark;
- London Borough of Tower Hamlets;
- Dartford Borough Council; and
- Thurrock Council.

5.6.2 Once the affected local authorities have been confirmed, further consultation will take place to discuss the proposed methodology of assessment.

5.6.3 Natural England will be consulted once the study area has been finalised for the locations of designated sites that are nitrogen-sensitive which could be affected by the Scheme.

5.6.4 The air quality monitoring campaign will continue until January 2015, in order to supplement the existing air quality data.

Air Quality Assessment

5.6.5 The final ES will include a more detailed air quality assessment which will assess the construction and operational impacts of the Scheme on air quality. That final assessment will follow the methodology outlined below. It will assess the final version of the Scheme being applied for.

Construction Dust Assessment

5.6.6 The methodology for the construction dust assessment will follow the guidance within the *Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance (SPG)* (Mayor of London, 2013). The assessment steps are as follows:

- Step 1 assesses the site and surroundings;
- Step 2 assesses the potential effects of each development phase on the nearest receptors; and
- Step 3 summarises the risk of dust effects.

Construction and Operational Vehicle Emissions

- 5.6.7 Receptors within 200m of the affected roads will be modelled for a base, projected base, Do-Minimum and Do-Something scenario. The assessment will be undertaken in line with relevant guidance at the time of assessment. Current guidance is found in the DMRB HA207/07 and the latest Interim Advice Notes (IANs) IAN 170/12 *Updated air quality advice on the assessment of future NO_x and NO₂ projections for users of DMRB Volume 11, Section 3, Part 1 Air Quality* and IAN 174/13 *Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07)*.
- 5.6.8 Five years of baseline monitoring data will be used to confirm that the trend in monitored concentrations is consistent with the advice outlined in IAN 170/12v3.
- 5.6.9 The assessment will consider worst case sensitive receptor locations within 200m of affected routes in terms of NO₂ and PM₁₀. Modelling predictions will be compared against UK AQS objectives / EU Limit Values as appropriate, as outlined in Appendix 5B.
- 5.6.10 Modelling will be undertaken using ADMS (Roads). Modelled pollutant concentrations calculated using base year (2012) traffic data will be verified against the baseline air quality monitoring results collected for the project as a means of calibrating the model. Model verification allows the user to determine the accuracy of the model runs and then to compensate in areas where the model has performed unacceptably. The model verification will be undertaken in accordance with the principles outlined in *Annex 3 of LAQM TG(09)* (Defra, 2009). The selection of sites that are to be used as part of the verification process is dependent on the extent of the traffic data that is supplied, and the suitability, reliability and availability of monitored data which has been acquired as part of the baseline data collection exercise.

Background Concentrations

- 5.6.11 *LAQM.TG (09)* (Defra, 2009) recommends the use of empirically-derived national background estimates available from the Defra website (Defra, 2012), which provides estimated background pollutant concentration maps for each 1km x1km grid square in the UK. A comparison between the concentrations from the background maps and background monitoring locations will be undertaken in order to determine the suitability of the concentrations from the background maps for use within the modelling. Background concentrations for both modelled receptors and monitored points will be taken from the corresponding 1km x 1km grid square.
- 5.6.12 Background NO_x and PM₁₀ maps provide data for the individual pollutant sectors (e.g. motorway, trunk A-roads, primary A-roads, minor roads and industry), therefore the components relating to road traffic will be removed for those road types being explicitly modelled, to avoid the double counting of road emissions. A calculator is available on the Defra website to adjust the NO₂ backgrounds, following removal of NO_x from the total NO_x background.

Ecological Assessment

- 5.6.13 Designated sites will require assessment as per paragraph 3.29 of HA 207/07 DMRB Vol. 11 Section 3 Part 1 should the adjacent highway links meet the DMRB criteria for the local air quality assessment.

Compliance Risk Assessment

- 5.6.14 Defra assess and annually report on the status of air quality in the UK, as compared to the Limit Values for each pollutant, to the European Commission in accordance with EU Directive (2008/50/EC). For the purposes of their assessment and reporting, the UK is divided in to 43 zones and agglomerations (hereafter referred to as zones). The main pollutants of concern with respect to compliance are NO₂ and PM₁₀. The assessment of compliance with the Directive is undertaken using both monitoring (Defra AURN Network) and modelling from Defras Pollution Climate Mapping (PCM) model. If any of the affected roads (as a result of the scheme) overlap with those identified in Defra's PCM model, then a compliance risk assessment will be carried out as per the methodology set out in HA IAN 175/13. The purpose of the assessment is to ascertain whether the Scheme represents a risk to possible compliance with EU Directive (2008/50/EC).
- 5.6.15 If the scheme is assessed as having a high risk of non-compliance, the IAN provides guidance on the production of Scheme Air Quality Action Plans (SAQAPs) containing actions designed to further mitigate scheme impacts and so reduce the risk of non-compliance.

Regional Assessment

- 5.6.16 An assessment considering the likely effect of the Scheme on regional air pollution will be undertaken as per DMRB HA 207/07 DMRB Vol. 11 Section 3 Part 1. The assessment level will mirror that of the local air quality assessment.

Tunnel Emissions

- 5.6.17 The impact of tunnel emissions will be modelled within the dispersion model and will form part of the local air quality assessment. Tunnel emissions will be modelled using ADMS (Roads) as a volume source located at the tunnel portals.

Evaluating Significance

- 5.6.18 IAN 174/13 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality provides advice on determining the significance of a scheme's impact on air quality. The advice provides a means of evaluating the significance of local air quality effects in line with the requirements of the existing EIA Directive for highway schemes. Details of the criteria to be used are presented in Tables A to C in Appendix 5C of this report.

Assessment Years

- 5.6.19 The local air quality assessment for the operational period will be applied to the following scenarios:
- Base Year – (2012) – for the purposes of model verification;
 - Projected Base Year (2021) – Base year traffic data inputted into air quality tools as opening year – for purposes of gap analysis as per IAN 170/12v3; and
 - Do-Minimum and Do-Something scenarios in the opening year (2021) of the Scheme and a future design year (2031).
- 5.6.20 The regional assessment and greenhouse gases assessment will be applied to the following scenarios:
- The Do-Minimum scenario in the opening year and design year (10 years after the opening year); and
 - The Do-Something scenario in the opening year and design year.

Mitigation

- 5.6.21 Should the assessment show that the Scheme would give rise to significant adverse air quality effects mitigation measures would be investigated and designed to minimise such effects. The construction air quality impacts, particularly construction dust, would be mitigated in accordance with best practice with the requisite measures documented in a CEMP.

6 Community and Private Assets

6.1 Introduction

- 6.1.1 This chapter presents an initial assessment of the effects of the Silvertown Tunnel on Community and Private Assets. The work is being undertaken in accordance with guidance set out in the DMRB Volume 11, Section 3, Part 8 'Pedestrians, Cyclists, Equestrians and Community Effects', for the assessment of effects on community; and Part 6 'Land Use' guides the assessment of effects on private assets. Community and private assets relate to a variety of different types of facility and land uses. The term community, for example, relates not only to facilities that provide services and resources for the local population (such as education and healthcare, places of worship, leisure and entertainment facilities, community centres and areas of public open space), but also looks at how such facilities are accessed and whether any severance of access may take place. The term private assets embraces residential, commercial and industrial sites and properties and includes both committed development and land that has been allocated for potential development.
- 6.1.2 Effects on agricultural land have been scoped out of the assessment as there is no agricultural land within the vicinity of the Scheme and therefore no impacts are expected in terms of land-take, husbandry, severance or accommodation works to agricultural land. The Scheme is also unlikely to give rise to any impacts on Waterway Restoration Projects as the tunnel will be constructed at such a depth that it would not directly impact on the River Thames.

6.2 Regulatory and Policy Framework

- 6.2.1 The final environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 6-1 below.

Table 6-1 Community and Private Assets Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
National Planning Policy Framework (NPPF)	<p>The NPPF sets out 12 core planning principles that should underpin decision taking. Those that apply to the development include to <i>'proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs.'</i></p> <p>Paragraph 69 of the NPPF states that <i>'the planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities.'</i> Planning policies and decisions should <i>'guard against the unnecessary loss of valued facilities and services, particularly where this would reduce the community's ability to meet its day to day needs'</i> (Paragraph 70).</p>

Policy/Legislation	Summary of Requirements
Planning Practice Guidance (2014)	The newly released Planning Practice Guidance provides practical guidance to support the NPPF. The Guidance states that existing open space should be taken into account when considering development proposals.
Draft National Policy Statement for the National Networks (December 2013)	<p>The Government's vision and strategic objectives for national networks includes 'supporting a prosperous and competitive economy' and specifically:</p> <ul style="list-style-type: none"> ▪ Networks with the capacity and connectivity to support national and local economic activity and facilitate growth and create jobs; and ▪ Networks which join up our communities and link effectively to each other.
<p>London Plan (2011)</p> <p>Policy 2.9 'Inner London'</p> <p>Policy 2.13 'Opportunity Areas'</p> <p>Policy 2.14 'Areas for Regeneration'</p> <p>Policy 2.18 'Green Infrastructure'</p>	<p>The London Plan 2011 is the overall strategic plan for London for the development of England's capital city up to 2031. In October 2013 revised early minor alterations to the London Plan were published, with Draft Further Alterations to the London Plan published in January 2014. The latest round of amendments is currently out for public consultation.</p> <p>The policy states that there is a desire to 'work to realise the potential of inner London in ways that sustain and enhance its recent economic and demographic growth while also inspiring its distinct environment, neighbourhoods and public realm, supporting and sustaining existing and new communities...and improving quality of life and health for those living, working, studying or visiting there.'</p> <p>The Greenwich Peninsula is designated as an Opportunity Area. The policy states that development proposals within Opportunity Areas should 'seek to optimise residential and non-residential output and densities, provide necessary social and other infrastructure to sustain growth and, where appropriate, contain a mix of uses' as well as 'supporting wider regeneration'.</p> <p>Identifies specific regeneration areas within London, including in and around the study area. The justification supporting the policy states that social deprivation remains particularly acute around the eastern side of central London.</p> <p>The policy states a need to 'protect, promote, expand and manage the extent and quality of, and access to, London's network of green infrastructure'.</p>

Policy/Legislation	Summary of Requirements
Policy 3.1 'Ensuring equal life chances for all'	The policy states that development proposals should protect and enhance facilities and services that meet the needs of particular groups and communities.'
Policy 3.16 'Protection and Enhancement of Social Infrastructure'	Describes what is covered by the term 'social infrastructure', referring to a wide range of facilities including health provision, nurseries, schools, colleges and universities, community, cultural, play, recreation and sport facilities, places of worship and fire stations. The policy includes the statement that 'proposals which would result in a loss of social infrastructure in areas of defined need for that type of social infrastructure without realistic proposals for re-provision should be resisted.'
Policy 4.1 'Developing London's Economy'	The policy states that there is a desire to 'promote and enable the continued development of a strong, sustainable and increasingly diverse economy across all parts of London'.
Policy 4.5 'London's Visitor Infrastructure'	The policy includes the need to promote, enhance and protect the special characteristics of major clusters of visitor attractions including those identified in Strategic Cultural Areas (for example Greenwich Riverside).
Policy 4.6 'Support for and Enhancement of Arts, Culture, Sport and Entertainment Provision'	The policy identifies the need to 'support the continued success of London's diverse range of arts, cultural, professional sporting and entertainment enterprises and the cultural, social and economic benefits that they offer to its residents, workers and visitors.'
Policy 7.17 'Metropolitan Open Land'	The policy states that there is protection from development having an adverse impact on the openness of MOL.
Policy 7.18 'Protecting Local Open Space and Addressing Local Deficiency'	The policy states that the loss of local protected open spaces must be resisted unless equivalent or better quality provision is made within the local catchment area.
Greater London Authority 'Economic Development Strategy' (May 2010)	The Economic Development Strategy sets out the Mayor's vision for London.
Action 2E	Action 2E states that the Mayor will 'work with boroughs and other partners to improve the quality of life in London both for the benefit of Londoners and as a key competitive asset for the city'.
Action 5A	Action 5A states that the Mayor will 'direct growth into the places that have the greatest need of and potential for

Policy/Legislation	Summary of Requirements
	development, as set out in the London Plan, especially the Opportunity Areas.’
Greater London Authority, Strategic Regeneration Framework (2011)	The Mayor of London and the six Olympic Host Boroughs have committed to working towards achieving socio-economic convergence between the Host Boroughs and the rest of London over the period to 2030. A Convergence Action Plan, together with an annual progress report, has been produced for the period 2011-2015.
Greenwich Core Strategy	The draft Core Strategy sets out the spatial strategy, vision, objectives and core policies for development within Greenwich up to 2027. Relevant strategic and development management policies include Policy EA1 (Economic Development), EA3 (Greenwich Peninsula West), EA4 (Strategic Industrial Locations), OS1 (Open Space), OS2 (MOL) and CH1 (Cohesive Communities).
Newham Core Strategy (adopted January 2012) Policy S3 ‘Royal Docks’ Policy S4 ‘Canning Town and Custom House’	Relevant policies include those relating to Strategic Industrial Sites and safeguarded wharves. The policy sets out a vision for this area as a unique and high quality waterfront urban quarter. Strategic sites included within the policy are S08 (Thames Wharf), S21 (Silvertown Quays) and S22 (Minoco Wharf). The spatial area covered by this policy also includes S08 (Thames Wharf). Other relevant policies include J1 (Investment in the New Economy), J2 (Providing for Efficient Use of Employment Land – which states that major industrial development will be directed to Strategic Industrial Locations (SIL) including those to the north side of the River Thames along the Royal Docks area and INF8 (Community Facilities).
Tower Hamlets Core Strategy (adopted 2010) Policy SP02	The Core Strategy forms the key spatial planning document for Tower Hamlets and includes five spatial themes, namely refocusing town centres, strengthening neighbourhood well-being, enabling prosperous communities, designing a high quality city and delivering placemaking. Policy SP02 states that the majority of new housing will be focused in the eastern part of the Borough, including locations such as Cubitt Town.
Greenwich Peninsula West Masterplan Supplementary Planning Document (SPD) April 2012	The SPD provides a masterplan to guide development and support the planning process, setting out a vision and objectives for the area.

6.3 Assessment Work Undertaken to Date

6.3.1 This section sets out the work that has been undertaken to date in terms of consultations, identification of study area, how baseline conditions have been established and the limitations and assumptions associated with the work.

Consultation

6.3.2 Consultation has been undertaken with relevant organisations including planning departments of the London Boroughs of Royal Greenwich and Newham within which the tunnel portals are located, as well as with the London Borough of Tower Hamlets, a small part of which is within the study assessment area for the Scheme. The purpose of the consultation has been to confirm strategic land allocations and to identify recent planning applications that may be of relevance. This information is included within later sections of this Chapter.

Study Area

6.3.3 For the purposes of collating baseline information a study area of approximately 1km from the Scheme has been used. This study area is currently proposed for the assessment of the environmental effects of the Scheme in the final ES but will be reviewed in the light of the traffic changes predicted for the Scheme (this will be particularly relevant in relation to assessing community severance effects).

Establishing Baseline Conditions

6.3.4 Baseline conditions have been established through a combination of site visits and desk-top research. These methods have enabled confirmation of existing land-uses within the study assessment area.

6.3.5 It is planned that there shall be a significant amount of development in south and south east London in future years. Accordingly, land allocations within relevant development plans and strategies have been identified, together with recent relevant planning applications / approvals.

Key Environmental Receptors and their Value

6.3.6 The key environmental receptors are the commercial and residential developments planned on the Greenwich Peninsula with respect to community and private assets as well as the educational, medical, entertainment and community facilities shown on Drawing 6.1. Community and Private Assets is a relatively new topic area for environmental assessment and as such, formal guidance as to the value of such receptors has not yet been issued. IAN 125/09 recommends that in the interim, existing published guidance should be followed, notably DMRB 'Community Effects' guidance on 'Pedestrians, Equestrians, Cyclists and Community Effects' and that on 'Land Use'. Adopting this recommendation, the significance of receptors would be as follows:

- *Very high* – where the asset is of high importance or rarity at a national scale, with limited potential for substitution

- *High* – where the asset is of high importance or rarity at a regional scale, with limited potential for substitution
- *Medium* – where the asset is of high importance or rarity at a local scale, with limited potential for substitution
- *Low* – where the asset is of low or medium importance or rarity at a local scale, with potential for substitution
- *Negligible* – where the asset is of very low importance or rarity, with potential for substitution

Assumptions and Limitations

- 6.3.7 It is assumed that the community facilities that have been identified will remain in place for the duration of the Scheme development.
- 6.3.8 In terms of spatial limitations, catchment areas for individual community facilities have not been identified. This may have implications in terms of assessing community severance for all potential users of a facility. The identification of community facilities has been undertaken by site visits and desk study research and every effort has been made to identify all relevant facilities.

6.4 The Existing Environment

- 6.4.1 The land required for the Scheme has been confined to the Scheme's safeguarded area (refer to Drawing 6.1). This includes Thames Wharf and Alexandra Wharf to the north of the Thames and the area around Edmund Halley Way on the Greenwich Peninsula on the southern side of the Thames. This section sets out the existing environment of the safeguarded area within the vicinity of the two tunnel portals, together with a description of community and private assets within the study area and a summary of the socio-economic environment as it relates to the three boroughs adjacent to the scheme of Greenwich, Newham and Tower Hamlets. The identification of existing and proposed land uses near the Scheme is in line with the National Networks draft National Policy Statement.

The Safeguarded Area

- 6.4.2 The northern portal lies in the London Borough of Newham. Mixed residential and recreational land uses predominate around the perimeter of the Royal Victoria Docks and light industrial and commercial uses to the south of the elevated Silvertown Way and the Docklands Light Railway. There are a number of businesses within the Dock Road/Thames Wharf area, including scrap metal dealers, waste recycling and management businesses and an aggregates supplier. There is a small area of derelict land that is entirely surrounded by the aggregates business and through which the DLR passes.
- 6.4.3 The southern tunnel portal sits on the Greenwich Peninsula in the Royal Borough of Greenwich. On the southern side of the River Thames, the land use is predominantly car parking associated with the O2 arena. The entrance to the Emirates Air Line is accessed from the western side of the Peninsula. There is a small quantity of industrial/commercial land at the eastern extent of the safeguarded area, in the vicinity of Tunnel Avenue. The majority of the land on

the Peninsula is owned by the GLA. A gas holder (approximately 75m in diameter) is currently situated between Millennium Way and the Blackwall Tunnel Southern Approach on the western boundary of the Scheme. Surface development associated with the Scheme and the new grade separated junction are located within the inner zone consultation distance as defined by the Health and Safety Executive (HSE). There is a footbridge which crosses the Blackwall Tunnel Approach in the vicinity of Boord Street.

- 6.4.4 The tunnel portal and the link roads from the southern junction encompass an area of derelict land that appears to be heavily overgrown with a mixture of small trees and scrub. It is bound by paved areas including the Blackwall Tunnel Approach to the west, Millennium Way to the east, the Gasometer site to the south and an industrial site to the north.

Wider Study Assessment Area

- 6.4.5 The wider assessment study area (within a 1km radius of the Scheme) includes areas of residential development as follows:

- The Britannia Village area to the north of Silvertown Way;
- The part of Canning Town bounded by Newham Way (the A13) to the north and Silvertown Way to the west;
- An area of housing bounded by Blackwall Way to the north, the East India Dock Basin to the west and the River Thames to the south;
- Part of Cubitt Town on the Isle of Dogs; and
- A small area of housing in the vicinity of North Greenwich District Centre.

- 6.4.6 There are also areas of commercial and industrial development, particularly along the riverside and wharf areas in Silvertown and on the Greenwich Peninsula, with a range of businesses operating in terms of sector and scale.

- 6.4.7 Social and community infrastructure has been identified within a 1km radius of the Scheme and includes the following types of facility:

- Areas of public open space;
- Education and healthcare facilities;
- Community centres;
- Leisure and entertainment facilities;
- Places of worship.

Open Space

- 6.4.8 Areas of public open space, as shown on Drawing 6-1, are limited to Central Park on the Greenwich Peninsula, which has been designated as 'Metropolitan Open Land' (MOL), a uniquely London designation which protects strategically important open spaces within the built up area of London, without regard for Borough administrative boundaries, that provide open-air recreation facilities to serve the needs of Londoners.

- 6.4.9 There are five parks or recreation grounds within the study assessment area, namely:
- Kier Hardie Recreation Ground
 - Lyle Park
 - Mudchute Farm
 - Milwall Park
 - St John's Park
- 6.4.10 The Thames Path, a national trail, follows the north bank of the river between Island Gardens and East India Dock and on the south bank of the river between Tower Bridge and the Thames Barrier. The National Networks draft National Policy Statement identifies that national trails are an important recreational facility and that appropriate mitigation measures are required to address adverse effects.
- 6.4.11 The Greenwich Peninsula Ecology Park is a freshwater habitat made up of an inner and outer lake; the park includes facilities for bird and wildlife watching and is open to the public every day except Mondays and Tuesdays.
- 6.4.12 The study area is not tranquil. Major road and rail infrastructure crosses the area together with the presence of London City Airport. The public open spaces are affected either by the airport flight path (over the Royal Docks) or elevated road and rail infrastructure (the Royal Docks and Lea Park/East India Dock basin areas). Central Park is relatively quiet partly due to the vacant development plots adjacent and low traffic levels during the day.

Education and Healthcare Facilities

- 6.4.13 There are no schools within 200m of the Scheme. The following education facilities are located within 1km of the Scheme:
- Britannia Village Primary School
 - Hallsville Primary School
 - St Luke's Primary School
 - Millennium Primary School
 - Ravensbourne University
 - Cubitt Town Junior School
 - St Luke's Church of England Primary School
- 6.4.14 The Greenwich Peninsula Masterplan includes as one of its objectives to provide employment and education opportunities of excellence, the latter relating principally to a possible elite sports facility or university faculty.
- 6.4.15 The following healthcare facilities are located within 1km of the Scheme:
- Island Medical Centre
 - PSU Surgery

- Custom House Teaching & Training Practice
- The Practice Britannia Village
- Greenwich Peninsula Practice

Community Centres

- 6.4.16 The only community centre within 1km of the Scheme is Island House Community Centre located on the northern bank of the Thames in the London Borough of Tower Hamlets. The Centre describes itself as a community resource hub, providing facilities, projects, services and activities for local people.

Leisure and Entertainment Facilities

- 6.4.17 The O2 Arena is located on the northern extent of the Greenwich Peninsula, which is a major entertainment venue combining performance space and a number of restaurants and bars. There are also two cinemas on Greenwich Peninsula, one within the O2 complex itself and the other located off Bugsby's Way.

Places of Worship

- 6.4.18 A number of places of worship have been located within 1km of the Scheme, as follows:
- Keir Hardie Methodist Church, Plymouth Street
 - Abraham's Care, Burke Street
 - Celestial Church of Christ, Horeb of God, North Woolwich Road
 - Christ and St John with St Luke, Manchester Road
 - Quaystone Church, Roserton Street
 - City of Peace Community Church, Glengall Christian Centre

Land Allocated for Development

- 6.4.19 The current development plans for the area focus on the Silvertown Quays to the east of Silvertown Way for mixed residential and commercial development.
- 6.4.20 There are plans for significant levels of development on land in the vicinity of both the northern and southern tunnel portals.
- 6.4.21 The Greenwich Peninsula is an area set for intense development to high environmental standards. 10,000 homes plus offices and public spaces have been proposed. Some elements of the development are within close proximity to the Scheme safeguarded boundary.
- 6.4.22 The **Peninsula Masterplan** envisages the development of a new entertainment/sports complex to the west of the Blackwall Tunnel Approach with a mixed development of high quality commercial and residential properties throughout the peninsula. The A102 corridor divides the peninsula and is a significant source of noise and air pollution.

- 6.4.23 Planning permission for the Peninsula Quays proposal was secured by a consortium (Meridian Delta Limited) on 23/02/2004 for use types as illustrated in Table 6-2.

Table 6-2 Greenwich Peninsula Planning Permission

Type	Amount
Residential	10,010 units
Office	343,000m ²
Retail	33,750m ²
Leisure	33,220m ²

Source: Atkins Draft Development Study 2014

- 6.4.24 There are a number of developers involved in the development with individual plots proceeding following approval of reserved matters applications. Eleven sites have recently obtained outline planning permissions for redevelopment at Peninsula Quays.
- 6.4.25 Other development projects within the northern part of Greenwich include Greenwich Meridian Village, an 11.32 hectare site with an expected build-out time of 2011-2021. The development currently provides 1,095 homes with a further 705 expected by completion, together with shops and commercial units.
- 6.4.26 Within Newham, the Borough's Core Strategy (2012) identifies the Silvertown Quays, Minoco Wharf (Royal Docks), Thames Wharf and Royal Victoria west as areas for intensive development.
- 6.4.27 **Silvertown Quays** is a residential-led mixed use development of 2,500 homes, also including commercial space and restaurants as well as a number of 'brand pavilions' which will combine product demonstration space, office space, exhibition space and retail space. New residential development on this site will form part of the wider neighbourhood at Silvertown, supported by local shopping and community uses (a new local centre) focused around North Woolwich Road, including use of space under the DLR viaduct. The Core Strategy outlines that leisure uses should relate to the water space, with clear pedestrian and cycle connections through to the new local centre and across North Woolwich Road. Public access to the dock edge should be provided. Work on the site is expected to start in 2014/15 with the first businesses opening in 2017.
- 6.4.28 **Minoco Wharf (Royal Docks)** includes land previously designated as a Strategic Industrial Location at Thameside West up to the eastern boundary of Lyle Park, and west of Lyle Park adjacent to North Woolwich Road (18 hectares in total). The release of this land is planned to assist in the development of a new neighbourhood at West Silvertown. A new local centre is intended to provide a focus to the new neighbourhood as a whole and provide connections to both DLR stations and pedestrian and cycle links to Silvertown Quays. Planned development should include pedestrian and cycle access to the river.

- 6.4.29 **Thames Wharf** is an area currently designated as a Strategic Industrial Location from which it is proposed to be released. Thames Wharf forms part of the Royal Docks area within which a number of wharves have been safeguarded within the London Plan, as part of a wider process to successfully maintain a number of sites which can later be used to transport goods through London. This safeguarding process is reviewed and updated approximately every five years and looks at opportunities to consolidate wharves going forward. There is scope to reconfigure the wharf on the site to the adjacent site (Carlsberg-Tetley) or to remove the wharf safeguarding at Thames Wharf if a consolidated wharf can be delivered at Thameside West subject to there being no net loss of functionality or wharf capacity. If it can be demonstrated that either scheme can be delivered, this could provide the opportunity to develop new employment, leisure/ tourism and residential uses grouped around a potential new DLR station where passive provision is in place, subject to addressing the constraints on the site, including the Silvertown Crossing safeguarding area, and the removal of the wharf safeguarding by the Secretary of State.
- 6.4.30 The Core Strategy states that the Council will work together with other public sector agencies and developers to further investigate proposals for relocating or consolidating the four individual safeguarded wharves at Thameside West, to facilitate a more efficient use of land, and support the growing neighbourhood at Silvertown.
- 6.4.31 **Royal Victoria West** is a gateway site to the Royal Docks at which new residential, leisure and cultural uses will be supported. The Siemens building and cable car link to Greenwich Peninsula were completed in 2012 providing new visitor attractions. The Core Strategy states that public realm improvements, including an enhanced pedestrian and cycle link to Canning Town, and active water space, are key priorities in this location.
- 6.4.32 Within the London Borough of Tower Hamlets, strategic sites included within the Core Strategy that fall within or in close proximity to the wider assessment area include:
- **Leamouth Peninsula** – a mixed use riverside development site including housing and improved public realm; and
 - **Marsh Wall East** – a mixed use development opportunity to include commercial and residential space.

The Local Economy

- 6.4.33 The purpose of this section is to present a picture of the current economic environment for the boroughs of Newham, Greenwich and Tower Hamlets, with comparator information provided for the wider London area and the UK as necessary. Relevant data includes information relating to economic activity rates; employment by occupation; deprivation; numbers of, and survival rates for, existing businesses in each of the three boroughs; and information relating to commuter travel. Data is also presented in relation to how the local economy might change over time in terms of population and employment growth.

6.4.34 Table 6-3 sets out the economic activity rates for the three boroughs, together with comparative figures for London and for England and Wales as a whole. The table shows that each of the boroughs has a lower economic activity rate than is the case for London, but also that the situation for each borough has improved over the ten years since 2001. Newham currently has London's lowest economic activity rate, yet both it and Tower Hamlets showed the greatest level of increase between 2001 and 2011 (Tower Hamlet's economic activity rate increasing by 11% and that of Newham increasing by 8%).

Table 6-3 Economic Activity Rates 2001 and 2011

	2001	2011
Newham	59%	67%
Tower Hamlets	59%	70%
Greenwich	66%	71%
London	68%	72%
England & Wales	67%	70%

Source: Census Data

6.4.35 Table 6-4 shows unemployment rates for each borough, together with comparative information for London and the UK. All three boroughs had higher unemployment rates than either for London as a whole or the UK as of June 2013. Tower Hamlets has the third highest unemployment rate in London (the highest is Barking and Dagenham, with an unemployment rate of 5.6%).

Table 6-4 Unemployment (Claimant Counts) 2013

	2013
Newham	4.8%
Tower Hamlets	5.1%
Greenwich	4.2%
London	3.6%
UK	3.5%

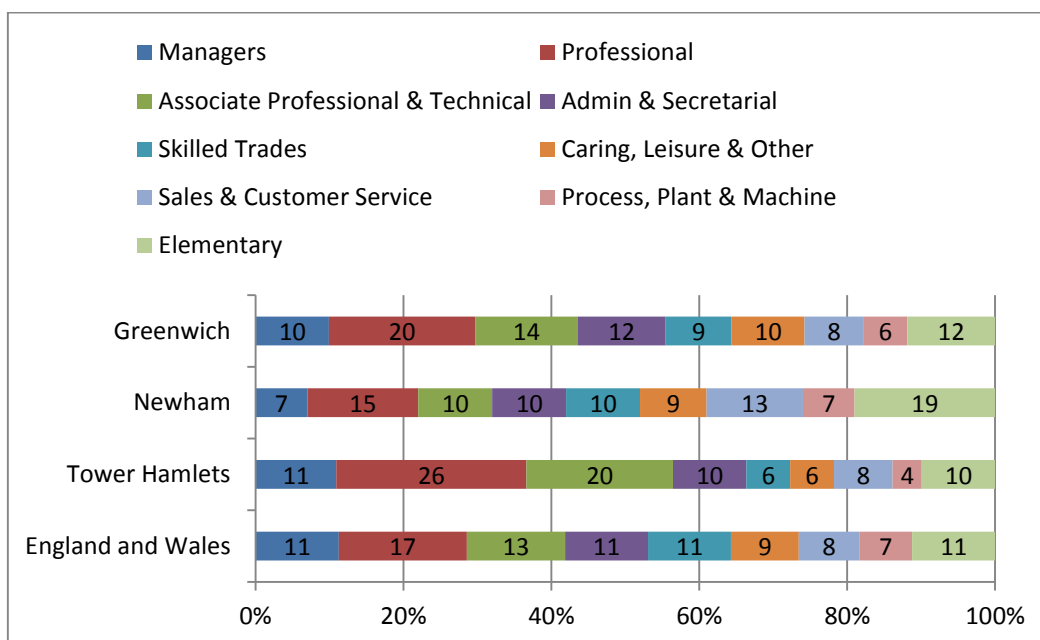
Source: Census Data

6.4.36 In terms of deprivation, Newham, Tower Hamlets and Greenwich rank amongst the fifty most deprived local authorities nationally, and amongst the twelve most deprived within London.

6.4.37 Figure 6-1 shows employment of residents within each borough by occupation. The breakdown of employees varies considerably between boroughs. For example Tower Hamlets has higher employment in the managerial and professional categories (based around employment in scientific and technical areas as well as a focus in financial and insurance services). Newham, on the other hand, has comparatively lower levels of employment in these areas but instead has a higher proportion of employment in the sales and customer

service and elementary sectors, reflecting employment in the wholesale and retail trade within the borough as well as accommodation and food services.

Figure 6-1 Resident Employment by Occupation



Source: Taken from RX Economic Baseline (based on ONS Census Data)

6.4.38 Tables 6-5 and 6-6 give a flavour of the business demography for the three boroughs. Table 6-5 shows that Tower Hamlets is above the London borough average in terms of total number of businesses (in fact the borough has the tenth largest business base of all London boroughs reflecting, perhaps, its location adjacent to central London). The number of firms within both Newham and Greenwich falls significantly below the London average and both boroughs have one of the five smallest business bases of all London boroughs. Table 6-6 sets out firms by sector within each of the boroughs.

Table 6-5 Number of Firms (2011)

	Number of Firms
Tower Hamlets	12,850
Greenwich	7,290
Newham	7,195
London Borough Average	12,763

Source: ONS Business Demography

Table 6-6 Number of Firms by Sector (2011)

Sector	England & Wales	London	Newham	Greenwich	Tower Hamlets
Agriculture, forestry & fishing	108,180	565	5	5	10
Production	134,969	13,755	290	320	455
Construction	244,190	33,775	740	745	560

Sector	England & Wales	London	Newham	Greenwich	Tower Hamlets
Motor trades	70,205	6,215	165	135	125
Wholesale	113,185	20,595	460	305	820
Retail	253,930	41,190	1,235	900	1,200
Transport & storage	74,185	9,515	240	200	395
Accommodation & food services	148,305	25,675	440	565	910
Information & communication	157,350	47,435	760	890	1,990
Finance & insurance	59,200	14,490	140	120	600
Property	82,910	20,390	295	195	555
Professional, scientific & technical	338,960	85,070	835	1,190	2,395
Business administration & support services	164,505	33,530	540	555	1,015
Public administration & defence	21,845	2,570	90	70	80
Education	59,760	8,810	240	245	305
Health	134,425	21,425	570	565	615
Arts, entertainment, recreation & other services	163,800	34,730	505	595	905
Total	2,329,895	419,735	7,550	7,600	12,935

Source: ONS

- 6.4.39 The three boroughs are characterised by a significant proportion of smaller firms – the majority of firms have fewer than four employees (70% of firms in Tower Hamlets fall into this category, 71% of firms in Newham and 74% of firms in Greenwich).
- 6.4.40 Tables 6-7 and 6-8 show the net increase in number of firms in 2011 and 2012 (business ‘births’ minus business ‘deaths’), together with survival rates for businesses born in 2007. Business start-ups, or births, are an indicator of entrepreneurial activity in an area, with survival rates giving an indication of the corresponding impact of that activity over time. Newham, despite having a relatively high number of business start-ups, has the second lowest business survival rate of the thirty-three London boroughs (the lowest being Wandsworth at 35.7%).

Table 6-7 Net Increase in Firms

	2011	2012
Tower Hamlets	1,000	700
Greenwich	440	315
Newham	740	500

	2011	2012
London	18,100	13,570

Source: ONS Business Demography

Table 6-8 Five Year Survival Rates for Businesses Born in 2007

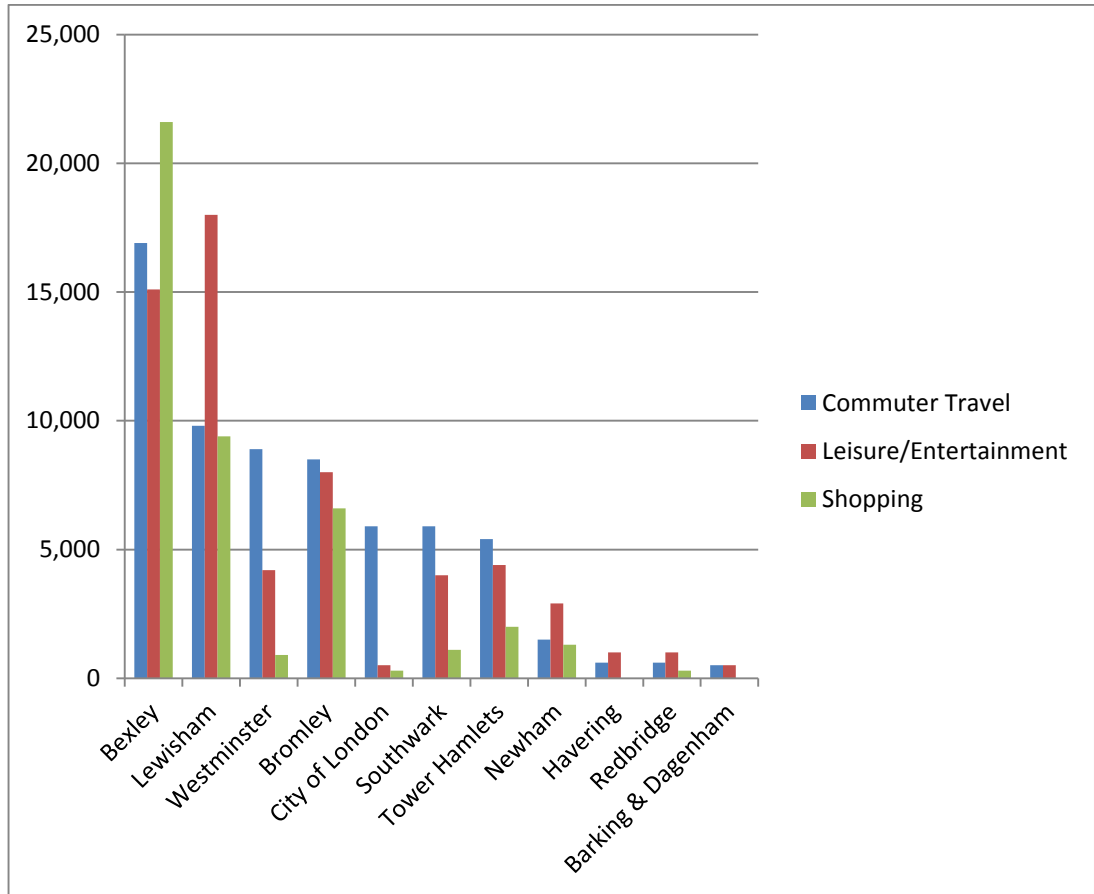
	Survival Rate
Tower Hamlets	39.5%
Greenwich	39.7%
Newham	36.2%
London	41.7%
UK	44.6%

Source: ONS Business Demography

Accessibility

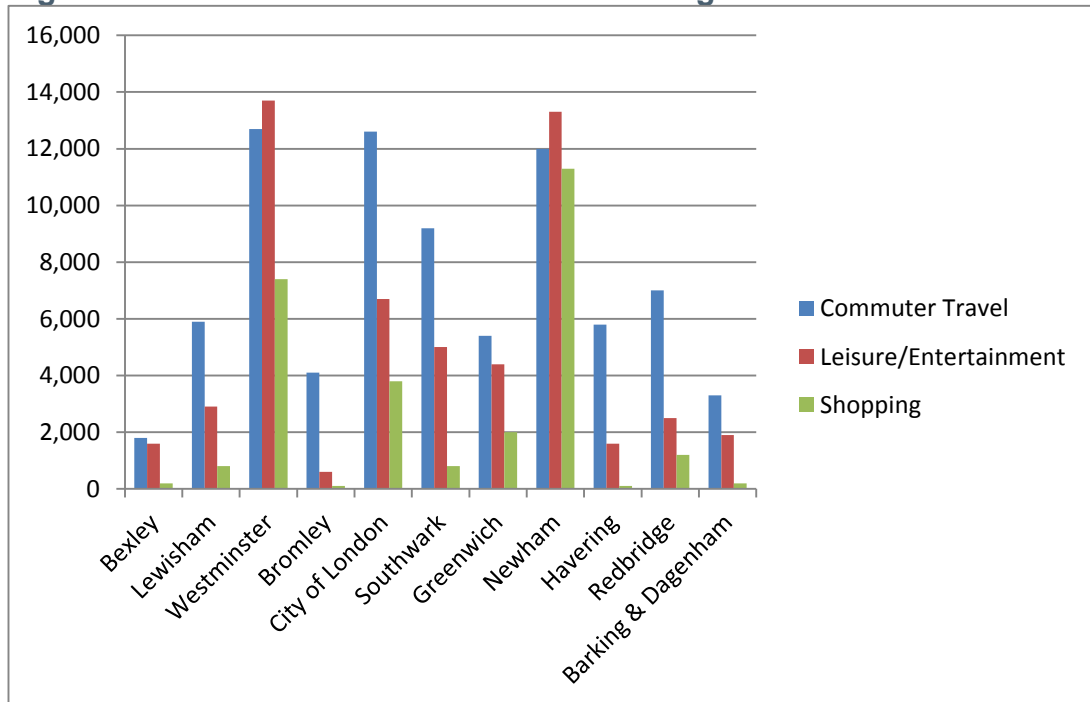
- 6.4.41 Figures 6-2 to 6-4 show the number of trips to and from each of the three London boroughs for the purposes of commuting for work, travel relating to leisure and entertainment purposes, and that relating to shopping trips. Generally, cross river travel accounts for a relatively small proportion of total trips. Exceptions include trips between Greenwich and Newham which are (relatively) high for both leisure and entertainment purposes and for shopping trips.

Figure 6-2 Travel To/From London Borough of Greenwich



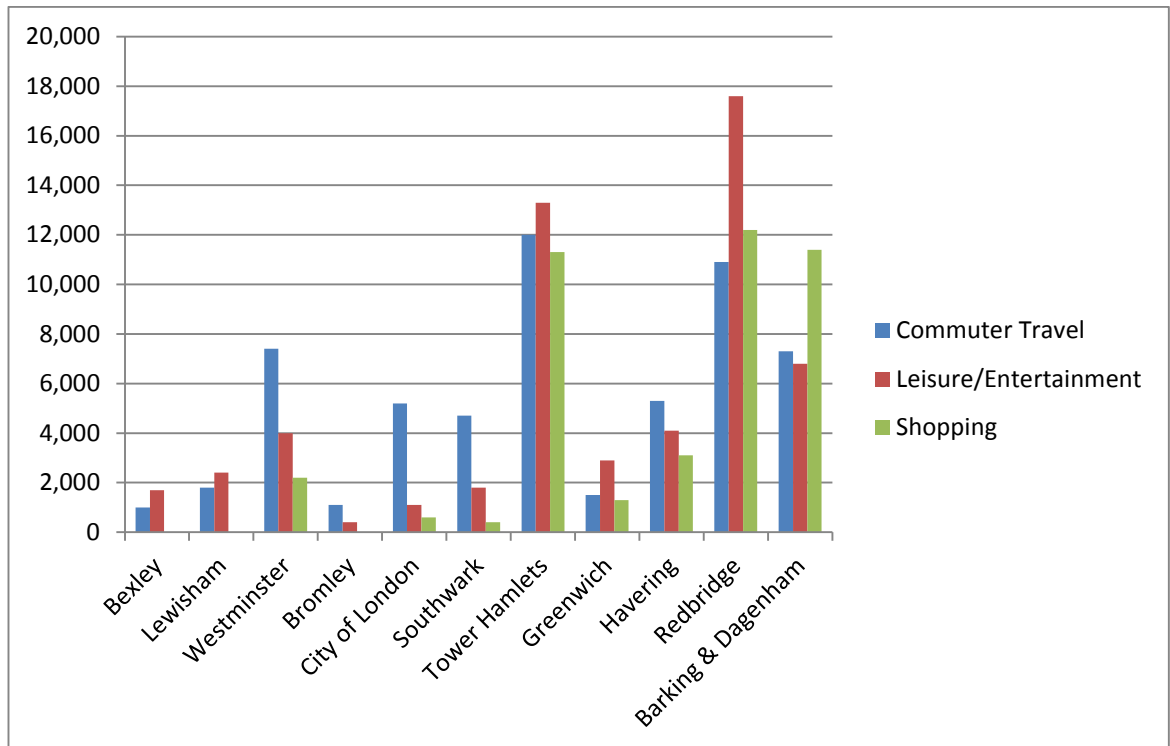
Source: LTDS Analysis

Figure 6-3 Travel To/From London Borough of Tower Hamlets



Source: LTDS Analysis

Figure 6-4 Travel To/From London Borough of Newham



Source: LTDS Analysis

6.4.42 Key transport issues identified by local businesses as part of a Regeneration Report looking at river crossings in East London (Steer Davies Gleave 2012) included:

- Reliability of existing river crossings (for example congestion, delays and unreliability associated with the Blackwall Tunnel and reliability and capacity issues associated with the Woolwich Ferry);
- Good access to the strategic road network; and
- The importance of the local road network.

6.4.43 The report also identified general support for the Silvertown Tunnel by local businesses, seen as a vital and necessary improvement by the majority of businesses contacted (Steer Davies Gleave 2012).

6.4.44 A more detailed and widespread survey of local businesses was undertaken by WSP in 2014 (the River Crossings Business Survey). This identified that 'a significant number of businesses see the river as a barrier to the development of their business on the other side', with 49% of businesses in Greenwich and 47% of businesses in Newham agreeing with this statement. The Survey also enquired whether firms would anticipate more business coming from the other side of the river, with 82% of businesses in Newham agreeing with this statement.

6.4.45 Predictability of journey times has been raised as an issue for businesses. The survey identified that 67% of firms consider that poor reliability of cross-river travel acts as a constraint on or disruption to their business to an extent.

Predictability was highlighted as an issue of particular concerns to firms based in Greenwich, amongst others.

6.4.46 The following findings from the River Crossings Business Survey are of particular relevance. Findings relate to the implementation of the East London River Crossings package as a whole, however broad conclusions can still be drawn regarding the Silvertown Tunnel element:

- Businesses expect a strong positive economic effect from the East London River Crossings package;
- Two thirds of firms (65%) expect that the River Crossings package will facilitate more business from the other side of the river (irrespective of being located north or south of the river), with Newham perceiving this impact most strongly (82%).
- Proximity to other businesses is identified as being most important to firms because it brings in more trade/customers (compared to other reasons for locating close to businesses in the same sector, for example providing variety for customers, keeping an eye on the competition or being good for the local area). Agglomeration benefits (the advantages of being located near other businesses in the same sector in order to support one another or to attract more trade to the cluster of activity) are noted as being particularly important for businesses in Tower Hamlets, Newham and Greenwich;
- 50% of businesses expect to recruit additional staff as a result of the investment, with firms in Boroughs closest to the planned new crossings anticipating the biggest effect (Greenwich (57%) and Newham (54%));
- The more efficient use of supplies and deliveries is anticipated by 65% of firms; and
- The main benefit anticipated by construction sector businesses is more predictable journey times.

Future Baseline

6.4.47 Tower Hamlets and Newham have shown the highest rates of population growth in London at 2.6% and 2.4% respectively between 2001 and 2011, with projections for Greenwich standing at 1.7% (Census data). In terms of forecast population growth, Tower Hamlets is expected to see the largest increase in total population across all London boroughs over the period 2010-2031, with a 35% increase in population predicted (GLA Borough Level Population Projections December 2011). Greenwich is expected to see the second highest rate of growth over this period (30%) with Newham fifth highest. The growth will 'generate significant demand for transport for business, commuting and leisure purposes and will place increasing pressure on existing transport infrastructure' (Steer Davies Gleave 2012).

6.4.48 Employment growth over a similar period is anticipated to be concentrated in a few central boroughs with Newham and Tower Hamlets predicted to see growth of 22% and 33% respectively between 2011 and 2031, compared to an overall figure for Greater London of 14% (GLA Borough Level Employment Growth Projections December 2011). Significant population growth is forecast for a

number of boroughs where there is less growth in jobs – this implies a greater need for commuting to central areas and therefore more cross-river movements (Steer Davies Gleave 2012).

6.5 Potential Significant Effects

- 6.5.1 Permanent land take related to the Scheme will be minimal and confined to small areas of currently safeguarded land on both sides of the Thames. Impacts on land take and subsequently land use are not anticipated to be significant but will be confirmed in the environmental assessment.
- 6.5.2 At present the land uses in the immediate vicinity of the Scheme mainly comprise derelict land and industrial premises. Proposals for future development within the Greenwich Peninsula and Newham in particular will lead to a significant increase in population in these areas. The design for the Scheme will need to be considered in conjunction with the plans for construction of the areas of allocated development, particularly the Greenwich Peninsula Masterplan. Should the northern boundary of the Masterplan shift northwards there is potential for severance to impact upon the development.
- 6.5.3 It is not currently expected that there will be any loss of open space as a result of the Scheme.
- 6.5.4 The safeguarded area encompasses some areas of industrial buildings on both the northern and southern sides of the River Thames. However, from initial site plans it is anticipated that the actual footprint of the Scheme will not impact upon these buildings. It is not currently proposed to demolish any existing properties as part of the Scheme although this will be confirmed as the design progresses. There will however, be a need to demolish and replace the existing footbridge which crosses the Blackwall Tunnel Approach in the vicinity of Boord Street (location highlighted on Drawing 6.1).
- 6.5.5 There is the potential for levels of community severance to be reduced as a result of improved traffic movement and reduced congestion. In the event of community land (defined by DMRB as any land used by the public for recreation or which may have conservation, landscape or other heritage value) being lost to the Scheme this would need to be replaced.
- 6.5.6 Other potential improvements relate to accessibility – making jobs more accessible for local people and encouraging business growth and development. The River Crossings Development Study (Atkins 2014) estimates changes in accessibility to jobs within a defined study area and identifies that areas south of the river stand to gain the most in terms of additional access to jobs with a river crossing in place at Silvertown. For example Woolwich town centre could experience a 95.7% increase in accessibility as the result of a Silvertown crossing. In other areas the figure is also high (Thamesmead (72.5%), New Charlton (60.8%) and North Greenwich (59.7%)).
- 6.5.7 Based on the information available to date, the potential significant effects that could arise from construction and operation of the proposals are summarised in Table 6-3.

Table 6-3 Community and Private Assets Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	<p>Disruption to local businesses and residents by virtue of Tunnel construction (for example noise etc as covered elsewhere in this report but also restrictions imposed by the HSE during the construction phase on operators of hazardous sites)</p> <p>The footbridge that currently crosses the Blackwall Tunnel Approach Road in the vicinity of Boord Street will need to be demolished. Replacement of the footbridge will be provided.</p> <p>There may be disruption to users of the Thames Path during construction</p>	Local residents, businesses and visitors to the area	<p>Communication with local businesses regarding Scheme progression, mitigation as described under specific topics elsewhere in this report and within the CEMP.</p> <p>Replacement of the demolished footbridge.</p> <p>Clear signage provided for any temporary diversions necessary.</p>
Permanent Impacts	<p>Improvements in accessibility to jobs and employment and for local businesses.</p> <p>Levels of community severance could</p>	<p>Local residents, businesses and visitors to the area</p> <p>Local residents, businesses and</p>	

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
	be reduced as a result of improved traffic movement and reduced congestion.	visitors to the area	
Cumulative Impacts	There may be scope for cumulative impacts arising from changing land uses occurring as part of the wider regeneration of the area.	Local residents, businesses and visitors to the area	Possible mitigation/enhancement measures to be explored following identification of cumulative impacts.

6.6 Further Assessment Work to Be Undertaken

6.6.1 Further assessment work to be undertaken in relation to the Community and Private Assets topic includes:

- A review of planning applications within 500m of the two tunnel portals will be undertaken comprising interrogation of London Borough planning databases together with liaison with planning officers. Applications will be considered over a five year period (applications from before this time will be discounted since they would either have been implemented and therefore form part of the current baseline or planning permission would have lapsed). The assessment will exclude householder applications and those for change of use/enforcement related applications. For each application we will identify its location, application reference, a brief description of the proposal and an assessment of the impact of the Scheme on the proposal.
- The data gathered in relation to future development uses will need to feed into the air quality and noise assessments in order to enable the effects on these receptors to be understood.
- Impacts of off-site materials disposal on agricultural land will be considered.

6.6.2 The key elements of the assessment work in relation to Community and Private Assets will be:

- Identify demolition of any private property and associated land-take.
- Assess any community land that will be lost which would comprise the confirmation of any land take from land used by the public including open space.

- Assess whether there will be any land-take for the Scheme from areas which have been allocated for development.
- Identify whether the Scheme will cause community severance i.e. the separation of residents from facilities and services they use.
- Further assessment and updating as necessary of socio-economic current and future baseline, including analysis of likely benefits of the Scheme for local businesses.

7 Cultural Heritage

7.1 Introduction

7.1.1 This chapter assesses the likely impacts of the Scheme on cultural heritage receptors with predefined study areas centred on the application site. The cultural heritage baseline has been established via consultation, desk-based studies and a site walk-over survey. The chapter identifies key receptors and provides a high-level assessment of potential impacts. Whilst outline mitigation measures are discussed, the chapter does not offer detailed mitigation strategies as these will be developed at a later stage.

7.2 Regulatory and Policy Framework

7.2.1 The environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 7-1 below.

Table 7-1 Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
Planning (Listed Buildings and Conservation Areas) Act 1990	This Act applies special protection to buildings and areas that are considered to be of special architectural and / or historic interest.
Ancient Monuments and Archaeological Areas Act 1979	This Act gives statutory protection to any structure, building or area of archaeological remains that is considered to be of particular historic and / or archaeological interest.
National Planning Policy Framework (NPPF) 2012	The NPPF sets out Government planning policies for England and how these policies are expected to be applied. Section 12 of the NPPF 'Conserving and enhancing the historic environment' contains policies relating to the conservation of heritage assets.
Newham 2027 Newham's Local Plan – the Core Strategy 2012	Sets out planning policy at a borough level. The document contains policies relating to the proper treatment of the historic environment within the planning system and defines Archaeological Priority Areas within the borough, where special consideration must be given in relation to archaeology. The Core Strategy sets out Newham's planning policy at borough level and contains policies relating to the protection of heritage assets.
Royal Borough of Greenwich Local Development Framework 2013	Sets out planning policy at a borough level. The document contains policies relating to the proper treatment of the historic environment within the planning system and defines Area of High Archaeological Potential within the borough, where special consideration must be given to archaeology.
Institute for Archaeologists, Code of Conduct 2013	The code promotes 'those standards of conduct and self-discipline required of members of the institute in the interests of the public and in pursuit of the study and care of the physical evidence of the human past'.

Policy/Legislation	Summary of Requirements
Institute for Archaeologists, Standard and guidance for commissioning work on, or providing consultancy advice, archaeology and the historic environment 2013	The guidance requires member of the institute to provide advice that is 'clear, compliant, impartial, informed and robust and should be proportionate to a thoroughly researched and clearly reasoned assessment of the known or potential significance of the heritage assets concerned.' The guidance also states that the advisor should be 'suitably qualified, skilled and competent.'
Institute for Archaeologists, Standard and guidance for historic environment desk-based assessment 2012	The guidance seeks to define good practice for the execution and reporting of desk-based assessments, which can be taken to include the production of cultural heritage elements of EIAs.
English Heritage, The Setting of Heritage Assets 2011	The guidance provides advice on managing change within the setting of heritage assets, including archaeological remains and historic buildings

7.3 Assessment Work Undertaken to Date

7.3.1 As part of this assessment, consultation on the Scheme and potential sources of information was undertaken with the Greater London Archaeological Advisory Service (GLAAS) advisors for Newham and Greenwich. GLAAS responded with information on the results of archaeological investigations that were not yet in the public domain.

7.3.2 Two study areas have been adopted for the purposes of this assessment. The first encompasses an area extending 1km from the application site and includes all designated heritage assets (World Heritage Sites, scheduled monuments, listed buildings, conservation areas, registered parks and gardens and registered battlefields). The second encompasses an area extending 500m from the application site and includes undesignated assets (records held by the Greater London Historic Environment Record and other sites identified from an analysis of historic mapping and during the walk-over survey).

7.3.3 The following sources of information were consulted during this assessment:

- English Heritage National Heritage List for England
- Greater London Historic Environment Service
- London Archaeological Archives and research Centre
- Museum of London Archaeology Service
- Ordnance Survey and other historic mapping

7.3.4 A walk-over survey of the environs of the application site was undertaken in good weather conditions on 15 May 2014. The object of the survey was to:

- Assess the current ground conditions within the application site
- Identify evidence and / or potential for the survival of buried archaeological remains within the application site
- Identify any unknown above ground heritage assets not recorded elsewhere
- Identify any areas where previous modern activities may already have impacted upon known and / or potential heritage assets
- Consider the potential impact of the proposed development upon built and buried heritage assets within the study area

7.4 The Existing Environment

7.4.1 This section presents a summary of the key heritage assets identified followed by a chronological description of the baseline environment with regard to cultural heritage identified during the assessment. Each identified heritage asset has been given an identifying number, which is given in brackets in the text below. A gazetteer of identified heritage assets can be found in Appendix 7A and their locations are shown on Drawing 7.1.

7.4.2 The following timescales are referred to in this assessment:

Prehistoric

Palaeolithic: 450,000 BP -10,000 BP

Mesolithic: 10,000 BP - 6,000 BP

Neolithic: 4,000BC (6,000BP)-2,000 BC

Bronze Age: 2,000-600 BC

Iron Age: 800 BC-AD 43

Historic

Roman: AD 43-410

Saxon (early-medieval): AD 410-1066

Medieval: AD 1066-1485

Post-medieval: AD 1485-1901

Modern: AD 1901-present

7.4.3 No World Heritage Sites or scheduled monuments have been identified within the application site or the 1km study area. No listed buildings have been identified within the application site itself, although 22 Grade II listed buildings lie within the 1km study area. On the north side of the Thames, the application site and the majority of the study areas lie within the Newham Archaeological Priority Area as designated by Newham Borough Council. On the south side of

the river, the application site and the study areas lie with the Greenwich Peninsula and Foreshore Area of High Archaeological Potential as designated by Greenwich Borough Council.

- 7.4.4 The earliest evidence for human occupation within the study area lies within the sub-surface deposits relating to the evolution of the Thames and its tributary the River Lea. Geoarchaeological analysis of borehole samples taken in advance of the construction of the Emirates Airline, adjacent to the application site, identified the presence of peat and alluvial clay sequences spanning the Mesolithic, Neolithic and Bronze Age periods. Whilst no direct evidence of human activity was found within these samples, prehistoric artefacts dating from the Palaeolithic onwards have been identified with the general area.
- 7.4.5 A Neolithic worked flint quarry was recovered from a deposit of peat within a test pit during geoarchaeological investigations on the Greenwich Peninsula, adjacent to the application site (28). The peat, which was located circa 4m below ground level, was found to be overlain by a deposit of alluvium that had accumulated from the Iron Age onwards (29).
- 7.4.6 The peat is thought to have formed over former grassy open Mesolithic land surfaces that sloped down towards the Thames with potential for evidence of activity during that period. Rising river levels during the Neolithic and Bronze Age periods led to the accumulation of deposits of peat over these land surfaces, which were in turn overlain by alluvium during subsequent rises in river level during the Iron Age and Roman periods.
- 7.4.7 Based on the available evidence, it is likely that extensive deposits of peat dating to the Mesolithic to Bronze Age periods extend beneath the application site on both sides of the Thames, overlain by alluvium and made ground. The peat deposits have potential to provide information on the past environment of the area as well as more direct evidence of early human activity. As the peat provides an environment conducive to the survival of organic remains, a wide range of artefacts and ecofacts may be preserved including wood and textiles. Interspersed with these deposits, there may be remnants of Mesolithic and Neolithic period land surfaces.
- 7.4.8 There are no heritage assets dating to the Roman period within the application site or study areas. Geoarchaeological investigations suggest that the application site and study areas would have consisted of mudflats and saltmarsh during the Iron Age and marshy meadowlands during the Roman period. Both the Thames and the Lea would have been fished and used for transport during these periods, as evidenced at other locations along the rivers and there may be some potential for Iron Age and Roman period archaeological remains to be present within the application site and study areas.
- 7.4.9 Archaeological evidence for the Saxon period is rare for the London area as a whole and none has been identified within the application site of study areas. The evidence that does survive across Greater London suggests a continuity of settlement from the Roman period and as such, there may be some potential for Saxon period archaeological remains to be present within the application site and study areas.

- 7.4.10 The medieval manor of Covelees (25), first recorded in AD 1248 is known to have been located circa 500m to the North West of the application site. Flood defences (27) are known to have been located in that area since the 12th century and it is possible that the putative causeway (27) also dates to this period, although it is equally possible that it may be of later date. The available evidence suggests that there is some potential for further medieval period archaeological remains to be present within the application site and study areas.
- 7.4.11 Mapping of the Greater London area began during the post-medieval period. The earliest map to show the application site and study area in any detail is Rocque's map of 1762, which shows the application site and study areas either side of the Thames as agricultural fields. One heritage asset dating to the 18th century was identified within the 500m study area, the location of an incomplete whale skeleton (30) identified during an archaeological watching brief on dredging operations approximately 500m west of the application site. The orientation of the whale suggested that it had been dragged onto the foreshore rather than becoming beached. Other examples of whale skeletons from the Thames are known and it is thought that they were caught in the Thames estuary before being hauled upriver.
- 7.4.12 Although later in date, one other heritage asset relating to whaling has been identified within the 1km study area. The Grade II listed Enderby House (8), was constructed during the early to mid-19th century for the whaling firm of Samuel Enderby, whose flagship Hermann Melville describes in 'Moby Dick'. Enderby House is located approximately 750m to the south of the application site.
- 7.4.13 A number of the other listed buildings and structures identified within the 1km study area during this assessment date to the early 19th century, the period which saw the beginning of the development of the area from agricultural fields to London's urban periphery. The Grade II listed row of eight cottages at 70-84 Riverway (11), located approximately 750m south east of the application site, was constructed in 1801 for workers at the adjacent tidal mill and chemical works, neither of which survive. The cottages were listed as they represent the earliest surviving residential development on the Greenwich Peninsula and represent a rare example of Georgian artisanal housing.
- 7.4.14 The Grade II listed houses at 1-7 Coldharbour were constructed in the early 19th century approximately 1km west of the application site and consist of a group of three listed structures (1, 2 and 3). Adjacent to this group are a further three Grade II listed buildings: 15 Coldharbour (4), constructed in 1843-44 as a workshop with living accommodation above; Blackwall River Police Station (5), constructed in 1894 to designs by John Butler and thought to be the earliest purpose built River Police Station; and the 19th century public house The Gun (6). To the south of this group, approximately 750m to the south west of the application site is the Grade II listed Millwall Wharf range of riverfront warehouses, constructed around 1879.
- 7.4.15 As can be seen from historic Ordnance Survey mapping, the southern side of the study area remained largely open toward the end of the 19th century, with some industrial development, whilst the northern side was occupied by open

ground, industrial development and areas of docks and associated development. Residential development was increasing at the southern and northern margins of the 1km study area. Two places of worship constructed to serve the increasing population during the later 19th century were identified. The Grade II listed Church of St Luke (13) was constructed in 1873-75 to designs by by Giles and Gane, approximately 600m north of the application site, whilst the Grade II listed Rothbury House (9), was constructed as a Congregational chapel in 1893-94 to design by TW Holland, approximately 1km south of the application site.

- 7.4.16 The development of the docks and associated infrastructure within the study areas began in the 19th century and a number of heritage assets associated with this development were identified within the 1km study area. The earliest is the Grade II listed Blackwall pier and entrance lock to the East India Dock Basin (13), constructed around 1803 and located approximately 800m to the North West of the application site. To the east of Blackwall pier are the Grade II listed Trinity House Buoy Wharf and Orchard Dry Dock (14) and Trinity House Chain Locker and Lighthouse Block (15), both of which were constructed around 1860. The wharf and dry dock were constructed to serve Trinity House lightships and the block constructed as a chain locker and workshop. Both are located approximately 600m to the north of the assessment site.
- 7.4.17 The Royal Victoria Dock, the western end of which is located approximately 100m to the east of the application site, opened in 1855. It was considered to be the largest dock in the world and was specifically designed to accommodate large steam ships. Two mid-19th century Grade II listed buildings are associated with the docks, Warehouse W (19) and Warehouse K (20), both of which are located approximately 750m north east of the application site. Also associated with the docks, but dating to the modern period, are the group of 14 Grade II listed Stothert and Pitt cranes (18) constructed between the 1920s and 1960s and the Grade II listed Silo D, a grain silo constructed in 1920. The cranes are located approximately 400m to 800m to the east and north east of the application site, whilst the silo is located approximately 1km to the east of the application site.
- 7.4.18 Lying immediately to the east of the application site is the Grade II listed entrance to the Blackwall Tunnel (10), constructed during the mid-1890s, a few years prior to the tunnel opening in 1897, to designs by T Blashill. Also associated with the tunnel is the Grade II listed ventilation shaft constructed in 1964-67 to designs by Terry Farrell and located approximately 500m North West of the application site.
- 7.4.19 In addition to the cranes, grain silo and ventilation shaft, three further modern period heritage assets were identified during this assessment. Tunnel Avenue (Morden Wharf) grain silos (31) were constructed for the Tunnel Glucose Company's works between the 1930s and 1970s, approximately 500m south of the application site. The Grade II listed Chapel of St George and St Helena (17) was constructed as a chapel to a former mission settlement in 1929-30 by Geoffrey Raymond, approximately 1km north of the application site; and the Grade II listed Silvertown War memorial was constructed around 1920, approximately 1km to the east of the assessment site.

The site walk-over survey did not identify any further heritage assets, although it was not possible to inspect the entirety of the river embankment or foreshore within the study areas. Modern day construction activities at each end of the application site, particularly construction of the flyover to the north and the residential and associated development to the south on the Greenwich Peninsula may have resulted in negative impacts on any sub-surface archaeological remains that may exist. These developments may also have also impacted on the settings of any design assets within the vicinity.

7.5 Potential Significant Effects

- 7.5.1 Excavations associated with construction of the Scheme and associated working areas could impact potential sub surface archaeological remains particularly land surfaces and peat deposits dating from the Mesolithic to Bronze age periods. There is also a possibility of relatively shallow post-medieval remains relating to industrial development.
- 7.5.2 No designated heritage assets are considered to be at risk of direct adverse impacts from the Scheme. Of the 21 designated assets identified, all of which are Grade II listed buildings or structures, the majority are not considered to be at risk of indirect negative impacts via changes to their setting due to their distance from the scheme or a lack of inter-visibility between them and the Scheme. Of the three listed buildings that are close enough to the Scheme to be considered at risk of indirect negative impacts, their settings are already heavily compromised by previous development and as such are not considered to be at risk of further indirect negative impacts: the Blackwall Tunnel entrance (10) is surrounded by signage, height restriction barriers, cameras and other transport infrastructure; 70-84 Riverway (11) sits in isolation, and only the river remains to inform its setting; and the Blackwall Tunnel ventilation shaft (12) is partly subsumed within the O2 Arena.
- 7.5.3 The likely potential for archaeological remains could be further understood by field surveys and if necessary mitigated by carrying out archaeological excavations in advance of development and watching briefs during construction.
- 7.5.4 Based on the information available to date, the potential significant effects that could arise from construction and operation of the proposals are set out in Table 7-2.

Table 7-2 Cultural Heritage Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	Excavations associated with the set-up of working areas at either end of the Scheme	Potential sub-surface archaeological remains that may exist within the working areas,	Potential could be better understood by field evaluation and if necessary any impacts mitigated by a

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
		particularly relatively shallow post-medieval remains relating to industrial development.	programme of further archaeological works such as archaeological excavations in advance of construction and watching briefs during construction
Permanent Impacts	Excavations associated with the Scheme, particularly for the cut and cover sections and launch / reception chambers at either end of the scheme	Potential sub-surface archaeological remains that may exist within these areas, particularly land surfaces and peat deposits dating from the Mesolithic to Bronze Age periods. May also include Iron Age to medieval remains and relatively shallow post-medieval remains relating to industrial development	Potential could be better understood by field evaluation and surveys of the foreshore. Impacts could be mitigated by a programme of further archaeological works such as archaeological excavations in advance of construction and watching briefs during construction
Cumulative Impacts	None anticipated	None anticipated	None anticipated

7.6 Further Assessment Work to be Undertaken

- 7.6.1 A number of archaeological investigations, including geoarchaeological studies have recently been undertaken in the vicinity of the application site, the results of which were not available during this assessment. Any further information that becomes available will be included within the PEIR and the ES.
- 7.6.2 A detailed impact assessment will be undertaken as part of the ES in accordance with the 'Code of Conduct and Standards Guidance for Archaeological Desk Based Assessments' and the methodology set out in DMRB Volume II Section 3, HA208/07 Cultural Heritage. Further discussion will take place with English Heritage and other relevant consultees to agree the detailed methodology including the need for any intrusive investigative work.

Measures to mitigate impacts on identified and potential cultural heritage assets will be developed in liaison with the project design team and project stakeholders, as part of the iterative EIA and design process.

8 Ecology and Nature Conservation

8.1 Introduction

8.1.1 This chapter assesses the impacts of the Scheme on Ecology and Nature Conservation. Ecological receptors are identified and assessed within a zone of influence that includes the Scheme area. The ecological baseline is established through desk studies and appropriate survey work. Surveys include an extended Phase 1 Habitat Survey and specific surveys for terrestrial invertebrates, reptiles, black redstarts and roosting bats.

8.2 Regulatory and Policy Framework

8.2.1 The environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 8-1 below.

Table 8-1 Ecology and Nature Conservation Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
The Conservation of Habitats and Species Regulations 2010	This legislation constitutes the UK Government's implementation of the Habitats Directive in England and Wales. The Regulations provide for the designation of both Special Protection Areas (SPAs) (first established under the Birds Directive, 1979) and Special Areas for Conservation (SACs) as part of the Natura 2000 network of protected areas across the European Union.
The Wildlife and Countryside Act (1981), as amended	<p>The Wildlife and Countryside Act (1981) and subsequent amendments, also amended and strengthened by the Countryside and Rights of Way Act (2000), is the principal legislative mechanism for the protection of wildlife in Great Britain. The Act established a statutory framework for the protection of wildlife. It provides for the designation of Sites of Special Scientific Interest (SSSI), which are selected as the best national examples of habitat types, sites with notable species and sites of geological importance.</p> <p>Schedules 1-4 of the Wildlife and Countryside Act (and amendments) deal with the protection of wild birds. Schedule 5 of the Act details protection of other animal species including great crested newts and bats. Full protection is given under Section 9 of the Act to certain animals listed on Schedule 5. Partial protection under Section 9 is given to certain other species, including all common species of reptile and EPS (which receive the majority of their protection under the Conservation of Habitats and Species Regulations 2010 (see above)). Schedule 6 of the Act which outlaws certain methods of taking or killing animals, where necessary. Schedule 8 of</p>

Policy/Legislation	Summary of Requirements
	<p>the Wildlife and Countryside Act details protection for plants and fungi.</p> <p>Schedule 9 of the Act lists those non-native invasive plant species that should not be knowingly spread in the wild including Japanese Knotweed (<i>Fallopia japonica</i>) and Giant Hogweed (<i>Heracleum mantegazzianum</i>).</p>
The Countryside and Rights of Way Act (2000)	The Countryside and Rights of Way Act (2000) gives greater protection to SSSIs and strengthens wildlife enforcement legislation by the introduction of the offence of 'reckless disturbance'. The Act also required Government Departments to have regard to biodiversity and conservation; Section 74 of the Act requires lists of habitats and species of principal importance to be produced, for which conservation steps should be taken or promoted. The requirement to prepare such lists of habitats and species has been extended by the Natural Environment and Rural Communities (NERC) Act 2006 (see below).
Natural Environment and Rural Communities (NERC) Act (2006)	The NERC Act places a duty upon public bodies to consider enhancement of biodiversity within all of their actions. In addition, this Act provides for those species and habitats identified under Section 41 of the Act to be considered as biodiversity conservation priorities. The species identified as conservation priorities which are of potential relevance to the survey area include slow-worm <i>Anguis fragilis</i> , common lizard <i>Lacerta vivipara</i> , starling <i>Sturnus vulgaris</i> and soprano pipistrelle <i>Pipistrellus pygmaeus</i> . Of the habitats that have been recorded within the survey area in 2014 the unmanaged grassland and areas of ruderals would be classified as Section 41 (NERC Act) habitats: Open mosaic habitats on previously developed land.
Protection of Badgers Act (1992)	Badgers are extensively protected by the Protection of Badgers Act (1992) which consolidates the legislation specific to badgers. The Act makes it an offence to wilfully take, kill, injure or ill-treat a badger; to obstruct, destroy, or damage in any part, a badger's sett; or to disturb badgers within a sett.
National Planning Policy Framework (NPPF) 2012	The NPPF section 11 provides guidance on how the planning system should protect and enhance nature conservation interests. A key function of the NPPF is to promote a presumption in favour of sustainable development including contributing to protecting and enhancing our natural environment.
England's Biodiversity Strategy (August 2011)	The document entitled 'Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services' sets out England's Biodiversity Strategy. Its aim is to halt the loss of biodiversity, support healthy well-functioning ecosystems and establish coherent ecological networks. It takes a strategic landscape scale approach to conservation on both the land

Policy/Legislation	Summary of Requirements
	<p>and at sea. It identifies the need to establish Local Nature Partnerships to deliver the Strategy through community involvement. It supports the establishment of Nature Improvement Areas, measures to increase the number of SSSI in favourable conservation status and the creation of a network of Marine Protection Areas. It also recognises that improvement and protection of the natural environment are part of the planning system and identifies that biodiversity offsetting will be piloted to deliver planning policy more effectively. It promotes flood and erosion management to conserve the natural environment and improve biodiversity. Whilst the survey area is not within a Nature Improvement Area there will be opportunities for the Scheme to contribute to the ecological function of the River Thames which provides an ecological network at the landscape scale. There are opportunities to enhance the biodiversity value of the survey area and adjacent habitats.</p>
<p>Draft National Policy Statement (NPS) for National Networks (2013)</p>	<p>The NPS sets out the Government's vision and policy for the future development of nationally significant infrastructure projects on the national road and rail networks. It reiterates the application of the Government's guidance on Biodiversity as set out under Biodiversity 2020: A Strategy for England's wildlife and ecosystem services for such projects. This includes guidance for decision making in relation to important sites and protected and notable species and habitats. Guidance relating to appropriate mitigation is also given including opportunities of biodiversity offsetting, and enhancements which are above and beyond statutory requirements for mitigation.</p>
<p>The Mayor's Biodiversity Strategy - Connecting with London's nature (2002)</p>	<p>The Mayor's Biodiversity Strategy aims to protect and enhance the natural habitats of London together with their variety of species. The Strategy sets out the Mayor's vision for the future, identifying the key issues and providing innovative solutions. It demonstrates how London's biodiversity can be maintained as a crucial part of a sustainable world city. The strategy takes account of local Biodiversity Action Plans. Its relevance to the Scheme will be its influence on the planning decisions that are made in relation to the incorporation of mitigation and enhancement measures.</p>
<p>London Biodiversity Partnership Biodiversity Action Plan</p>	<p>A number of habitats and species are listed by the plan for which targets have been set to increase their range and distribution in London. Several such species are relevant to the site, including black redstart and bumblebees.</p>
<p>Newham's Biodiversity Resource: Evidence Base For The Local Development Framework (May 2010)</p>	<p>This is the Biodiversity Action Plan for the London Borough of Newham. The action plan lists a number of habitats and species within Newham for which targets have been set to increase their range and distribution. Several such species are relevant to the site, including bees (as a group) and butterflies (as a group).</p>

Policy/Legislation	Summary of Requirements
Greenwich Biodiversity Action Plan (March 2010)	The Greenwich Biodiversity Action Plan (BAP) aims to achieve the targets relevant to the Royal Borough of Greenwich identified in both the UK and London BAP. The action plan lists a number of habitats and species within Greenwich for which targets have been set to increase their range and distribution. Species listed that are relevant to the site include black redstart.
London Borough of Newham Unitary Development Plan (2012) Policy EQ10	The Policy states: “ <i>Development proposals on sites of nature conservation importance listed in appendix EQ2 should include an ecological statement outlining compensatory mitigation measures to: a) conserve existing wildlife habitats and features of nature conservation interest; and b) take into account national and local biodiversity action plan priorities. The relocation of species or recreation of habitats will only be considered in exceptional circumstances where the reasons for the proposal clearly outweigh the nature conservation value of the site. The council’s priority is to conserve existing features/species as part of any development scheme (please refer to Policy EQ11 below). The relocation, replacement or recreation of existing protected individual species of flora/fauna or entire habitats will only be considered in exceptional circumstances, such as when this is necessary by reason of overriding public interest or where the proposed development will bring benefits of primary importance to the environment.</i> ”
Royal Borough of Greenwich Unitary Development Plan (2012) Policy D3	<p>The Policy states: <i>Development proposals will be expected to take account of Ecological factors as well as display a high standard of landscaping, in particular paying attention to the needs for:</i></p> <ul style="list-style-type: none"> <i>i. The regard for the biodiversity and geological features of the site and the surrounding area, including protected species (See Policy O22). These features should be respected and the area’s natural character enhanced.</i> <i>ii. A survey of flora and fauna on sites of defined ecological importance and on sites over 1 hectare to enable decisions to be made regarding their conservation.</i> <i>iii. An appropriate level of survey to enable decisions to be made about the existing trees on the site. Development decisions will be based on the requirement:</i> <ul style="list-style-type: none"> <i>a. To protect trees and their root systems from damage as a result of the development both during and after building operations;</i> <i>b. To achieve an appropriate replacement of trees taking account of size, coverage and species where it is agreed that existing trees can be felled;</i>

Policy/Legislation	Summary of Requirements
	<p><i>c. That landscaping schemes should include environmentally appropriate planting using locally native species and demonstrate appropriate irrigation plans for landscaping.</i></p> <p><i>d. To ensure that planting design does not impact negatively on personal safety and accessibility.</i></p> <p><i>iv. The retention of trees and the protection and enhancement of natural and ecological features, tree ridge lines, green corridors, wildlife habitats, boundary walls, surface materials, hedges and other features where these will contribute to the development.</i></p> <p><i>v. The protection and enhancement of natural river features and corridors by appropriate landscaping and design. (See Policy O21)</i></p>

8.3 Assessment Work Undertaken to Date

Consultation

- 8.3.1 Consultation has been undertaken with Natural England, the Environment Agency, the London Wildlife Trust and the ecologists of the London Boroughs of Greenwich, Tower Hamlets and Newham. The purpose of the consultation has been to agree ecological survey requirements, the assessment methodology to be used (including the mitigation measures proposed), and to obtain records of any important habitats and species in the study area.

Study Area

- 8.3.2 The CIEEM 'Guidelines for Ecological Impact Assessment' (2006) require the assessment to be focussed on 'zones of influence' specific to individual habitats or species. Therefore, whilst the majority of impacts will be experienced directly as a result of land take within the application boundary (i.e. habitat loss), indirect effects could be experienced further afield.
- 8.3.3 The maximum extent of the 'zone of influence' does not currently extend further than 2km from the boundary of the Scheme. This has been determined appropriate (by professional judgement) due to the nature of the proposals, whereby impacts will be largely within the site itself and the likely receptors, which again are largely within the site boundaries.
- 8.3.4 It is currently considered unlikely that impacts on water quality will result from the Scheme that could affect important freshwater or estuarine habitats downstream of the works. The study area does not therefore include the River Thames and Tidal Tributaries SINC or the aquatic elements of the Greenwich Peninsula Ecology Park, Bow Creek Ecology Park, East India Dock Basin and the Royal Docks where these fall beyond 2km from the Scheme.

8.3.5 Similarly, the extended Phase 1 Habitat Survey determined that the extent of suitable habitat for wading birds was very limited and already subject to much visual and noise disturbance and therefore the study area for this group is not set beyond the Scheme boundary at the current time.

Baseline Information Obtained/Surveys Undertaken

8.3.6 A desk study has been undertaken to determine likely ecological issues associated with the Scheme.

8.3.7 This has included:

- A review of aerial photographs to identify valuable habitats such as mudflats and ponds close to or within the Scheme boundary;
- A web based review for the Scheme area and surrounding area up to a distance of 2km from the boundary of the Scheme. The Multi-Agency Geographical Information System (MAGIC) website (www.magic.gov.uk) was used to search for statutory designated sites of nature conservation value within 2km of the site. In addition, the Local Biodiversity Action Plan (LBAP) for London (London Biodiversity Partnership BAP) for Newham (Newham Biodiversity Action Plan) and for Greenwich (Greenwich Biodiversity Action Plan) were reviewed with reference to the potential value of habitats and species present, or likely to be present, within or adjacent to the site;
- Greenspace Information for Greater London (GiGL) were asked to supply information on non-statutory sites, protected species and species of conservation concern within 2km of the site;
- The review of a tunnel engineering report commissioned by the Applicant (Mott MacDonald, July 2013) along with a highway design report (Atkins, April 2013), as both include some ecological baseline analysis.

8.3.8 The following field surveys were undertaken within the application site (Silvertown and Greenwich) between 2013 and 2014. The methodology for each of these surveys is presented below.

- Extended Phase 1 Habitat Survey of the application site (Silvertown and Greenwich).
- Targeted reptile surveys at selected locations within the application site (Silvertown and Greenwich).
- Targeted black redstart surveys within the application site (Silvertown and Greenwich).
- Dusk emergence bat survey at a selected location (Silvertown).
- Targeted terrestrial invertebrate surveys at selected locations within the application site (Silvertown and Greenwich).

8.3.9 An extended Phase 1 Habitat Survey (JNCC, 2010) was undertaken in November 2013 and March 2014. This comprised a walkover search of the site to identify any habitats likely to be of conservation value, and to investigate the presence (or likely presence) of protected species of plants and/or animals.

Target Notes of important ecological features are shown on the Phase 1 Habitat Survey Plans (Drawings 8.3 and 8.4) and descriptions are provided in Appendix 8A to this report.

- 8.3.10 The extended Phase 1 Habitat Survey confirmed the potential for the site to support notable invertebrates, birds including nesting and foraging black redstarts, roosting and foraging bats and common species of reptiles. Very little exposed mud was present adjacent to the Scheme area at low tide. Wading birds were not therefore considered to be present in significant numbers and are not therefore considered a significant ecological receptor.
- 8.3.11 The presence of reptiles was investigated by the placing of artificial refuges (sheets of roofing felt, approximately 1x1m) at 10m intervals in selected locations within the application site (Silvertown and Greenwich). The refuges were placed at a density of at least 10 per hectare, following the guidance of Reptile Survey Methods (English Nature Science Series 27, 1996).
- 8.3.12 Twenty refuges were placed adjacent to the DLR line, north of Scarab Close, Silvertown, in suitable habitat at the edge of Bramble scrub and within tall ruderal herbs. Ten refuges were placed on a road verge adjacent to Blackwell Tunnel Approach/A102 in suitable habitat which was comprised of unmanaged grassland. At Silvertown these refuges were checked in suitable weather conditions on six occasions between May and mid-July 2014. A seventh survey at Silvertown is planned to take place before the end of September. At Greenwich these refuges were checked in suitable weather conditions on three occasions throughout May 2014. A June visit to Greenwich revealed that the vegetation along the road verge adjacent to Blackwell Tunnel Approach/A102 had been cut to a uniform sward height of approximately 10cm, rendering this location unsuitable for use by reptiles. Therefore, no additional surveys were undertaken at Greenwich in June 2014.
- 8.3.13 Due to the time of year, reptile tin checks were carried out early in the mornings when any reptiles present were likely to be basking. On each occasion, surveyors also searched for basking reptiles whilst moving between the artificial refuges.
- 8.3.14 Targeted black redstart surveys were undertaken which followed the methodology of Gilbert *et al.* (1998). This stipulates that five survey visits are undertaken during the breeding season (mid-April to late-June). Each survey was undertaken for a duration of at least three hours during favourable weather conditions and commenced one hour before dawn, to coincide with the time when male black redstarts typically sing. These surveys were intended to identify black redstart breeding territories and locate nesting sites (if present).
- 8.3.15 The entire application site at Silvertown was considered suitable for use by breeding black redstarts. Suitable black redstart breeding habitat at Greenwich was confined to the gas works structure and O2 Arena and therefore, survey effort was concentrated at these selected locations. During each survey, a predetermined route was walked at Silvertown and the selected locations at Greenwich, alternating the direction of the route on each visit to ensure that surveyors were not always starting and ending at the same location. Transects were walked slowly, taking time to stop and listen for singing birds or to observe

any suspected sightings through binoculars. Any black redstarts heard or seen were further investigated to ascertain their precise location.

- 8.3.16 A dusk emergence bat survey was undertaken in suitable weather conditions on 12th May 2014 at ASD Metals, Silvertown. Features suitable for use by roosting bats had been previously identified, these being: crevices in the brick work and fascia boarding on the south-west and south-east side of the main building on the site. The survey was undertaken by two experienced bat surveyors using broadband (time expansion) bat detectors, allowing bat calls to be recorded for subsequent identification. Surveyors were in place half an hour before sunset, remaining until it was too dark to determine whether bats were emerging from the building (by this time any bats present are likely to have emerged).
- 8.3.17 Targeted terrestrial invertebrate surveys, which have included sweep-netting and suction sampling were undertaken in targeted locations at Silvertown and Greenwich.
- 8.3.18 Details regarding the timings of the extended Phase 1 Habitat Survey and targeted surveys for terrestrial invertebrates, reptiles, black redstarts and roosting bats are provided in Table 8-2.

Table 8-2 Timings of ecology surveys undertaken within the application site (Silvertown and Greenwich)

Survey	Date	
	Silvertown	Greenwich
Extended Phase 1 Habitat Survey	6 November 2013	
	17 March 2014	
Terrestrial Invertebrates	28 June 2014	
	4 July 2014	
	25 July 2014	
Reptiles	8 May 2014	
	15 May 2014	
	29 May 2014	
	30 May 2014	N/A
	12 June 2014	
	24 June 2014	
Black Redstarts	24 April 2014	
	8 May 2014	

	30 May 2014	
	12 June 2014	
	24 June 2014	
Roosting Bats	12 May 2014	N/A

8.3.19 Given that the tunnel is to be created using a Tunnel Boring Machine (TBM) at a depth of at least 6m underneath the riverbed, it is not considered that detailed surveys for fish or other features of the River Thames are necessary at this stage. This includes the bryozoan trembling sea-mat (*Victorella pavida*) and the mollusc lagoon sea slug (*Tenellia adspersa*), both of which receive full protection under the Wildlife and Countryside Act 1981 (as amended). As the design progresses, the potential impacts from the likely vibration of the TBM will be considered within the noise and vibration topic.

8.3.20 The Environment Agency’s Scoping Opinion states “We do not anticipate that fish will be affected by this proposal. Any impacts to fish during construction have been removed through the choice to progress the long bored option, which involves no marine works. We do not envisage vibrations from the boring machine will have an impact on fish. Therefore, we accept the scoping out of fish surveys”.

Valuing the Ecological Receptors

8.3.21 Ecological receptors will be valued in accordance with the methodology laid down in the CIEEM Guidelines. Ecological receptors are valued on the basis of a combination of their rarity, status and distribution. Habitats and plant communities are measured against existing selection criteria, wherever possible. The geographic frame of reference presented in Table 8-3 will be used to classify the nature conservation value of ecological receptors.

Table 8-3 Valuing ecological receptors

Level of Value	Examples
International	<p>An internationally designated site (SPA, pSPA, SAC, Ramsar site, Biogenetic Reserve).</p> <p>A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</p> <p>Any regularly occurring population of an internationally important species, which is threatened or rare in the UK (i.e. it is a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK) or of uncertain conservation status or of global conservation concern in the UK BAP.</p> <p>A regularly occurring, nationally significant population of any internationally important species during a critical phase of its life cycle.</p>

Level of Value	Examples
National	<p>A nationally designated site (SSSI, ASSI, NNR, Marine Nature Reserve) or a discrete area which meets the published selection criteria for national designation (e.g. SSSI selection guidelines).</p> <p>A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole.</p> <p>Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP).</p> <p>A regularly occurring, regionally or county significant number of a nationally important species during a critical phase of its life cycle.</p>
County	<p>Viable areas of key habitat identified in the County BAP or smaller areas of such habitat which are essential to maintain the viability of a larger whole;</p> <p>Viable areas of key habitat identified as being of county value in the appropriate Natural Area Profile (or equivalent);</p> <p>Any regularly occurring population of a nationally important species which is not threatened or rare in the county (see local BAP).</p> <p>Any county occurring, locally significant population of a species listed as being nationally scarce (i.e. it occurs in 16-100 10km squares in the UK) or in a county BAP or relevant Natural Area (or equivalent) on account of its county rarity or localisation;</p> <p>A regularly occurring, locally significant number of a County "red data book" or BAP species, designated on account of its County rarity or localisation;</p> <p>A regularly occurring, locally significant number of a County important species during a critical phase of its life cycle.</p>
District/Borough	<p>Semi-natural ancient woodland smaller than 0.25 ha;</p> <p>Areas of habitat identified in a sub-County (District/Borough) BAP or in the relevant Natural Area Profile (or equivalent);</p> <p>Sites/features that are scarce within the District/Borough or which appreciably enrich the District/Borough habitat resource;</p> <p>A diverse and/or ecologically valuable hedgerow network;</p> <p>A population of a species that is listed in a District/Borough BAP because of its rarity in the locality or in the relevant Natural Area (or equivalent) because of its regional rarity or localisation;</p> <p>A regularly occurring, locally significant number of a District/Borough important species during a critical phase of its life cycle.</p>
Parish/ Neighbourhood	<p>Areas of habitat or populations/communities of species considered to appreciably enrich the habitat resource within the context of the parish or neighbourhood, e.g. species-rich hedgerows.</p>

Limitations to establishment of the baseline

- 8.3.22 A few areas limited in size could not be accessed fully and were therefore surveyed from beyond boundary fences. These included an area of hardstanding in Greenwich and a grassed bank surrounding a sludge lagoon at Silvertown. The latter site was also deemed too dangerous to survey due to the presence of deep liquid silt below a steep bank. In both instances these areas

could be adequately viewed from adjacent land and lack of access is therefore not anticipated to affect the outcome of their assessment.

8.4 The Existing Environment

8.4.1 The site is not situated within or immediately adjacent to any international or national designated sites for nature conservation. Whilst the tunnelling report identified that the Scheme lies within 2km of one Geological Site of Scientific Interest (SSSI), one Local Nature Reserve (LNR) and 27 non-statutory Sites of Importance for Nature Conservation (SINC), none of these sites will be directly affected. These sites have been mapped on Drawings 8.1 and 8.2. The closest of these sites to the Scheme are as follows:

- The River Thames and Tidal Tributaries SINC (this includes the areas of mudflat within the study area, under which the tunnel would be bored) is directly adjacent to the Scheme at Silvertown.
- Greenwich Ecology Park and Southern Park SINC (an area of freshwater habitat with native tree planting and wildflower meadows approximately 0.5km south east of the southern part of the application site).
- Bow Creek Ecology Park SINC (an area of created wetlands which include ponds, reedbeds and ditches approximately 0.8km north west of the northern part of the application site).
- East India Dock Basin SINC (an area of mud and saltmarsh habitat approximately 0.5km west of the northern part of the application site).
- Royal Docks SINC (an area of open water linked to the River Thames and its tidal creeks, located approximately 0.2km east of the northern part of the application site).

8.4.2 None of these sites will be directly affected, and indirect effects (e.g. through disturbance of birds using the mudflats or impacts on local water quality) on receptors from the Scheme are not currently thought to be significant. This will be confirmed through the continuing EIA process. GIGL held a large number of records for notable plant species (including nationally scarce species and local species of conservation concern) within 2km of the application site. The closest of which included Creeping Willow (*Salix repens*), Sea-Buckthorn (*Hippophae rhamnoides*), Golden Dock (*Rumex maritimus*), Meadow Crane's-bill (*Geranium pratense*) and Common Cudweed (*Filago vulgaris*), all of which are listed as local species of conservation concern. Common Cudweed could occur within the habitats recorded at Silvertown. Overall, the Phase 1 Habitat Surveys confirmed that the application site is comprised of relatively poor habitat. The habitats are illustrated on the Phase 1 Habitat Survey Plan (see Drawing 8.3 and 8.4), which also shows the location of Target Notes (see Appendix 8A).

8.4.3 The area required for the construction of the southern (Greenwich) end of the Scheme is largely comprised of paved areas, including the Blackwall Tunnel Approach to the west, Millennium Way to the east, the Gasometer site to the south and an industrial site to the north. However, it does include an area of derelict land that appears to be heavily overgrown with a mixture of small trees and scrub. This is one of the only patches of such habitat on the Greenwich Peninsula, and has been identified on Natural England's website as 'deciduous

woodland', a Biodiversity Action Plan (BAP) habitat. Woodland is also listed as a London, Greenwich and Newham BAP Priority Habitat.

- 8.4.4 The northern part of the Scheme area (located on the border between Tower Hamlets and Newham) was dominated by industrial infrastructure of limited nature conservation importance, although there were small areas of semi-natural habitat within the application boundary. One comprised a triangle of scrubby woodland adjacent to the DLR (within the boundaries of the cement works) whilst the other (a larger triangle of land at the northern end of the application site, west of the A1020 roundabout, and also bounded to the west by the railway) comprised a derelict post-industrial area of bare ground, ephemeral vegetation/grassland and scrub. A settling pond for silt and a channel connecting the pond to the River Thames was located within the industrial area. This supported a dense growth of Common Reed (*Phragmites australis*). The pond is an isolated feature and choked with deep silt. Standing water is listed as a London, Greenwich and Newham BAP Priority Habitat.
- 8.4.5 The Scheme at Silvertown is directly adjacent to the River Thames. The boundary of the Scheme with the River Thames at Silvertown was represented by sheet piling, wharfs and walls. There is no saltmarsh vegetation in the study area; however there is a small amount of exposed mud at low tide. Rivers are listed as London, Greenwich and Newham BAP Priority Habitats
- 8.4.6 GiGL held a number of records for invasive plant species located within 2km of the application site, these included Montbretia (*Crocasmia x crocosmiiflora*), Giant Hogweed (*Heracleum mantegazzianum*), Himalayan Balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*), Floating Pennywort (*Hydrocotyle ranunculoides*), Three-cornered Garlic (*Allium triquetrum*), Rhododendron (*Rhododendron ponticum*) and Contoneaster (*Cotoneaster horizontalis*). The extended Phase 1 Habitat Surveys confirmed that there were areas of Japanese Knotweed within the application site (Greenwich and Silvertown).
- 8.4.7 GiGL held a number of notable invertebrate records within 2km of the application site including, wall (*Lasiommata megera*), stag beetle (*Lucanus cervus*) and ear moth (*Amphipoea oculea*). Stag beetles are listed as a London, Greenwich and Newham BAP Priority Species. However, none of these records was located within 0.5km of the application site. The extended Phase 1 Habitat Surveys confirmed that there were areas of suitable habitat for notable invertebrates (Silvertown). The laboratory analysis of the samples gathered during the terrestrial invertebrate surveys (Silvertown and Greenwich) was ongoing at the time of the issue of this report.
- 8.4.8 GiGL held one common toad (*Bufo bufo*) record located 1.6km from the application site and one slow-worm (*Anguis fragilis*) record located 1.8km from the application site. Amphibians are listed as a Newham BAP Priority Species and reptiles are listed as London and Newham BAP Priority Species. The extended Phase 1 Habitat Surveys confirmed that the application site supports habitat suitable for use by common species of reptiles (Greenwich and Silvertown), but was not considered suitable for use by amphibians. However, no reptiles were seen during the course of the targeted reptile surveys (Silvertown and Greenwich).

- 8.4.9 GiGL held a number of records for red-listed bird species, typical of urban and wetland habitats, located within 2km of the application site including lapwing (*Vanellus vanellus*), dunlin (*Calidris alpina*), yellow-legged gull (*Larus michahellis*), starling (*Sturnus vulgaris*) and lesser spotted woodpecker (*Dendrocopos minor*). The extended Phase 1 Habitat Surveys confirmed that the application site (Greenwich and Silvertown) supports habitat suitable for use by nesting birds. The small amount of intertidal mud recorded along the River Thames at Silvertown is considered suitable for wading birds. It is considered unlikely that the Scheme would cause any significant disturbance to wading birds as the area of mud appeared to be very limited and the current baseline situation included considerable industrial activity, boat and vehicle movements adjacent to the river in this location. GiGL held a large number of confidential black redstart (*Phoenicurus ochruros*) records located within 2km of the application site. Black redstarts are listed as a London and Greenwich BAP Priority Species. Both the River Thames and tidal tributaries and East India Dock Basin SINC are known to support foraging black redstarts. Habitat beyond Dock Road in Silvertown and around the gas holders at Greenwich is considered suitable for foraging and nesting black redstart. However, no black redstarts were seen/heard during the course of the targeted black redstart surveys (Silvertown and Greenwich).
- 8.4.10 GiGL held a number of bat species records within 2km of the application site including, Daubenton's bat (*Myotis daubentonii*), Noctule bat (*Nyctalus noctula*) and soprano pipistrelle (*Pipistrellus pygmaeus*). However, none of these records was located within 0.5km of the application site. Bats are listed as London, Greenwich and Newham BAP Priority Species. The application site (Silvertown and Greenwich) supports habitats suitable for use by commuting and foraging bats and in the case of Silvertown, habitat suitable for use by roosting bats. However, no bats were observed emerging from the brick building at ASD Metals (Silvertown) during the emergence survey. Indeed no bats were seen or heard during the survey.
- 8.4.11 No UK BAP Priority Species are recorded during the terrestrial invertebrates' surveys. The inventory includes two Red Data Book species (Toadflax Brocade Moth *Calophasia lunula* and the Ground Bug *Stictopleurus punctatonevrosus*), though both of these have become widespread and common since the designation was applied. In addition, some 17 of the recorded species during the surveys in 2014 are Nationally Scarce.

8.5 Potential Significant Effects

- 8.5.1 Potential impacts that could arise would be temporary disturbance of habitats during the construction period. Noise and visual disturbance and pollution from runoff could potentially impact on foraging and nesting birds and the River Thames Site of Importance for Nature Conservation. Mitigation would be implemented to ensure that construction (site clearance) in these areas is undertaken outside of nesting season, work sites are visually screened and runoff is prevented.

8.5.2 Permanent impacts would be in the form of loss of existing habitat for birds, invertebrates and reptiles through land take. If species are impacted as a result of unavoidable land take, suitable replacement habitat would be created.

8.5.3 Based on the information available to date, the potential significant effects that could arise from construction and operation of the Scheme are set out in Table 8-4.

Table 8-4 Ecology and Nature Conservation Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	Disturbance during construction at the site level	Foraging and nesting birds (including black redstart)	Construction undertaken outside of the nesting season where possible.
	Visual and noise disturbance during construction beyond that currently experienced	River Thames SINC	Visual screening of operations from the river. Noise limits set in CEMP.
	Pollution during construction	River Thames SINC	Measures to be stated in CEMP to prevent run off during construction.
Permanent Impacts	Loss of existing habitat at the site level	Foraging and nesting birds (including black redstart).	Habitat creation targeting important species at a scale equivalent to or exceeding that lost. Creation of brownfield foraging habitats for black redstart. Creation of hard landscaping suitable for nesting black redstart.
	Loss of existing habitat at the site level	Notable terrestrial invertebrates.	Avoidance of the loss of important invertebrate habitat wherever possible. Creation of diverse brownfield habitats targeted for notable invertebrates discovered during survey.
	Loss of existing habitat at the site level	Common species of reptile.	Creation of scrub/unmanaged grassland mosaics for reptiles. Retention of populations of reptiles on site wherever possible.

8.6 Further Work to Be Undertaken

- 8.6.1 The protected species surveys have all proved negative and therefore further survey or licensing will not be required for these species. This includes the need for mitigation licences for any European Protected Species (EPS) such as bats.
- 8.6.2 Consideration will be given to the effects of the scheme on Epping Forest Special Area of Conservation (SAC) located approximately 4.5m to the north of the Scheme, specifically considering if reduced air quality is likely to result from the scheme and an appropriate level of assessment would then be undertaken if required.
- 8.6.3 The CIEEM Guidelines, in combination with DMRB Volume 11 Section 2, Part 5, Volume 11 Section 3 Part 4 (Highways Agency, 1993), and Interim Advice Note 130/10 (Highways Agency, 2010), will form the basis of the ecological assessment methodology once the ecological baseline has been established following the completion of the surveys listed above.

9 Effects on all Travellers

9.1 Introduction

9.1.1 An Introductory Transport Assessment has been prepared for the project in line with current guidance, namely Department for Transport (2007) Guidance on Transport Assessment and Transport for London (2010) Transport assessment best practice guidance document. This Chapter summarises the findings of that Introductory Transport Assessment, and sets out the potential effects of the Silvertown Tunnel on vehicle travellers, cyclists and pedestrians.

9.2 Regulatory and Policy Framework

9.2.1 This section sets out the framework of national, regional and local plans and policies that have informed the development of, and will be considered when a decision is made on, plans for a new river crossing at Silvertown.

Table 9-1 Effects on all Travellers Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
Draft National Policy Statement (NPS) for National Networks	<p>The NPS sets out the Government's vision and policy for the future development of NSIPs on the national road and rail networks. It gives guidance for promoters of NSIPs, and provides the primary basis for the examination of those projects by the Examining Authority and decisions by the Secretary of State. The NPS explicitly notes at paragraph 2.23 that new links that cross a river or estuary (such as the Silvertown Tunnel), may be needed to increase capacity and connectivity to meet the needs created by economic and demographic growth.</p> <p>The NPS contains the following statement in Section 2 setting out the Government's vision and strategic objectives for nationally significant networks:</p> <p><i>'The Government will deliver national networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system. This means:</i></p> <p><i>Networks with the capacity and connectivity to support national and local economic activity and facilitate growth and create jobs</i></p> <p><i>Networks which support and improve journey quality, reliability and safety</i></p> <p><i>Networks which support the delivery of environmental goals and the move to a low carbon economy</i></p> <p><i>Networks which join up our communities and link effectively to each other'</i></p>
London Plan (2011)	<p>Section 6 of the London Plan is focused on transport and the need for additional east London river crossings as set out in Policy 6.1 (Strategic Approach). This states that the Mayor will work with all relevant partners to encourage the closer integration of transport and development through schemes and proposals including 'new and enhanced road vehicle river crossing(s) in east London</p>

Policy/Legislation	Summary of Requirements
	(package of measures)' – described as a 'programme of works under development to improve cross-Thames links in east London'.
Mayor's Transport Strategy (2010)	<p>The six goals the MTS seeks to achieve are:</p> <ol style="list-style-type: none"> 1. To support economic development and population growth 2. Enhance the quality of life for all Londoners 3. Improve the safety and security of all Londoners 4. Improve transport opportunities for all Londoners 5. Reduce transport's contribution to climate change, and improve its resilience 6. Support delivery of the London 2012 Olympic and Paralympic Games and its legacy <p>Overall, the implementation of the Strategy would see the increase in public transport and cycling usage of recent years continue, along with a corresponding decrease in car mode share across London. As with the London Plan, the MTS identifies a clear need to progress a package of river crossings for east London, to help deliver growth and to meet its overall objectives. The London Plan notes both the need to address the existing problems with the current infrastructure as well as the need to plan for the substantial growth anticipated for the surrounding area.</p>
East and South East London Sub-Regional Transport Plan (2014)	<p>Section 2.2.7 of the plan highlights the barrier effect of the river Thames and the problems caused by current poor levels of cross river connectivity and capacity in East London. It goes on to highlight the Silvertown Tunnel crossing as a future opportunity as part of the proposed river crossings package</p> <p>Section 2.3.1 of the plan provides an overview of network issues and potential solutions to these issues. It includes a review of the current congestion issues on the southern approach to the Blackwall Tunnel in the AM peak and mentions the need to consider additional cross river capacity potentially with measures to restrain demand.</p>
Local Plans and Policies	<p>The London Plan and the MTS provide the statutory framework for London boroughs to develop their own local plans. The local plans and other policy documents of the Royal Borough of Greenwich, London Borough of Newham, London Borough of Tower Hamlets and adjoining boroughs have been reviewed and relevant policies have been taken into account.</p>

9.3 The Existing Environment

9.3.1 This section presents the existing transport and movement networks in the vicinity of the Scheme. For a more detailed analysis of the cross-river transport flows, existing volumes of cross-river movements by all modes please refer to Introductory Transport Assessment (October 2014).

Local Pedestrian Network

- 9.3.2 There are a limited number of pedestrian cross-river links in east London. The dedicated foot tunnels at Greenwich and Woolwich, built in the early years of the twentieth century, have recently been refurbished by Greenwich Council. The Rotherhithe tunnel is also open to pedestrians but in practice constitutes a very uninviting walking environment and is only used by a handful of pedestrians each day. TfL has explored the potential for additional fixed pedestrian crossing links. The Emirates Air Line, which opened in 2012 provides an additional cross-river shuttle service between North Greenwich and Royal Victoria. Pedestrians can also use other public transport links in the area to cross the river (Overground, Jubilee Line, and DLR) or the Woolwich ferry.
- 9.3.3 The pedestrian network in the study area is expected to change significantly before the proposed tunnel opening year as a result of several major developments. The Greenwich Peninsula Masterplan and the Greenwich Peninsula West Masterplan highlight the continuing phases of development on the peninsula. The latter document is of particular significance to the Scheme due to the need to coordinate planning of pedestrian access over the A102 Blackwall Tunnel Approach. Adjacent to the northern Blackwall tunnel portal, London Borough of Tower Hamlets has granted outline planning permission to the Blackwall Reach development, which will re-configure the local movement network in this area. There are also a number of major developments planned that will alter the nature of the local movement network around Silvertown.

Cycling network

- 9.3.4 The current cycling network in the vicinity of the Scheme includes several designated cycle routes. Cycle Superhighway 3 is a well-used commuter route, which follows the A13 before cutting south to Naval Row, crossing Cotton Street and continuing along Poplar High Street towards Limehouse. An equivalent Cycle Superhighway 4 route is planned to broadly follow the A206 between Woolwich and Greenwich to the south of the Greenwich Peninsula. The Thames Path, in particular on the eastern side of Greenwich Peninsula, is a very popular leisure cycle route. National Cycle Network route 1, which also forms part of European EuroVelo route network, crosses the Thames at the Greenwich foot tunnel.
- 9.3.5 Cross-river cycling links in east London are more constrained than pedestrian links. Cyclists have slightly fewer public transport options, due to restrictions on the carriage of (non-folded) cycles on the Jubilee line at all times and DLR at peak times. Cyclists can use the foot tunnels (but must do so on foot) and Woolwich Ferry free of charge. Cycles may also be carried on the Emirates Air Line, which provides an important link for the Greenwich peninsula as neither cyclists nor pedestrians can use the Blackwall tunnel.

Public Transport Network

- 9.3.6 There has been a period of sustained investment in public transport capacity across the whole of east London over the past 20 years and this will continue with the introduction of Crossrail services from 2018. Prior to 1999 there was only one rail crossing of the River Thames in east London in the form of London

Underground's East London line, which provided only a local shuttle from New Cross to Shoreditch.

9.3.7 Since 1999, new cross-river rail links have been provided on these routes:

- Jubilee line (opened 1999, and subsequently enhanced with more frequent and longer trains)
- Docklands Light Railway (extended to Greenwich and Lewisham in 1999, and subsequently enhanced with longer trains, and to Woolwich in 2009)
- High Speed 1, which started operating frequent high speed trains between Kent and east London in 2009
- London Underground's East London line was transferred to the London Overground network, with new services to a much wider range of destinations from 2010, and further services from 2012
- Crossrail, now under construction and which will provide a new high frequency cross-river link to Woolwich from 2018.

9.3.8 The additional rail capacity will see total public transport cross-river capacity rise to 60,000 northbound passengers in the AM peak hour, and further capacity enhancements could be achieved through provision of additional and/or longer trains.

9.3.9 In terms of station access, the proposed southern Silvertown tunnel portal is located close to the North Greenwich public transport interchange, and the proposed northern Silvertown tunnel portal is located close to the site safeguarded for a potential Thames Wharf DLR station.

9.3.10 London's existing cross-river bus network reflects the limited highway crossing provision to the east of Tower Bridge. Overall there are comprehensive networks of services on either side of the river in east and south east London, but these networks operate largely independently of one another.

9.3.11 The Introductory Transport Assessment provides details of all standard bus routes in Greater London which at some points cross the River Thames. There are 47 bus routes which cross the river west of Vauxhall Bridge, and only a single route (the 108) crossing the river east of Tower Bridge (using Blackwall Tunnel). The assessment highlights the notable disparity in cross-river bus provision in cross-river bus routes between east and west London, which is a consequence of the very limited number of cross-river road connections.

9.3.12 Route 108 is a 24-hour service scheduled to operate around every 10 minutes during the day between Stratford and Lewisham via the Blackwall Tunnel. This service can suffer from significant disruption when the Blackwall Tunnel is closed. Bus connections are available at both ends of the foot tunnel and ferry at Woolwich, and via stations with cross-river services.

9.3.13 The Blackwall Tunnel carries a large number of commuter coaches between Kent and central London in peak hours. The peak movement is northbound in the AM peak with 59 coaches scheduled to cross the Blackwall tunnel between 07:30 and 08:30 (TfL, 2014).

Road network

- 9.3.14 Silvertown Crossing Assessment of Needs and Options (October 2014) refers to the strategic highway network in east and south east London. The Introductory Transport Assessment illustrates the difference in the availability of road crossings of the Thames in east and west London, from the edge of the Central London Congestion Charging zone to the M25.
- 9.3.15 The Rotherhithe and Blackwall Tunnels and the Woolwich ferry are included in the Transport for London Road Network (TLRN). However, in terms of use by longer-distance traffic and high volumes, the only current 'strategic' cross-river highway link in east London is the Blackwall Tunnel.
- 9.3.16 The Blackwall Tunnel passes under the River Thames between the Greenwich Peninsula and Blackwall, approximately three miles east of Tower Bridge. It forms a primary route link (the A102) between the A2 to the south (which connects to the A205 South Circular) and the A12 / A13 to the north (which connects to the A406 North Circular).
- 9.3.17 The Blackwall Tunnel comprises twin bored tunnels carrying two lanes of traffic northbound and two lanes southbound. The northbound tunnel was constructed first, opening in 1897 and has a slightly smaller diameter than the southbound tunnel which opened in 1967, as it was originally designed with horse-drawn traffic in mind.

Cross-river highway capacity

- 9.3.18 The Introductory Transport Assessment provides details of the approximate capacity and morning peak demand on the three river crossings in the study area. The actual capacity varies both within and between days due to fluctuations in vehicle flow volumes, speeds and vehicle mix, so this is a guideline only.
- 9.3.19 Blackwall Tunnel has the greatest capacity with an estimated throughput of 3,236 PCUs/hr northbound and 3,842 PCUs/hr southbound. The tunnel's maximum capacity in the northbound (peak) direction in the AM peak hour has been reached. Analysis of northbound peak hour congestion shows that delays of around 20 minutes are the norm, and that full use of the available tunnel capacity is not made under these constrained operating conditions.
- 9.3.20 The highway capacity issues are compounded for freight operators by the restrictions on use of certain types of heavy goods vehicles. An implication of the restrictions on the use of the Rotherhithe and Blackwall Tunnels and the Woolwich ferry by large vehicles is that vehicles with origins or destinations in east and south east London may need to take very lengthy diversionary routes, possibly on inappropriate roads, in order to cross the River Thames. The maximum height for commercial vehicles is 4m on Blackwall Tunnel northbound, 4.7m on Blackwall Tunnel southbound), and 4.4m on Rotherhithe Tunnel.
- 9.3.21 The London Lorry Control Scheme represents a further impediment for some road traffic in restricting Heavy Goods Vehicles (HGVs) to a network of main

roads for the majority of their trip during the night time to limit noise impacts. During scheme operating hours, the Blackwall Tunnel is the only permitted river crossing route between Richmond and the Dartford Crossing (a crow-flies distance of some 22 km).

9.4 Potential Significant Effects

- 9.4.1 Beneficial impacts are identified with regard to improved journey times for freight, servicing and business travel, car drivers, coach and bus passengers. Other benefits of the Scheme include improved resilience and reliability of the river crossing for all road users.
- 9.4.2 Minor temporary route diversions during construction are likely to occur along the off-street cycle route linking the Lower Lea Crossing and Tidal Basin Road around the south of roundabout. Cycle access to Dock Road from the roundabout will be closed. The alternative cycle access routes are via the Silvertown Way and North Woolwich Road, or alternatively via The Crystal and through a shared path tunnel under Silvertown Way. The pedestrian routes to Dock Road and along Millennium Way are anticipated to be diverted during construction. The existing Boord Street footbridge will be demolished as part of the works however a replacement bridge will be provided.
- 9.4.3 Mitigation measures include appropriate signage of alternative pedestrian and cycle access routes. Coordinated information campaign will be undertaken targeting the affected routes, stations and stops. User charging on both Silvertown and Blackwall Tunnels is being proposed as a way to manage traffic levels and prevent congestion on the surrounding network as a result of the new crossing.
- 9.4.4 Table 9-2 presents a summary of the potential significant effects during construction and operation.

Table 9-2 Effects on all Travellers Potential Significant Effects

	Impact Description	Receptors affected	Possible Mitigation / Enhancement Measures
Temporary (Construction) Impacts	<p>Pedestrian routes around the Tidal Basin roundabout will remain open, although there may be minor temporary route diversions.</p> <p>Pedestrian access to Dock Road from the roundabout will be closed. The alternative pedestrian route is along the Silvertown Way roundabout slip road and down a stairwell. The nearest step-free access route would be via The Crystal and through a shared path tunnel under Silvertown Way.</p> <p>The pedestrian route along Millennium Way will be closed. The</p>	Pedestrians	<p>Signage of alternative pedestrian and cycle access routes between the Tidal Basin roundabout and Dock Road (via The Crystal).</p> <p>Signage of alternative pedestrian and cycle access routes around the works site (Millennium Way and Boord Street footbridge); Active management of</p>

	Impact Description	Receptors affected	Possible Mitigation / Enhancement Measures
	<p>exact pedestrian diversion routes have not yet been determined but a potential alternative route into North Greenwich station and the O2 via West Parkside is only marginally longer and is a safe and comfortable walking route. The existing Boord Street footbridge over the Blackwall Approach will be demolished as part of the works and replaced with either a temporary structure or a permanent replacement footbridge.</p> <p>The pedestrian route along the Thames Path will be unaffected by the works. Pedestrian access to properties on the closed section of Tunnel Avenue may be restricted at times and engagement with the affected businesses will be required to ensure business continuity.</p>		<p>access arrangements to Tunnel Avenue during the construction phase where access will be severely restricted.</p> <p>Construction Management Plans (CMPs) will be produced for the works sites at the northern and southern portals.</p> <p>The Boord footbridge will be replaced with either a temporary structure or a permanent replacement footbridge.</p>
	<p>Minor temporary route diversions along the off-street cycle route linking the Lower Lea Crossing and Tidal Basin Road around the south of roundabout. Cycle access to Dock Road from the roundabout will be closed. The alternative cycle access routes are via the Silvertown Way and North Woolwich Road, or alternatively via The Crystal and through a shared path tunnel under Silvertown Way.</p> <p>The cycle route along Millennium Way will be closed for the duration of the works. The exact diversion routes are yet to be determined. A potential alternative cycle route into North Greenwich station and the O2 could utilise the existing dedicated cycle track on West Parkside, which is a relatively convenient diversion.</p> <p>The Boord Street footbridge (also used by cyclists) will be demolished. A footbridge will be maintained at or adjacent to this location for the duration of the construction works either in the form of permanent replacement bridge or a temporary</p>	Cyclists	<p>Signage of alternative pedestrian and cycle access routes between the Tidal Basin roundabout and Dock Road (via The Crystal).</p> <p>Signage of alternative pedestrian and cycle access routes around the works site (Millennium Way and Boord Street footbridge); Active management of access arrangements to Tunnel Avenue during the construction phase where access will be severely restricted.</p> <p>Construction Management Plans (CMPs) will be produced for the works sites at the northern and southern portals.</p>

	Impact Description	Receptors affected	Possible Mitigation / Enhancement Measures
	<p>bridge until the permanent replacement is constructed.</p> <p>The cycle route along the Thames Path will be unaffected by the works. Access to properties on the closed section of Tunnel Avenue will be restricted at times although access to businesses should be guaranteed through the management of pedestrian access points.</p>		
	<p>The Silvertown works will not impact upon the operation of DLR services/Crossrail or the Emirates Air Line.</p> <p>Key public transport access routes will remain open. The Greenwich works will not impact upon the operation of North Greenwich bus station, Jubilee Line station or the Emirates Air Line. However, there will be some diversions to existing bus routes (see Introductory Transport Assessment for details)</p>	Public Transport users	Coordinated information campaign targeting the affected routes, stations and stops.
	<p>River transport is likely to be used to minimise the number of heavy vehicle movements on the local road network.</p> <p>The Silvertown works site will require a larger number of lorry movements due to large working areas. The vehicular access point to this works site will be via the current alignment of Dock Road from the Tidal Basin roundabout, shared with access to Scarab Close/Thames Wharf. The Construction Management Plan will include HGV routes from the strategic road network to the site. The principal HGV route from the A13 and A12 to the site should be via Leamouth Road and the Lower Lea Crossing. The estimate of lorry movements does not relate to workforce access. The construction workforce will be discouraged from travelling by car by means of a Site Travel Plan.</p> <p>There will be no access to properties via Dock Road from the Tidal Basin</p>	Road network users	<p>HGV drivers will be advised to avoid Canning Town to minimise the impact on residential areas and to avoid Silvertown Way, which does not offer a direct route into the Tidal Basin roundabout.</p> <p>If detailed traffic routeings of vehicles analysis shows increases in through-traffic using local residential streets, a range of localised traffic management and traffic calming measures can be employed to mitigate these impacts.</p> <p>Construction Management Plans (CMPs) will be prepared for both sites</p>

	Impact Description	Receptors affected	Possible Mitigation / Enhancement Measures
	<p>roundabout for the majority of the construction works since the main tunnel portal works site will be located here. The eastern access to Dock Road from North Woolwich Road will be maintained at all times. Access to Scarab Close/Thames Wharf from the Tidal Basin roundabout will also be maintained to properties that are not affected by the works site.</p> <p>Edmund Halley Way and a section of Millennium Way will be closed for a period during the construction works to enable cut and cover section of the tunnel to be constructed.</p>		<p>(Silvertown and Greenwich). The construction workforce will be discouraged from travelling by car by means of a Site Travel Plan.</p> <p>The exact diversion routes during the closure of Edmund Halley Way and a section of Millennium way are yet to be determined and efforts will be made to minimise disruption to highways users. However, a temporary diversion route to provide access between the north section of Millennium Way, the bus station and West Parkside would be designed to cater for likely traffic type and demand.</p>
	<p>The river will likely be used to transport construction materials and waste. The mooring of barges at Thames Wharf is not expected to have a direct operational impact on other river barge or passenger services at any of the nearby piers. This report does not look at navigational issues or preliminary risk assessment for navigation, and separate assessments will be required as plans for the river operations are drawn up.</p>	River network users	
Operational Phase/ Permanent Impacts	Beneficial impact - the Silvertown Tunnel will provide a river crossing that is available to all vehicle types, including overheight vehicles.	Overheight vehicles	User charging to regulate demand and ensure reliable journey times.

	Impact Description	Receptors affected	Possible Mitigation / Enhancement Measures
	<p>Beneficial impacts are identified with regard to improved journey times and reliability for servicing and business travel, car drivers, coach and bus passengers.</p> <p>The largest changes in traffic flows are close to the crossings. On the northern side, there are increased flows on the approaches to the new crossing, namely on North Woolwich Road and the Lower Lea Crossing. Conversely, the switching city-bound traffic to the Silvertown crossing alignment is predicted to result in a reduction in traffic accessing the A13 westbound from Blackwall Tunnel.</p> <p>There will be no significant adverse impacts around the northern tunnel portal in Silvertown. The re-configured Tidal Basin roundabout will continue to provide local access to Dock Road. Future access to the Thames Wharf site is also maintained.</p> <p>The impacts to local road access around the southern tunnel portal will be limited. The main change will be that there will no longer be direct access from Tunnel Avenue to the Blackwall Tunnel Approach. Vehicles travelling between businesses on Tunnel Avenue and the Blackwall Tunnel will need to enter the Blackwall Tunnel Approach via Blackwall Lane.</p>	Road users	
	<p>Pedestrian routes around the Tidal Basin roundabout at both portals will be re-instated, including access to Dock Road (closed during construction), future access to Thames Wharf, Millennium Way and Tunnel Avenue.</p>	Pedestrians	
	<p>The exact design of cycling facilities at the Tidal Basin roundabout has not yet been confirmed. However, it is assumed that the current off-street cycle tracks will be maintained, with appropriate crossing facilities</p>	Cyclists	

	Impact Description	Receptors affected	Possible Mitigation / Enhancement Measures
	<p>provided in line with current good practice.</p> <p>The cycling routes affected by construction at the southern portal, namely Millennium Way and Tunnel Avenue will be re-instated as through-routes. The Boord Street crossing will be re-instated.</p>		
	<p>No impacts on the operation of the Jubilee Line, Docklands Light Railway or Emirates Airline services. The tunnel portals do not have a material impact on the pedestrian access routes to nearby stations. Access routes to a potential new DLR station at Thames Wharf are maintained.</p> <p>Bus service enhancements, potential new cross-river bus service (or extension of existing route 108).</p>	Public transport users	
Cumulative Impacts	<p>No material impacts are identified for underground, Emirates Airline and DLR passengers, pedestrians, cyclists, and river transport users.</p> <p>Improved journey times for freight, bus and coach passengers, car drivers.</p>	All users	User charging to regulate demand and ensure reliable journey times

9.5 Further Assessment Work to be Undertaken

- 9.5.1 The road layout at either of the tunnel portals is designed to link into the existing network and maintain local access routes wherever possible. Work is continuing to investigate localised traffic issues in greater detail using micro-simulation traffic modelling. This will identify any localised congestion issues and potential mitigation measures.
- 9.5.2 Work is continuing to understand the detailed traffic routings of vehicles accessing the Blackwall and Silvertown Tunnels. Once this work is completed, a more detailed assessment of the streets and junctions that will experience higher or lower volumes of traffic will be produced.
- 9.5.3 The exact design of cycling facilities at the Tidal Basin roundabout has not yet been confirmed. However, it is assumed that the current off-street cycle tracks will be maintained, with appropriate crossing facilities provided in line with current good practice. Work is continuing to understand the detailed traffic routings of vehicles accessing the Blackwall and Silvertown Tunnels. This

work will investigate the likely effect of the Silvertown Tunnel upon key cycling routes in the area and how adverse impacts, if any, might be mitigated.

10 Geology and Soils

10.1 Introduction

10.1.1 This chapter relates to the proposed development of a new road tunnel linking the areas north and south of the Thames between the Greenwich Peninsula and Silvertown, hereinafter referred to as the Silvertown Tunnel (the Scheme). It considers the potential risks to sensitive receptors including geological and soil resources, human health and controlled waters that the Scheme may affect.

10.1.2 This chapter does not include assessment of:

- Effects on agricultural land quality and agricultural soils as the Scheme is located within an entirely urban environment.
- Effects on geological SSSIs as the desk study completed to date has confirmed that there are none which could be affected by the Scheme.
- Geotechnics, a separate geotechnical investigation is being undertaken as part of the Scheme design.
- Dewatering is required for the construction of the tunnel and cutting area of the highway tie-in at both the Greenwich end and Silvertown end of the Scheme. This chapter provides no assessment of the potential impacts to the local hydrogeological regime, of any proposed dewatering during the construction of the Scheme. Environmental information on dewatering is contained within Chapter 14 Water Environment.

10.2 Regulatory and Policy Framework

10.2.1 The environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 10-1 below.

Policy/Legislation	Summary of Requirements
The Environmental Protection Act 1990	<p>The Environmental Protection Act 1990 (EPA) defines, within England and Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment. The Act was intended to strengthen pollution controls and support enforcement with heavier penalties. Before the Act there had been separate environmental regulation of air, water and land pollution and the Act brought in an integrated scheme that would seek the "best practicable environmental option".</p>
Draft National Policy Statement for National Networks (2013)	<p>The draft NPS sets out the value of geological conservation relating to sites that are designated for their geology and/or their geomorphological importance. These include Sites of Special Scientific Interest (SSSI), Marine Conservation Zones (MCZs), and Regional and Local Sites of geological interest.</p> <p>The policy sets out the need to include appropriate mitigation measures as an integral part of their proposed development including identifying where and how they are proposed to be secured. In particular, the applicant should demonstrate that:</p> <ul style="list-style-type: none"> • During construction, they will seek to ensure that activities will be confined to the minimum area required for the works. <p>The Secretary of State will consider what appropriate requirements should be attached to any consent and/or any planning obligations entered into in order to ensure that mitigation measures are delivered.</p> <p>The Secretary of State will take account of what mitigation measures may have been agreed between the applicant and Natural England and/or the MMO, and whether Natural England and/or the MMO has granted or refused, or intends to grant or refuse, and relevant licences, including protected species mitigation licences.</p>
The Statutory Guidance on Part IIA of the Environmental Protection Act 1990 as set out in Defra Circular 01/2006	<p>Part IIA of the Environmental Protection Act 1990 – which was inserted into that Act by section 57 of the Environment Act 1995 – contains a regulatory regime for the identification and remediation of contaminated land. In addition to the requirements contained in the primary legislation, operation of the regime is subject to regulations and statutory guidance.</p> <p>The main objective underlying the introduction of the Part IIA contaminated land regime was to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health or the wider environment, assessed in the context of the current use and circumstances of the land.</p>

Policy/Legislation	Summary of Requirements
National Planning Policy Framework 2012 (NPPF)	<p>The NPPF (paragraphs 120-122) provides guidance on land contamination issues including that local policies and decisions should ensure that as regards new development on a site, the site should be suitable for its new use taking account of ground conditions, pollution arising from previous uses and any proposals for land remediation.</p> <p>Paragraph 120 of the framework states that <i>'To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner'</i>.</p>
Waste Management Regulations 2006	<p>The Waste Management (England and Wales) Regulations 2006 states that excavated material generated by the development of land maybe subject to waste regulatory controls to ensure that waste does not harm human health or the environment.</p>
Water Resources Act 1991	<p>The Water Resources Act 1991 replaced the corresponding sections of the Water Act 1989. The Act sets out the responsibilities of the Environment Agency in relation to water pollution, resource management, flood defence, fisheries, and in some areas, navigation. The Act regulates discharges to controlled waters, namely rivers, estuaries, coastal waters, lakes and groundwaters.</p>
The Environment Agency's Model Procedures for the Management of Land Contamination (Contaminated Land Report 11)	<p>Contaminated Land Report 11 (CLR 11) has been developed to provide the technical framework for applying a risk management process when dealing with land affected by contamination. The process involves identifying, making decisions on, and taking appropriate action to deal with land contamination in a way that is consistent with government policies and legislation within the UK. The document is consistent with the approach presented within the "Guidelines for Environmental Risk Assessment and Management" published by the Department of the Environment, Transport and the Regions, the Environment Agency and the Institute for Environment and Health (2000).</p>
The Environment Agency's Guiding Principles for Land Contamination, dated March 2010	<p>This is a suite of three documents providing generic guidance with the main aim to encourage good practice to promote compliance with regulatory requirements. The report largely focuses on water and waste issues.</p>
Groundwater Regulations 2009	<p>The Groundwater Regulations are an environmental protection measure which complete transposition of the Groundwater Directive (80/68/EEC) and provide enhanced protection for groundwater. Under the Regulations, the Environment Agency has responsibility for the enforcement of the Regulations and decisions of their scope and effect.</p>

Policy/Legislation	Summary of Requirements
Water Framework Directive, 2000	The Directive implements goals to improve water quality (surface water and groundwater) and drives sustainable use of water. Goals are set out in each Water Basin Management Plan.
Environmental Permitting (England & Wales) Regulations 2007	The Environmental Permitting (England and Wales) Regulations were created to standardise environmental permitting and compliance in England and Wales to protect human health and the environment. The regulations largely replace the Environmental Protection Act 1990 on pollution prevention and control and the Waste Management Licensing Regulations 1994 on waste management. The regulations create an environmental permitting system that replaces waste licences and pollution prevention and control permits in England and Wales, without changing the operating conditions already contained in existing permits. The Environment Agency and local councils enforce the regulations in England and Wales.
CL:AIRE The Definition of Waste: Development Industry Code of Practice	<p>This Code of Practice (CoP) provides best practice for the development industry to use when assessing if materials are classified as waste, or not, and determining when treated waste can cease to be waste for a particular use. The CoP provides engineers, contractors, consultants and developers a basis upon which to demonstrate to the Environment Agency that they are following best practice with respect to the use and reuse of materials. It provides an auditable system to demonstrate that the CoP has been adhered to on a site by site basis. The development and use of the CoP is seen as a Better Regulation Approach by the EA.</p> <p>The CoP requires a normal risk assessment based approach (see CLR 11 above) to prove that materials are “suitable for use”. Where materials are not considered to be waste the Environmental Permitting Regulations (2007) need not be applied. Soils requiring treatment to allow their re-use are considered to be waste. Such treatment processes must be undertaken under an appropriate Mobile Treatment Permit. The CoP allows the user to demonstrate when wastes have been fully recovered, via treatment, and hence cease to be waste.</p> <p>The CoP requires regulatory agreement for each stage of the works. This is best achieved via a formal planning consent with appropriate conditions attached to the investigation, assessment and remediation. Approval is effectively obtained by discharge of the planning conditions that require regulatory agreement of:</p> <ul style="list-style-type: none"> ▪ Remediation Strategy. ▪ Remediation Method Statement. ▪ Verification Report.

Policy/Legislation	Summary of Requirements
Environment Agency Pollution Prevention Guidance Notes	<p>The Environment Agency has produced a range of Pollution Prevention Guidance Notes (PPGs) to provide advice on the laws and good environmental practice relevant to a number of industrial sectors and activities. These include the following:</p> <ul style="list-style-type: none"> ▪ PPG1 – General guide to the prevention of pollution ▪ PPG2 – Above ground oil storage tanks ▪ PPG5 – Works and maintenance in or near water ▪ PPG6 – Working at construction and demolition sites ▪ PPG8 – Safe storage and disposal of used oil ▪ PPG13 – Vehicle washing and cleaning ▪ PPG21 – Pollution incident response planning
Control of Substances Hazardous to Health 2002	<p>The Control of Substances Hazardous to Health (COSHH) Regulations, 2002, and subsequent amendments and the Construction and Design Management (CDM) Regulations, 2007, require the developer to ensure that risks to the public and site workers, in relation to the likely presence of contaminated land, are minimised.</p>
The London Plan 2011.	<p>The document states that ‘<i>appropriate measures should be taken to ensure that development on previously contaminated land does not activate or spread contamination</i>’. Local Plans should also encourage the remediation of contaminated sites and set out policy to deal with contamination.</p>
Newham Local Plan	<p>The Newham Local Plan seeks to improve environments through soil improvements and the sustainable remediation of contaminated land. Within the Local Plan Policy EQ49 outlines the requirements for completion of investigative works on a contaminated site and the need for developers to prove that any development satisfies the ‘suitability of use’ criteria of the Environment Act 1995</p> <p>Planning applications for development of a site known or reasonably suspected of being contaminated or containing landfill gas will be required to be accompanied by an assessment of the type and extent of contamination, as well as proposals for any necessary remedial measures required to deal with the hazards, before the application can be determined by the council.</p> <p>Where the council suspects that there may be slight contamination, planning permission may be granted by conditions will be attached to ensure developments will not be permitted to start until a site investigation and assessment has been carried out and that the development itself will need to incorporate all the measures shown in the assessment to be necessary.</p>

Policy/Legislation	Summary of Requirements
Greenwich Peninsula Environmental Method Statement (EMS)	<p>All work on the Greenwich Peninsula that results in ground disturbance is subject to the requirements of the EMS objectives.</p> <p>The primary objectives of the EMS as follows:</p> <ul style="list-style-type: none"> • To ensure compliance with environmental law; • To minimise any health and safety risks associated with the residual contaminants contained with the soils and groundwater on the peninsula; • To ensure that best practice standard is achieved in the design and construction of all development works; • To minimise the environmental impacts and possible migrations of residual contamination; • To minimise any cross boundary migration of contamination between separate development sites; • To ensure that long term solutions to contamination issues are adopted in full consultation with the competent authorities.

10.3 Assessment Work Undertaken to Date

10.3.1 The study area comprises the Scheme footprint including construction compound land and storage areas and an area 500m around the Scheme as shown on Drawing 1.1. Significant effects on geology and soil resources will be limited to the land within the red line boundary, but a wider study area has been considered in view of the contamination potential of the site and the need to consider potential effects on nearby sensitive receptors.

10.3.2 Baseline conditions have been established using the following sources of information:

- Mott MacDonald (May 2013), TfL River Crossings – Ground Investigation Desk Study, Preliminary Sources Study Report.
- Mott MacDonald (June 2013), TfL River Crossings – Phase 1 Contamination Assessment, Silvertown to Greenwich Peninsula. (Envirocheck Report reproduced as Appendix 10A)
- Landmark Information Group: Historical Maps and Environmental Data Pack (taken from the desk study reports)
- Environment Agency (EA):
<https://www.gov.uk/government/organisations/environment-agency>

10.4 The Existing Environment

Geology

- 10.4.1 From the desk study reports, it is suggested that there is a presence of extensive Made Ground to the northeast and southeast of the crossing. Superficial sediments exist around the docklands area comprising of alluvial deposits of the floodplain of the Thames which rests on the flood plain gravels (Thames River Terrace Deposits). These superficial deposits overlie solid geology, which comprises London Clay, the Woolwich, Reading Beds and Upnor Formation of the Lambeth Group, Thanet Sand Formation and the White Chalk. In addition to the above, the presence of Made Ground is also indicated around the perimeter of the Royal Victoria Dock, the Tidal Basin and the former Royal Victoria Dock Western Entrance. Historically Made Ground was placed to raise the ground level above the marshland. Subsequently Made Ground is likely to be associated with the demolition and redevelopment of sites in the area.
- 10.4.2 Within the surface of the London Clay and Lambeth Group, deep drift-filled features, termed 'scour hollows' may be present. These represent localised zones in which the strata vary abruptly from the surrounding geology; these features can have an effect on groundwater flow. A number of these features have been suggested as being present within the application site by Berry (1979). A substantial scour hollow is present on the line of the Blackwall Tunnels, while two additional scour hollows are suggested, one at the mouth of the River Lea, and one near the Butane Store at East Greenwich Gas Works.
- 10.4.3 There are no geological SSSIs that could be affected by the Scheme. The nearest geological SSSI is Gilbert's Pit located over 2km to the east of the Scheme.

Hydrology and Hydrogeology

- 10.4.4 The closest surface water features to the Scheme are the River Thames and the Royal Victoria Dock. A minor river, the River Lea, joins the River Thames adjacent to the northern approaches for the proposed tunnel alignment.
- 10.4.5 The Scheme will be situated within an area in which superficial deposits are designated with Secondary (undifferentiated) aquifer status. This status is assigned '*in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type*'.
- 10.4.6 The bedrock deposits immediately underlying the Scheme are primarily designated as unproductive strata (London Clay), however the Lambeth Group outcrops beneath the southern approaches for the proposed tunnel alignment, which is designated with Secondary A aquifer status. The Thanet Sand and White Chalk are classified as a Principal Aquifer.
- 10.4.7 The Scheme is situated in an area with soils classified as having a high leaching potential according to the groundwater vulnerability map.

- 10.4.8 The proposed tunnel crossing does not lie in close proximity to a source protection zone, or source protection zone borehole. A nitrate vulnerable zone is located, on site, on the north bank of the River Thames.
- 10.4.9 From the desk study reports, groundwater is likely to be encountered as perched water in the Made Ground, with an upper aquifer in the River Terrace Deposits and a lower aquifer in the granular Lambeth Group and underlying Thanet Sands and Chalk. The Lambeth Group is known to be locally permeable and therefore continuity with underlying Thanet Sands cannot be discounted. The groundwater in the upper aquifer is likely to be in continuity with the River Thames.
- 10.4.10 Groundwater abstractions are located at four locations within 500m of the site boundary, however it is not known if water is currently being abstracted.

Site History

- 10.4.11 The northern part of the site at Silvertown was historically occupied by the Royal Victoria Docks and associated wharves and jetties. Historic mapping from 1938 shows the Royal Victoria Dock has since been remodelled and the jetties demolished. During the early 1960s, the Gas Works building overlying the proposed tunnel route was demolished on the western side and a Goods Depot and associated railway tracks are no longer shown.
- 10.4.12 The northern part of the site is currently occupied by a mixture of residential and recreational uses around the perimeter of the Royal Victoria Docks, and light commercial use to the south of the elevated Silvertown Way and the Docklands Light Rail (DLR). Waste management and cement/aggregate/concrete batching facilities dominate to the north and west of the proposed northern tunnel portal.
- 10.4.13 The southern part of the site (Greenwich Peninsula) was historically dominated by the South Metropolitan Gasworks between the 1860s and 1980s. A single gas holder is the only above ground remnant of the facility.
- 10.4.14 The southern part of the site is currently predominantly occupied by car parking (i.e. hardstanding), with the O2 Arena and commercial buildings located to the north west, and a leisure facility to the south east.

Contaminated Land

- 10.4.15 The potential for ground and groundwater contamination within the Scheme area has been considered by the Phase 1 Contamination Assessment undertaken by Mott MacDonald as part of the Ground Investigation Desk Study commission. Overall the site has been given a moderate to high risk rating.
- 10.4.16 The principal contamination sources on the north bank comprise former land uses including rail land (including coal and goods depots), manure works, chemical works, garages and an engineering works as well as those associated with continued use for industrial activities.
- 10.4.17 On the Greenwich Peninsula the principal contamination source relates to the former South Metropolitan Gasworks which dominated this area between the

1860s and 1980s. Site wide remediation of the gasworks was undertaken during the late 1990s by British Gas and English Partnerships. It is understood that key sources of contamination, such as tar tanks and known contamination hot spots, were removed, groundwater remediation was undertaken and near surface soils were removed or cleaned prior to landscaping. However, it is understood that contaminated materials remain beneath much of the site.

- 10.4.18 It is common knowledge that residual contamination from the South Metropolitan Gasworks is still impacting the nearby Blackwall Tunnel today. Tar has been found to seep into the Blackwall tunnel which both degrades materials and blocks gulleys.
- 10.4.19 Asbestos was encountered in 'inert' backfill to the Western Entrance Lock to the Royal Victoria Dock during the ground investigation for the London Cable Car project.
- 10.4.20 There are no sites determined to be Contaminated Land under Part IIA of the Environmental Protection Act 1990 within 250m of the Scheme.

Landfill Sites

- 10.4.21 Historic landfills have been identified on both the northern and southern sides of the Thames. On the northern side of the river the landfill is associated with the infilling of the former Western Entrance lock to the Royal Victoria Dock with inert waste which remains largely unaltered once buried, such as glass, concrete, bricks, tiles, soil and stones. On the southern side of the Thames, landfill is designated in an area adjacent to the south portal of the tunnel crossing. This landfill accepted inert waste as above. Within this zone, south of Edmund Halley Way, there is a registered waste treatment or disposal site. The site has surrendered a completion certificate.

Unexploded Ordnance

- 10.4.22 The Scheme is located within an area of London which is known to have been heavily bombed during the Second World War. A Stage 2/3 detailed Unexploded Ordnance (UXO) Threat Assessment in line with current guidance was undertaken as part of Atkins Report (STWTN-ATK-STU-TUXX-RP-C-0003). The assessment established that in the areas on either side of the River Thames there is a Medium / High risk of encountering UXO. This risk increases to High within the River Thames as bomb strikes are likely to have gone unnoticed.

10.5 Potential Significant Effects

- 10.5.1 Surface water and groundwater resources as well as construction workers and nearby residential/commercial premises could potentially be impacted by construction activity in the form of dust, disturbance of contaminated land such as landfill/Made Ground and the mobilisation of contaminants in the soil or creation of new contaminant pathways and contaminated run off.
- 10.5.2 Every effort would be made to avoid impacts from contaminated soil through damping down and covering of spoil and lorries during transportation of material

to minimise airborne dust. Contaminated land would be treated and the Scheme would be designed to reduce the need for materials to be imported and to minimise waste. Construction would adhere to a good site management plan, a Construction Code of Practice and Environment Agency Guidelines.

10.5.3 It is not anticipated that permanent impacts on geology and soils would result from the proposed Scheme.

10.5.4 Based on the information available to date, the potential significant effects that could arise from construction and operation of the proposals are set out in Table 10-2.

Table 10-2 Geology and Soils Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	Dust created by on-site construction activity, particularly excavation and transportation of soil materials	Construction Workers Commercial / residential land uses	Measures such as damping down, covering of stockpiles, use of wheel washes and covering of lorries during transportation would be implemented as part of a general good site management plan to ensure the potential effects associated with airborne dust are minimised.
	Disturbance of potentially contaminated land such as landfill and areas of Made Ground	Surface water and Groundwater resources Construction Workers Commercial / residential land uses	Measures such as <ul style="list-style-type: none"> • Treatment of contaminated land based on the information obtained from the site investigation • Completion of Risk Assessments and a Remediation Strategy (if required) and adherence to them throughout the construction works • Adherence to the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009) • Adherence to <i>Environment Agency Pollution Prevention Guidelines</i> • Use of a CEMP
	Mobilisation of contaminants in the soil that would otherwise be immobile.		
	Creation of new contaminant pathways e.g. contamination of soils in construction laydown areas		
Creation of contaminated run-off			

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
	Dewatering during the construction phase resulting in the creation of contaminated effluent/mobilisation of off-site contaminants/saline intrusion		<ul style="list-style-type: none"> • Optimise the design of the Scheme to reduce need for materials import and minimise waste (although it is noted that waste is assessed within the 'Materials' chapter) • Completing a detailed assessment of the local hydrogeological regime prior to dewatering scheme design (it is noted that this will be covered within the 'Water Environment' chapter) • Obtaining appropriate environmental discharge permits for discharges to water courses • Adherence to Greenwich Peninsula Environmental Method Statement
Operational Phase/ Permanent Impacts	None Identified, subject to final assessment		
Cumulative Impacts	None Identified, subject to final assessment		

10.6 Further Assessment Work to Be Undertaken

- 10.6.1 The proposed study area comprising the project footprint including the construction compound and storage area and an area 500m around the project will be agreed with the relevant stakeholders.
- 10.6.2 Consultation will be undertaken with the London Boroughs of Greenwich, Tower Hamlets and Newham regarding the assessment methodology and to obtain records of contaminated land in the study area.
- 10.6.3 Consultation will be undertaken with the Environment Agency (EA) regarding the assessment approach including the mitigation measures proposed.
- 10.6.4 Site investigations will be undertaken to inform the Scheme design. The results of these investigations will be documented in separate reports with the relevant information being used to inform the potential contaminated land effects of the Scheme. Remediation works will be undertaken where appropriate.

- 10.6.5 Information regarding the storage of materials, particularly the waste spoil from the excavation of the tunnel will be obtained.
- 10.6.6 A utilities service plan, including consultation with relevant stakeholders, will be prepared by Atkins, taking into account National Grid pipelines.
- 10.6.7 Information regarding dewatering on site will be obtained.
- 10.6.8 Following confirmation of the scheme design and operation, a final assessment of the potential significant effects of the operational phase will be completed.
- 10.6.9 There are no specific significance criteria for the assessment of effects on geology and soils and, therefore, professional judgement would be used. Further guidance on the determination of significance is provided in the DMRB within Volume 11, Section 2, Part 5, HA 205/08 Assessment and Management of Environmental Effects.
- 10.6.10 For determination of significance criteria for the assessment of effects on contaminated land, guidance would be sought from CLR11, CIRIA C552 and professional judgement.
- 10.6.11 Any mitigation measures would be determined based on the assessment of the investigation data and would be incorporated into the CEMP prior to construction.

11 Materials

11.1 Introduction

- 11.1.1 This chapter addresses potential impacts resulting from waste management and the use of resources associated with the works in the construction, demolition, excavation and operational phases of the scheme.
- 11.1.2 This chapter does not include assessment of geology and soils, these are dealt with under Chapter 10, Geology and Soils. However, there are some interactions between this Chapter and other Chapters as follows:
- Chapter 12 Townscape and Visual
 - Chapter 14 Water Environment

11.2 Regulatory and Policy Framework

- 11.2.1 The environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 11-1 below.

Table 11-1 Materials Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
EU Landfill Directive (Directive 1999/31/EC on the landfill of waste)	Establishes a framework for the management of waste across the European Community. It also defines certain terms, such as 'waste', 'recovery' and 'disposal', to ensure that a uniform approach is taken across the EU. Furthermore, it is an instrument for driving waste up the hierarchy through waste minimisation and increased levels of recycling and recovery. Sets out a number of procedures and criteria for construction, excavation and operational waste acceptance at landfills. These include ensuring that the waste will not endanger human health and the environment and satisfies the Waste Acceptance Criteria (WAC). They also set strict requirements for the acceptance of certain stable, non-reactive hazardous waste into non-hazardous waste landfills.
The Waste Framework Directive (Directive 2006/12/EC on waste)	The Waste Framework Directive (WFD; Directive 2006/12/EC on waste) contains the definition of waste. This definition is used to establish whether a material is a waste or not. It sets targets for recycling non-hazardous construction and demolition waste (70% by weight by 2020: Article 10). The EPR introduced a permitting and compliance regime, which deliver many of the requirements of the European Environmental Directives and of national policy. The Schedules to the Regulations identify precise requirements, article by article, for each Directive which must be delivered through the permitting system. Each Directive covered by the Regime has a specific schedule. The most relevant for this project are:

Policy/Legislation	Summary of Requirements
	<ul style="list-style-type: none"> ▪ Part A installations and Part A mobile plant (the Integrated Pollution Prevention and Control Directive) - Schedule 7 ▪ Domestic Part B installations and Part B mobile plant - Schedule 8 ▪ The Waste Framework Directive - Schedule 9: Waste Operations ▪ The Landfill Directive - Schedule 10: Landfill
<p>The Hazardous Waste (England and Wales) Regulations 2005, Statutory Instrument 2005 No. 894, and 2009 amendment SI 507</p>	<p>Under the Hazardous Waste Regulations 2005, "it is an offence to produce hazardous waste at premises, or remove that waste from premises, unless those premises are either registered with the Environment Agency or are exempt."</p> <p>Where subcontractors produce hazardous waste, it will be removed under the Hazardous Waste Premises Registration for that site.</p> <p>The Hazardous Waste (England and Wales) Regulations 2005 require a Hazardous Waste Consignment Note (HWCN) to be produced for each consignment of hazardous waste removed from site.</p>
<p>Waste (England and Wales) Regulations 2011 SI 988</p> <p>And 2012 amendment SI 1889 (transposes the Revised Waste Framework Directive)</p>	<p>The regulations implement the WFD and require:</p> <ul style="list-style-type: none"> ▪ Businesses to confirm that they have applied the waste management hierarchy when transferring waste and to include a declaration on their waste transfer note or consignment note; ▪ A new permit waste hierarchy permit condition and where appropriate a condition relating to mixing of hazardous waste; and ▪ Introduce a two-tier system for waste carrier and broker registration, which includes those who carry their own waste, and introduces a new concept of a waste dealer.
<p>The Clean Neighbourhoods and Environment Act 2005</p>	<p>It is the responsibility of everyone working in the construction industry to ensure that all waste is disposed of properly. All employees need to be made aware that if they are tasked with waste disposal this must be carried out in accordance with the law, or they risk being fined.</p>
<p>Waste Strategy for England 2007 (WSE 2007)</p>	<p>This strategy builds on Waste Strategy 2000 and the progress since then but aims for greater ambition by addressing the key challenges for the future through additional steps.</p> <p>The Government's key objectives are to:</p> <ul style="list-style-type: none"> ▪ Decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re-use ▪ Meet and exceed the Landfill Directive diversion targets for biodegradable municipal waste in 2010, 2013 and 2020 ▪ Increase diversion from landfill of non-municipal waste and secure better integration of treatment for municipal and non-municipal waste

Policy/Legislation	Summary of Requirements
	<ul style="list-style-type: none"> ▪ Secure the investment in infrastructure needed to divert waste from landfill and for the management of hazardous waste ▪ Get the most environmental benefit from that investment, through increased recycling of resources and recovery of energy from residual waste using a mix of technologies
<p>Waste Strategy for England 2011 (WSE 2011)</p>	<p>This strategy builds on the Waste Strategy 2000 and 2007. The report contains actions and commitments, which set a clear direction towards a zero-waste economy. The WSE 2011 presents the key principles in waste management policy: the waste hierarchy, the diversion of waste away from landfill, producer and consumer responsibility, the proximity principle and the concept of Best Practicable Environmental Option (BPEO).</p>
<p>Waste Management Plan for England (DEFRA, Dec 2013)</p>	<p>The plan is a requirement of Article 28 of the Waste Framework Directive and is a compilation of existing waste management information and policies. In particular, it reflects the conclusions of the Government Review of Waste Policy in 2011.</p> <p>The plan confirms the UK's commitment to meet its target under the Waste Framework Directive of recovering at least 70% by weight, of construction and demolition waste (Note: this relates to construction and demolition waste, excluding hazardous waste and naturally occurring material falling within code 17 05 04 in Schedule 1 to the List of Wastes (England) Regulations 2005 (SI 2005/895)).</p>
<p>Environmental Permitting (England & Wales) Regulations 2010</p>	<p>The Environmental Permitting (England and Wales) Regulations were created to standardise environmental permitting and compliance in England and Wales to protect human health and the environment. The regulations largely replace the Environmental Protection Act 1990 on pollution prevention and control and the Waste Management Licensing Regulations 1994 on waste management. The regulations create an environmental permitting system that replaces waste licences and pollution prevention and control permits in England and Wales, without changing the operating conditions already contained in existing permits. The Environment Agency and local councils enforce the regulations in England and Wales.</p>
<p>CL:AIRE The Definition of Waste: Development Industry Code of Practice (Apr 2012)</p>	<p>This Code of Practice (CoP) provides best practice for the development industry to use when assessing if materials are classified as waste, or not, and determining when treated waste can cease to be waste for a particular use. The CoP provides engineers, contractors, consultants and developers a basis upon which to demonstrate to the Environment Agency that they are following best practice with respect to the use and reuse of materials. It provides an auditable system to demonstrate that the CoP has been adhered to on a site by site basis. The development and use of the CoP is seen as a Better Regulation Approach by the EA.</p>

Policy/Legislation	Summary of Requirements
<p>The London Plan 2011.</p>	<p>The London Plan outlines the Mayor's commitment to making better use of waste and its management in an attempt to reduce London's impact on climate change. The London Plan describes waste as a valuable resource that can be exploited for London's environmental, economic and social benefit. As outlined below, the London Plan emphasises the importance of four policies in relation to waste management:</p> <ul style="list-style-type: none"> ▪ Policy 5.3 Sustainable Design and Construction - states that the highest standard of sustainable design and construction should be achieved in developments to improve the environmental performance of new developments. This should be achieved through a number of sustainable design principles including minimising the generation of waste and maximising re-use and recycling. ▪ Policy 5.16 Waste self-sufficient – states that the Mayor will work with various stakeholders and authorities to ensure that by 2031, 100% of London's waste will be managed within London and zero biodegradable or recyclable waste will be sent to landfill. ▪ Policy 5.17 Waste capacity – states the need to increase the waste processing capacity in London and that all new developments should have suitable waste and recycling storage facilities. ▪ Policy 5.18 Construction Design and Excavation Waste (CDE waste) – states that waste should be removed from construction sites, and materials should be brought to the site, by water or rail transport wherever that is practicable. <p>The London Plan Revised Early Minor Alterations were published on 13 October 2013. With regard to waste, the Revised Early Minor Alterations states that the Mayor intends to work closely with agencies and authorities in neighbouring regions in order to develop and implement policies pertaining to waste management.</p> <p>The London Draft Further Alterations was published on 14 January 2014 to build upon alterations of the Revised Early Minor Alterations (2013)</p>
<p>The GLA Draft Sustainable Design and Construction, Supplementary Planning Guidance (2013)</p>	<p>The Greater London Authority (GLA) Draft Sustainable Design and Construction Supplementary Planning Guidance (SPG) was published for public consultation which ended on 21 October 2013. The draft Sustainable Design and Construction SPG provides additional guidance on Policy 5.3 Sustainable Design and Construction, as well as a range of other policies, of the London Plan. As such, the draft SPG provides further details and best practice on how to achieve the various targets described by policies of the London Plan in the most efficient and effective way.</p> <p>In relation to waste, Section 2.6 Materials and Waste of the SPG provides guidance on how materials generated by the demolition phase of new developments can be managed within the construction phase through application of the waste hierarchy. Section 2.6 of the SPG also provides guidance in</p>

Policy/Legislation	Summary of Requirements
	<p>order to ensure developments contain sufficient space for the storage of recyclables, organic material and waste. The draft SPG also states that 95% of construction, demolition and excavation waste should be recycled or re-used by 2020, with 80% being recycled as aggregates.</p>
<p>East London Waste Authority, Joint Waste Development Plan Document (2012)</p>	<p>The ELWA comprises the London Borough of Barking and Dagenham (LBBD), the London Borough of Havering (LBH), the London Borough of Redbridge (LBR) and the London Borough of Newham (LBN). Under this partnership, the ELWA and its four constituent Boroughs are working together to manage the waste apportionment targets, as set by the London Plan.</p> <p>Accordingly, the ELWA has prepared the Joint Waste Development Plan Document (DPD) (Ref. 6-30), which was adopted in February 2012, and sets out a planning strategy for sustainable waste management through until 2021. The Joint Waste DPD includes the ELWA Joint Waste Management Strategy, which details how the ELWA Boroughs intend to manage municipal waste. The vision of the Joint Waste Strategy is “to provide an effective and efficient waste management service that is environmentally acceptable and delivers services that local people value”.</p> <p>Under the Joint Waste DPD, the ELWA sets out how the total apportionment target of all four Boroughs will be met (including the individual amount to be managed within each Borough), as well as the range and type of facilities needed to manage waste arisings. The evidence base used in producing the Joint DPD highlighted the need for additional waste treatment capacity to be provided within the ELWA to manage waste arisings in line with targets set by the London Plan. Therefore, the Joint Waste DPD also discusses suitable locations for additional facilities within the ELWA.</p>
<p>London Borough of Newham (LBN) Core Strategy (2012)</p>	<p>The LBN Core Strategy (Ref. 6-31) was adopted in January 2012 and sets out the spatial strategy for the Borough through until 2027. With regards to waste, Policy INF3 Waste and Recycling states that waste produced within the LBN should be managed in accordance with the waste hierarchy.</p> <p>As part of the Core Strategy, four licensed operational sites used for waste management purposes have been safeguarded; a further 18 operational sites licensed by the Environment Agency have been safeguarded by the London Plan. With regards to site allocation, a 7 hectare (ha) site has been allocated at Beckton Riverside for a medium-sized waste management site; this site will manage the additional waste arisings apportioned to Newham in the London Plan. Transport of waste materials should first consider rail and waterway options over road transport routes.</p>
<p>London Borough of Greenwich Draft Core Strategy (2011)</p>	<p>The Draft Core Strategy with Development Management Policies will help the Council shape development and</p>

Policy/Legislation	Summary of Requirements
	<p>determine all planning applications in the borough up until 2027.</p> <p>As part of the Draft Core Strategy, sustainability measures, to meet challenges such as climate change, will have been incorporated into new development and significant progress will have been made in assimilating them into existing areas. These measures will have reduced waste, water and energy consumption and zero carbon and low carbon developments will be the norm thus ensuring a cleaner, greener Greenwich</p>
<p>London Borough of Tower Hamlets Core Strategy (2010)</p>	<p>The Draft Core Strategy with Development Management Policies will help the Council shape development and determine all planning applications in the borough up until 2025.</p> <p>The strategic objective is to plan for and manage the borough's waste efficiently, safely and sustainably, by minimising the amount of waste produced, maximising recycling, and managing non-recyclable waste using treatment methods other than landfill.</p>

11.3 Assessment Work Undertaken to Date

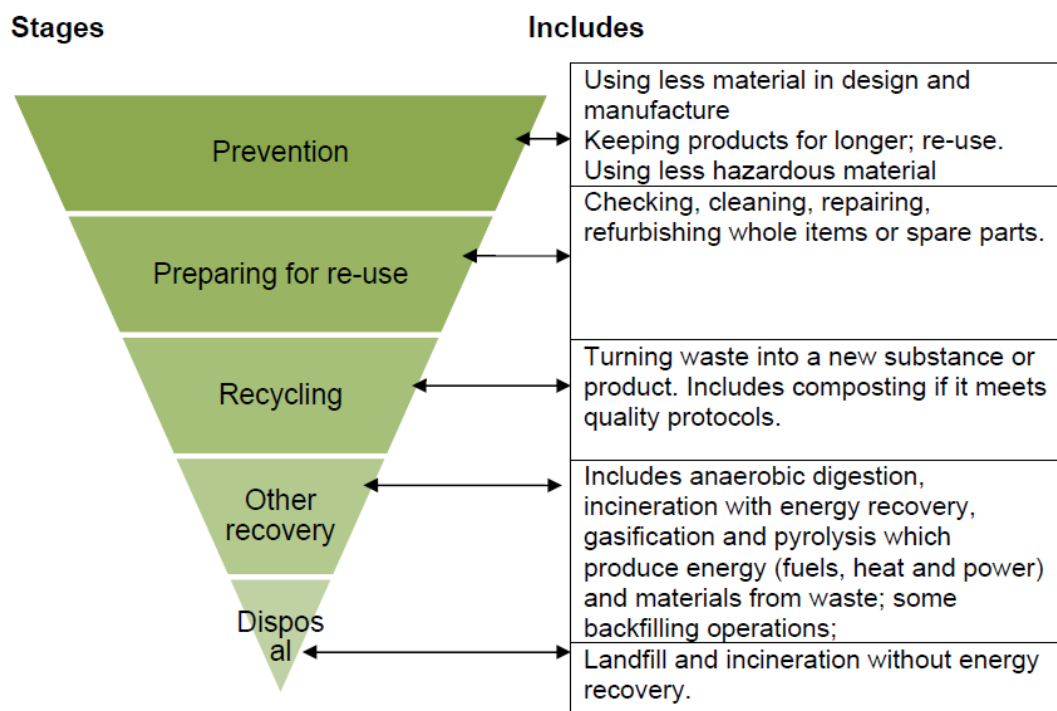
Establishing baseline conditions

- 11.3.1 For the purpose of this assessment, the baseline conditions include the current waste management facilities in London Borough of Tower Hamlets (LBTH), Greenwich (LBG) and Newham (LBN). The LBN forms one of the four constituent Boroughs of the East London Waste Authority (ELWA). Whilst the study area would not include the operation of these waste management facilities, it would be necessary to ensure that the facilities have the capacity and capability to support the Scheme deliver on its waste objectives and targets.
- 11.3.2 The study area for the materials assessment will be limited to the boundaries of the construction site within which materials will be used and wastes generated and managed. This is considered appropriate as the purpose of the materials assessment is to assess the effects associated with the use of primary, secondary and recycled raw materials and manufactured construction products. However, there is no baseline information collated in relation to materials generation or use as this will be informed by the continued development of the Scheme design.
- 11.3.3 Baseline conditions have been established through desktop research, including the interrogation of key data bases such as NetRegs Waste Directory (<http://www.wastedirectory.org.uk/>), the Environment Agency register of licences for waste disposal and treatment facilities (<http://www2.environment-agency.gov.uk/epr/>), the Waste Survey of Arisings Use of Alternatives to Primary Aggregates in England (Department for Communities and Local Government (2005) Survey of arisings).

Assessment methodology

- 11.3.4 The assessment has been undertaken in accordance with the DMRB, Interim Advice Note (IAN) 153/11 - Guidance on the EIA of Material and Interim Advice Note 153/11 Guidance on the Environmental Assessment of Material Resources.
- 11.3.5 Materials would be required to build the new infrastructure. Modifications and removal of existing infrastructure features would cause CDE waste to be generated. Waste can cause harm to the environment through its treatment and final disposal, and therefore, effective waste management should follow the principles of the waste hierarchy shown on Figure 11-1.

Figure 11-1 The Waste Hierarchy



- 11.3.6 The term 'Materials' was introduced by the August 2008 amendment to Section 1 of the DMRB Volume 11 and in the context of this assessment it is considered to include assessment of key materials, soils (potentially contaminated) and wastes which may be associated with the Scheme. It also includes requirements for materials and waste treatment, transportation and/or disposal, including impacts on landfill void capacity. The assessment considers the impact on the environment as a result of the generation of this waste and the use of materials and details measures to mitigate these impacts.
- 11.3.7 Table 11-2 below presents the materials that are likely to arise during the excavation and construction phases of the Scheme.

Table 11-2 Potential waste sources during construction and excavation phases

Development phase	Potential wastes produced	Classification of waste
Excavation	Made ground, sand, gravel, clay, soil and sub-soil.	Inert; and /or Non-hazardous. Potentially hazardous if it contains sufficiently high levels of heavy metals.
Construction	Construction materials, such as concrete, bricks, ceramics, plastics, metals, timber insulation, packaging, cement and plaster, etc.	Inert; and / or, Non-hazardous; and / or, Hazardous. Non-hazardous, and Hazardous if it contains sufficiently high levels of heavy metals.

11.3.8 It is anticipated that any spoil generated may be re-used off-site for landscaping or other beneficial purposes, therefore it is expected that only minimal volumes of material may require disposal at landfill. As referred to in Section 2.3 above, to minimise disruption to the highway network, and reduce carbon emissions, river facilities are currently being considered for delivery of tunnel segments and other bulk materials to the site and removal of spoil via Thames Wharf. Due to proximity to the river and wharf, river transport is a logical option.

11.3.9 Spoil would travel by conveyer from the tunnel to a storage site and would then transfer through a loading bunker and conveyer to a barge at Thames Wharf.

11.3.10 The assessment:

- Provides a forecast of the types, volumes and destination of wastes generated by the project
- Provides possible options for designing out waste
- Provides recommendations for waste minimisation and management
- Confirms the procedures for storing and transporting waste including the potential for the River Thames to be used to transport materials.

11.3.11 The assessment addresses potential impacts resulting from waste management and the use of primary/secondary/recycled/manufactured materials associated with the works in the CDE and operation and maintenance phases of the Scheme. The use of materials and resources could cause the following impacts:

- The depletion of natural resources
- Increased pressure on waste management and disposal facilities.
- Energy consumption through plant use and transportation of materials and waste
- Release of contaminants to air, land or water through the sourcing, use, storage, transportation and disposal of materials and waste that could result in pollution.

- Creation of nuisance for local communities
- Flooding as a result of inappropriate materials and/or waste storage

11.3.12 At the current stage of design, the details (types, quantities, specifications, the construction methods and the suitability for reuse of excess site materials) required to accurately determine the quantities of waste arising during the CDE, operation and maintenance phases are not confirmed. Therefore, the likely types and quantities of waste arisings from these phases should be estimated when more information becomes available. These estimations could be based on Building Research Establishment (BRE) Waste Benchmark Data for infrastructure projects or on the Scheme Bill of Quantities if it becomes available.

11.3.13 The assessment describes how resource efficiency will be maximised and how waste minimisation and optimal use of surplus waste will be prioritised.

Consultation

11.3.14 Consultation has been undertaken as part of the assessment to:

- Define the targets in the London Borough of Tower Hamlets, Greenwich and Newham waste policies
- Discuss waste management aspirations for the proposed development and set targets
- Determine a formal position with regards to any future waste facilities in the region and implications on waste management at the proposed development

11.3.15 Further consultation will be required as the proposed development progresses.

Limitations and assumptions

11.3.16 With regards to data analysis, collection of CDE waste services are generally provided by private contractors. Therefore, data pertaining to the volume and composition CDE waste, and their associated management methods, is typically not widely available. Consequently, the most recent survey data currently available for CDE waste has been used as part of this assessment and in determining baseline conditions.

11.4 The Existing Environment

Current local waste arisings

11.4.1 East London has an estimated total CDE waste arisings of 3,689,749 tonnes per year (Department for Communities and Local Government (2005) Survey of arisings and use of alternatives to primary aggregates in England: Construction, Demolition and Excavation Waste). Of this total:

- 58% was recycled to produce graded and ungraded aggregates and soil (excluding topsoil) by the regions 45 recycling crushers

- 21% of the residual waste entered licensed landfill sites (of this 83% was used for engineering and capping and 17% was waste)
- 21% of the residual waste was used on exempt sites

11.4.2 There are two other data sources that provide some information on local CDE waste - the Environment Agency Waste Data Interrogator and the SEERAWP Aggregate Monitoring Survey. However, these do not provide a sufficient set of data to corroborate the estimates of arisings provided by the Waste Survey of Arisings Use of Alternatives to Primary Aggregates in England.

Current regional waste arisings

11.4.3 In terms of CDE waste, WRAP conducted a study in 2012 aimed at estimating the total amount of CDE waste generated in England and its associated management methods. The Waste Framework Directive has targeted recovery of at least 70% of all CDE waste by 2020. Accordingly, this study was commissioned to demonstrate whether England was meeting or exceeding this target. Table 11-3 details results of the Defra study, outlining the current volume of CDE waste produced in England during 2008, 2009 and 2010 and how it is managed.

Table 11-3 Current CDE waste arisings and management in England

Method	Waste Arisings (ktonnes)					
	2008		2009		2010	
Waste transferred for treatment processes	7,053	7%	6,885	8%	7,203	9%
Reuse	52,730	56%	42,184	55%	42,184	54%
Waste exemptions (i.e. no permit needed)	10,978	12%	9,708	13%	8,150	11%
Landfill	23,785	26%	18,192	24%	19,839	26%
Total	94,546	100%	76,696	100%	77,356	100%

Waste capacity

11.4.4 Existing waste management facilities operating within the East London Waste Authority include the following:

- 4 x Household Reuse and Recycling Centres (RRCs) (i.e. one in each constituent Borough, with all accepting WEEE)
- Jenkins Lane Mechanical Biological Treatment (MBT) facility and RRC (LBN's RRC is located at Jenkins Lane)
- Frog Island Waste Management and MBT facility
- 10 x Material Recovery Facilities (MRF)
- 2 x composting facilities

- 5 x metal recycling sites
- 35 x waste transfer stations (designated for specific streams)
- 6 landfills accepting non-biodegradable waste

11.4.5 Existing waste strategic waste sites in Greenwich include the following:

- Nathan Way reuse & recycle centre and waste transfer station with an average annual throughput of 37,129 tonnes
- Recycling Centre, Day Aggregates (Day Group Ltd) processing 250,000 tonnes of CD waste with an average annual 99% recycling rate
- Integrated Waste Management & Recycling Facility with a current licensed capacity of 130,000 tonnes per annum
- Murphy's Waste Ltd, Greenwich Transfer Station with an average annual throughput approximately 96,000 tonnes

11.4.6 According to waste management licence data provided by the Environment Agency in December 2008, there are currently 11 licensed waste management facilities within London Borough of Tower Hamlets. However, the waste facilities evidence base report from London Borough of Tower Hamlets has confirmed that five of these are non-operational as waste management facilities. The remaining six facilities include five transfer stations (three taking household and C&I wastes, two taking hazardous waste) and one facility which is coded by the Environment Agency as a materials recycling treatment facility and a transfer station, which actually reprocesses construction and demolition waste.

11.4.7 There are a number of treatment and recycling facilities within a reasonable proximity of the Site, see Appendix 11A. However, this is a guide and the appointed waste contractor for the Site would contact the Environment Agency directly to determine the most appropriate waste transfer station to handle the waste material being produced. The transfer station will then send it off for beneficial reuse at a suitable site or as a last resort for final disposal at an appropriate landfill site.

11.4.8 Appendix 11A also highlights a number of possible waste disposal facilities within a 25 mile radius to the Site and that also run a waste collection service and UK soil treatment centres.

11.5 Potential Significant Effects

11.5.1 The Scheme design will be optimised to reduce the levels of excavated materials (spoil) produced by the Scheme and to minimise the need for materials to be imported onto the site. It is anticipated that the Scheme will produce large volumes / quantities of spoil during excavation phases. It is not anticipated that these spoils will be suitable for re-use in the construction phase of the Scheme. However, it is likely that these spoils will be suitable for re-use off-site, and suitable investigations to re-use significant volumes / quantities of spoil off-site will be investigated. Suitable ground investigation will be carried out to determine the extent of any contamination, if contamination is found then suitable measures will be put in place to treat any affected spoils prior to any re-use off-site

- 11.5.2 The Scheme will require significant volumes of natural resources through extraction of primary aggregates (e.g. sands and gravels) from local or other quarries. In order to mitigate this, the use of recycled aggregates and materials will be investigated.
- 11.5.3 Carbon emissions include embodied carbon of the materials to be used, as well transportation of materials and disposal of waste. The use of materials with low embodied carbon, the utilisation of nearby waste treatment facilities and the use of river transport to deliver materials or remove waste will be investigated.
- 11.5.4 Based on the information available to date, the potential significant effects that could arise from excavation, construction and operation of the Scheme are set out in Table 11-4.

Table 11-4 Materials Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	<p>Large volumes / tonnes of spoil are likely during the excavation and construction phases of the Scheme.</p> <p>Increased pressure on waste management and disposal facilities</p> <p>Transfer of materials e.g. via barge/HGV.</p>	<p>Decreasing waste facility void space for current local and/or regional catchments waste outputs</p>	<p>Optimise the design of the Scheme to reduce need for materials import and minimise waste.</p> <p>It is unlikely that any of the excavated materials that will arise will be re-used on-site. Opportunities for re-use of excavated materials should be sought on suitable sites within the region.</p> <p>At this stage it is uncertain if there will be suitable local or regional sites which may be able to receive these excavated materials for beneficial re-use.</p> <p>The ground investigation that is being undertaken will determine the extent of any contamination of the excavated materials.</p> <p>If contamination is found within materials to be excavated then opportunities to treat the materials should be sought prior to any re-use off-site.</p> <p>A SWMP and a CEMP will be produced and implemented.</p>

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
	The depletion of natural resources could occur through extraction of primary aggregates (e.g. sands and gravels) from local or other quarries.	Natural resources – primary aggregates.	Excavation materials to be re-used off-site, where possible, Recycled content aggregates to be specified to reduce the use of primary aggregates. A CEMP will be produced and implemented.
	Carbon Emissions (embodied and operational - energy consumption through plant use and transportation of materials and waste).	Release of contaminants to air.	Use materials with low embodied carbon Transportation of materials. Transportation and disposal / recovery of specific CDE waste materials. Procedure against proximity principle ³ . Transfer via barge /choose waste facilities nearby.
	Flooding within waste storage areas as a result of insufficient drainage and inappropriate materials and/or waste storage.	Construction site	Ensure that the materials and waste storage areas are suitably drained and materials / wastes are appropriately stored as to prevent flooding. A SWMP and a CEMP will be produced and implemented.
Permanent Impacts	None Identified, subject to final assessment.		
Cumulative Impacts	None Identified, subject to final assessment.		

11.6 Further Assessment Work to Be Undertaken

11.6.1 Further assessment work will be undertaken to inform the PEIR and the ES. To inform the assessment that is provided for the ES, the following Scheme design information will be collated:

- The types and quantities of construction materials that would be required to be imported into site, for example bulk earthwork materials, topsoil, aggregates, concrete

³ The proximity principle advocates that waste should be disposed of (or otherwise managed) close to the point at which it is generated, thus aiming to achieve responsible self-sufficiency at a regional or sub regional level. Where this is not possible, priority should be given to transportation by rail or water.

- Information about how structures are to be procured and constructed
- Details of the source/origin of materials
- The cut and fill balance
- Details of storage arrangements for wastes that are generated on site
- Details of the proposed construction methods and techniques
- Details of materials that will be re-used during the Scheme construction
- Details of the wastes that are likely to be generated, for example, hazardous or contaminated soils, invasive species, surplus construction materials, demolition waste.

- 11.6.2 Consultation will be undertaken with the London Boroughs of Greenwich, Tower Hamlets and Newham regarding the assessment methodology and to obtain records of waste in the study area.
- 11.6.3 Consultation will be undertaken with the Environment Agency (EA) regarding the assessment approach including the mitigation measures proposed.
- 11.6.4 Information regarding the storage of materials, particularly the waste spoil from the excavation of the tunnel will be obtained. The use of materials with low embodied carbon, the utilisation of nearby waste treatment facilities and the use of river transport to deliver materials or remove waste will be investigated.
- 11.6.5 There are no specific significance criteria for the assessment of effects on materials and waste, therefore, professional judgement would be used. Further guidance on the determination of significance is provided in the DMRB within Volume 11, Section 2, Part 5, HA 205/08 Assessment and Management of Environmental Effects.

12 Noise and Vibration

12.1 Introduction

12.1.1 This Chapter considers the potential road traffic noise effects as a result of the Scheme. The existing noise conditions and the potential road traffic noise effects during the operation of the Scheme are considered.

12.1.2 At this stage of the Scheme design potential construction noise and vibration effects have not been considered. This will be considered once sufficient design detail is delivered to enable effects to be evaluated. These will then be reported in the ES.

12.2 Regulatory and Policy Framework

12.2.1 The environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 12-1 below.

Table 12-1 Noise and Vibration Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
Greater London Authority July 2011 Policy 7.15 Reducing Noise and Enhancing Soundscapes	Development proposals should seek to reduce noise by: <ul style="list-style-type: none"> ▪ minimising the existing and potential adverse impacts of noise on, from, within, or in the vicinity of, development proposals ▪ separating new noise sensitive development from major noise sources wherever practicable through the use of distance, screening, or internal layout in preference to sole reliance on sound insulation ▪ promoting new technologies and improved practices to reduce noise at source.
Tower Hamlets Local Plan April 2013 Policy DM25 Amenity	Development should seek to protect, and where possible improve, the amenity of surrounding existing and future residents and building occupants, as well as the amenity of the surrounding public realm by not creating unacceptable levels of noise and vibration during the construction and life of the development.
Royal Greenwich Local Plan July 2014 Policy E(a)/Pollution	Planning permission will not normally be granted where a proposed development or change of use would generally have a significant adverse effect on the amenities of adjacent occupiers or uses, and especially where proposals would be likely to result in the unacceptable emission of noise
Newsham Core Strategy Saved Unitary Development Plan Policies February 2012 Policy EQ47	Where a proposed development is likely to produce a considerable increase in noise relating to its use, the council will require an assessment of noise impact to be carried out by a developer for submission with the planning application.
Land Compensation Act 1973	Part one of the Land Compensation Act provides a means by which compensation can be paid to owners of land or property

Policy/Legislation	Summary of Requirements
	which has experienced a loss in value caused by the use of public works, such as new or improved roads.
The Noise Insulation Regulations 1975 (as amended 1988)	Regulation 3 imposes a duty on authorities to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings. This is subject to meeting certain criteria given in the Regulation.
The Highways Noise Payments and Movable Homes (England) Regulations 2000 (as amended 2001)	The Highways Noise Payments and Movable Homes Regulations 2000, provide highway authorities with a discretionary power to provide a noise payment where new roads are to be constructed or existing ones altered. The relevant Regulations set out the criteria which should be applied in assessing eligibility for making such payments.
The Noise Insulation Regulations 1975 (as amended 1988)	Regulation 5 provides relevant authorities with discretionary powers to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings with respect to construction noise. This is subject to meeting certain criteria given in the Regulation.
Control of Pollution Act 1974	The Control of Pollution Act 1974 Section 61 sets out procedures to enable those undertaking construction works to obtain 'Prior Consent' for construction works within agreed noise limits.
Noise Policy Statement for England (NPSE) March 2010 DEFRA	<p>The NPSE vision is to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. To achieve this vision the NPSE sets out the following aims for the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:</p> <ul style="list-style-type: none"> ▪ avoid significant adverse impacts on health and quality of life; ▪ mitigate and minimise adverse impacts on health and quality of life; and ▪ where possible, contribute to improvement of health and quality of life.
National Planning Policy Framework 2012	<p>Paragraph 123 of the NPPF (Ref. 6) states that: <i>Planning policies and decisions should aim to:</i></p> <ul style="list-style-type: none"> ▪ Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development; and ▪ Reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions; ▪ Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and ▪ Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

Policy/Legislation	Summary of Requirements
Draft NPS National Networks (5.179)	<p>The Secretary of State should not grant development consent unless satisfied that the proposals will meet the following aims:</p> <ul style="list-style-type: none"> ▪ Avoid significant adverse impacts on health and quality of life from noise as a result of the new development; ▪ Mitigate and minimise other adverse impacts on health and quality of life from noise from the new development; and ▪ Where possible, contribute to improvements to health and quality of life through the effective management and control of noise.

12.3 Assessment Work Undertaken to Date

Existing Ambient Noise Conditions

- 12.3.1 To establish an indicative level of existing ambient daytime noise levels at residential dwellings within the local vicinity of the Scheme, short term noise surveys have been conducted over a period of one hour at three locations which are indicated in Drawing 12-1 and presented in Table 12-2.

Table 12-2 Noise Survey Locations

Monitoring Location ID (see Figure 12-1)	Monitoring Location Description	Approximate Ordnance Survey Grid Reference
NML 1	Tunnel Avenue	539688, 178544
NML 2	Clements Avenue	540362, 181038
NML 3	Britannia Gate	540376, 180171

- 12.3.2 The surveys were undertaken on 1 July 2014 using a class one sound level meter (SLM) logging LAeq, LA Max, LA Min, LA90 and LA10 parameters every 15 minutes. The SLM was calibrated before and after each survey with no drift in calibration recorded.
- 12.3.3 The weather conditions on all days were dry and sunny with light wind speeds in any direction less than 5m/s, and therefore considered acceptable for environmental noise measurements.
- 12.3.4 Photographs of the survey locations and a complete set of measurement data is presented in Appendix 12A.

Initial Road Traffic Noise Calculations

- 12.3.5 Initial road traffic noise calculations have been undertaken using the currently available traffic data for all roads within 1km of the Scheme. This initial Study Area is based upon guidance contained in DMRB HD213/11, Volume 11, Section 3, Part 7 (HD213/11).
- 12.3.6 The procedure for predicting the noise level from a road is described in the Department of Transport and Welsh Office technical memorandum Calculation

of Road Traffic Noise (CRTN) (Department of Transport and Welsh Office, 1988). The prediction method takes into account factors such as the traffic flow, composition and speed, the alignment and distance of the road relative to receiving property, the road surface type, the nature of the intervening ground cover between the road and reflections from building facades in order to calculate the dB LA10,18-hour noise level.

- 12.3.7 Traffic and the level of noise it generates fluctuate in intensity hourly, daily and seasonally and so the impact of traffic noise is assessed in terms of a time-averaged indicator.
- 12.3.8 In the UK, traffic noise is normally assessed using LA10,18hour index, defined as the arithmetic mean of the dB(A) noise levels exceeded for 10% of the time in each of the 18, one-hour periods between 06:00-00:00 on a typical weekday. This takes account of the diurnal variation in traffic noise. Annual average weekday traffic (AAWT) flows, speeds and percentage of heavy vehicles is used to allow for seasonal variations.
- 12.3.9 The calculations undertaken within the Study Area of this assessment have been conducted using a computer based prediction program IMMI (produced by Wölfel Meßsysteme). The software package follows the procedures given in CRTN.
- 12.3.10 Traffic data has been provided by the project transport consultants for the baseline year of 2021 and future assessment year of 2031.
- 12.3.11 Other model inputs include mapping data, height contours and scheme design drawings. Height contours of the study area have allowed for the vertical alignment of both the Do-Minimum and Do-Something situations to be modelled, with the Scheme drawings used to inform the vertical alignment of the Scheme in the Do-Something situation.
- 12.3.12 The outputs from the road traffic noise model have been used to generate noise difference contour figures to identify where any areas are predicted to experience an increase or decrease within 1km of the Scheme.
- 12.3.13 Short term noise impacts have been assessed by comparing the opening baseline year of 2021 without the Scheme (Do-Minimum) against the opening baseline year with the Scheme (Do-Something).
- 12.3.14 Long term noise impacts have been assessed by comparing the opening baseline year of 2021 without the Scheme (Do-Minimum) against the future assessment year (2031) with the Scheme (Do-Something).
- 12.3.15 DMRB HD213/11 provides classification for the magnitude of changes in road traffic noise. A change in road traffic noise of 1dB(A) in the short term (Do-Minimum to Do-Something in the baseline year) is the smallest that is considered perceptible. In the long term (Do-Minimum in the baseline year to Do-Something in the future assessment year) a 3dB(A) change is considered to be perceptible.

- 12.3.16 The magnitudes of impact in the short and long term are therefore considered to be different⁴. For road traffic noise the classification of magnitude of change is reproduced from HD213/11 in Table 12.3 and Table 12.4 for the short and long term respectively.

Table 12-3 Classification of magnitude of noise impacts in the short term

Noise Change $L_{A10, 18 \text{ Hour}}$	Magnitude of Impact
0	No Change
0.1 - 0.9	Negligible
1 - 2.9	Minor
3 - 4.9	Moderate
5 +	Major

Table 12-4 Classification of magnitude of noise impacts in the Long term

Noise Change $L_{A10, 18 \text{ Hour}}$	Magnitude of Impact
0	No Change
0.1 – 2.9	Negligible
3 – 4.9	Minor
5 – 9.9	Moderate
10 +	Major

12.4 The Existing Environment

- 12.4.1 Sensitive receptors in terms of noise are defined as residential dwellings, hospitals, schools, and community facilities, designated areas (e.g. Area of Natural Beauty (AONB), National Park, Special Protection Area (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), Scheduled Ancient Monument (SAM), and public rights of way.
- 12.4.2 The majority of residential receptors within the anticipated noise study area are located on the north side of the Scheme in Canning Town.
- 12.4.3 The results of the ambient noise survey are presented in Table 12-5. The noise levels presented in Table 12-5 are one hour averages.

⁴ In the short term it would be an abrupt change (DMRB classes 1dB as being perceptible). Over the course of 10 to 15 year the change in noise level is gradual so a larger change in noise level is required to be perceptible.

Table 12-5 Summary of Ambient Noise Surveys

Monitoring Location ID (see Figure 12-2)	Monitoring Location Description	*L _{Aeq}	**L _{A10}	**L _{A90}
NML 1	Tunnel Avenue	62.5	63.9	59.9
NML 2	Clements Avenue	48.8	49.8	45.8
NML 3	Britannia Gate	62.2	64.7	53.5
<i>*Logarithmic one hour average **Arithmetic one hour average</i>				

- 12.4.4 On the southern side of the Scheme at measurement location NML 1 existing traffic noise levels are above the WHO Guidelines for Community Noise threshold of 55 dB(A). This is mainly due to traffic noise contribution from the A102 located approximately 80m away from the measurement location.
- 12.4.5 On the northern side of the Scheme at measurement location NML 2 noise levels are lower than the WHO Guidelines for Community Noise threshold of 55 dB(A). This is due to the local roads within close proximity to the measurement location having lower traffic flows and screening from buildings.
- 12.4.6 On the northern side of the Scheme at measurement location NML 3 existing traffic noise levels are above the WHO Guidelines for Community Noise threshold of 55 dB(A). This is mainly due to traffic noise contribution from Silvertown Way located approximately 50m away from the measurement location.

12.5 Potential Significant Effects

- 12.5.1 A road project has the potential to cause both increases and decreases in traffic noise on an existing road by altering the traffic flow and composition. In the case of a new road, such as the Scheme a completely new noise source would be created which could have a significant effect upon the existing noise climate.
- 12.5.2 There will also be construction noise effects and potentially a requirement for overnight working associated with the removal of the pedestrian footbridge that spans the Blackwall Tunnel Approach on the Greenwich Peninsula.
- 12.5.3 Based on the information available to date, the potential significant effects that could arise from construction and operation of the proposals are set out in Table 12-6.
- 12.5.4 Initial road traffic noise calculations indicate that potential significant effects would be localised to receptors within close proximity to the tunnel portals.
- 12.5.5 The majority of identified receptors within the Study area would experience negligible impacts in both the short term and long term, with residential receptors nearby to the baseline monitoring locations predicted to experience negligible to minor noise increases.

- 12.5.6 Noise difference contours are presented in Drawing 12.2 and 12.3 indicating where potential changes in road traffic noise level may occur as a result of the Scheme in the short and long term.

Table 12-6 Noise Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	Construction Activity Noise and Construction Traffic	Residential receptors within close proximity of the Scheme in the Canning Town area	Noise barriers, use of best practice techniques, noise mitigation measures included in CEMP
Permanent Impacts	Increases in road traffic noise	Initial calculations indicate potential increases at residential receptors within close proximity to the tunnel portals	Thin/low-noise surfacing, Noise barriers
	Noise from Ventilation Shafts	Residential receptors within close proximity of the Ventilation Shafts	Reduction of noise at point of generation, containment of noise generated (e.g. by insulating buildings which house machinery and/or providing purpose-built barriers around the site)

12.6 Further Assessment Work to Be Undertaken

Environmental Noise Surveys

- 12.6.1 Consultation will be undertaken with the relevant local environmental health officers to establish the locations and duration of further ambient noise surveys within the local area of the Scheme.

Construction Noise and Vibration

- 12.6.2 The method of assessing and calculating noise and vibration impacts from construction activities will be undertaken using the guidance contained in British Standard 5228:2009 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' Parts 1 and 2 (BS5228).
- 12.6.3 Part 1 of BS 5228 provides guidance on predicting and measuring construction noise and assessing its impact on the environment.
- 12.6.4 Part 2 of BS 5228 provides recommendations for basic methods of vibration control and methods of assessing its effects on the environment relating to construction where work activities/operations generate significant vibration levels.

Road Traffic Noise

- 12.6.5 A DMRB 'detailed' assessment will be undertaken. In accordance with DMRB HD213/11 the following comparisons will be made with the calculated road traffic noise levels:
- Do-Minimum scenario in the baseline year against Do-Minimum scenario in the future assessment year (long term)
 - Do-Minimum scenario in the baseline year against Do-Something scenario in the baseline year (short term)
 - Do-Minimum scenario in the baseline year against Do-Something scenario in the future assessment year (long term)
- 12.6.6 For night-time noise impacts, only comparisons in the long term will be considered for receptors predicted to exceed an L_{night} , outside of 55 dB(A) in accordance with DMRB.
- 12.6.7 The calculation of permanent traffic noise nuisance impacts in accordance with DMRB will be undertaken for the following comparisons:
- Do-Minimum scenario in the baseline year against Do-Minimum scenario in the future assessment year (long term)
 - Do-Minimum scenario in the baseline year against Do-Something scenario in the future assessment year (long term)
- 12.6.8 Traffic induced airborne vibration nuisance will also be considered for the same scenarios for all identified sensitive receptors within 40m of any affected roads.
- 12.6.9 All predictions and comparisons will be presented in the reporting tables specified in DMRB HD213/11 and will consider the masterplan of any new developments which are proposed within the Study Area.

Ventilation Noise

- 12.6.10 Operational noise from the tunnel ventilation will be assessed in accordance with British Standard 4142:1997 'Method for Rating industrial noise affecting mixed residential and industrial areas' (BS4142) which contains relevant guidance on the assessment of noise of an industrial nature and the likelihood of complaints from residents affected by such sources.
- 12.6.11 The methodology compares industrial noise levels at the noise sensitive receptors with existing background noise levels. A difference of +10dB or more between the existing background level and the industrial noise source indicates that complaints are likely, whereas +5dB difference is considered to be of marginal significance. For differences of less than +5dB, the likelihood of complaints reduces further, with a difference of -10dB being a positive indication that complaints are unlikely.

13 Townscape and Visual

13.1 Introduction

13.1.1 This chapter considers the townscape and visual implications of the Scheme. 'Landscape' is defined in the European Landscape Convention as '...an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe, 2000). In urban areas landscape is termed 'townscape'. Visual or visual amenity considerations relate specifically to the views of a landscape/townscape afforded to people. These separate but related issues form the basis for townscape and visual impact assessment (TVIA). Whilst cultural heritage features have a bearing on townscape, cultural heritage effects are considered separately within Chapter 7.

13.2 Regulatory and Policy Framework

13.2.1 The environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 13-1 below.

Table 13-1 Townscape and Visual Regulatory and Policy Framework

Policy/Legislation	Summary of Requirements
Department for Transport (2013) Draft National Policy Statement (NPS) for National Networks	The NPS sets out the Government's vision and policy for the future development of nationally significant infrastructure projects on the national road and rail networks. The Government's policy is for these projects to be seen in the context of a significant package of measures to protect the environment and support sustainable transport on the national networks. The NPS advises that landscape (references to landscape should be taken as covering seascape and townscape, where appropriate) and visual assessment should be undertaken and projects should include reasonable mitigation in respect of landscape and visual effects, where possible and appropriate. Great weight should be given to conserving landscape and scenic beauty in nationally designated areas and the assessment should also take account of relevant policies in local development documents. However, local landscape designations should not be used in themselves as reasons to refuse consent, as this may unduly restrict acceptable development.
Department for Communities and Local Government (2012) National Planning Policy Framework	Advises that landscapes should be taken into account in the planning process through the protection and enhancement of landscapes.
Greater London Authority (2011) The London Plan	The Scheme falls within Thames Policy Areas, as part of the London Blue Ribbon Network; the London Plan requires Thames-side boroughs to identify these policy areas and formulate corresponding policy that is consistent with the London Plan in

Policy/Legislation	Summary of Requirements
	relation to the protection and enhancement of townscape and views.
Royal Borough of Greenwich Council (2006) Greenwich Unitary Development Plan (UDP): Policy W2 (Thames Policy Area)	This policy advises that townscapes and views need to be protected and enhanced within Thames Policy Areas.
Royal Borough of Greenwich Council (2006) Greenwich Unitary Development Plan (UDP): Policy D27 (Local Views)	This policy advises that planning permission will be given for development which would not have a seriously adverse effect on the overall perspective and essential quality of Local Views. A Local View is situated near the Scheme at the Pilot Public House forecourt, within Metropolitan Open Land (MOL), affording a view of the Millennium Dome from the Central Park. The Scheme would not disrupt this view, as it would be obscured by intervening parkland vegetation (within the MOL) which would not be affected by the Scheme. As a result the Local View is not considered further within this assessment.
London Borough of Newham Council (2012) Newham 2027, Newham's Local Plan - The Core Strategy: Policy INF7 (Blue Ribbon Network)	This policy advises that landscape character and views will be protected and enhanced within the Blue Ribbon Network, which falls within Thames Policy Areas.

13.3 Work Undertaken to Date

- 13.3.1 In relation to townscape and visual amenity, effects would be localised and centred on the proposed tunnel portals/highway links rather than the proposed tunnel, as a result the study area limits extend only 500m from the centreline of the Scheme, as shown on Drawing 13.1. Beyond these extents, the Scheme is not anticipated to be readily perceptible as part of the local townscape or within views. Relevant desk-based information has been obtained from the Greater London Authority, Royal Borough of Greenwich Council, London Borough of Newham Council and Ordnance Survey.
- 13.3.2 Field survey work was undertaken during summer 2013. Survey viewpoints were selected to represent the range of views affected. Viewpoint photographs were taken in accordance with Landscape Institute (LI) guidance, entitled Photography and Photomontage in Landscape and Visual Impact Assessment (LI, 2011), using a digital single lens reflex (SLR) camera, with lens selected to provide the digital equivalent of 50 mm focal length for a 35 mm film format SLR camera. Photographs were then stitched together to generate a panorama spanning approximately ninety degrees in the direction of the Scheme (the extent of the view that would be experienced by the viewer at the selected viewpoint, when facing in that direction).

13.4 The Existing Environment

- 13.4.1 Newham Character Study (London Borough of Newham Council, 2011), undertaken to inform Newham Core Strategy, identifies that the Scheme falls within the 'Southern part of the borough, including the Royal Docks, (Silvertown, North Woolwich) and Beckton', key features of which are identified as 'the Royal Dock basins (from c.1885), airport and River Thames, industrial development around the Tate and Lyle factory and Thames Wharves and modern service industry development at ExCeL (hotels, exhibition centre); ex-railway lands (some incorporated as the modern road network); the DLR and emerging Crossrail route.' A character study has not been prepared at this stage for the Royal Borough of Greenwich.
- 13.4.2 Whilst Listed Buildings (with historical/cultural associations) occur at the Royal Victoria Docks, north of the Scheme, and the approach to Blackwall Tunnel, at the western edge of the Scheme, the local townscapes in the immediate vicinity of the proposed tunnel portals/road junction alterations are largely defined by highway corridors, light industrial/commercial areas and derelict land, as illustrated by photographs shown on Drawings 13.2 and 13.3. These townscapes include a number of features and elements that are discordant, derelict or in decline, with few features of value (through use/perception) or with historic/cultural associations that could not be replaced. As a result, it is anticipated that these townscapes are of low sensitivity, by the nature of their character, they would be able to accommodate change of the type proposed without undue townscape effects and with considerable scope for townscape enhancement.
- 13.4.3 Visual receptors comprise low sensitivity light industrial/commercial places of work (including Hanson, Waterfront Studios, Brenntag UK Ltd, Ranburn Ltd, Studio 338 Bar and O'Keefe Construction), low sensitivity highway/road users (including A1020 Lower Lea Crossing, A1011 Silvertown Way, Tidal Basin Road, Dock Road, Scarab Close, A102/Blackwall Tunnel Approach, Tunnel Avenue, Millennium Way, Ordnance Crescent, Boord Street, Morden Wharf Road), moderate sensitivity designated tourist routes (comprising National Cycle Route 13 and the Emirates Air-Line) and high sensitivity residential properties at the Royal Victoria Docks (Western Beach Apartments). Existing views from these receptors are characterised by the presence of existing highway corridors together with light industrial/commercial and derelict townscape components, with considerable scope for enhancement, as illustrated by the photographs shown on Drawings 13.2 and 13.3.
- 13.4.4 The local environment will change considerably over the coming years as a result of the large amount of development proposed in this area. To ensure that the assessment is based on the most accurate and up to date information about the future baseline, this will be considered in order to inform the ES.

13.5 Potential Significant Effects

- 13.5.1 The land surrounding both the southern and northern portals is currently characterised by highway corridors, light industrial/commercial areas and derelict land. It is considered that these townscapes would be able to

accommodate the proposed change, with scope for enhancement. In terms of visual amenity, nearby sensitive visual receptors include users of tourist routes (such as Emirates Air Line and National Cycle Route 13) and residential properties.

- 13.5.2 Construction activities, stockpiling of material/spoil and heavy vehicle movements could cause temporary disruption to townscape and views however construction best practice such as targeted use of hoarding would be used to limit disruption to townscape and visual amenity.
- 13.5.3 In terms of permanent impacts, the Scheme design is being carefully considered in order that the proposals would be integrated with the local townscape and, where possible, opportunities are taken to enhance townscape and visual amenity.
- 13.5.4 Based on the information available to date, the potential significant effects that could arise from construction and operation of the proposals are set out in Table 13-2.

Table 13-2 Townscape and Visual Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	Disruption to townscape through construction activities including movement of plant/vehicles and creation of materials stockpiles.	Local townscape (low sensitivity).	Construction best practice, including use of hoarding, where appropriate, to limit townscape disruption.
	Disruption to views through construction activities including movement of plant/vehicles and creation of materials stockpiles.	Visual receptors (low sensitivity places of work and roads; moderate sensitivity tourist routes and high sensitivity residential properties).	Construction best practice, including use of hoarding, where appropriate, to limit visual intrusion.
Permanent Impacts	Potential for the Scheme to introduce elements that are at variance with the local townscape.	Local townscape (low sensitivity).	Carefully considered design, including landscape design, with strong potential to enhance the local townscape.
	Potential for the Scheme to introduce elements that compromise existing views.	Visual receptors (low sensitivity places of work and roads; moderate sensitivity tourist routes and high sensitivity residential properties).	Carefully considered design, including landscape design, with strong potential to enhance the local visual amenity.

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Cumulative Impacts	The Greenwich Master Plan may influence townscape and visual conditions, in the vicinity of the Scheme.	Local townscape and visual receptors.	None anticipated at this stage.

13.6 Further Assessment Work to be Undertaken

- 13.6.1 The assessment will consider townscape (urban landscape) rather than landscape, given the urban location of the Scheme. The area in general can be considered to be an E4 Environmental Zone (high district brightness areas - town/city centres with high levels of night-time activity) within Institution of Lighting Engineers classification. Therefore, further lighting on the portals of the tunnel is likely to have a negligible effect. However, the need for a night time assessment has been reviewed during scoping consultation with relevant stakeholders and will be undertaken for the preparation of the ES.
- 13.6.2 A detailed impact assessment will be undertaken, based on Highways Agency Interim Advice Note 135/10. The assessment and measures to mitigate impacts on townscape and visual amenity/views will be developed, as appropriate, in liaison with the project design team and consultees (including the London Borough of Newham Council, Royal Borough of Greenwich Council and London Borough of Tower Hamlets Council), as part of the iterative EIA and design process. Construction phase activities (including spoil storage) and night-time visual amenity will be taken into account in the assessment. Services/utilities constraints will be taken into account in the design/mitigation proposals (including any planting proposals).

14 Water Environment

14.1 Introduction

14.1.1 This Chapter identifies and assesses the Water Environment of the Scheme. The main focus will be on establishing the baseline conditions, summarising the relevant legislation and policy covering the assessment, and identifying the potential effects during and post- construction.

14.1.2 It is considered that sufficient baseline data is available to characterise the water quality of surface water receptors so water quality sampling and analysis is not proposed. Based on the baseline research undertaken to date it is considered that no key elements of the water environmental impact assessment (water quality, drainage and flood risk) can be scoped out.

14.2 Regulatory and Policy Framework

14.2.1 The environmental assessment will be undertaken in accordance with current international and national legislation, and national, regional and local plans and policies. A summary of these has been provided in Table 14-1 below.

Table 14-1 Water Environment Regulatory and Policy Framework

Policy / Legislation	Summary of Requirements
National Planning Policy Framework, 2012	The NPPF and the Technical Guidance to the National Planning Policy Framework (TGNPPF) set out the Government's planning policies for England and how these are expected to be applied. As the Scheme encroaches into Flood Zone 3, a standalone Flood Risk Assessment (FRA) is required to be prepared.
Water Framework Directive (WFD), 2000	The objectives of the Directive are to enhance the status, and prevent further deterioration, of aquatic ecosystems, promote the sustainable use of water, reduce pollution of water (especially by 'priority' and 'priority hazardous' substances) and ensure progressive reduction of groundwater pollution. The River Thames and lower Lea are monitored under the requirements of the Water Framework Directive (WFD).
CIRIA Development and Flood Risk: Guidance for the Construction Industry (C624) (2004)	All developments may lead to an increase in downstream flood risk due to increased runoff rates and volumes. Therefore, all new developments should be designed so that runoff from the development is considered and, if appropriate, controlled. Safe access to and from the development should be allowed for during a flood event and the above should be met for the lifetime of the development including considerations for climate change.
The Thames Estuary 2100 plan (2014)	The Thames Estuary 2100 plan divides the Thames Estuary into policy units with separate policies. The right bank of the river Thames in the vicinity of the southern tunnel approach is within the Greenwich policy unit and has been given a "P5" policy which means "Take further action to reduce the risk of flooding (now and in the future)." The left bank of the River Thames is within the Royal Docks policy unit which has been

Policy / Legislation	Summary of Requirements
	<p>given a “P4” policy which means “Take further action to sustain current scale of flood risk into the future (responding to potential increases in flood risk from urban development, land use change, and climate change).” Therefore, it can be assumed that the defences which currently provide protection to the proposed tunnel approaches will be maintained into the future.</p>
<p>Unitary Development Plan (UDP) – Royal Borough of Greenwich (2005)</p>	<p>A Unitary Development Plan (UDP) sets out a vision for providing new homes, jobs, transport and local services, whilst also protecting the environment. The Greenwich Unitary Development Plan forms the current development plan for the borough.</p> <p>In the Greenwich UDP there are a number of policies relevant to the proposed development. Policy SM1 and Policy SM6 state how vital the Silvertown Tunnel will be to improving transport in the borough.</p> <p><u>Policy SM1</u> To effectively link major transport generators and attractors to the current and foreseeable transport network, at no or minimal cost to the environment.</p> <p><u>Policy SM6</u> To safeguard the Crossrail route, changes to the strategic public transport and road networks in respect of Deptford Church Street junction realignment, Thames Gateway Bridge and to have regard to notification requirements in respect of a third Blackwall crossing (to Silvertown Way in L.B.Newham) Woolwich Rail Crossing and DLR (Woolwich) Extension. Greenwich Waterfront Transit is another strategic scheme the Council supports, and will be safeguarded as and when appropriate.</p> <p>Policy E17, Policy E18 and Policy E19 states how developments should be controlled so as not to give rise to flooding.</p> <p><u>Policy E17</u> All development will be controlled so as not to give rise to flooding or surface water, groundwater or aquifer pollution. Surface water should be disposed of as close to source as possible, or attenuated before discharge to a watercourse or surface water sewer. Surface water should not be allowed to enter the foul system.</p> <p><u>Policy E18</u> Planning applications for development on sites of more than 1 hectare within these areas must be accompanied by a flood risk assessment appropriate to the scale of and nature of the development, the level of flood risk, and the protection afforded by the existing defences.</p> <p>Development in undeveloped areas at risk from fluvial flooding will only be permitted in exceptional circumstances. In developed areas at risk from fluvial flooding, development will only be permitted where appropriate flood defence measures are taken, and it can be demonstrated that there is no increased risk of flooding to other sites.</p> <p><u>Policy E19</u> The Council will, in consultation with the Environment Agency, ensure that new developments safeguard existing tidal and fluvial flood</p>

Policy / Legislation	Summary of Requirements
	<p>defences. Where works are being carried out in proximity to a tidal or fluvial flood defence the Council will seek to safeguard, and where possible extend, public access to the waterfront and protect and enhance existing ecological features. Generally, consideration will be given to maintaining and/or improving the existing ecological features, the existing flood defences and access to flood defence facilities for operational and maintenance purposes.</p>
<p>Unitary Development Plan (UDP) – London Borough of Newham (2012)</p>	<p>A Unitary Development Plan (UDP) sets out a vision for providing new homes, jobs, transport and local services, whilst also protecting the environment. The Newham Unitary Development Plan, forms the current development plan for the respective borough.</p> <p>In the Newham UDP there are a number of policies relevant to the proposed development. Policy 7.6 states how vital the Silvertown Tunnel will be to improving transport in the borough.</p> <p><u>Policy 7.6</u> Over the Plan period major improvements to the public transport system will be achieved, particularly the extension of the DLR to Silvertown and London City Airport. Construction will commence on other major Schemes, including a combined international and domestic station at Stratford on the Channel Tunnel Rail Link, CrossRail, and Woolwich River Crossing by rail, East London Transit and the Thames Gateway Bridge. Most of the London Bus priority network will be completed over the Plan period, resulting in more reliable and faster bus services. There will also be major improvements to the road system, including the A13 junction reconstructions, and it is hoped that the Silvertown Crossing and A406/A13 flyover will commence.</p> <p>Policy 3.123 states how development should not have an adverse effect on the water environment.</p> <p><u>Policy 3.123</u> Water pollution can have a potentially devastating effect on the environment, such as loss of river life and loss of amenity, and can have effects on human health and safety. Therefore, the council will not permit development which is likely to adversely affect the water environment or which would prove unacceptable to the Environment Agency and other bodies.</p>
<p>London Borough of Newham Level 2 SFRA (2010) and London Borough of Greenwich SFRA (2010)</p>	<p>A Strategic Flood Risk Assessment (SFRA) was completed in 2010 for Newham and in 2011 for Greenwich. SFRAs are intended to guide development decisions and allow Local Planning Authorities to apply the NPPF Sequential Test.</p> <p>Both the SFRAs recognise that development on land that is outside Flood Zones 2 and 3 should be pursued first. Newham SFRA and the Greenwich SFRA predict floodwater depths of 3.1m and 2.6m at the proposed northern and southern tunnel approaches, respectively, during the 1 in 200 year plus climate change breach event.</p>
<p>Drain London, London Borough of Newham Surface Water Management Plan (2010)</p>	<p>A Surface Water Management Plan was completed in 2011 for Newham. The report outlines the preferred surface water management strategy for the borough as well as demonstrating that the proposed scheme is shown not to be at risk of surface water flooding or in a critical drainage area.</p>

Policy / Legislation	Summary of Requirements
Non Statutory Planning Guidance – Sustainable Drainage SPG (2002)	This supplementary planning guidance document is provided by SGC as a guide for developers which identifies when and how to incorporate sustainable drainage solutions into new development. The leaflet has been produced jointly with the Environment Agency.

14.3 Assessment Work Undertaken to Date

14.3.1 On the 21st July 2014 a meeting with the Environment Agency regarding the water environment section in the Scoping Report was undertaken to discuss the proposed scope of the assessment. The outcome of discussions was reflected in the Environment Agency’s scoping response.

14.3.2 The study area has been defined to include the area within the application boundary, in addition to downstream reaches of the Rivers Thames and Lea and the Royal Victoria Dock, and any other surface or groundwater receptor identified within 500m of the application boundary.

14.3.3 Additional baseline data has been collected from a number of published documents, in particular:

- The London Borough of Newham Level 2 Strategic Flood Risk Assessment (Capita Symonds, 2010).
- The London Borough of Greenwich Strategic Flood Risk Assessment (JBA, 2011).
- Drain London, London Borough of Newham Surface Water Management Plan (Capita Symonds, 2011)
- Thames Catchment Flood Management Plan (Environment Agency, 2009).
- The Silvertown Tunnel Flood Risk Analysis report, (Mott MacDonald, 2013).
- What’s In Your Backyard’ Mapping, Environment Agency, <http://maps.environmentagency.gov.uk/wiyby> (linked accessed June 2014).

14.3.4 A site walkover was undertaken on 29th May 2014. The walkover comprised a visual assessment of the catchment to develop an understanding of the hydraulics of the surrounding area and the site. It should be noted that, due to access restrictions, not all the site could be accessed during the walkover.

14.4 The Existing Environment

14.4.1 For both the northern and southern Scheme sites, the majority of the development is located in Flood Zone 3, which is defined as land assessed as having a high probability of flooding from rivers or the sea. There are some

small areas located in Flood Zone 2, which is defined as medium probability of flooding from rivers or the sea. Both the northern and southern tunnel approaches are classed as being in an 'Area Benefitting from Defences' (ABD). The flood defences along the tidal Thames in this area are all raised, man-made and privately owned. They provide a standard of protection up to a 1 in 1000 year flood event. The defences are inspected twice a year by the Environment Agency and must be maintained by their owners to a crest level of 5.18m AOD. As part of this study there is no requirement to survey the flood defences. The main source of flooding to the scheme is from the breach of existing defences in combination with extreme tide levels.

- 14.4.2 According to the Newham SFRA the northern approach to the tunnel lies within the flood extent for the 1928, 1947 and 1953 flood events. The southern approach is approximately 400m north of the area flooded during the 1928 flood event.
- 14.4.3 According to the EA surface water maps for both the northern and southern sites the majority of the site is located in an area of very low surface water flood risk (less than 1 in 1000 chance). There are some small isolated areas where the site is at low (between 1 in 1000 and 1 in 100 chance), medium (between 1 in 100 and 1 in 30 chance) and high (greater than 1 in 30 chance) risk of surface water flooding. In the southern part of the scheme there is an area of low surface water flood risk along the road which is the entrance of the tunnel. As the site is larger than 1ha, a Flood Risk Assessment will be undertaken to support the ES Chapter.
- 14.4.4 It is understood that currently the southern site within Silvertown is occupied by four waste sites. The EA has stated that currently there is unsuitable drainage infrastructure on site as there is significant pollution of the local watercourses. The surface water drainage serving the Dock Road providing access to the site is provided by continuous kerb drainage using beanie blocks. Several sections of the beanie blocks have been damaged and the outlet from the beanie blocks has not been connected to the lowest point of the road. On the northern site there is a balancing pond which receives water from the site and Scarab Close. The pond discharges into a channel called the Cut which connects to the Thames. The pond and Cut are heavily silted, restricting these outfalls.
- 14.4.5 Based on information to date, and in accordance with the definitions of receptor value using assessment criteria drawn from Part 10 of Volume 11 of the DMRB, the River Lea and River Thames is assigned a medium value, the Victoria Dock is assigned a low value and groundwater resources within the study area are assigned a medium value.
- 14.4.6 The River Thames and lower Lea are monitored under the requirements of the Water Framework Directive (WFD) and their current ecological potential is defined as Moderate. The chemical quality of these waterbodies currently fails WFD objectives.

14.5 Potential Significant Effects

- 14.5.1 At present the development is located in Flood Zone 3, with some small areas located in Flood Zone 2. Any construction work in Flood Zone 2 and 3 and near

to flood defences may be at risk of flooding. The most important way to mitigate against this is to ensure that construction workers are aware of the potential flood risk and that flood risk is part of the health and safety procedure. For the development located within Flood Zone 2 and 3 to mitigate against it is recommended to sign up for EA flood warnings for the life time of the tunnel so the tunnel can be closed and users are prepared in advance of a flood.

- 14.5.2 Construction work may cause heavily silted, or contaminated runoff from construction sites. To mitigate against this treatment of temporary construction drainage discharges prior to entry to the water environment is recommended. As well as implementation of best-practice pollution prevention methods as outlined in the EA's Pollution Prevention Guidelines.
- 14.5.3 Introduction of impermeable surfaces may increase both the risk of surface water flooding on site as well as the risk of increasing flood water levels downstream of the site. Currently there is failure of the drainage system. The Scheme proposes to fix and improve this. It is proposed to improve this by the provision of storage to attenuate the rates of discharge of surface water drainage. It is believed that once this has been done the drainage system will be able to cope with the additional increase in surface water so will not increase surface water flood risk on site or downstream of the site. SuDS will be used where appropriate.
- 14.5.4 Based on the information available to date, the potential significant effects that could arise from construction and operation of the proposals are summarised in Table 14-2.

Table 14-2 Water Environment Potential Significant Effects

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
Temporary Impacts	Any works within Flood Zones 2 and 3 or in close proximity to, existing flood defences may be at risk of flooding. Additionally flood defence work has to take place within 16m of flood defence.	Construction work and construction Site in both Greenwich and Silvertown	Ensure construction workers are aware of potential flood risk and that flood risk is part of the health and safety procedure. Regular liaison with EA through design and construction, Sign up for EA flood warnings. Implement appropriate drainage measures on site
	Water Requirements during construction	Construction sites in both Greenwich and Silvertown	Water would be required at both the north end at south end tie-in construction sites. More details of the water requirement during

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
			construction contractor involvement.
	Construction work may cause heavily silted, or contaminated runoff from construction sites.	Water quality of surface water bodies including the River Thames and Lower Lea.	Treatment of temporary construction drainage discharges prior to entry to the water environment. Implementation of best-practice pollution prevention methods as outlined in the EA's Pollution Prevention Guidelines. Currently there is failure/collapse of current drainage system. The development proposes to improve this prior to beginning works.
Permanent Impacts	Any development work within Flood Zones 2 and 3 or in close proximity to, existing flood defences may be at risk of flooding.	The tunnel	Sign up for EA flood warnings so tunnel can be closed and users are prepared in advance of a flood.
	Introduction of impermeable surfaces may increase both the risk of surface water flooding on site as well as the risk of increasing flood water levels downstream of the site.	The tunnel and areas downstream of the site	Currently there is failure/collapse of current drainage system. The development proposes to fix and improve this. It is proposed to improve this by the provision of storage to attenuate the rates of discharge of surface water drainage. It is believed that once this has been done the drainage system will be able to cope with the additional increase in surface water so will not increase surface water flood risk on site or downstream of the site. Landscaping to increase permeable surfacing.

	Impact Description	Receptor(s) affected	Possible Mitigation / Enhancement Measures
			SuDS

14.6 Further Assessment Work to Be Undertaken

- 14.6.1 To enhance the baseline understanding specific data requests will be made to the EA for:
- Updated 'Flood Product 4 and 8' information for the site
 - Details of existing licensed abstractions from surface water and consented discharges
 - Records of any pollution incidents to controlled waters
 - Mapping providing details of the local sewer network.
- 14.6.2 Thames Water will also be consulted to gather data to define the existing sewer network. The London Boroughs of Newham and Greenwich will be consulted in their role as Lead Local Flood Authorities and to check for records of any private water supplies.
- 14.6.3 In addition to the baseline data described the following additional information is required to inform the assessment:
- Two-way traffic (AADT) for the design year Do-Minimum and Do-Something scenarios.
 - Percentage of HGVs.
 - Areas (impermeable and any permeable) draining to highway drainage outfalls along the connecting highway network.
 - Proposed surface water drainage outfall locations.
 - Information regarding dewatering on site. This is expected to become available towards the end of the Reference design commission and will be confirmed by the Design & Build contractor.
- 14.6.4 Further consultation with the EA is required to discuss surface water drainage arrangements and flood protection/mitigation. If new drainage outfalls and discharge consents are required it will be included in the final Environmental Assessment. Consultation regarding flood defence consent with the EA is also required.
- 14.6.5 Further consultation with the Port of London Authority (PLA) to discuss if any temporary or permanent land take licenses are required. If licenses are required they will be covered in the final environmental assessment.
- 14.6.6 At present it is anticipated that the Thames Wharf will be used for the construction of Silvertown tunnel. As this wharf is currently being used for the

Crossrail project, no physical works will be required to enable this usage. However this will be confirmed in the EIA process.

- 14.6.7 A more detailed final environmental assessment will be undertaken with our enhanced understanding of the baseline condition and climate change scenarios which assesses the potential for accidents/spillages and identifies appropriate mitigation measures.
- 14.6.8 The significance criteria will be derived from the Design Manual for Roads and Bridges, Volume 11 Environmental Assessment Section 3 Environmental Topics Part 10 Road Drainage and the Water Environment (HA 45/09) (Highways Agency, 2007). In the final Environmental Assessment the assessment of potential effects on the water environment will be made using assessment criteria drawn from Part 10 of Volume 11 of the DMRB, with reference to the paper Practical Methodology for Determining the Significance of Impacts on the Water Environment (Mustow et al, 2005).

15 Conclusions and Next Steps

- 15.1.1 This Introductory Environmental Assessment Report summarises the assessment of potential environmental effects work done to date as part of the EIA process for the Scheme. It presents an early indication of the potential impacts of the proposals and the mitigation measure that we are considering. Key impacts that have been identified are:
- Beneficial impacts for all road users during operation with regard to reduced journey times, increased reliability and reduced congestion levels at peak times. Beneficial impacts for public transport users are related to enhancements of the bus services and more cross-river opportunities.
 - Temporary impacts during construction, such as noise, dust, travel disruption, waste generation
 - The Air Quality impacts of the Scheme would be dependent on the change in traffic flows. Should the impact of the Scheme be significant, mitigation measures shall be investigated to attempt to reduce the Scheme impacts. There are limited mitigation measures to control emissions from vehicles as a result of the Scheme; however the attractiveness of the Scheme (and therefore the number of vehicles using it) could be influenced by user charges.
 - Initial calculations have indicated a potential for increased noise levels at residential receptors within close proximity to the entrance/exit of the Scheme. Mitigation measures include appropriate design, user charging, noise barriers, and prevention and control measures as part of a CEMP.
- 15.1.2 Potential mitigation measures for all significant adverse impacts are summarised for each environmental topic in Appendix 15A.
- 15.1.3 Responses received through the consultation process will be reviewed by the engineering and environmental design teams. Where appropriate, we will consider the need for further studies, modifications to the Scheme, and / or further development of mitigation measures. Once the preliminary design for the scheme is complete, further studies and assessments will be undertaken to provide detailed assessments and mitigation proposals in the form of a Preliminary Environmental Information Report (the PEIR), which will be presented at a further public consultation in Spring 2015. Comments received at this consultation will be considered, and an Environmental Statement (ES) for the proposed scheme will be prepared to accompany the application for a Development Consent Order.

Abbreviations

AADT	Average Annual Daily Traffic
ABD	Area Benefitting from Defences'
AQFAs	Air Quality Focus Areas
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BAP	Biodiversity Action Plan
BPEO	Best Practicable Environmental Option
BRE	Building Research Establishment
CDE	Construction, Demolition and Excavation
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRTN	Calculation of Road Traffic Noise
CLR 11	Contaminated Land Report 11
CoP	Code of Practice
COSHH	Control of Substances Hazardous to Health
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DLR	Docklands Light Railway
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
ELHAM	East London Highway Assignment Model
ELWA	East London Waste Authority
EPA	Environmental Protection Act 1990
ES	Environmental Statement
EU	European Union
FRA	Flood Risk Assessment
GiGL	Greenspace Information for Greater London
GLA	Greater London Authority
HA	Highways Agency

HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HWCN	Hazardous Waste Consignment Note
IAN	Interim Advice Note
IAQM	Institute of Environmental Management and Assessment
IP	Inter Peak
KER	Key Ecological Receptor
LAARC	London Archaeological Archive and Research Centre
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LBBD	London Borough of Barking and Dagenham
LBG	London Borough of Greenwich
LBH	London Borough of Havering
LBN	London Borough of Newham
LBR	London Borough of Redbridge
LBTH	London Borough of Tower Hamlets
LI	Landscape Institute
LNR	Local Nature Reserve
MBT	Mechanical Biological Treatment
MOL	Metropolitan Open Land
MOU	Measure of Uncertainty
MRF	Material Recovery Facilities
MTS	Mayor's Transport Strategy
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
OP	Off Peak
PCU/hr	Passenger Car Unit per hour
PFI	Private Finance Initiative
PINS	Planning Inspectorate

RRCs	Reuse and Recycling Centres
SAC	Special Area of Conservation
SAF	Strategic Assessment Framework
SFRA	Strategic Flood Risk Assessment
SINC	Site of Importance for Nature Conservation
SIL	Strategic Industrial Locations
SLR	Single Lens Reflex
SoCC	Statement of Community Consultation
SPA	Special Protection Area
SPG	Supplementary Planning Guidance
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TfL	Transport for London
TGNPPF	Technical Guidance to the National Planning Policy Framework
TLRN	Transport for London Road Network
TVIA	Townscape and visual impact assessment
UDP	Unitary Development Plan
UXO	Unexploded Ordnance
WAC	Waste Acceptance Criteria
WFD	Water Framework Directive
WHO	World Health Organisation
WHS	World Heritage Site
WSE 2011	Waste Strategy for England 2011
Zol	Zone of Influence

Glossary of Terms

Alluvium Sediment deposited by rivers on adjacent land.

Air Quality Management Areas An Air Quality Management Area (AQMA) is an area of land where air quality levels are breaching the national limits and require action to deal with or 'manage' this. Thus in places where National Air Quality Objectives are not likely to be achieved, the LPAs must declare an Air Quality Management Area.

Annual Average Daily Traffic (AADT) It is the total volume of vehicle traffic of a motorway or road for a year divided by 365 days.

Catchment A drainage/basin area within which precipitation drains into a river system and eventually into the sea; or the population region which is served by a city, town, or village.

Construction Environmental Management Plan (CEMP) Developed prior to any works commencing on site, the primary purpose which is to guide environmental management of implementation of the project.

Clay A soil separate consisting of particles < 0.002 mm in equivalent diameter.

dB(A): A-weighted decibels. The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not perceived to be as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.

Demography Study of both quantitative and qualitative aspects of human population.

Design Manual for Roads and Bridges (DMRB) A set of documents that provide a comprehensive manual system which accommodates all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads (including motorways).

Diffusion Tubes Passive gas collection (e.g. NO₂) devices consisting of a small tube containing a chemical absorbent. Diffusion tubes are used to determine relatively long period average concentrations, typically weekly, fortnightly or monthly.

Erosion Movement of soil materials by water or wind action

Emissions Standard The maximum amount or pollution concentration allowed to be released from a specific source.

Flood Zone 2 An area where flooding from watercourses is expected to occur between once in a hundred years and once in a 1000 years, or from the sea between once in a two hundred years and once in a 1000 years

Flood Zone 3 An area where flooding from watercourses is expected to occur more frequently than once in a hundred years or from the sea more than once in a two hundred years.

Fluvial flooding Flooding as a result of river flows overtopping river banks and spreading across adjacent land.

Geology The science that deals with the dynamics and physical history of the earth, the rocks of which it is composed, and the physical, chemical, and biological changes that the earth has undergone or is undergoing

Health Impact Assessment A process of assessing the impact of a project, plan or programme on human health and wellbeing.

Heavy goods vehicle Assumed to be buses, rigid trucks and semi-trailer trucks with a weight greater than 3 tonnes. Also heavy vehicles can be defined in terms of length as buses, or trucks with a length exceeding 5.25 metres.

Iron Age 800BC to AD43

Townscape Townscape is defined as the combination of buildings and the spaces between them and how they relate to one another to form the familiar and cherished local places within the town and its wider context

Leaching The transport of materials down through a soil as a result of water draining vertically down through the soil.

Listed Building A building that has been placed on the Statutory List of Buildings of Special Architectural or Historic Interest.

Material Recovery Facilities Specialised facilities that receive, separate and prepare recyclable materials. These recyclables will have been previously sorted or separated from other waste streams.

Mechanical Biological Treatment Plants used to treat residual municipal waste by a combination of physical and biological processes. The biological processes are aerobic decomposition and anaerobic digestion

Medieval Period 1066 to 1540

Mitigation Measures Methods employed to avoid, reduce, remedy or compensate for significant adverse impacts of development proposals.

Modern period 1914 to present

National Planning Policy Framework (NPPF) The National Planning Policy Framework set out the Government's planning policies for England. It provides a framework within which local authorities can produce their own

distinctive local and neighbourhood plans to reflect the needs and priorities of their communities.

Noise Sound which a listener does not wish to hear.

PM10 Particulate matter smaller than about 10 micrometers

Phase 1 Habitat Survey Recognised standard methodology for collating information on the habitat structure of a particular site.

Pollution An increase of matter or energy to a level considered harmful to living organisms or their environment.

Post-medieval period AD1540 to AD1914

Roman Period AD42 to AD410

Sensitive Receptors People or places that have the potential to experience impacts.

Scoping The process of identifying the issues to be addressed by the environmental impact assessment process. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered to be not significant.

Silt A soil separate consisting of particles 0.063 to 0.002 mm in equivalent diameter.

Site of Nature Conservation Importance Designations used by local authorities in England for sites of substantive local nature conservation and geological value

Soil The upper layer of the earth's crust, in which plants grow: descriptions usually identify the relevant characteristics of its (usually) horizontal layers in terms of their significance for soil characteristics and crop growth, usually to 1.2 m depth.

Statutory Related to legislation or prescribed in law or regulation.

Statutory Organisations Any principal council for the area where the land is situated, Natural England, English Heritage, the Environment Agency; and any other public authority which has environmental responsibilities and which the Secretary of State considers likely to have an interest in the project.

Study area The spatial area within which environmental effects are assessed (i.e. extending a distance from the project footprint in which significant environmental effects are anticipated to occur). This may vary between the topic areas.

Superficial deposits Sediments laid down over the top of the solid rocks, for example materials deposited by rivers.

Topsoil The upper part of a soil, often darker in colour and often considered to be more fertile than underlying layers.

Unemployment A person is defined as unemployed if he or she is not in employment, is available to start work in the next 2 weeks and has either looked for work in the last 4 weeks or is waiting to start a new job. This is consistent with the International Labour Office (ILO) standard classification.

Unexploded Ordnance Explosive weapons (bombs, shells, grenades, land mines, naval mines, etc.) that did not explode when they were employed and still pose a risk of detonation

Unitary Development Plan A statutory document that sets out a council's planning policies that will be used to guide development, conservation, regeneration and environmental improvement activity

References

- Atkins (September 2014) *Silvertown Tunnel Interim Reference Design Report*
- Atkins (April, 2013) *Silvertown Tunnel: Highway Infrastructure Conceptual Design Recommendations*
- Atkins (May, 2012) *TfL Silvertown Crossing: Highway Options and Feasibility Design (Volumes A to E)*
- Atkins (October, 2012) *TfL Crossing: Highway Options and Feasibility Design (Volumes F & G)*
- British Standards Institution (1997) *Method of rating industrial noise affecting mixed residential and industrial areas BS 4142: 1997*. British Standards Institution, Chiswick
- British Standards Institution (2009) *Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise BS 5228: 2009*. British Standards Institution, Chiswick
- British Standards Institution (2009) *Code of Practice for noise and vibration control on construction and open sites – Part 2: Vibration BS 5228: 2009*. British Standards Institution, Chiswick
- British Standards Institution (2013) *BS 5489-1 Code of Practice for the design of Road Lighting*
- Buildings Research Establishment (February, 2003) *Control of Dust from Construction and Demolition Activities*
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2006) *Guidelines for Ecological Impact Assessment*
- CIRIA (2001) *Contaminated Land Risk Assessment A Guide to Good Practice*
- Control of Pollution Act 1974 HMSO, London
- DCLG (2010) *Planning Policy Statement 5: Planning for the Historic Environment*
- DCLG (March, 2012) *National Planning Policy Framework*
- Defra (2007) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*
- Defra (2009) *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*
- Defra (2009) *Local Air Quality Management Technical Guidance*
- Defra (2009) *Odour Guidance for Local Authorities*
- Defra (2011) *Air Quality Plans for the achievement of EU air quality limit values for nitrogen dioxide (NO₂) in the UK*
- Defra (2011) *Trends in NO_x and NO₂ emissions and ambient measurements in the UK*. [Prepared by AEA]
- Defra (2012) *How can I remove the influence of higher NO₂ concentrations in 2010 from the background Maps*
- Department for Communities and Local Government (March, 2005) *Minerals Policy Statement 2: Controlling and Mitigating the Environmental Effects of Mineral Extraction in England*

Department for Transport (2009) *Road Vehicle Emission Factors 2009*

Department for Transport (2013) *Draft National Policy Statement for the National Road and Rail Networks*.

Department for Transport (2013) *Options for a New Lower Thames Crossing - Consultation Document*

Department of Transport and Welsh Office (1988) *Calculation of Road Traffic Noise*.

Environment Agency (2004) *Model Procedures for the Management of Contaminated Land CLR11*

European Commission (2002) *Assessment and Management of Environmental Noise Directive 2002/49/EC*

European Commission (2008) *Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe*

European Commission (2011) *European Council Directive No 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment*

European Commission (2014) *European Council Directive No 2014/52/EU of the European Parliament and of the Council of 12 March 2014 on the assessment of the effects of certain public and private projects on the environment*

Greater London Authority (2006) *Control of dust and emissions from construction and demolition*

Greater London Authority (July, 2011) *The London Plan*

Greater London Authority (May, 2010) *Mayor's Transport Strategy*

Greater London Authority (October, 2009) *London Regional Flood Risk Appraisal*

Highways Agency (1993) DMRB Volume 11 Section 2, Part 5, Volume 11 Section 3 Part 4 *Ecology and Nature Conservation*

Highways Agency (1999) Volume 2 Section 2 Part 9 BD 78/99 *Design of Road Tunnels*

Highways Agency (2007) DMRB Volume 11, Section 3, Part 1 *Air Quality*

Highways Agency (2007) Volume 11 Section 3 Part 2 HA 208/07 *Cultural Heritage*

Highways Agency (2008) DMRB Volume 11, Section 2, Part 1, *General Principles and Guidance on Environmental Impact Assessment*

Highways Agency (2008) Volume 11, Section 2, Part 5 205/08 *Assessment and Management of Environmental Effects*

Highways Agency (2009) IAN 125/09 *Supplementary guidance for users of DMRB Volume 11 Environmental Assessment*

Highways Agency (2009) Volume 11 Section 1 Part 1 HA 200/08 *Aims and Objectives of Environmental Assessment*

Highways Agency (2010) Interim Advice Note 130/10 *Ecology and Nature Conservation: Criteria for Impact Assessment*

Highways Agency (2011) DMRB Volume 11, Section 3, Part 7, HD 213/1 *Noise and Vibration*

Highways Agency (2011) IAN 153/11 *Guidance on the Environmental Assessment of Material Resources*

Highways Agency (August, 2001) DMRB Volume 11, Section 3, Part 6 *Land Use*

Highways Agency (June 2013) IAN 174/13 *Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07)*

Highways Agency (June, 1993) DMRB Volume 11 *Section 3 Part 8 Pedestrians, Cyclists, Equestrians and Community Effects and Community Effects*

Highways Agency (June, 1993) *Volume 11 Section 3 Part 9 Vehicle Travellers*

Highways Agency (June, 1993) *Volume 11, Section 3, Part 11 Geology and Soils*

Highways Agency (June, 2013) IAN 170/12 *Updated air quality advice on the assessment of future NO_x and NO₂ projections for users of DMRB Volume 11, Section 3, Part 1 Air Quality*

Highways Agency (May, 2007) DMRB Volume 11, Section 3, Part 1 HA 207/07 *Air Quality*

Highways Agency (November, 2010) *Interim Advice Note 135/10 Landscape and Visual Effects Assessment*

Highways Agency (October, 2011) IAN 153/11 *Guidance on the Environmental Assessment of Materials*

Hyder Consulting (November 2013) *River Crossings, Silvertown Tunnel Options Study Report*

Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2012 (Statutory Instrument 2012/787)

Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (Statutory Instrument 2009/2263)

Institute for Field Archaeologists (2012) *Standard and Guidance for Historic Environment Desk-Based Assessment*

Institute of Air Quality Management (2014) *Guidance on the assessment of dust from demolition and construction*

Institution of Lighting Engineers (ILE). 2000. *Guidance Notes for the Reduction of Light Pollution*. Warwickshire, UK: the Institution of Lighting Engineers.

London Borough of Newham (2012) *Newham Core Strategy*

London Councils' Guidance (November, 2006) *The Control of Dust and Emissions from Construction and Demolition*

Mayor of London (2013) *Sustainable Design and Construction, Draft Supplementary Planning Guidance*

Mott Macdonald (December, 2009) *New Thames River Crossing: Greenwich to Silvertown – Highways (Alignment and Interfaces)*

Mott Macdonald (February, 2012) *Silvertown Crossing Study: Tunnel Engineering*

Mott Macdonald (July 2013) *Silvertown Tunnel Further Development of Tunnel Engineering 298348/MNC/TUN/002*

Mott Macdonald (May, 2010) *New Thames River Crossing: Network Development and Forecasting Report*

Mott Macdonald (May, 2013) *TfL River Crossings – Ground Investigation Desk Study Preliminary Sources Study Report*

National Atmospheric Emissions Inventory [2014, online]

Office of the Deputy Prime Minister (2005) *Minerals Policy Statement 2 Annex 1: Dust*

Planning Inspectorate (April 2012) *Advice Note 9: Using the Rochdale Envelope*

Planning Inspectorate (April 2012) *The developer's pre-application, consultation, publicity and notification duties*

Planning Inspectorate (April, 2012) *Advice Note 12: Development with significant transport impacts consultation*

Planning Inspectorate (January, 2013) *Advice Note 10: Habitats Regulations Assessment relevant to nationally significant infrastructure projects*

Planning Inspectorate (July, 2013) *Advice Note 3: The Planning Inspectorate and Nationally Significant Infrastructure Projects*

Planning Inspectorate (July, 2013) *Advice Note 7: Environmental Impact Assessment: Screening, Scoping and Preliminary Environmental Information*

Planning Inspectorate (July, 2014) *Scoping Opinion Proposed Silvertown Tunnel.*

Steer Davies Gleave (2012) *Regeneration Report*

TfL (October 2014) *Outline strategy for user charging at Blackwall and Silvertown Tunnel*

TfL (September 2014) *Silvertown Tunnel Introductory Transport Assessment.*

TfL (April 2013) *River Crossings Consultation Report*

TfL (December, 2012) *East London River Crossings: Assessment of Options*

TfL (July 2014) *East London River Crossings - Assessment of Needs & Options East of Silvertown*

TfL (July, 2012) *TfL River Crossings Package Report to the Mayor on 2012 Informal Consultation*

TfL (October, 2014) *Silvertown Crossing: Assessment of Needs and Options*

TfL (October, 2014) *Silvertown Tunnel Outline Business Case*

TfL (October, 2014) *Silvertown Tunnel Traffic Forecasting Report*

TfL (October, 2014) *Silvertown Tunnel Traffic Forecasting Report*

The Environmental Noise (England) Regulations 2006 (as amended 2008, 2009).

Watts, G.R. (1990). *Traffic induced vibration in buildings. TRRL RR246, Transport and Road Research*

WSP (2014). *The River Crossings Business Survey*

Appendices

Appendix 3A Scoping Opinion Response Table

Appendix 5A Diffusion Tube Monitoring Data

Appendix 5B Legislative Background

Appendix 5C Air Quality Assessment Criteria

Appendix 7A Gazetteer of Heritage Assets

Appendix 8A Phase 1 Habitat Survey Target Notes

Appendix 10A Envirocheck Report

Appendix 11A Waste Management Infrastructure

Appendix 12A Noise Survey Data

Appendix 15A Mitigation Measures Summary Table

Appendix 3A

Scoping Opinion Response Table

The following table provides a response to each of the points raised in the Planning Inspectorate’s Scoping Opinion on the proposed content of the Environmental Statement for the Silvertown Tunnel. For each comment, where appropriate, we have identified how this will be addressed in the EIA process.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The following is a summary of the information on the proposed development and its site and surroundings prepared by the applicant and included in their Scoping Report. The information has not been verified and it has been assumed that the information provided reflects the existing knowledge of the proposed development and the potential receptors/resources. (Para 2.1 of PINS Report).	PINS	NA	NA
The project will provide a dual two-lane connection between the A102 Blackwall Tunnel Approach on Greenwich Peninsula and the Tidal Basin roundabout junction on the A1020 Lower Lea Crossing/Silvertown Way by means of twin tunnels under the River Thames. (Para 2.2 of PINS Report).	PINS	Scheme description	NA
The project is needed because existing nearby Blackwall Tunnel does not meet current dimensional and geometrical design standards; this contributes to incidents that cause the temporary closure of one or both bores, leading to traffic congestion. (Para 2.3 of PINS Report).	PINS	Scheme description	NA
The location of the project is set-out in section 1.2 of the Scoping Report. Plate 1-1 of the Scoping Report illustrates the proposed location of the Silvertown Tunnel. The application site boundary and project infrastructure is shown in more detail on drawing STWTN-ATK-GEN-XXXXDR-Z-00002 in Appendix A of the Scoping Report. (Para 2.4 of PINS Report).	PINS	Scheme description	NA
The tunnel would link areas immediately to the north and south of the Thames between Silvertown and the Greenwich Peninsula. (Para 2.5 of PINS Report).	PINS	Scheme description	NA
The northern portal of the proposed tunnel lies in the London Borough of Newham. This portal lies close to the Silvertown Quays which lie to the east of Silvertown Way where mixed use residential and commercial development is proposed. The surrounding area, around the perimeter of the Royal Victoria Docks, comprises mixed residential and recreational uses. Light commercial uses dominate to the	PINS	Scheme description	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
south of the elevated Silvertown Way and the Docklands Light Railway (DLR). (Para 2.6 of PINS Report).			
The north junction tunnel approach roads would impact on a small area of derelict land that is entirely surrounded by the cement works and the embankments of the DLR. (Para 2.7 of PINS Report).	PINS	Scheme description	NA
The southern tunnel portal lies on the Greenwich Peninsula in the Royal Borough of Greenwich. The current land use in this area is predominantly car parking, together with the O2 arena and commercial buildings located to the northwest and a leisure facility to the south-east. (Para 2.8 of PINS Report).	PINS	Scheme description	NA
A gas holder (approximately 75m in diameter) is located close to the highway realignment works on the western boundary of the project. (Para 2.9 of PINS Report).	PINS	Scheme description	NA
The surrounding area encompasses several industrial buildings on both sides of the Thames, it is anticipated that these buildings will not be affected. The area is currently classified as relatively deprived, but this is predicted to improve as a result of new development in the area. (Para 2.10 of PINS Report).	PINS	Socio-economic	NA
The World Heritage Sites of Maritime Greenwich and the Scheduled Greenwich Palace lie approximately 1.5 km to the south west of the proposed site. (Para 2.11 of PINS Report).	PINS	Cultural Heritage	NA
The number of routes available allowing vehicles to cross the Thames in this area are limited as there is a width restriction at the Rotherhithe Tunnel and a height restriction at the Blackwall Tunnel. These restrictions can lead to tunnel closures and delays. The existing road network in the area is struggling to keep up with increasing demand. (Para 2.12 of PINS Report).	PINS	Transport	NA
The Woolwich Ferry provides an alternative option to the tunnel for vehicles, however there are only a limited number of crossings per day and the ferry may not be ideally located for both current and future needs in the area. The lack of alternatives means that whenever there is a problem with any of the existing road	PINS	Transport	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
crossings, traffic is forced to make long diversions in order to cross the Thames. (Para 2.13 of PINS Report).			
Section 3 of the Scoping Report identifies the four main options which were initially identified for assessment: Option A Do nothing Option B Demand management and maximise public transport Option C Lower cost road options (ferry crossings) Option D Higher cost road options (road tunnels and bridges). (Para 2.14 of PINS Report).	PINS	Alternatives	NA
These options were then subdivided into more specific options, from which the following schemes were shortlisted for further assessment: User charging at the Blackwall Tunnel (in conjunction with new infrastructure) A bored tunnel at Silvertown A new vehicle ferry at Gallions Reach A new vehicle ferry at Woolwich; and A new local road bridge or tunnel at Gallions Reach (in conjunction with Silvertown tunnel). (Para 2.15 of PINS Report).	PINS	Alternatives	NA
The above options were appraised to determine whether or not they would meet the defined investment criteria. This appraisal demonstrated that a combination of measures would be required to meet the criteria. The package identified as most closely meeting the Mayor's policies and the investment criteria was the one comprising: Silvertown Bored Tunnel; Gallions Reach Ferry; and User Charging at the Blackwall Tunnel (only with new infrastructure). (Para 2.16 of PINS Report).	PINS	Alternatives	NA
The proposed Silvertown Tunnel would provide a dual two lane connection between the A102 Blackwall Tunnel Approach on Greenwich Peninsula and the Tidal Basin roundabout junction on the A1020 Lower Lea Crossing/Silvertown Way by means of twin tunnels under the River Thames. The twin bored tunnels (11.0m internal diameter and 1.0km long) would be designed with a circular cross section with cross	PINS	Scheme description	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>passages for evacuation at maximum 350m centres. The tunnel approaches would be cut and cover. The speed limit within the tunnel and on the approach roads would be 30mph. (Para 2.17 of PINS Report).</p>			
<p>The project would pass under the River Thames, inside an area of land that has been safeguarded for this purpose; the applicant must ensure that the boundaries of the safeguarded land are clearly identified within a plan included within the ES. (Para 2.18 of PINS Report).</p>	PINS	Scheme description	The boundaries of the safeguarded land will be clearly identified within a plan included within the ES
<p>The Blackwall Tunnel does not meet current dimensional and geometrical design standards contributing to a high number of traffic incidents that necessitate temporary closure of one or other bore (there were circa 1400 closures in 2012). The new tunnel would be built to modern standards and would be large enough to carry vehicles of all sizes. (Para 2.19 of PINS Report).</p>	PINS	Scheme description	NA
<p>Pedestrians and cyclists would not be able to use the Silvertown Tunnel for safety reasons, but could use the existing nearby Emirates Air Line (2.20 of PINS Report).</p>	PINS	Scheme description	NA
<p>The project design and alignment provides for:</p> <p>A grade-separated, free-flow link from the A102 Blackwall Tunnel approach, to the south of Blackwall Tunnel, to the Silvertown Tunnel south portal</p> <p>An at-grade interchange with the Tidal Basin Roundabout providing a link from the Silvertown Tunnel north portal to the local road network with direct access to the A1020 Lower Lea Crossing/Silvertown Way</p> <p>Reconnection of Tunnel Avenue to the west of the A102 on the Greenwich Peninsula to improve local accessibility</p> <p>Public Transport and non-motorised user links to improve accessibility and safety</p> <p>Consideration of emergency/contingency planning including impacts on the wider network; and</p> <p><input type="checkbox"/> Integration with land development proposals (e.g. Greenwich Peninsula Masterplan). (Para 2.21 of PINS Report).</p>	PINS	Scheme description	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The northern highway arrangement is shown on Drawing STWTN-ATK-GEN-ANXX-DR-Z-00001 in Appendix A of the Scoping Report. (Para 2.22 of PINS Report).	PINS	Scheme description	NA
The northern arrangement would require the elongation of the existing Tidal Basin roundabout to provide a suitable tie-in for the tunnel approach road. This modification incorporates a cut-through for southbound traffic approaching the tunnel from the Lower Lea Crossing providing a direct route through the signalised roundabout. This design would ensure that full access is maintained at the junction with all traffic navigating the signalised roundabout conventionally, apart from the aforementioned traffic flow that would cut through the centre. (Para 2.23 of PINS Report).	PINS	Scheme description	NA
The southern highway arrangement is shown on Drawing STWTN-ATK-GEN-ANXX-DR-Z-00001 of Appendix A of the Scoping Report. (Para 2.24 of PINS Report).	PINS	Scheme description	NA
The southern section would create a free-flow connection between the tunnel and the A102 from the south only. This would be achieved by raising the vertical alignment of the A102 southbound carriageway such that it spans over the new northbound tunnel approach road, by means of a new bridge, as it diverges from the A102 northbound carriageway. (Para 2.25 of PINS Report).	PINS	Scheme description	NA
The southbound exit from the tunnel would join the A102 southbound carriageway as a lane gain, with a suitable weaving length, before the nearside lane tapers down. (Para 2.26 of PINS Report).	PINS	Scheme description	NA
Extensive retaining walls would be utilised to accommodate the significant level differences between carriageways around the southern section and thereby reduce overall landtake. (Para 2.27 of PINS Report).	PINS	Scheme description	NA
The Silvertown Tunnel would connect with the existing road network from the north portal to the A1020 Lower Lea Crossing/Silvertown Way and from the south portal to the south of the Blackwall Tunnel and via a gradeseparated, free-flow link from the A102 Blackwall Tunnel approach. (Para 2.28 of PINS Report).	PINS	Scheme description	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
River facilities are currently being considered for delivery of tunnel segments and other bulk materials to the site and removal of spoil via Thames Wharf. (Para 2.29 of PINS Report).	PINS	Scheme description	NA
An indicative construction programme has been developed which indicates that the construction period would be approximately 4-5 years. The current construction programme assumes some enabling works would commence during 2017/2018. The programme assumes that the tunnel would be bored seven days a week. (Para 2.30 of PINS Report).	PINS	Scheme description	NA
The main bores would be constructed by a tunnel boring machine and would have a lining of reinforced pre-cast concrete segments. The segments would be bolted longitudinally and radially and would be fitted with gaskets to render the lining watertight. (Para 2.31 of PINS Report).	PINS	Scheme description	NA
Excavated material from tunnelling activity, the construction of the portals and general construction waste would be removed from the site where the tunnel boring machine enters the ground and from the area of the cut and cover and open cut portals located at the northern and southern ends of the tunnel at Silvertown and the Greenwich Peninsula respectively. (Para 2.32 of PINS Report).	PINS	Scheme description	NA
To minimise disruption to the highway network, and reduce carbon emissions, river facilities are currently being considered for delivery of tunnel segments and other bulk materials to the site and the removal of spoil via Thames Wharf. (Para 2.33 of PINS Report).	PINS	Scheme description	NA
Spoil would travel by conveyer from the tunnel to a storage site and would then transfer through a loading bunker and conveyer to a barge at Thames Wharf. (Para 2.34 of PINS Report).	PINS	Scheme description	NA
The tunnel segments would be off-loaded from the barge by a crawler crane and placed in a designated segment storage stack area. Segments would be moved from the storage area by a gantry crane to the tunnel. (Para 2.35 of PINS Report).	PINS	Scheme description	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
Whilst the proximity to the River Thames provides the opportunity to remove waste by barge and thereby reduce adverse impacts on local roads, disposal by road transport remains an option at this stage. As the reference design develops the consideration would give potential re-use and disposal options for the excavated material, in particular re-use options for London Clay. (Para 2.36 of PINS Report).	PINS	Scheme description	NA
The Scoping Report highlights that based upon the current project design it is not anticipated that there would be a requirement for any property demolition. However, this would be reviewed as the reference design is completed. (Para 2.37 of PINS Report).	PINS	Scheme description	NA
The extent of the permanent and temporary works and associated land take for the project is shown on Drawing STWTN-ATK-GEN-XXXX-DR-Z-00002 in Appendix A of the Scoping Report. (Para 2.38 of PINS Report).	PINS	Scheme description	NA
As part of the development of the project design an Outline Site Waste Management Plan has been prepared that will continue to be updated as the reference design is produced. (Para 2.39 of PINS Report).	PINS	Scheme description	NA
The Scoping Report provides limited information in regard to the operational and maintenance requirements of the proposed development. (Para 2.40 of PINS Report).	PINS	Scheme description	NA
The SoS notes that there is no clear section in the report setting out the description of the site and its surroundings, rather is dispersed throughout the report. The SoS recommends that a clear description is set out in the ES. (Para 2.41 of PINS Report)	PINS	Scheme description	A clear description of the site and surrounding area will be provided in the ES
The SoS welcomes the use of figures to support the description of the application site. In the ES it should be ensured that the figures are of high quality and relate closely to the main text. It is recommended that: All features referenced in the main text of the ES should be shown and named on a relevant figure All figures should be clear and legible, and where there is a lot of environmental information to present, consideration should be given for this to be arranged over a	PINS	All (drawings)	Figures provided in the ES will be of high quality and will relate closely to the main text, and in line with the recommendations set out.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>number of figures to limit the amount of overlaid information and avoid confusion; and</p> <ul style="list-style-type: none"> • All features on figures should be clearly labelled, identifying not only the presence of certain designations, but also the name of that specific feature. (Para 2.42 of PINS Report) 			
<p>It would be helpful for the description of the location of receptors to be provided by reference to the direction and distance from the main site. (Paras 2.43 of PINS Report)</p>	PINS	All	<p>The description of receptors will include reference to the direction and distance from the main site.</p>
<p>The applicant should ensure that the description of the proposed development that is being applied for is as accurate and firm as possible as this will form the basis of the environmental impact assessment. It is understood that at this stage in the evolution of the project the description of the proposals and even the location of the site may not be confirmed. It is noted at paragraph 2.5.2 of the Scoping Report that an 'early concept design' is presented. The applicant should be aware however, that the description of the development in the ES must be sufficiently certain to meet the requirements of paragraph 17 of Schedule 4 Part 1 of the EIA Regulations and there should therefore be more certainty by the time the ES is submitted with the DCO. (Para 2.44 of PINS Report)</p>	PINS	Scheme description	<p>An accurate and firm scheme description will be provided.</p>
<p>If a draft DCO is to be submitted, the applicant should clearly define what elements of the proposed development are integral to the NSIP and which are 'associated development' under the Planning Act 2008 (PA 2008) or are an ancillary matter. (Para 2.45 of PINS Report).</p>	PINS	Scheme description	<p>The ES will define what elements of the proposed development are integral to the NSIP and which are 'associated development' under the Planning Act 2008 (PA 2008) or are an ancillary matter.</p>

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
Any proposed works and/or infrastructure required as associated development, or as an ancillary matter, (whether on or off-site) should be considered as part of an integrated approach to environmental assessment. (Para 2.46 of the PINS Report).	PINS	Scheme description	The ES will consider associated development as part of an integrated approach to the EIA.
The SoS recommends that the ES should include a clear description of all aspects of the proposed development, at the construction, operation and decommissioning stages, and include: <ul style="list-style-type: none"> <input type="checkbox"/> Land-use requirements <input type="checkbox"/> Site preparation <input type="checkbox"/> Construction processes and methods <input type="checkbox"/> Transport routes <input type="checkbox"/> Operational requirements <input type="checkbox"/> Maintenance activities <input type="checkbox"/> Emissions: water, air and soil pollution, noise, vibration, light, heat, radiation. (Para 2.47 of PINS Report)	PINS	Scheme description	The ES will include a clear description of all aspects of the proposed development, at the construction, operation and decommissioning stages, as set out.
The environmental effects of all wastes to be processed and removed from the site should be addressed. The ES will need to identify and describe the control processes and mitigation procedures for storing and transporting waste off site. All waste types should be quantified and classified. (Para 2.48 of PINS Report)	PINS	Waste	Effects of waste will be covered as described.
The ES requires that the applicant provide 'An outline of the main alternatives studied by the applicant and an indication of the main <i>reasons for the applicant's choice, taking into account the environmental effects</i> ' (See Appendix 3). (Para 2.49 of PINS Report)	PINS	Alternatives	An outline of alternatives will be provided
The SoS welcomes the discussion of the alternative options in section 3 of the scoping report. However the SoS draws the applicant's attention to the response from the London Borough of Tower Hamlets (LBTH), at Appendix 2 of this Opinion, regarding multi-modal tunnels, when addressing alternatives within the ES. (Para 2.50 of PINS Report).	PINS	Alternatives	See response to that specific comment.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS considers that a decision should be reached regarding the selection of river or road transport for the removal of waste as soon as possible, if this is not possible it must be ensured that the worst case scenario is assessed within the ES. (Para 2.51 of PINS Report).	PINS	Scheme description	A decision will be made prior to commencement of the assessments.
The SoS notes the reference (para 2.5.1 in the Scoping Report) to the 'Rochdale Envelope' but directs attention to the 'Flexibility' section in Appendix 3 of this Opinion which provides additional comment on the recommended approach. (Para 2.52 of PINS Report)	PINS	Scheme description	Noted, this guidance will be referred to when defining the scheme description.
If river transport is to be utilised in the removal of waste the ES will need to capture the potential cumulative impact of additional barge use along this stretch of the Thames in combination with that required in association with other development along the Thames. (Para 2.53 of PINS Report)	PINS	All	The ES will consider the impacts of additional barge use in relevant topics
It should be noted that if the proposed development changes substantially during the EIA process, prior to application submission, the applicant may wish to consider the need to request a new scoping opinion. (Para 2.54 of PINS Report)	PINS	Scheme description	Noted.
The Scoping Report provides little detail on site access arrangements during the construction phase. The SoS expects to see a detailed description of access arrangements in the ES, accompanied by figures where appropriate. (Para 2.55 of PINS Report)	PINS	Scheme Description	The scheme description will include a detailed description of access arrangements.
The ES should identify proposed routes to and from the construction sites for both construction vehicles and workers. (Para 2.56 of PINS Report)	PINS	Scheme Description	The ES will identify construction routes.
The SoS considers that information on construction including: phasing of programme; construction methods and activities associated with each phase; siting of construction compounds (including on and off site); lighting equipment/requirements; and number, movements and parking of construction vehicles (both HGVs and staff) should be clearly indicated in the ES. (Para 2.57 of PINS Report).	PINS	Scheme Description	Construction information will be provided in the ES as recommended.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS recommends that potential off-site implications of the disposal of waste are also considered in the ES. (Para 2.58 of PINS Report)	PINS	Scheme Description	Off-site implications of disposal of waste will be considered where appropriate.
Information on the operation and maintenance of the proposed development should be included in the ES and should cover but not be limited to such matters as the number of full/part-time jobs; shift patterns; the number and types of vehicle movements generated during the operational stage. (Para 2.59 of PINS Report)	PINS	Scheme Description	Information on the operation and maintenance of the proposed development will be included in the ES
This section contains the SoS's specific comments on the approach to the ES and topic areas as set out in the Scoping Report. General advice on the presentation of an ES is provided at Appendix 3 of this Opinion and should be read in conjunction with this Section. (Para 3.1 of PINS Report)	PINS	All	Noted, this guidance will be referred to when preparing the ES.
Applicants are advised that the scope of the DCO application should be clearly addressed and assessed consistently within the ES. (Para 3.2 of PINS Report).	PINS	All	The scope of the DCO application will be clearly set out in the ES and assessed by all topics.
The ES should not be a series of separate reports collated into one document, but rather a comprehensive assessment drawing together the environmental impacts of the project. (Para 3.3 of PINS Report).	PINS	All	Noted
Attention is drawn to the recommendation in Appendix 3 to provide a series of Summary Tables. As well as assisting the decision making process these may also help to ensure impacts have been fully assessed and to ensure that mitigation relied upon in the ES is included on the draft DCO. (Para 3.4 of PINS Report)	PINS	All	Noted, this guidance will be referred to when preparing the ES.
The information provided in the Scoping Report sets out the proposed approach to the preparation of the ES. Whilst early engagement on the scope of the ES is to be welcomed, the SoS notes that the level of information provided at this stage is not	PINS	NA	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
always sufficient to allow for detailed comments from either the SoS or the consultees. (Para 3.5 of PINS Report).			
The SoS would suggest that the applicant ensures that appropriate consultation is undertaken with the relevant consultees in order to agree wherever possible the timing and relevance of survey work as well as the methodologies to be used. The SoS notes and welcomes the intention to finalise the scope of investigations in conjunction with ongoing stakeholder liaison and consultation with the relevant regulatory authorities and their advisors. (Para 3.6 of PINS Report).	PINS	All	Noted
The SoS recommends that the physical scope of the study areas should be identified under all the environmental topics and should be sufficiently robust in order to undertake the assessment. The extent of the study areas should be on the basis of recognised professional guidance, whenever such guidance is available. The study areas should also be agreed with the relevant consultees and, where this is not possible, this should be stated clearly in the ES and a reasoned justification given. The scope should also cover the breadth of the topic area and the temporal scope, and these aspects should be described and justified. (Para 3.7 of PINS Report).	PINS	All	Agreed
The Scoping Report sets out the specific topic sections as a series of Tables. This is not helpful when needing to identify and cross refer to text. Therefore the SoS recommends that the ES should be set out in report format with all paragraphs clearly numbered. (Para 3.8 of PINS Report).	PINS	All	Noted
<p>The applicant has identified in the section 6.2 of the Scoping Report the matters proposed to be ‘scoped out’. These include:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Air Quality: <ul style="list-style-type: none"> o Odour assessment <input type="checkbox"/> Community and Private Assets: <ul style="list-style-type: none"> o Effects on Agricultural Land o Impacts on Waterway Restoration Projects 	PINS	NA	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<ul style="list-style-type: none"> <input type="checkbox"/> Effects on all Travellers: <ul style="list-style-type: none"> o Bridleways and Equestrian Travellers <input type="checkbox"/> Geology and Soils: <ul style="list-style-type: none"> o Effects on Agricultural Soils o Effects on Geologically Designated Sites <input type="checkbox"/> Materials: <ul style="list-style-type: none"> o Impacts due to extraction and transport of raw materials o Impacts from the manufacture of products and subsequent transport; and <input type="checkbox"/> Townscape and Visual Assessment: <ul style="list-style-type: none"> o Impacts on landscape. (Para 3.9 of PINS Report) 			
Matters are not scoped out unless specifically addressed and justified by the applicant, and confirmed as being scoped out by the SoS. (Para 3.10 of PINS Report)	PINS	NA	Noted
It is proposed that odour will be scoped out of the air quality assessment as an odour assessment is largely not relevant to a highways scheme. Any potential odour impacts generated through the movement of contaminated materials during construction would be managed through the use of a Construction Environmental Management Plan (CEMP) and adherence to task specific method statements. The SoS agrees that this is an acceptable approach and that odour may be scoped out of the assessment. (Para 3.11 of PINS Report)	PINS	Air Quality	NA
Effects on agricultural land are to be scoped out of the assessment on community and private assets as there is no agricultural land within the vicinity of the project. The SoS agrees that impacts on agricultural land may be scoped out of the assessment at the tunnel location, but not in terms of where any sites are identified for the disposal of excavated material. (Para 3.12 of PINS Report)	PINS	Community and Private Assets / Geology and Soils	If off-site options for waste disposal are identified and included in the DCO then the impacts of these will be considered in the ES.
It is proposed that impacts on Waterway Restoration Projects will be scoped out of the assessment as the tunnel will be constructed at such a depth that it would not	PINS	NA	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
impact directly upon the River Thames. The SoS agrees that impacts on Waterway Restoration Projects may be scoped out of the assessment. (Para 3.13 of PINS Report)			
It is proposed that effects on equestrian travellers be scoped out of the assessment as there are no bridleways in the study area and there is a lack of evidence of equestrian use, the SoS agrees that effects on equestrian travellers can be scoped out of the assessment. (Para 3.14 of PINS Report)	PINS	Transport	NA
It is proposed that effects on agricultural soils can be scoped out at the tunnel location only. Effects on geologically designated sites are proposed to be scoped out of the assessment as there are no geological sites within the study area. The SoS agrees that effects on geologically designated sites at the tunnel location can be scoped out of the assessment, if following consultation (as set out on page 69 of the Scoping Report), this confirms there are no statutory or non-statutory geologically designated sites in the vicinity likely to be significantly affected. (Para 3.15 of PINS Report)	PINS	Geology and Soils	Noted.
It is proposed that the environmental effects associated with the extraction and transportation of primary raw materials and manufacture of products will be scoped out of the assessment as these processes are already likely to have been subject to environmental assessment. The SoS agrees that extraction of raw materials and manufacture of products may be scoped out of the assessment. However the SoS considers that the transport of materials and manufactured products both to and from the proposed site should be assessed. The SoS notes the comments of the LBTH that also request that impacts associated with the transport of materials are assessed. (Para 3.16 of PINS Report)	PINS	Scheme description Air quality Transport	The scheme description will include information on construction traffic including materials haulage, and this will be assessed in the EIA.
Townscape and visual assessment is proposed to be considered due to the urban location of the proposed tunnel. The SoS agrees that landscape character may be scoped out of the assessment. (Para 3.17 of PINS Report)	PINS	Townscape and Visual	NA
The SoS notes that in addition to the points specifically identified in section 6.2 of the Scoping Report, other matters are identified in the Scoping Report that are proposed	PINS	Ecology	See specific responses on these aspects are

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
to be scoped out. The SoS does not agree to the following matters to be scoped out: surveys for fish or other features of the River Thames (page 58 of the Scoping Report); ground-borne vibration during the construction phase (page 77 of the Scoping Report); and night-time lighting (page 79 of the Scoping Report). Specific comments on these aspects are given in the relevant sections below. (Para 3.18 of PINS Report)		Noise and Vibration Townscape and Visual	provided in the relevant sections below.
Whilst the SoS has not agreed to scope out certain topic or matters within the Opinion on the basis of the information available at the time, this does not prevent the applicant from subsequently agreeing with the relevant consultees to scope matters out of the ES, where further evidence has been provided to justify this approach. This approach should be explained fully in the ES. (Para 3.19 of PINS Report)	PINS	All	Noted
In order to demonstrate that topics have not simply been overlooked, where topics are scoped out prior to submission of the DCO application, the ES should still explain the reasoning and justify the approach taken. (Para 3.20 of PINS Report)	PINS	All	Noted
Sector specific NPSs are produced by the relevant Government Departments and set out national policy for nationally significant infrastructure projects (NSIPs). They provide the framework within which the Examining Authority will make their recommendations to the Secretary of State and include the Government's objectives for the development of NSIPs. (Para 3.21 of PINS Report)	PINS	NA	NA
The relevant NPS is the National Road and Rail Networks NPS which is currently in draft. This draft NPS sets out assessment principles that should be considered in the EIA for the proposed development. When undertaking the EIA, the applicant must have regard to this draft NPS and identify how principles these have been assessed in the ES. (Para 3.22 of PINS Report)	PINS	All	The assessments will have regard to this draft NPS and identify how principles these have been assessed in the ES.
The SoS must have regard to any matter that the SoS thinks is important and relevant to the SoS's decision. This can include the draft NPS where the relevant NPS has not been formally designated. (Para 3.23 of PINS Report)	PINS	NA	Noted

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
Section 7 of the Scoping Report sets out the outline structure of the ES on which the applicant seeks the opinion of the SoS. (Para 3.24 of PINS Report)	PINS	NA	NA
<p>The SoS notes from paragraph 7.1.3 that the EIA would cover a number of assessments under the broad headings of:</p> <ul style="list-style-type: none"> Air Quality Community and Private Assets Cultural Heritage Ecology and Nature Conservation Effects on all Travellers Geology and Soils Materials Noise and Vibration Townscape and Visual Water Environment; and Cumulative Effects. (Para 3.25 of PINS Report) 	PINS	NA	NA
The SoS notes that the assessment will be undertaken in accordance with DMRB HA 207/07 and the latest Interim Advice Notes (IAN): 170/12 and 174/13. The assessment will consider worst case sensitive receptor locations within 200m of affected routes. Modelled predictions will be compared against the UK Air Quality Objectives / EU Limit Values as appropriate. The SoS welcomes this approach to the assessment of air quality impacts for this project. (Para 3.26 of PINS Report)	PINS	Air quality	NA
There are a number of declared Air Quality Management Areas (AQMA) close to the proposed tunnel; the site itself is almost surrounded by declared AQMAs with the southern end of the tunnel entirely contained within an AQMA. The majority of these AQMA's have been declared in relation to measured or predicted exceedances of the nitrogen dioxide (NO2) air quality objectives, a number have also been declared in relation to exceedances of the particulate matter (PM10) objectives. It should be	PINS	Air quality	It will be made clear in the ES whether the AQMAs relate to a measured or predicted breach of the annual mean objectives for each pollutant and/or

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
made clear in the ES whether the declarations relate to a measured or predicted breach of the annual mean objectives for each pollutant and/or the shorter term objectives for each pollutant (Para 3.27 of PINS Report)			the shorter term objectives for each pollutant.
A total of 23 AQMA's have been identified within the East London Highway Assignment Model (ELHAM) though the applicant has indicated that it is unlikely that all of these AQMA's would be affected by the proposed project. (Para 3.28 of PINS Report)	PINS	Air quality	NA
Consultations will be held with the officers responsible for air quality in those local authorities which may be affected by the project. The SoS recommends that the applicant seeks agreement with the relevant local authority officers over the size of the air quality study area and the selection of receptor locations to be assessed and that this is reported in the ES. (Para 3.29 of PINS Report)	PINS	Air quality	Consultations will be held with the officers responsible for air quality in those local authorities which may be affected by the project, and this will agree the study area and methodology for the air quality assessment.
The SoS recommends that dispersion modelling considers a range of possibilities and seeks to ensure that the 'worst case' scenario is assessed, for example congestion associated with the construction phase. (Para 3.30 of PINS Report).	PINS	Air quality	The impact of tunnel emissions will be modelled within the dispersion model and will form part of the local air quality assessment. Tunnel emissions will be modelled using ADMS (Roads) as a volume source located at the tunnel portals.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS welcomes that the applicant intends to consult Natural England (NE) regarding the location of any designated nitrogen sensitive sites that could be affected by the project. (Para 3.31 of PINS Report)	PINS	Air quality	NA
The SoS recommends that the applicant gives due consideration to potential mitigation measures in the ES and set these out clearly in the ES. The applicant should also consult the relevant local authority officers regarding locations where additional air quality monitoring would be appropriate. (Para 3.32 of PINS Report)	PINS	Air quality	Mitigation measures will be set out in the ES. Consultation has already been undertaken with relevant local authority officers to identify appropriate locations for air quality monitoring.
The SoS notes the concerns of the LBTH regarding the classification of air quality impacts within AQMA's, it is recommended that any increase (even if very small) of pollutant concentrations within an AQMA should not be categorised as having a negligible impact. (Para 3.33 of PINS Report)	PINS	Air quality	IAN 174/13 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality provides advice on determining the significance of a scheme's impact on air quality. The advice provides a means of evaluating the significance of local air quality effects in line with the requirements of the existing EIA Directive for highway schemes.
The SoS recommends that the assumptions relating to the future air quality baseline should be set out clearly in the ES. The SoS notes the comments of the LBTH that a	PINS	Air quality	Assumptions relating to the future air quality

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
conservative approach to the future baseline should be taken. (Para 3.34 of PINS Report)			baseline will be set out clearly in the ES.
The SoS recommends that it is ensured that all cross referencing is correct in the ES. (Para 3.35 of PINS Report)	PINS	All	Noted.
The SoS notes that the study area is crossed by road and rail infrastructure and there is not currently expected to be any loss of open space or any need to demolish any existing properties. (Para 3.36 of PINS Report)	PINS	Community and Private Assets	NA
The SoS notes the comments of the Canal and River Trust regarding the selection of a tunnel crossing being of benefit as it would not result in further restrictions on larger vessels using this stretch of the Thames. (Para 3.37 of PINS Report)	PINS	Community and Private Assets	NA
The SoS notes the comments of the Health and Safety Executive (HSE) concerning the proposed application surface development being within the inner zone consultation distance of two major hazard sites which include the east Greenwich gasholder station and Brenntag UK. Additionally the new grade separated junction will be within the inner zone of one of the sites. HSE advises against dual carriageways within the inner consultation zones. (Para 3.38 of PINS Report)	PINS	NA	This information has been passed to the project H&S advisor and design team for information.
The SoS draws the attention of the applicant to the HSE comments in relation to explosive sites. During the construction phase of the development land controlled by General Marine (Tugs and Barges) Ltd would be included in the temporary land take for temporary work or site compounds, consequently General Marine would not be able to handle any explosives at their premises during the construction phase, HSE intend to contact the company regarding this matter. (Para 3.39 of PINS Report)	PINS	NA	This information has been passed to the project H&S advisor and design team for information.
The SoS notes that the methodology for the assessment will follow that set out in DMRB Volume II Section 3, HA208/07 Cultural Heritage. The assessment will accord with the 'Code of Conduct and Standards Guidance for Archaeological Desk Based Assessments' of the Institute of Archaeologists. The study will also conform to the requirements of the National Planning Policy Framework. The SoS notes the comments by English Heritage that the methodology will need to extend beyond desk-based assessment and the recommendation that a comprehensive 3D	PINS	Cultural Heritage	Noted. Consultation with English Heritage and other relevant consultees will be undertaken.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>geoarchaeological deposit model of the site and its surroundings based on existing and new boreholes be utilised in carrying out the assessment. The SoS recommends further discussion takes place between the applicant, English Heritage and other relevant consultees to agree the detailed methodology including the need for any intrusive investigative work. (Para 3.40 of PINS Report)</p>			
<p>The SoS notes the response from English Heritage highlighting the extensive existing data available in the Greater London Historic Environment Record (GLHER) and other data held by Crossrail. The SoS agrees that the assessment should take all relevant information into account. (Para 3.41 of PINS Report)</p>	PINS	Cultural Heritage	Baseline data has been obtained from GLHER and will be included in the ES. The assessment will consider all data that is made available to us.
<p>The SoS notes that the Heritage List for England identifies 14 listed buildings within 1.5km of the application site; these include a number of structures associated with the Royal Victoria Docks such as warehouses and grain silos. The World Heritage Sites of Maritime Greenwich and the Scheduled Greenwich Palace lie approximately 1.5 km to the south west of the proposed site. The SoS notes the findings of previous archaeological investigations in the study area which indicate there is potential for the application site to contain remains relating to flood events and human activity in the prehistoric period and the industrial development of the area from the post-medieval period onwards. English Heritage have indicated that to the north of the river impacts are expected to be in relation to industrial archaeology and deeply buried prehistoric remains, whereas impacts to the south of the river are expected to be related to deeply buried prehistoric remains only. (Para 3.42 of PINS Report)</p>	PINS	Cultural Heritage	Noted.
<p>The SoS notes that the entire tunnel site lies within Archaeological Priority Areas (APAs), it is recommended that this is taken into consideration within the ES. (Para 3.43 of PINS Report)</p>	PINS	Cultural Heritage	The assessment will take into account the fact that the tunnel lies within an APA.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The proposed study area will cover 500m from the application site boundary for undesignated assets and 1 km from the application site boundary for designated assets. The SoS welcomes that assets of particular significance highlighted by consultees falling outside of the defined study area will also be considered by the applicant. (Para 3.44 of PINS Report)	PINS	Cultural Heritage	NA
The applicant has identified potential mitigation measures including intrusive and non-intrusive surveys of archaeological, built heritage and historic landscape assets, which might include: archaeological excavation; archaeological watching brief; photographic survey; measured survey; building recording including internal and external inspection; remote sensing and diver survey of the riverbed. The SoS welcomes that the applicant will consider a broad range of potential mitigation. (Para 3.45 of PINS Report)	PINS	Cultural Heritage	NA
The SoS recommends that English Heritage's Inspector of Ancient Monuments is consulted in relation to effects within the river such as scour from barge traffic. (Para 3.46 of PINS Report)	PINS	Cultural Heritage	The use of barges for transportation still to be confirmed. English Heritage's Inspector of Ancient Monuments will be consulted in relation to effects within the river.
The SoS notes that the CIEEM Guidelines in combination with DMRB Volume 11 Section 2, Part 5, Volume 11, Section 3 Part 4 (Highways Agency, 1993) and Interim Advice Note 130/10 (Highways Agency, 2010) will form the basis of the ecological assessment methodology. This approach to the assessment is accepted by the SoS. (Para 3.47 of PINS Report)	PINS	Ecology	NA
The SoS recommends that surveys should be thorough up to date and should take account of other development proposed in the vicinity. (Para 3.48 of PINS Report)	PINS	Ecology	Noted
The SoS recommends that the proposals should address fully the needs of protecting and enhancing biodiversity. The assessment should cover habitats	PINS	Ecology	Noted

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
species and processes within the study site and its surroundings. (Para 3.49 of PINS Report)			
The SoS notes that the applicant considers that no European sites would be affected by the proposals; the closest European site is the Lee Valley SPA and Ramsar site which is approximately 8 km north west of the application boundary. (Para 3.50 of PINS Report)	PINS	Ecology	NA
The SoS notes that the key ecological receptors have been identified as: <ul style="list-style-type: none"> • River Thames and Tidal Tributaries SINC (including mudflats and wetland birds) • Deciduous/scrubby woodland (including, potentially nesting birds) • Scrub and bare ground mosaic habitat (including potentially, reptiles, nesting birds and notable invertebrates) • Black Redstart <i>Phoenicurus ochruros</i>; and • Common species of reptiles. (Para 3.51 of PINS Report) 	PINS	Ecology	NA
The assessment should take account of impacts on noise, vibration and air quality and cross reference should be made to these specialist reports. (Para 3.52 of PINS Report)	PINS	Ecology	Interrelationship of impacts will be considered in the ES and where noise/vibration/AQ impacts are taken into account it will be clearly cross-referenced in the ES.
The SoS recommends that the ES assesses the impact of all phases of the proposal on protected species. (Para 3.53 of PINS Report)	PINS	Ecology	Noted.
The SoS notes the advice of NE regarding consideration of the potential impacts on non-statutory sites such as Local Wildlife Sites, local Nature Reserves and Regionally Important Geological and Geomorphological Sites within the ES. (Para 3.54 of PINS Report)	PINS	Ecology	Non-statutory sites will be considered in the ES.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>The SoS notes the concerns of the Marine Management Organisation (MMO) regarding the scoping out of surveys of fish or other features of the River Thames. The proposed works have the potential for noise and vibration from boring activities to impact upon migratory fish, however the Environment Agency have accepted the scoping out of fish surveys due to the selection of the long bored option for tunnel construction. The SoS recommends that clear justification is provided within the ES if these surveys are to be scoped out of the assessment. (Para 3.55 of PINS Report)</p>	PINS	Ecology	Further consultation with MMO will be undertaken and if agreed, the ES will provide clear justification for the scoping out of fish surveys.
<p>The SoS notes that the applicant intends to consult the London Boroughs of Newham, Tower Hamlets and Greenwich regarding rights of way and usage where appropriate. The SoS welcomes both this local authority consultation and the applicant's proposed consultation with the users of key community facilities to characterise usage, travel patterns and catchment areas. (Para 3.56 of PINS Report)</p>	PINS	Transport	NA
<p>The SoS recommends that the Transport Assessment is completed as soon as possible as the findings will be needed to inform other relevant ES chapters. The SoS recommends that the applicant consults the Highways Agency regarding the scope of the transport assessment. (Para 3.57 of PINS Report)</p>	PINS	Transport	Noted.
<p>The SoS recommends that the applicant gains agreement from the relevant local authorities regarding the total area to be considered within the transport assessment. (Para 3.58 of PINS Report)</p>	PINS	Transport	Noted.
<p>The SoS notes that user charging on both Silvertown and Blackwall Tunnel's is being proposed as a means to manage traffic levels and reduce congestion on the surrounding network. The ES assessment should consider the delivery mechanism and long term effectiveness of this mitigation proposal. The SoS reminds the applicant that mitigation relied upon for the purposes of the assessment but which is outside of the DCO's effective control will need to be appropriately secured. (Para 3.59 of PINS Report)</p>	PINS	Transport	The ES will reflect the scope of the charging regime.
<p>The SoS notes the comments of LBTH in regard to the need for the construction traffic assessment to incorporate construction staff movements. It is recommended</p>	PINS	Transport	Noted.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
that likely construction traffic routes are established as early as possible to aid in the identification of relevant receptors. (Para 3.60 of PINS Report)			
The SoS notes the comments of LBTH in regard to the consideration of multi-modal tunnel options and recommends that clarification around why the tunnel will not be multi-modal is provided in the ES. (Para 3.61 of PINS Report)	PINS	Transport	Noted.
The SoS notes that the proposed study area for the assessment will comprise the project footprint including the construction compound and storage areas and an area 500m around the project; it is recommended that the proposed area is agreed with the relevant stakeholders. (Para 3.62 of PINS Report)	PINS	Geology and soils	Relevant stakeholders will be consulted on the proposed study area of the assessment.
The SoS notes that the mobilisation of contaminants in the soil that would otherwise be immobile will be considered in the assessment, it is recommended that appropriate crossreference is made to the chapter on Water Environment. The SoS notes and welcomes that mitigation measures will be implemented. Reference is also made to disposal sites; these should be taken into account in the assessment. (Para 3.63 of PINS Report)	PINS	Geology and soils Materials	Reference will be made to the Water Environment chapter where appropriate. Disposal sites will be taken into consideration in the ES.
The SoS notes the comments of the Environment Agency in regard to the Greenwich Peninsula Environmental Method Statement which details how projects on the peninsula can be developed to prevent the mobilisation of existing contaminants, the applicant should take this document into account in making their assessment and developing the project design. (Para 3.64 of PINS Report)	PINS	Geology and soils	Greenwich Peninsula Environmental Method Statement will be taken into account in the assessment.
The SoS notes the comments of National Grid Gas Plc in regard to the existing gas pipelines which lie close to the order limits. The applicant should remain aware that National Grid has a Deed of Grant of Easement for each pipeline, preventing the erection of permanent or temporary buildings or structures, changes to existing ground levels, storage of materials etc. (Para 3.65 of PINS Report)	PINS	Geology and soils	Noted.
The SoS recommends that where construction traffic cannot use existing roads it is agreed with National Grid at which locations construction traffic would cross any pipelines. The applicant should also note that written permission is required from	PINS	NA	Noted.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
National Grid before any works can commence in the National Grid easement strip. (Para 3.66 of PINS Report)			
The SoS recommends that the applicant takes note of National Grid's requirements regarding the laying of cables across any pipeline as appropriate. (Para 3.67 of PINS Report)	PINS	NA	Noted.
The SoS recommends that the applicant has an awareness of the Health and Safety Executive's guidance document HS(G) 47 'Avoiding Danger from Underground Services' and National Grid's specification for Safe Working in the vicinity of National Grid High Pressure gas pipelines and associated installations – requirements for third parties T/SP/SSW22. (Para 3.68 of PINS Report)	PINS	NA	Noted.
The SoS notes that any excavations within 3m of a National Grid High Pressure Pipeline or within 10m of an above ground installation the exact depth and position of the pipeline will need to be confirmed on site under the supervision of a National Grid representative. (Para 3.69 of PINS Report)	PINS	NA	Noted.
The SoS notes the assessment will focus on construction effects but advises that operational effects should also be assessed. (Para 3.70 of PINS Report)	PINS	Geology and soils	Permanent operational impacts will be considered in the ES.
The SoS welcomes the applicant's intention that consultation will take place with the relevant London Boroughs and the Environment Agency to obtain information about waste management facilities that could be utilised during the proposed developments construction. (Para 3.71 of PINS Report)	PINS	Materials	NA
The SoS notes that the proposed study area for the materials assessment will be limited to the boundaries of the construction site within which materials will be used and wastes generated and managed however the SoS recommends that detailed information is provided within the ES regarding the transport of materials to the proposed site and the disposal of spoil from the site. This should detail where spoil will be temporarily stored and how spoil will be disposed of. (Para 3.72 of PINS Report)	PINS	Materials Transport	Transport of materials will be considered in the Transport topic. Storage and disposal of spoil will be considered in the Materials topic.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS notes the concerns of the MMO regarding the lack of information provided in relation to the use of the spoil. It is recommended that information regarding the use of the spoil be provided within the ES and that consideration be given to the Waste Framework Directive. (Para 3.73 of PINS Report)	PINS	Materials	Information in relation to the use of spoil will be included in the ES.
The SoS notes that should barges be used to deliver materials and remove spoil the impact of such barge movements upon marine ecology and navigation should be assessed in the ES. (Para 3.74 of PINS Report)	PINS	Materials Ecology Transport	Noted.
The SoS notes the comments of the Port of London Authority (PLA) in relation to the potential to use ships to transport materials instead of barges depending on the wharves to be used. The SoS requests that the applicant consider this option. (Para 3.75 of PINS Report)	PINS	Transport	Options of river transport are currently being considered.
The SoS notes that the assessment will be undertaken in accordance with HA205/08 Assessment and Management of Environmental Effects. This approach to the assessment is welcomed by the SoS. (Para 3.76 of PINS Report)	PINS	Materials	NA
The SoS notes the uncertainty regarding materials and the maintenance regime once the proposals are operational. Any assessment will need to ensure that it has considered the worst case. (Para 3.77 of PINS Report)	PINS	Materials	Worst case will be considered where uncertain elements regarding the materials and maintenance regime are Identified.
The SoS notes that the applicant may require a permit or exemption from the Environment Agency for the treatment, disposal or storage of waste associated with the proposed development. The applicant's attention is drawn to Annex D (relating to the Environment Agency) of the Planning Inspectorate's Advice Note 'Working with public bodies in the infrastructure planning process' which is available on the Advice Note's page of the National Infrastructure Planning website. (Para 3.78 of PINS Report)	PINS	Materials	Noted

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS welcomes that the applicant has stated that consultation will take place with the Environmental Health Departments of the London Boroughs of Greenwich, Tower Hamlets and Newham in regard to the noise and vibration assessment. (Para 3.79 of PINS Report)	PINS	Noise and Vibration	NA
Information should be provided on the types of vehicles and plant to be used during the construction phase. Once operational, noise sources generated should be identified and assessed. Where appropriate, effective measures should be provided to mitigate against noise nuisance (Para 3.80 of PINS Report)	PINS	Noise and Vibration	Noted.
The SoS welcomes that noise mitigation measures through the construction phase will be incorporated in the Construction Environmental Management Plan (CEMP). It is recommended that consideration should be given to identifying a means of communicating any particularly noisy activities to people using the area nearby and to providing a means of receiving and addressing complaints and concerns. (Para 3.81 of PINS Report)	PINS	Noise and Vibration	Noted. Communication with local residents will be considered in the CEMP.
Noise and vibration impacts on people should be specifically addressed and particularly any potential noise and vibration disturbance at night and other unsocial hours such as weekends and public holidays. Ground-borne vibration during the construction phase should not be scoped out of the assessment. (Para 3.82 of PINS Report)	PINS	Noise and Vibration	Noise and vibration impacts will be considered in the ES including potential disturbance during unsocial hours. The need for assessment of ground-borne noise from the TBM will be reviewed once the type of TBM to be used is known and the depth of construction works is determined.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS welcomes that both the Royal Borough of Greenwich and the London Borough of Newham Councils will be consulted regarding the methodology for the assessment. (Para 3.83 of PINS Report)	PINS	Townscape and Visual	NA
The SoS welcomes that IAN 135/10 criteria will be applied to the assessment. (Para 3.84 of PINS Report)	PINS	Townscape and Visual	NA
The SoS recommends that any temporary storage of spoil in the vicinity of the proposed development site should be taken into consideration within the assessment of the potential short-term impact on townscape. (Para 3.85 of PINS Report)	PINS	Townscape and Visual	Spoil storage will be considered within the assessment of potential short-term impacts in the ES.
The SoS notes the comments of National Grid Electricity Transmission Plc in regard to the high voltage electricity overhead transmission line which lies close to the proposed order limits. The applicant should note National Grid's right of access to maintain, repair and inspect their asset, the need to maintain the statutory electrical safety clearances at all times and the requirement that no permanent structures are built directly beneath overhead lines. (Para 3.86 of PINS Report)	PINS	NA	NA
The SoS recommends that site staff should have an awareness of the Health and Safety Executive's guidance in relation to working safely near existing overhead lines Guidance Note GS 6 'Avoidance of Danger from Overhead Electric Lines'. Plant, machinery, equipment, buildings or scaffolding should not encroach within 5.3 metres of any high voltage conductors when those conductors are in their worst conditions of maximum 'sag' and 'swing'. (Para 3.87 of PINS Report)	PINS	NA	NA
The SoS recommends that where landscape mitigation is proposed, only slow or low growing species of trees and scrubs should be planted beneath and adjacent to the existing transmission line. The applicant should note that drilling and excavation work should not be undertaken if it has the potential to disturb or adversely affect the foundations of an existing tower. (Para 3.88 of PINS Report)	PINS	Townscape and Visual	To be considered in landscape design.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS notes the comments of ES Pipelines indicating that though they are not directly affected by the works they would draw the applicants attention to the fact that part of their electricity network is within the 500m study area marked in Figure 6.5 of the Scoping Report which illustrates townscape and visual considerations. (Para 3.89 of PINS Report)	PINS	NA	NA
The SoS notes the comments of the Civil Aviation Authority (CAA) regarding the need for the applicant to consider any potential concerns of any relevant aerodrome licence holders/operators. (Para 3.90 of PINS Report)	PINS	NA	NA
Night-time lighting should be included in the assessment, including taking into account the design of lighting to minimise any adverse effects notably on local sensitive receptors. (Para 3.91 of PINS Report)	PINS	Townscape and Visual	Night-time lighting will be included in the ES.
The SoS notes the concerns of the LBTH in regard to viewpoint selection. It is recommended that LBTH are consulted to agree the viewpoints from the LBTH. (Para 3.92 of PINS Report)	PINS	Townscape and Visual	NA
The SoS welcomes that the Flood Risk Assessment (FRA) will be developed in consultation with key bodies including the Environment Agency (EA). The SoS notes the comments of the EA regarding the need for the FRA to consider impacts caused by and upon all sources of flooding, the current state of the tidal flood defences and the projects possible impacts on them and possible impacts on the development of predicted sea level rise. The assessment should demonstrate that flood defences will be fit for purpose for the lifetime of the development. (Para 3.93 of PINS Report)	PINS	Water	Noted.
The SoS notes that the applicant will require Flood Defence Consent from the EA for any works within 16m of the landward side of the flood defence. (Para 3.94 of PINS Report)	PINS	Water	Noted.
The SoS notes that the applicant intends to reference the Thames Estuary 2100 (TE2100) Plan (which outlines how the Thames tidal defences will need to be managed to combat predicted sea level rises over the next 100 years) within the FRA. (Para 3.95 of PINS Report)	PINS	Water	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS notes the comments of the LBTH in regard to the need to consider climate change impacts where appropriate in the ES. It is recommended that the development should be assessed against future climate change scenarios as identified in the Mayor of London's Climate Change Adaptation Strategy. (Para 3.96 of PINS Report)	PINS	Water	Climate change impacts will be considered in the ES.
The SoS recommends that the assessment takes into consideration both the construction and the operational phases of the development. The potential for accidents should also be addressed. (Para 3.97 of PINS Report)	PINS	Water	The assessment will take into consideration both the construction and operational phases in the ES including the potential for accidents.
The SoS welcomes that the potential of the proposed project to impact on the water quality of receiving waters from routine runoff will be assessed in accordance with DMRB methodologies for assessing both pollution from routine runoff and the risk of pollution due to accidental spillage. (Para 3.98 of PINS Report)	PINS	Water	NA
The SoS notes that the study area has been defined, in accordance with DMRB guidelines, to include the application site, downstream reaches of the Rivers Thames and Lea, the Royal Victoria Dock and any other surface or groundwater receptor identified within 500m of the application boundary. (Para 3.99 of PINS Report)	PINS	Water	NA
The SoS recommends that the section considering the water environment be cross referenced to other topic chapters in the ES as appropriate. (Para 3.100 of PINS Report)	PINS	Water	Noted.
The SoS notes the comments of the PLA requiring that the ES include information regarding the depth of the tunnel under the River Thames.(Para 3.101 of PINS Report)	PINS	Scheme description	Information regarding the depth of the tunnel will be included in the scheme description.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS recommends that the ES outlines whether or not the applicant would need to temporarily suspend the public right of navigation along sections of the River Thames. (Para 3.102 of PINS Report)	PINS	Scheme description	Noted.
The SoS notes that the tunnel would involve permanent land take of the PLA's land and recommends that the applicant consults the PLA regarding the need for a River Works Licence. (Para 3.103 of PINS Report)	PINS	Planning issue	NA
The SoS notes that the Scoping Report refers to the proposed highway drainage scheme in paragraphs 2.3.18 and 2.3.20 and that new surface run-off will be gravity drained to an outfall but it is not stated whether or not this this will be via the use of an existing outfall or a new outfall, any works below Mean High Water Spring (MHWS) would require a marine licence from the Marine Management Organisation (MMO). (Para 3.104 of PINS Report)	PINS	Water Scheme description	Noted.
The SoS recommends that the applicant provides clarification around whether or not in-river structures will be required. If additional works or activities are identified that may require a Marine Licence it is recommended that the MMO are notified at the earliest opportunity. (Para 3.105 of PINS Report)	PINS	Scheme description	A decision will be made prior to commencement of the assessments.
The SoS notes that the applicant will need to identify whether any water resources will be required during the construction phase and where this water will be sourced as this will determine whether any permits will be required from the EA. (Para 3.106 of PINS Report)	PINS	Water Scheme description	A decision will be made prior to commencement of the assessments.
The SoS recommends that the applicant refers to the Environment Agency Guiding Principles for Land Contamination to inform the assessment of risk to controlled waters from the development. (Para 3.107 of PINS Report)	PINS	Water Ground conditions	Environment Agency Guiding Principles for Land Contamination to inform the assessment of risk to controlled waters from the development will be followed where applicable in the ES.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
The SoS refers the applicant to the additional information in Appendix 3 of the Scoping Opinion regarding interrelationships between environmental factors and cumulative impacts. (Para 3.108 of PINS Report)	PINS	Cumulative	See response to specific comments
The SoS notes that the traffic model will take into account other transportation schemes as well as future predicted traffic growth as a result of new development. The SoS recommends that, if the River Thames is to be used for the transport of materials to and from the site, that the assessment should ensure it has taken full account of the volume of river traffic arising from other projects, in particular the availability of barges and wharfs as well as suitably qualified staff. (Para 3.109 of PINS Report)	PINS	Transport Cumulative	A decision regarding the use of river transport will be made prior to commencement of the assessments.
The SoS recommends that the applicant consults all the relevant local authorities to ensure all proposed and consented developments relevant to the project are included within the cumulative assessment. (Para 3.110 of PINS Report)	PINS	Cumulative	Noted.
The SoS welcomes that the interactive cumulative effects with other schemes will be reported in each of the individual environmental topic chapters and the use to be made to Advice Note 9 in terms of identifying other major developments in the area. (Para 3.111 of PINS Report)	PINS	All	NA
The SoS notes that the proposed study area for the cumulative assessment will be based on the scope of each of the individual environmental topic chapters. Justification should be provided for the final study area selected. (Para 3.112 of PINS Report)	PINS	Cumulative	Justification for the final study area will be provided in the ES chapter.
The SoS notes the comments of the PLA regarding the inclusion of the Thames Tideway Tunnel within the cumulative assessment. (Para 3.113 of PINS Report)	PINS	Cumulative	See previous comments.
Pending any specific civil aviation regulatory query, the CAA does not wish to be further involved with this consultation.	Aviation	NA	NA
We have just one comment to make regarding the proposal that we would like taken into account. The Canal & River Trust acknowledges the need to provide additional crossings in East London, but these proposed crossings should not interfere with	Canal & River Trust London	NA	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>navigation or place an additional restrictions greater than that imposed by the QE2 bridge or the Emirates Cable Car. A tunnel would be acceptable, or a bridge which has a lifting section to accommodate large vessels with a high air draft, navigating to and from West India Dock.</p>			
<p>We are not directly affected by your works, however our electricity network (ref ESPE0258, drawing attached) is in the 500m Study Area as shown on your drawing, ref Fig 6.5.</p>	ESP Utilities	NA	NA
<p>Introduction</p> <p>Damage to ESP Utilities Group’s plant can result in uncontrolled gas escapes which may be dangerous. In addition these occurrences can cause expense, disruption of work and inconvenience to the public.</p> <p>Various materials are used for gas mains and services. Cast Iron, Ductile Iron, Steel and Plastic pipes are the most widely found. Modern Plastic pipes are either bright yellow or orange in colour. Cast Iron and Ductile Iron water pipes are very similar in appearance to Cast Iron and Ductile Iron gas pipes and if any Cast Iron or Ductile Iron pipe is uncovered, it should be treated as a gas pipe. ESP Utilities Group do not own any metallic gas pipes but their gas network infrastructures may be connected to Cast Iron, Ductile Iron or Steel pipes owned by Transco. The following general precautions apply to Intermediate Pressure (2-7barg MOP), Medium Pressure (75mbarg-2barg MOP), Low Pressure (up to 75mbarg MOP) and other gas mains and services likely to be encountered in general site works and are referred to within this document as ‘pipes’.</p> <p>Locating Gas Pipes</p> <p>It should be assumed when working in urban and residential areas that gas mains and services are likely to be present. On request, ESP Utilities Group will give approximate locations of pipes derived from their records. The records do not normally show the position of service pipes but their probable line can be deducted from the gas meter position. ESP Utilities Group’s staff will be pleased to assist in the location of gas plant and provide advice on any precautions that may be required. The records and advice are given in good faith but cannot be guaranteed</p>	ESP Utilities	NA	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>until hand excavation has taken place. Proprietary pipe and cable locators are available although generally these will not locate plastic pipes.</p> <p>Safe working Practices</p> <p>To achieve safe working conditions adjacent to gas plant the following must be observed:</p> <p>Observe any specific request made by ESP Utilities Group's staff. Gas pipes must be located by hand digging before mechanical excavation. Once a gas pipe has been located, mechanical excavation must proceed with care. A mechanical excavator must not in any case be used within 0.5 metre of a gas pipe and greater safety distances may be advised by ESP Utilities Group depending on the mains maximum operating pressure (MOP). Where heavy plant may have to cross the line of a gas pipe during construction work, the number of crossing points should be kept to a minimum. Crossing points should be clearly indicated and crossings at other places along the line of the pipe should be prevented. Where the pipe is not adequately protected by an existing road, crossing points should be suitably reinforced with sleepers, steel plates or a specially constructed reinforced concrete raft as necessary. ESP Utilities Group staff will advise on the type of reinforcement necessary.</p> <p>No explosives should be used within 30 metres of any gas pipe without prior consultation with ESP Utilities Group.</p> <p>ESP Utilities Group must be consulted prior to carrying out excavation work within 10 metres of any above ground gas installation.</p> <p>Where it is proposed to carry out piling or boring within 15 metres of any gas pipe, ESP Utilities Group should be consulted prior to the commencement of the works.</p> <p>Access to gas plant must be maintained at all times during on site works.</p> <p>Proximity of Other Plant</p> <p>A minimum clearance of 300 millimetres (mm) should be allowed between any plant being installed and an existing gas main to facilitate repair, whether the adjacent plant be parallel to or crossing the gas pipe. No apparatus should be laid over and along the line of a gas pipe irrespective of clearance.</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>No manhole or chambers shall be built over or around a gas pipe and no work should be carried out which results in a reduction of cover or protection over a pipe, without consultation with ESP Utilities Group.</p> <p>Support and Backfill</p> <p>Where excavation of trenches adjacent to any pipe affects its support, the pipe must be supported to the satisfaction of ESP Utilities Group and must not be used as an anchor or support in any way. In some cases, it may be necessary to divert the gas pipe before work commences. Where a trench is excavated crossing or parallel to the line of the gas pipe, the backfill should be adequately compacted, particularly beneath the pipe, to prevent any settlement which could subsequently cause damage to the pipe.</p> <p>In special cases it may be necessary to provide permanent support to the gas pipe, before backfilling and reinstatement is carried out. Backfill material adjacent to gas plant must be selected fine material or sand, containing no stones, bricks or lumps of concrete, etc., placed to a minimum depth of 150mm around the pipes and well compacted by hand. No power compaction should take place until 300 mm of selected fine fill has been suitably compacted. If the road construction is in close proximity to the top of the gas pipe, a "cushion" of selected fine material such as sand must be used to prevent the traffic shock being transmitted to the gas pipe. The road construction depth must not be reduced without permission from the local Highway Authority. No concrete or other hard material must be placed or left under or adjacent to any Cast Iron pipe as this may cause fracture of the pipe at a later date. Concrete backfill should not be used closer than 300 mm to the pipe.</p> <p>Damage to Coating</p> <p>Where a gas pipe is coated with special wrapping and this is damaged, even to a minor extent ESP Utilities Group must be notified so that repairs can be made to prevent future corrosion and subsequent leakage.</p> <p>Welding or "Hot Works"</p> <p>When welding or other "hot works" involving naked flames are to be carried out in close proximity to gas plant and the presence of gas is suspected, ESP Utilities</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Group must be contacted before work commences to check the atmosphere. Even when a gas free atmosphere exists care must be taken when carrying out hot works in close proximity to gas plant in order to ensure that no damage occurs.</p> <p>Particular care must be taken to avoid damage by heat or naked flame to plastic gas pipes or to the protective coating on other gas pipes.</p> <p>Leakage from Gas Mains or Services</p> <p>If damage or leakage is caused or an escape of gas is smelt or suspected the following action should be taken at once:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Remove all personnel from the immediate vicinity of the escape; <input type="checkbox"/> Contact Transco's National Gas Escape Call Centre, on: 0800 111 999; <input type="checkbox"/> Prevent any approach by the public, prohibit smoking, extinguish all naked flames or other source of ignition for at least 15 metres from the leakage; <input type="checkbox"/> Assist gas personnel, Police or Fire Service as requested. 			
<p>Based on the information provided, I can confirm that Energetics does not have any plant within the area(s) specified in your request.</p>	Energetics Design and Build	NA	NA
<p>Thank you for the opportunity to respond to the Scoping Request for the Silvertown Tunnel Nationally Significant Infrastructure Project (NSIP). As the Government's adviser on all matters pertaining to the historic environment and a consultation body for the purposes of Regulation 10(4) of the Town and Country (Environmental Impact Assessment) (England and Wales) Regulations 1999 ("the EIA Regulations"), English Heritage is pleased to inform consideration of the historic environment at all stages of the NSIP procedure. Accordingly, we have reviewed this consultation in the context of the <i>National Planning Policy Framework</i> (NPPF) and its core principle that heritage assets be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations. Having done this, English Heritage considers that the treatment of non-archaeological heritage is generally acceptable, and, on behalf of the Greater</p>	English Heritage	Cultural Heritage	See previous comments.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>London Archaeological Advisory Service (GLAAS), makes the following observations in respect of archaeological heritage:</p> <ul style="list-style-type: none"> • The indication of consultation with GLAAS made in the Scoping Request is welcomed but GLAAS wishes to note that it will identify a single point of contact for its engagement with this NSIP in due course; • English Heritage’s Inspector of Ancient Monuments should be consulted in relation to effects within the river, such as scour from barge traffic; • The entire tunnel site falls with Archaeological Priority Areas (APAs) that are defined in the Greenwich and Newham Local Plans and this needs to be recognised together with the relevant statements of significance referred to (it is noted that Newham is a draft); • The main impacts on the north of the river are expected to be in relation to industrial archaeology and deeply buried early prehistoric remains; • The main impacts south of the river are expected to be in relation to deeply buried prehistoric remains only; • Extensive data is available in the Greater London Historic Environment Record (GLHER) (including recent reports not yet fully incorporated) and other data is held by Crossrail; • A comprehensive 3D geoarchaeological deposit model of the site and its surroundings based on existing and new boreholes (for which there is much existing data as stated above) will be of critical importance as a Detailed Survey element of the assessment, as this will model the sub-surface topography and enable assessment and further evaluation/mitigation measures to be properly defined and targeted; • Specialist assessment may also be required of scour or other impacts on the river foreshore; 			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<ul style="list-style-type: none"> • As key environmental receptors, the significance of the two APAs should be identified; • Methodology will need to extend beyond desk-based assessment as indicated above; and • Options for reducing impact should be preferred for mitigation, with investigation where that is not possible, and a report and archive will be expected. It should be noted that this advice is based upon information provided by Transport for London. We trust this advice is of assistance in the development of the Silvertown NSIP and we would be glad to discuss any element of it with the Applicant should this be deemed to be of assistance to the process. 			
<p>We have previously provided advice to TfL on the various alternative schemes that were considered. The decision to progress with the long bored option has removed biodiversity and fisheries concerns for the inter-tidal and estuarine habitats that would have been present for an immersed tunnel option.</p> <p>6.6 Ecology and Nature Conservation</p> <p>We do not anticipate that fish will be affected by this proposal. Any impacts to fish during construction have been removed through the choice to progress the long bored option, which involves no marine works. We do not envisage vibrations from the boring machine will have an impact on fish. Therefore, we accept the scoping out of fish surveys.</p> <p>6.9 Materials</p> <p>The use, treatment, disposal or storage of waste could require an Environmental Permit or exemption. For more information please see the link below; https://www.gov.uk/environmental-permit-check-if-you-needone/overview</p> <p>Use of river transport options</p> <p>We support the consideration to remove waste by river, which we consider to be a sustainable option that also will help the Thames continue to act a functioning river, in line with the London Plan.</p>	Environment Agency	Ecology Materials Transport Geology and Soils Townscape	See previous comments.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Re-use of waste We support the intention to re-use waste where possible.</p> <p>6.8 Geology and Soils The baseline information does not reference the Greenwich Peninsula Environmental Method Statement, which details how any scheme on the peninsula should be developed to stop the mobilisation of existing contaminants. It is important that this document is considered. We understand that TfL will now include this method statement within their EIA, including any post-construction monitoring requirements. This section does include the descriptions of the possible significant effects on receptors that we are concerned about. However, the effects of them on surface and groundwater receptors will be covered in Water Environment Assessment. We believe reference to 'Table 6-10' should read 'Table 6-16. It is important that this important subject is strongly cross-referenced between these two sections, should it be decided that the section headings remain as they are.</p> <p>6.11 Townscape and Visual We are pleased that pedestrian impacts and mitigation measures will be considered. We support the principles of the Thames Path because of the passive recreation of the river it provides to the public. It is important that impacts on public access to and public enjoyment of the river are considered.</p> <p>6.12 Water Environment The Design Manual for Roads and Bridges contains suggested categories for use for EIA scoping. The Water Environment section provided in the Scoping Report will need to contain a wide variety of issues, some of which overlap with other sections, such as Geology and Soils, as mentioned in the Report.</p> <p>Flood risk We understand from TfL that a full Flood Risk Assessment (FRA) will be provided as an Appendix to the Environmental Statement. This is important to ensure that flood risk is adequately considered and represented. The FRA will need to consider impacts by and on all sources of flooding, the current state of the tidal flood defences and the project's possible impacts on them and possible impacts on the</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>development of predicted sea level rise. It should be demonstrated that flood defences will be fit for purpose for the lifetime of the development. Flood Defence Consent will be needed from the Environment Agency for any works within 16 m of the landward side of the flood defence.</p> <p>Climate change, predicted sea level rise and flood defences</p> <p>There is currently no reference to the Thames Estuary 2100 (TE2100) Plan, which outlines how the Thames tidal defences will need to be managed to combat predicted rises in sea level over the next 100 years. The TE2100 Plan was published in November 2012 and includes anticipated future requirements for the raising of defences that will likely be included in the red line boundary for this development. There is reference in the Scoping report to a possible need to raise defences in the future but this is not linked to climate change or to the TE2100 Plan. The need to plan for future defence raisings is an important issue that, we advise, must be considered within the FRA within the Environmental Statement. We understand, following our meeting, that TfL will include the TE2100 Plan in their EIA.</p> <p>Surface water drainage</p> <p>Highway drainage proposals should refer to sustainable drainage principles, which we understand TfL will do.</p> <p>Water quality</p> <p>The Water Framework Directive (WFD) classification information on the Greenwich Tertiaries Groundwater Body has not been included in the Scoping Report. We understand that TfL will now include this information. WFD objectives for all of the water bodies should be considered. The EIA should assess the hydrogeological impacts of the development. There is a need to assess and understand the potential impacts of carrying out dewatering works during the operational lifetime of the scheme. We strongly advise that possibilities of, and mitigation measures against, contaminant mobilisation are assessed.</p> <p>There is also a risk of saline intrusion during dewatering activities. There is already a rising trend of water salinity in Greenwich Tertiaries. Hence, dewatering works should be designed and carried out in a way that will reduce the risk of increased</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>saline intrusion. In addition, relevant monitoring should be put in place to enable the observation of and mitigation against any negative impacts.</p> <p>The use of certain grouts/drilling fluids may be prohibited if they contain hazardous pollutants which may pose unacceptable risk to groundwater.</p> <p>An Environmental Permit or registered exemption are needed from us to discharge anything other than clean, uncontaminated water to inland freshwaters (eg rivers, lakes and streams), groundwater (eg boreholes), estuaries and coastal waters.</p> <p>Water resources</p> <p>TfL should identify early on if water resources will be required during the construction phase and where this water will be sourced. This will also help inform whether any permits are required from the Environment Agency. TfL have confirmed to us that they will identify water requirements for construction and consider potential sources and capacities. Dewatering activity that will be carried out during the construction period is exempt from the abstraction licensing regime at present. However, any secondary uses of water (obtained through dewatering activity), that are not directly related to the operations, will be licensable. We advise that TFL refer to the Environment Agency Guiding Principles for Land Contamination (please find the link below) for the type of information that we require in order to assess risks to controlled waters from the site. Local Authorities advise on risk to other receptors, such as human health.</p> <p>https://www.gov.uk/government/publications/managing-and-reducing-landcontamination.</p>			
<p>We can confirm that Fulcrum Pipelines Limited have no comments to make on this scoping report. Please note that we are constantly adding to our underground assets and would strongly advise that you consult us again prior to undertaking any excavations. Please note that other gas transporters may have plant in this locality which could be affected.</p> <p>We will always make every effort to help you where we can, but Fulcrum Pipelines Limited will not be held responsible for any incident or accident arising from the use</p>	Fulcrum Pipelines Ltd.	NA	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>of the information associated with this search. The details provided are given in good faith, but no liability whatsoever can be accepted in respect thereof.</p> <p>If you need any help or information simply contact Fulcrum on 0845 641 3060</p>			
<p>This application falls within the consultation distance of two major hazard sites, the East Greenwich gasholder station and Brenntag UK. The consultation distance of each site is divided into zones based on the Hazardous Substances Consent held by the site. Any change to the consent may result in a change to the zones. Based on the existing granted consents, the surface development is within the inner zone of both sites with the new grade separated junction in the inner zone of one site. In line with PADHI+ guidance, HSE would advise against dual carriageways within the HSE inner consultation zone. This would apply even though there is an existing dual carriageway.</p> <p><u>Hazardous Substances Consent</u></p> <p>The presence on, over or above land of certain hazardous substances, at or above set threshold quantities (Controlled Quantities), may require Hazardous Substances Consent (HSC) under the planning (Hazardous substances) Act 1990 as amended. The substances, alone or when aggregated with others, for which HSC is required, and the associated Controlled Quantities, are set out in The Planning (Hazardous Substances) Regulations 1992 as amended particularly by The Planning (Hazardous Substances) (Amendment) (England) Regulations 2009 and 2010, as well as Planning (Control Of Major Accident Hazards) Regulations 1999. Hazardous substances consent would be required if the site is intending to store or use any of the Named Hazardous substances or categories of substances and preparations at or above the controlled quantities set out in schedule 1 of these regulations. Further information on HSC should be sought from the relevant hazardous substances authority who should be aware of any pending consent applications.</p> <p><u>Explosives sites</u></p> <p>After completion, HSE will have no objection to the tunnel development, as it will not impinge upon any of our licensed explosive sites. However, during the construction phase, it appears that land controlled by General Marine (Tugs and barges) Ltd. Is to be included in the 'temporary land take for temporary works or site compounds'.</p>	Health and Safety Executive	NA	See previous comments.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
Therefore, during the construction phase, General marine would be unable to handle any explosives at their premises. HSE will be contacting the company regarding this matter.			
The Scoping report contains little detail on the intended scope of traffic modelling and in this respect it is assumed that a separate Transport Assessment will be prepared as part of the full submission. If this is not the case and the Transport Assessment is to be included within the scope of the EIA then we would wish to have further input into the scope of the section of the EIA covering transport issues. If a separate transport Assessment is to be prepared, we wish to be consulted on its content, and early involvement in the process would be welcomed.	Highways Agency	Transport	A separate Transport Assessment will be prepared.
Following an assessment I can confirm that no objection is raised to the EIA scoping report submitted in respect of the above proposal. Please note that the Council do wish to be consulted at all further stages of this proposal.	Bexley Council Development Control.	NA	NA
<p>In February 2013 The London Borough of Tower Hamlets (LBTH) provided comments on the Mayor of London's Transport for London (TfL) River Crossings consultation. The previous consultation response recognised the predicted growth in traffic associated with the new development and population forecasts for East London which will inevitably impact on demand for cross river movement. The Council also recognised the existing problems of extremely poor air quality, congestion and resilience of the existing Blackwell tunnels to incidents. It was agreed that action needed to be taken, but officers were concerned that the proposals set out in the consultation did not deliver sufficient benefits. This previous response should read alongside this latest consultation response.</p> <p>Potential significant effects on LBTH</p> <p>LBTH have reviewed the EIA scoping report, and due to its proximity to the LBTH, it is considered that the proposed development has the potential to affect environmental receptors within the Borough . Of particular concern to LBTH are those that have the potential to lead to significant environmental effects, including:</p> <p>a) Increase in traffic on LBTH road network</p> <p>b) Changes to noise and vibration as a result of construction work and once</p>	Tower Hamlets	Assessment Methods	<p>The ES will provide a justification for why wind and microclimate effects have been scoped out.</p> <p>See previous comments for each topic.</p>

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>operational;</p> <p>c) Changes to air quality as a result of construction work and once operational;</p> <p>d) Changes to socio economic as a result of changes to employment ;</p> <p>e) Disturbance and mobilisation of any historic contamination ;</p> <p>f) Changes to flood risk and surface drainage ;</p> <p>g) Visual effects and effects on townscape character resulting from the development ;</p> <p>h) The generation and disposal of waste; and</p> <p>i) Potentially significant cumulative effects</p> <p>The Council would seek environmental, social and economic mitigation measures to reduce any adverse effects on the proposed Silvertown Tunnel.</p> <p>Scoped out</p> <p>No information is provided on why wind microclimate or daylight and sunlight have been scoped out of the EIA. This may be because there are no likely significant effects, but this has not been explained in the EIA scoping report. The ES should provide clarification as to why these disciplines are not considered likely to generate significant effects and therefore have been scoped out of the EIA.</p> <p>Climate change should be considered as part of the EIA, where appropriate. This does not need to be a standalone assessment, but can be incorporated into the relevant discipline assessments eg. increased risk of flooding. The UK climate predictions 2009 should be utilised and potential ways to mitigate the development's impact on climate change should be highlighted as detailed in the LBTH EIA scoping guidance (eg. Reduced energy usage, minimising CO2 emissions during construction). The development should be assessed against future climate change scenarios as identified in the Mayor's climate change Adaption Strategy which are the same as recommended in LBTH's EIA scoping guidance.</p> <p><u>General</u></p> <p>The ES should clearly illustrate the effects identified. For example, highlighting the</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>effect in bold can assist the reader in identifying the effects of the proposed development quickly and easily.</p> <p><u>Environmental Disciplines</u> Traffic and transport</p> <p>The construction traffic assessment should consider both vehicles bringing in/out materials and equipment as well as construction staff movements and the effects this will have on the network capacity. Likely construction traffic routes should be established, so that receptors can be appropriately assessed. The EIA scoping report identifies the potential to utilise water transport as a mode during construction. Consideration should be given to the effect that an increase in river-borne traffic may have on the estuary, specifically in relation to both commercial and recreational navigation. It is unclear why data from 2012 is being utilised as the baseline data, rather than more up to date data given that it is now mid-way through 2014. The council is disappointed to see that the proposed Silvertown Tunnel will not be designed to accommodate pedestrians and cyclists. The Council believes that there should be more emphasis on sustainable means of transport, as well as improving connectivity by walking, cycling and public transport to assist the regeneration of this part of London. TfL should consider multi-modal double deck tunnels which would help provide a more long term sustainable transport solution eg integrating DLR route within the Silvertown Tunnel. This approach would greatly improve the reach of the DLR network for passengers in East and South-East London. It would increase rail capacity (and provide for better walking and cycling connectivity) as well as reduce pressure on the existing limited rail river crossings in this part of London. Consideration needs to be given to road users using local residential roads as cut through routes to and from the Silvertown Tunnel, A13 and Blackwell Tunnel, and the effects that this may have on local residents. Receptors of specific concern are Aberfeldy Estate, Virginia Quay and South Poplar. LBTH is currently working with TfL and the London Legacy Development Corporation (LLDC) on improvements to the A12, including public realm and potential new crossings. The proposed Silvertown Tunnel should not compromise these improvements. Predicted changes</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>to traffic levels and flows that may require mitigation measures will be on the A12 and A13.</p> <p>Air Quality As noted in the EIA scoping report, the whole of the LBTH has been designated as an Air Quality Management Area (AQMA). This means that even small increases in emissions can lead to significant effects. It is therefore not considered appropriate for an increase in emissions, however small, to be categorised as negligible. The ES should set out the proposed approach to defining the future baseline. Current thinking is that the anticipated improvement in background air quality resulting from vehicle emission controls is now likely to occur. When predicting future air quality a conservative approach should be taken.</p> <p>Community and private assets Item 4 of table 6.8 sets out the ‘Significance of the receptors’ – it is assumed that this should in fact be referred to as the ‘sensitivity of receptors’</p> <p>Cultural Heritage With respect to item 4 of Table 6.9, reference should also be given to Conservation Areas and locally listed buildings. Note that the eastern end of the Borough is designated Archaeological Priority Zone. It is essential that consultation is undertaken with Greater London Archaeology Service (GLAAS). It is recommended that GLAAS are engaged early in the EIA process. With respect to Item 4 of Table 6.9 and Table B5 of Appendix B, English Heritage has previously advised that there should also be no distinction drawn between Grade I and II* Buildings and Grade II buildings. The degree of protection afforded to listed buildings by the legislation does not distinguish between grades and as a national designation all grades should be regarded as ‘high’ importance. English Heritage has also previously advised that there should be no distinction in sensitivity between conservation areas. As a local designation arising from powers in national legislation they should be designated heritage assets of ‘high’ importance. If a distinction is then to be drawn in townscape terms between those of consistent architectural or townscape character that should be reflected in the magnitude of change and not in their importance. Table 1 will therefore need to be updated accordingly.</p> <p>Townscape and Visual</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>No information has been provided on the viewpoints to be assessed , or which are to be wireless/rendered – views from LBTH will need to be discussed and agreed with the Council. As a minimum, it is asked that London View Management Framework (LVMF) views are rendered. It is also requested that views from open spaces such as parks and waterways are rendered, as well as any within/ close to conservation areas and/ or heritage assets e.g. listed buildings. All judgements on the significance of effects should be fully explained and justified and be based on judgements of the potential effects identified, their magnitude and the sensitivity of the receptor affected.</p> <p>Cumulative Developments</p> <p>No detail has been provided on the cumulative developments to be assessed with the EIA. Reasonably foreseeable schemes within LBTH should be taken into account if it is considered likely that they will contribute to any impacts identified in the EIA. The Council’s standard advice is that the EIA should also affect cumulative developments that have been submitted as planning applications but not yet approved should also be included, as the council considers these to be ‘reasonably foreseeable’.</p> <p>The following extant planning consents should be considered:</p> <ul style="list-style-type: none"> a) Leamouth Peninsula North – PA/10/01864 b) Orchard Wharf – PA/10/02778 c) Aberfeldy Estate redevelopment – PA/11/02716 d) Blackwall reach Development – PA/12/00001 e) Wood Wharf – PA/13/296 f) New Union Wharf PA/12/00360 g) Land on West side of Leamouth Road – PA/07/0039 h) 60 Portree Street and Lanrick House, Lanrick road – PA/08/01669 i) Building C, New Providence Wharf, Blackwall Way – PA/06/02101 j) Alberta House – PA/07/00241 k) Prestons Road – PA/11/1668 l) Virginia Quays – PA/11/1462 m) Canning Town and Custom House – 11/00662/LYGDC) n) Rathbone Market, Barking Road – 08/02263/LTGDC 			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>o) Crossrail – Eastern tunnels logistics site (Planning references: 09/00912/AOD, 09/00787/AOD 09/00912/ AOD, 10/01016/AOD and 11/ 00157/AOD)</p> <p>The EIA will need to carefully and quantifiably (eg using data in other ESs) assess cumulative effects, and demonstrate this in the ES. It is recommended that the list of cumulative developments is reviewed regularly to ensure that all relevant current applications are captured for EIA purposes.</p> <p>Conclusion LBTH would welcome the opportunity to consult further on the EIA for this scheme both pre and post submission.</p>			
<p>Based on the information provided in the Report, the MMO has identified the following activities which may require licensing under the 2009 Act:</p> <p><input type="checkbox"/> Construction of the tunnels – The Report notes that the tunnels will be bored beneath the Thames. All work within the marine environment, including both beneath and above the tidal extents of rivers, will require a marine licence under the 2009 Act. It should be noted, however, that there is an exemption relating to bored tunnels in the Marine Licensing (Exempted Activities) (Amendment) Order 2013, as follows:</p> <p>Bored tunnels</p> <p>35.—(1) Article 4 applies to a deposit or works activity carried on wholly under the sea bed in connection with the construction or operation of a bored tunnel.</p> <p>(2) Paragraph (1) is subject to conditions 1 and 2.</p> <p>(3) Condition 1 is that notice of the intention to carry on the activity must be given to the licensing authority before the activity is carried on.</p> <p>(4) Condition 2 is that the activity must not significantly adversely affect any part of the environment of the UK marine area or the living resources that it supports.</p> <p>(5) But article 4 does not apply to any such deposit carried on for the purpose of disposal.</p>	Marine Management Organisation	Planning issue	Noted.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p><input type="checkbox"/> Construction of drainage water outfalls – Section 2 of the Report refers to highway drainage. Paragraphs 2.3.18 and 2.3.20 state that surface run-off will be ‘gravity drained to an outfall’. The Report does not state if this will be via the use of an existing outfall or if a new outfall will be required. Any works below MHWS, including both the construction of a new outfall, or works to existing infrastructure, such as repair, modification or upgrades, would require a marine licence.</p> <p><input type="checkbox"/> Construction of in-river structures – Item 12 of section 6.5 of the Report mentions a ‘requirement for in-river structures’, however, notes that ‘this is not currently envisaged’. On this matter the MMO would highlight that further clarification is required.</p>			
<p>The Report includes limited detail regarding work activities and their associated methodologies. Further detail is required in order to ascertain what, if any, activities require licensing under the 2009 Act, and to enable a thorough and robust assessment of their impacts upon the marine environment.</p> <p>Any additional works or activities in the marine area which may require a marine licence under the 2009 Act should be notified to the MMO at the earliest opportunity and the impacts of such works considered in the EIA process.</p>	Marine Management Organisation	Planning issue	Noted.
<p>General comments</p> <p>The Report provides a broad overview of the Project; however, due to the high level nature of the document and lack of Project detail, confidence in the assessments made is limited. For example, as stated in section 3 of this document, only a broad overview of the works to be undertaken has been provided. This limits the confidence that all relevant elements of the project have been scoped with regards to impact pathways and receptors.</p>	Marine Management Organisation	NA	The scoping exercise and consultation with relevant stakeholders will ensure all relevant elements have been scoped in with regards to impact pathways and receptors.
<p>Chapter 2 – The Scheme</p> <p>Paragraph 2.3.26 of the Report provides a brief description of the tunnel design, however, does not state how far below the river bed the tunnels will be bored. Further information is required regarding the exact location of the tunnels, their</p>	Marine Management Organisation	Scheme Description	See previous comments.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>depth below the river bed and a more detailed works methodology regarding tunnel construction.</p> <p>Paragraph 2.3.44 of the Report discusses waste and the disposal of excavated material from tunnelling activity. It is noted that, due to the location of the works in close proximity to the Thames, removal by barge would be a likely option. No further detail is provided to advise how this material will be used. The MMO would highlight that consideration should be given to the Waste Framework Directive.</p> <p>Paragraph 2.3.47 also refers to the possible use of barges to transport tunnel segments and other bulk materials to the site. The impact of such barge movements on marine receptors such as marine ecology and navigation should be assessed.</p> <p>As stated in paragraph 3.1 of this document, the construction of in-river structures such as jetties to support the use of barges, would constitute a licensable activity. Further detail should be provided and the impacts of such construction activities assessed as part of the EIA process.</p>			
<p>Chapter 3 – Consideration of alternatives</p> <p>Chapter 3 of the Report sets out a consideration of alternatives and discusses the possible use of immersed tube tunnel construction, however, states that this was not taken forward due to the associated higher environmental risks associated with this option.</p> <p>The MMO supports the use of construction methods which minimise the impact upon the environment and should be advised of any amendment to the proposed works methodology, in particular, if a decision is made to use immersed tube tunnel construction.</p>	Marine Management Organisation	NA	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Chapter 5 – Environmental impact assessment methodology</p> <p>The MMO is content with the proposed method of assessment as outlined in Chapter 5 of the Report</p>	<p>Marine Management Organisation</p>	<p>NA</p>	<p>NA</p>
<p>Chapter 6 – Scope of the EIA</p> <p>Chapter 6 of the Report provides a high level overview of the proposed scope of the EIA, including environmental topics to be covered. This includes limited scope with regards to marine aspects with no consideration given to impacts upon river navigation, marine ecology, hydrodynamics, recreational and commercial fishing, or other marine users.</p> <p>In particular, section 6.6 states that ‘given that the tunnel is to be created by directional drilling underneath the river, it is not considered that detailed surveys for fish or other features of the River Thames are necessary. These are therefore scoped out of the assessment.’ The proposed works have the potential for noise and vibration from boring activities to impact upon migratory fish. If no impact is expected then clear justification should be given as to why this has been scoped out.</p> <p>As with all works within the marine environment, the MMO would expect to see a thorough and robust assessment of impacts upon marine receptors and clear justification provided for topics/impacts/receptors which have been scoped out.</p> <p>Particular consideration should be given in relation to the bored tunnels exemption as outlined at section 3.1 of this document. In order for the exemption to apply, it must be demonstrated in the EIA that the construction of the tunnel does not adversely affect the environment of the UK Marine area or the living resources that it supports. Therefore, any potential for adverse impact on the marine environment should be adequately assessed and scoped out of consideration in the EIA, in order to effectively deliver this requirement.</p> <p>Consultation process and next steps</p>	<p>Marine Management Organisation</p>	<p>Ecology</p>	<p>See previous comments.</p>

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>The MMO welcomes further consultation and recommends that Transport for London discuss the licensing requirements under the 2009 Act with the MMO at the earliest opportunity.</p>			
<p>National Grid Electricity Transmission</p> <p>National Grid Electricity Transmission has a high voltage electricity overhead transmission line which lies within or in close proximity to the proposed order limits. This line forms an essential part of the electricity transmission network in England and Wales and include the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> ZR 400kV Overhead Transmission Line – Barking-West Ham The following points should be taken into consideration: <input type="checkbox"/> National Grid’s Overhead Line/s is protected by a Deed of Easement/Wayleave Agreement which provides full right of access to retain, maintain, repair and inspect our asset <p>Statutory electrical safety clearances must be maintained at all times. Any proposed buildings must not be closer than 5.3m to the lowest conductor. National Grid recommends that no permanent structures are built directly beneath overhead lines. These distances are set out in EN 43 – 8 Technical Specification for “overhead line clearances Issue 3 (2004) available at:</p> <p>http://www.nationalgrid.com/uk/LandandDevelopment/DDC/devnearohl_final/appendixIII/applIII-part2</p> <p>If any changes in ground levels are proposed either beneath or in close proximity to our existing overhead lines then this would serve to reduce the safety clearances for such overhead lines. Safe clearances for existing overhead lines must be maintained in all circumstances.</p> <p>Further guidance on development near electricity transmission overhead lines is available</p> <p>here: http://www.nationalgrid.com/NR/rdonlyres/1E990EE5-D068-4DD6-8C9A-4D0B06A1BA79/31436/Developmentnearoverheadlines1.pdf</p>	National Grid.	Scheme description	NA

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>The relevant guidance in relation to working safely near to existing overhead lines is contained within the Health and Safety Executive's (www.hse.gov.uk) Guidance Note GS 6 "Avoidance of Danger from Overhead Electric Lines" and all relevant site staff should make sure that they are both aware of and understand this guidance.</p> <p>Plant, machinery, equipment, buildings or scaffolding should not encroach within 5.3 metres of any of our high voltage conductors when those conductors are under their worse conditions of maximum "sag" and "swing" and overhead line profile (maximum "sag" and "swing") drawings should be obtained using the contact details above.</p> <p>If a landscaping scheme is proposed as part of the proposal, we request that only slow and low growing species of trees and shrubs are planted beneath and adjacent to the existing overhead line to reduce the risk of growth to a height which compromises statutory safety clearances.</p> <p>Drilling or excavation works should not be undertaken if they have the potential to disturb or adversely affect the foundations or "pillars of support" of any existing tower. These foundations always extend beyond the base area of the existing tower and foundation ("pillar of support") drawings can be obtained using the contact details above.</p> <p>Due to the scale, bulk and cost of the transmission equipment required to operate at 275kV or 400kV we only support proposals for the relocation of existing high voltage overhead lines where such proposals directly facilitate a major development or infrastructure project of national importance which has been identified as such by government.</p> <p>To view the Development Near Lines Documents. Please use the link below: http://www.nationalgrid.com/uk/LandandDevelopment/SC/devnearohl_final/</p> <p>To view the National Grid Policy's for our Sense of Place Document. Please use the link below:</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>http://www.nationalgrid.com/uk/LandandDevelopment/DDC/</p> <p>Gas Distribution</p> <p>National Grid has Gas Distribution pipelines located within and in close proximity to the order limits. Details are as follows:</p> <ul style="list-style-type: none"> <input type="checkbox"/> High or Intermediate pressure (above 2 bar) Gas Pipelines and associated equipment <input type="checkbox"/> Low or Medium pressure (below 2 bar) gas pipes and associated equipment. (As a result it is highly likely that there are gas services and associated apparatus in the vicinity) <p>Above ground gas sites and equipment has also been identified as being located within or in close proximity to the order limits.</p> <p>Specific Comments – Gas Infrastructure</p> <p>The following points should be taken into consideration:</p> <ul style="list-style-type: none"> <input type="checkbox"/> National Grid has a Deed of Grant of Easement for each pipeline, which prevents the erection of permanent / temporary buildings, or structures, change to existing ground levels, storage of materials etc. <p>Pipeline Crossings:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Where existing roads cannot be used, construction traffic should ONLY cross the pipeline at previously agreed locations. <input type="checkbox"/> The pipeline shall be protected, at the crossing points, by temporary rafts constructed at ground level. The third party shall review ground conditions, vehicle types and crossing frequencies to determine the type and construction of the raft required. <input type="checkbox"/> The type of raft shall be agreed with National Grid prior to installation. 			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p><input type="checkbox"/> No protective measures including the installation of concrete slab protection shall be installed over or near to the National Grid pipeline without the prior permission of National Grid.</p> <p><input type="checkbox"/> National Grid will need to agree the material, the dimensions and method of installation of the proposed protective measure.</p> <p><input type="checkbox"/> The method of installation shall be confirmed through the submission of a formal written method statement from the contractor to National Grid.</p> <p><input type="checkbox"/> Please be aware that written permission is required before any works commence within the National Grid easement strip.</p> <p><input type="checkbox"/> A National Grid representative shall monitor any works within close proximity to the pipeline to comply with National Grid specification T/SP/SSW22.</p> <p><input type="checkbox"/> A Deed of Consent is required for any crossing of the easement</p> <p>Cables Crossing:</p> <p><input type="checkbox"/> Cables may cross the pipeline at perpendicular angle to the pipeline i.e. 90 degrees.</p> <p><input type="checkbox"/> A National Grid representative shall supervise any cable crossing of a pipeline.</p> <p><input type="checkbox"/> Clearance must be at least 600mm above or below the pipeline.</p> <p><input type="checkbox"/> Impact protection slab should be laid between the cable and pipeline if cable crossing is above the pipeline.</p> <p><input type="checkbox"/> A Deed of Consent is required for any cable crossing the easement.</p> <p><input type="checkbox"/> Where a new service is to cross over the pipeline a clearance distance of 0.6 metres between the crown of the pipeline and underside of the service should be maintained. If this cannot be achieved the service shall cross below the pipeline with a clearance distance of 0.6 metres.</p> <p>General Notes on Pipeline Safety:</p> <p><input type="checkbox"/> You should be aware of the Health and Safety Executives guidance document HS(G) 47 "Avoiding Danger from Underground Services", and National Grid's</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>specification for Safe Working in the Vicinity of National Grid High Pressure gas pipelines and associated installations - requirements for third parties T/SP/SSW22.</p> <ul style="list-style-type: none"> <input type="checkbox"/> National Grid will also need to ensure that our pipelines access is maintained during and after construction. <input type="checkbox"/> Our pipelines are normally buried to a depth cover of 1.1 metres however; actual depth and position must be confirmed on site by trial hole investigation under the supervision of a National Grid representative. Ground cover above our pipelines should not be reduced or increased. <input type="checkbox"/> If any excavations are planned within 3 metres of National Grid High Pressure Pipeline or, within 10 metres of an AGI (Above Ground Installation), or if any embankment or dredging works are proposed then the actual position and depth of the pipeline must be established on site in the presence of a National Grid representative. A safe working method agreed prior to any work taking place in order to minimise the risk of damage and ensure the final depth of cover does not affect the integrity of the pipeline. <input type="checkbox"/> Excavation works may take place unsupervised no closer than 3 metres from the pipeline once the actual depth and position has been confirmed on site under the supervision of a National Grid representative. Similarly, excavation with hand held power tools is not permitted within 1.5 metres from our apparatus and the work is undertaken with NG supervision and guidance. <p>To view the SSW22 Document, please use the link below: http://www.nationalgrid.com/uk/LandandDevelopment/DDC/GasElectricNW/safeworking.htm</p> <p>To view the National Grid Policy's for our Sense of Place Document. Please use the link below: http://www.nationalgrid.com/uk/LandandDevelopment/DDC/</p> <p>To download a copy of the HSE Guidance HS(G)47, please use the following link: http://www.hse.gov.uk/pubns/books/hsg47.htm</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Further information in relation to National Grid's gas transmission pipelines can be accessed via the following internet link: http://www.nationalgrid.com/uk/LandandDevelopment/DDC/gastransmission/gaspipes/</p> <p>Further Advice</p> <p>We would request that the potential impact of the proposed scheme on National Grid's existing assets as set out above is considered in any subsequent reports, including in the Environmental Statement, and as part of any subsequent application. Where the promoter intends to acquire land, extinguish rights, or interfere with any of National Grid apparatus protective provisions will be required in a form acceptable to it to be included within the DCO.</p> <p>Where any diversion of apparatus may be required to facilitate a scheme, National Grid is unable to give any certainty with the regard to diversions until such time as adequate conceptual design studies have been undertaken by National Grid. Further information relating to this can be obtained by contacting the email address below.</p> <p>National Grid requests to be consulted at the earliest stages to ensure that the most appropriate protective provisions are included within the DCO application to safeguard the integrity of our apparatus and to remove the requirement for objection. All consultations should be sent to the following: DCOConsultations@nationalgrid.com as well as by post to the following address: The Company Secretary 1-3 The Strand London WC2N 5EH</p> <p>In order to respond at the earliest opportunity National Grid will require the following: <input type="checkbox"/> Draft DCO including the Book of Reference and relevant Land Plans</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<input type="checkbox"/> Shape Files or CAD Files for the order limits			
NATS anticipates no impact from the proposal and has no comments to make on the Scoping Request.	NATS	NA	NA
<p>The scoping request is for a proposal that does not appear, from the information provided, to affect any nationally designated geological or ecological sites (Ramsar, SPA, SAC, SSSI, NNR) or landscapes (National Parks, AONBs, Heritage Coasts), or have significant impacts on the protection of soils (particularly of sites over 20ha of best or most versatile land), nor is the development for a mineral or waste site of over 5ha.</p> <p>At present therefore it is not a priority for Natural England to advise on the detail of this EIA. We would, however, like to draw your attention to some key points of advice, presented in annex to this letter, and we would expect the final Environmental Statement (ES) to include all necessary information as outlined in Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2011. If you believe that the development does affect one of the features listed in paragraph 3 above, please contact Natural England at consultations@naturalengland.org.uk, and we may be able to provide further information.</p> <p>1. General Principles</p> <p>Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2011, sets out the necessary information to assess impacts on the natural environment to be included in an ES, specifically:</p> <p><input type="checkbox"/> <input type="checkbox"/> A description of the development – including physical characteristics and the full land use requirements of the site during construction and operational phases.</p> <p><input type="checkbox"/> <input type="checkbox"/> Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.</p>	Natural England	Ecology	See previous comments.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p><input type="checkbox"/> <input type="checkbox"/> An assessment of alternatives and clear reasoning as to why the preferred option has been chosen.</p> <p><input type="checkbox"/> <input type="checkbox"/> A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors.</p> <p><input type="checkbox"/> <input type="checkbox"/> A description of the likely significant effects of the development on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects. Effects should relate to the existence of the development, the use of natural resources and the emissions from pollutants.</p> <p>This should also include a description of the forecasting methods to predict the likely effects on the environment</p> <p><input type="checkbox"/> <input type="checkbox"/> A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.</p> <p><input type="checkbox"/> <input type="checkbox"/> A non-technical summary of the information.</p> <p><input type="checkbox"/> <input type="checkbox"/> An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.</p> <p>It will be important for any assessment to consider the potential cumulative effects of this proposal, including all supporting infrastructure, with other similar proposals and a thorough assessment of the ‘in combination’ effects of the proposed development with any existing developments and current applications. A full consideration of the implications of the whole scheme should be included in the ES.</p> <p>All supporting infrastructure should be included within the assessment.</p> <p>2. Biodiversity and Geology</p> <p>2.1. Ecological Aspects of an Environmental Statement Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters.</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Guidelines for Ecological Impact Assessment (EclA) have been developed by the Institute of Ecology and Environmental Management (IEEM) and are available on their website. EclA is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EclA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal.</p> <p>The National Planning Policy Framework (NPPF) sets out guidance in S.118 on how to take account of biodiversity interests in planning decisions and the framework that local authorities should provide to assist developers.</p> <p>2.2. Internationally and Nationally Designated Sites</p> <p>Natural England undertakes an initial assessment of all development consultations, by determining whether the location to which they relate falls within geographical ‘buffer’ areas within which development is likely to affect designated sites. The proposal is located outside these buffer areas and therefore appears unlikely to affect an Internationally or Nationally designated site. However, it should be recognised that the specific nature of a proposal may have the potential to lead to significant impacts arising at a greater distance than is encompassed by Natural England’s buffers for designated sites. The ES should therefore thoroughly assess the potential for the proposal to affect designated sites, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites and Sites of Special Scientific Interest (SSSI). Should the proposal result in an emission to air or discharge to the ground or surface water catchment of a designated site then the potential effects and impact of this would need to be considered in the Environmental Statement Local Planning Authorities, as competent authorities under the provisions of the Conservation of Habitats and Species Regulations 2010 (the ‘Habitats Regulations’), should have regard to the Habitats Regulations Assessment process set out in Regulation 61 of the Habitats Regulations in their determination of a planning application. Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Appropriate Assessment, in addition to consideration of impacts through the EIA process. Statutory site locations can be found at www.magic.gov.uk. Further information concerning particular statutory sites can be found on the Natural England website.</p> <p>2.3. Protected Species</p> <p>The ES should assess the impact of all phases of the proposal on protected species. Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, groups and individuals; and consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment.</p> <p>The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 <i>Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System</i>. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.</p> <p>Natural England has adopted standing advice for protected species. It provides a consistent level of basic advice which can be applied to any planning application that could affect protected species. It also includes links to guidance on survey and mitigation.</p> <p>Natural England does not hold comprehensive information regarding the locations of species protected by law, but advises on the procedures and legislation relevant to such species.</p> <p>2.4. Regionally and Locally Important Sites</p> <p>The ES should thoroughly assess the impact of the proposals on non-statutory sites, for example Local Wildlife Sites (LoWS), Local Nature Reserves (LNR) and Regionally Important Geological and Geomorphological Sites (RIGS). Natural</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>England does not hold comprehensive information on these sites. We therefore advise that the appropriate local biological record centres, nature conservation organisations, Local Planning Authority and local RIGS group should be contacted with respect to this matter.</p> <p>2.5. Biodiversity Action Plan Habitats and Species</p> <p>The ES should thoroughly assess the impact of the proposals on habitats and/or species listed in the UK Biodiversity Action Plan (BAP). These Priority Habitats and Species are listed as ‘Habitats and Species of Principal Importance’ within the England Biodiversity List, recently published under the requirements of S14 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available in the Defra publication ‘Guidance for Local Authorities on Implementing the Biodiversity Duty’.</p> <p>Government Circular 06/2005 states that BAP species and habitats, ‘are capable of being a material consideration...in the making of planning decisions’. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those species and habitats included in the relevant Local BAP. The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of BAP habitat for the area under consideration.</p>			
<p>3. Landscape, Access and Recreation</p> <p>3.1. Landscape and Visual Impacts</p> <p>The consideration of landscape impacts should reflect the approach set out in the <i>Guidelines for Landscape and Visual Impact Assessment</i> (Landscape Institute and the Institute of Environmental Assessment and Management, 2013, 3rd edition), the <i>Landscape Character Assessment Guidance for England and Scotland</i> (Scottish Natural Heritage and The Countryside Agency, 2002) and good practice. The</p>	Natural England	Townscape and Visual Impacts Effects on all Travellers Air Quality Flood Risk	Effects on agricultural land are scoped out of the assessment as there is no agricultural land within the vicinity of the Scheme and therefore no impacts are expected in terms of land-take, husbandry,

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England would expect the cumulative impact assessment to include those proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application.</p> <p>The assessment should refer to the relevant National Character Areas which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page.</p> <p>3.2. Access and Recreation</p> <p>The ES should include a thorough assessment of the development's effects upon public rights of way and access to the countryside and its enjoyment through recreation. With this in mind and in addition to consideration of public rights of way, the landscape and visual effects on Open Access land, whether direct or indirect, should be included in the ES. Natural England would also expect to see consideration of opportunities for improved or new public access provision on the site, to include linking existing public rights of way and/or providing new circular routes and interpretation. We also recommend reference to relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.</p> <p>4. Land use and soils</p> <p>Impacts from the development should be considered in light of the Government's policy for the protection of the best and most versatile (BMV) agricultural land as set out in paragraph 112 of the NPPF. We also recommend that soils should be considered under a more general heading of sustainable use of land and the valuing of the ecosystem services they provide as a natural resource in line with paragraph 109 of the NPPF.</p>			<p>severance or accommodation works to agricultural land. However impacts of off-site materials disposal on agricultural land will be considered.</p>

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Soil is a finite resource that fulfils many important functions and services (ecosystem services) for society; for instance as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution. It is therefore important that the soil resources are protected and used sustainably. The Natural Environment White Paper (NEWP) <i>'The Natural Choice: securing the value of nature'</i> (Defra, June 2011), emphasises the importance of natural resource protection, including the conservation and sustainable management of soils and the protection of BMV agricultural land.</p> <p>Development of buildings and infrastructure prevents alternative uses for those soils that are permanently covered, and also often results in degradation of soils around the development as result of construction activities. This affects their functionality as wildlife habitat, and reduces their ability to support landscape works and green infrastructure. Sealing and compaction can also contribute to increased surface run-off, ponding of water and localised erosion, flooding and pollution.</p> <p>Defra published a Construction Code of Practice for the sustainable use of soils on construction sites (2009). The purpose of the Code of Practice is to provide a practical guide to assist anyone involved in the construction industry to protect the soil resources with which they work.</p> <p>As identified in the NPPF new sites or extensions to new sites for Peat extraction should not be granted permission by Local Planning Authorities or proposed in development plans. General advice on the agricultural aspects of site working and reclamation can be found in the Defra Guidance for successful reclamation of mineral and waste sites.</p> <p>5. Air Quality</p> <p>Air quality in the UK has improved over recent decades but air pollution remains a significant issue; for example over 97% of sensitive habitat area in England is predicted to exceed the critical loads for ecosystem protection from atmospheric nitrogen deposition (England Biodiversity Strategy, Defra 2011). A priority action in</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The assessment should take account of the risks of air pollution and how these can be managed or reduced. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk). Further information on air pollution modelling and assessment can be found on the Environment Agency website.</p> <p>6. Climate Change Adaptation</p> <p>The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment "by establishing coherent ecological networks that are more resilient to current and future pressures" (NPPF Para 109), which should be demonstrated through the ES.</p>			
<p>Tunnel Design</p> <p>It is understood that the Silvertown Tunnel would be a 1.0km long bored tunnel with an 11m internal diameter. There would be cut and cover tunnel approaches. Whilst reference is made to "maximising cover to the river bed at the tunnel low point" and that the "tunnel will be constructed at such a depth that it would not directly impact on the River Thames" what the PLA needs to understand and what the ES needs to address, is the depth of the tunnel under the River Thames. This includes not only the tunnel itself but also any scour protection/rock armour that the applicant may be considering placing on top of the tunnel. The depth of the tunnel, its alignment and any tunnel protection could have implications for users of the River Thames. For example, the PLA is currently undertaking some work for the applicant identifying existing moorings or other works in the river in this area. It may, depending on the</p>	Port of London Authority	Scheme description Community and Private assets Ecology Water Environment	See previous comments.

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>depth of the tunnel be necessary at the applicant's expense, to relocate existing moorings or other works. Where would these moorings and works be relocated to? What are the navigational, river regime and environmental implications of any relocations? It may also be necessary to determine the impact of the tunnel on the foundations of the cable car tower.</p> <p>It should also be confirmed whether the applicant would be looking for an exclusion zone(s) around the tunnel and whether there would be any limitations in the area. For example, would there be a limitation on anchoring due to the depth of the tunnel which would impact on river users. Would the applicant be looking to temporarily or permanently extinguish the public right of navigation?</p> <p>It is noted that the tunnel would involve permanent land take of the PLA's land. Discussions will be needed with the PLA about the need for a River Works Licence.</p> <p>Use of the River/Materials</p> <p>It is noted and welcomed that the applicant will be looking to use the river for the removal of spoil and the delivery of tunnel lining segments and that this will be reviewed as part of the ES. Further details will be required on this aspect of the project, including projections for spoil removal and the sizes and types of vessels involved. For example, it might be possible depending on the wharf to be used, to use ships to transport materials rather than barges. It is therefore recommended that a full analysis of potential wharves in the area which could be utilised in connection with the delivery of construction and waste materials is undertaken. The ES should demonstrate how the use of the river for the transport of construction and waste materials is to be maximised in line with planning policy.</p> <p>Community and Private Assets</p> <p>The land required for the Scheme has been confined to the Scheme's safeguarded area – this includes Thames Wharf, Alexandra Wharf and Royal Victoria Dock.</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Thames Wharf is safeguarded by Ministerial Direction and planning policy seeks to protect it for waterborne cargo handling uses. The planning policy section of the ES will need to address this and demonstrate how capacity and viability of the safeguarded wharf is not adversely affected as a result of the proposed development both during construction and on completion of the tunnel. Reference is made to the Newham Core Strategy and Thames Wharf. It refers to the Core Strategy's proposed release of Thames Wharf from SIL and there being scope to reconfigure the safeguarded wharf on the site to the adjacent Carlsberg-Tetley) or to remove the wharf safeguarding at Thames Wharf if a consolidated wharf can be delivered at Thameside West subject to there being no net loss of functionality or wharf capacity. It is suggested that care needs to be taken in the ES in relation to the safeguarded wharf. The drawings in the appendix to the scoping document appear to show the limit of any use of Thames Wharf to being temporary land take for temporary works or site compounds. The ES will therefore need to be very clear about this aspect of planning policy and place the Newham Core Strategy into context, as it applies to the development itself rather than to any wider aspirations of Newham Council.</p> <p>Ecology and Nature Conservation</p> <p>Clarification should be provided in the ES of any works proposed in the River Thames. For example, reference is made to it being considered unlikely that <i>"the Scheme would cause any significant disturbance to wading birds as the area of mud appears to be very limited and the current baseline situation appears to include a lot of industrial activity, boat and vehicle movements adjacent to the river in this location."</i> What disturbance does the applicant consider might be likely from a bored tunnel to wading birds? The document implies that any effects would be indirect from elevated noise levels or the risk of accidental spillages during construction. What spillages does the applicant consider might be possible? Berths would have working practices to maintain clear berthing for the barges so spillages are avoided. Does the applicant mean pollution from liquid spills? How the dewatering/drainage might be managed in relation to the river and the tunnel operation should also be explained in the ES (i.e. if there is a spillage and it is raining, is the attenuation going to be affected? Would it flow into the river or the sewage system?)</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Cumulative Effects</p> <p>It is recommended that the cumulative effects considered should include the Thames Tideway Tunnel the construction of which would be taking place at the same time at the Silvertown Tunnel.</p>			
<p>In order to ensure that health is fully and comprehensively considered the Environmental Statement (ES) should provide sufficient information to allow the potential impact of the development on public health to be fully assessed.</p> <p>We understand that the promoter will wish to avoid unnecessary duplication and that many issues including air quality, emissions to water, waste, contaminated land etc. will be covered elsewhere in the ES. PHE however believes the summation of relevant issues into a specific section of the report provides a focus which ensures that public health is given adequate consideration. The section should summarise key information, risk assessments, proposed mitigation measures, conclusions and residual impacts, relating to human health. Compliance with the requirements of National Policy Statements and relevant guidance and standards should also be highlighted.</p> <p>In terms of the level of detail to be included in an ES, we recognise that the differing nature of projects is such that their impacts will vary. Any assessments undertaken to inform the ES should be proportionate to the potential impacts of the proposal, therefore we accept that, in some circumstances particular assessments may not be relevant to an application, or that an assessment may be adequately completed using a qualitative rather than quantitative methodology. In cases where this decision is made the promoters should fully explain and justify their rationale in the submitted documentation.</p> <p>General approach</p> <p>The EIA should give consideration to best practice guidance such as the Government's Good Practice Guide for EIA1. It is important that the EIA identifies</p>	<p>Public Health England</p>	<p>HIA Air Quality Water Environment Geology and Soils Materials</p>	<p>HIA will take into account the points made in the scoping response.</p> <p>When identifying potential impacts, the interrelationship with all relevant topics will be considered.</p>

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>and assesses the potential public health impacts of the activities at, and emissions from, the installation. Assessment should consider the development, operational, and decommissioning phases.</p> <p>It is not PHE’s role to undertake these assessments on behalf of promoters as this would conflict with PHE’s role as an impartial and independent body. We note that the information provided states that there will be three associated development projects, but that these will be the subject of separate planning consent applications. We recommend that the EIA includes consideration of the impacts of associated development and that cumulative impacts are fully accounted for.</p> <p>Consideration of alternatives (including alternative sites, choice of process, and the phasing of construction) is widely regarded as good practice. Ideally, EIA should start at the stage of site and process selection, so that the environmental merits of practicable alternatives can be properly considered. Where this is undertaken, the main alternatives considered should be outlined in the ES. The following text covers a range of issues that PHE would expect to be addressed by the promoter. However this list is not exhaustive and the onus is on the promoter to ensure that the relevant public health issues are identified and addressed. PHE’s advice and recommendations carry no statutory weight and constitute non-binding guidance.</p> <p>Receptors</p> <p>The ES should clearly identify the development’s location and the location and distance from the development of off-site human receptors that may be affected by emissions from, or activities at, the development. Off-site human receptors may include people living in residential premises; people working in commercial, and industrial premises and people using transport infrastructure (such as roads and railways), recreational areas, and publicly-accessible land. Consideration should also be given to environmental receptors such as the surrounding land, watercourses, surface and groundwater, and drinking water supplies such as wells, boreholes and water abstraction points.</p> <p>Impacts arising from construction and decommissioning</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Any assessment of impacts arising from emissions due to construction and decommissioning should consider potential impacts on all receptors and describe monitoring and mitigation during these phases. Construction and decommissioning will be associated with vehicle movements and cumulative impacts should be accounted for.</p> <p>We would expect the promoter to follow best practice guidance during all phases from construction to decommissioning to ensure appropriate measures are in place to mitigate any potential impact on health from emissions (point source, fugitive and traffic-related). An effective Construction Environmental Management Plan (CEMP) (and Decommissioning Environmental Management Plan (DEMP) will help provide reassurance that activities are well managed. The promoter should ensure that there are robust mechanisms in place to respond to any complaints of traffic-related pollution, during construction, operation, and decommissioning of the facility.</p> <p>Emissions to air and water</p> <p>Significant impacts are unlikely to arise from installations which employ Best Available Techniques (BAT) and which meet regulatory requirements concerning emission limits and design parameters. However, PHE has a number of comments regarding emissions in order that the EIA provides a comprehensive assessment of potential impacts.</p> <p>When considering a baseline (of existing environmental quality) and in the assessment and future monitoring of impacts these:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Should include appropriate screening assessments and detailed dispersion modelling where this is screened as necessary <input type="checkbox"/> <input type="checkbox"/> Should encompass all pollutants which may be emitted by the installation in combination with all pollutants arising from associated development and transport, ideally these should be considered in a single holistic assessment <input type="checkbox"/> <input type="checkbox"/> Should consider the construction, operational, and decommissioning phases <input type="checkbox"/> <input type="checkbox"/> Should consider the typical operational emissions and emissions from start-up, shut-down, abnormal operation and accidents when assessing potential impacts and 			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>include an assessment of worst-case impacts should fully account for fugitive emissions</p> <ul style="list-style-type: none"> <input type="checkbox"/> Should include appropriate estimates of background levels <input type="checkbox"/> Should identify cumulative and incremental impacts (i.e. assess cumulative impacts from multiple sources), including those arising from associated development, other existing and proposed development in the local area, and new vehicle movements associated with the proposed development; associated transport emissions should include consideration of non-road impacts (i.e. rail, sea, and air) <input type="checkbox"/> Should include consideration of local authority, Environment Agency, Defra national network, and any other local site-specific sources of monitoring data <input type="checkbox"/> Should compare predicted environmental concentrations to the applicable standard or guideline value for the affected medium (such as UK Air Quality Standards and Objectives and Environmental Assessment Levels) <input type="checkbox"/> If no standard or guideline value exists, the predicted exposure to humans should be estimated and compared to an appropriate health-based value (a Tolerable Daily Intake or equivalent). <input type="checkbox"/> This should consider all applicable routes of exposure e.g. include consideration of aspects such as the deposition of chemicals emitted to air and their uptake via ingestion <input type="checkbox"/> Should identify and consider impacts on residential areas and sensitive receptors (such as schools, nursing homes and healthcare facilities) in the area(s) which may be affected by emissions, this should include consideration of any new receptors arising from future development. <p>Whilst screening of impacts using qualitative methodologies is common practice (e.g. for impacts arising from fugitive emissions such as dust), where it is possible to undertake a quantitative assessment of impacts then this should be undertaken. PHE's view is that the EIA should appraise and describe the measures that will be used to control both point source and fugitive emissions and demonstrate that standards, guideline values or health-based values will not be exceeded due to</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>emissions from the installation, as described above. This should include consideration of any emitted pollutants for which there are no set emission limits. When assessing the potential impact of a proposed installation on environmental quality, predicted environmental concentrations should be compared to the permitted concentrations in the affected media; this should include both standards for short and long-term exposure.</p> <p><i>Additional points specific to emissions to air</i></p> <p>When considering a baseline (of existing air quality) and in the assessment and future monitoring of impacts these:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Should include consideration of impacts on existing areas of poor air quality e.g. existing or proposed local authority Air Quality Management Areas (AQMAS) <input type="checkbox"/> <input type="checkbox"/> Should include modelling using appropriate meteorological data (i.e. come from the nearest suitable meteorological station and include a range of years and worst case conditions) <input type="checkbox"/> <input type="checkbox"/> Should include modelling taking into account local topography <p><i>Additional points specific to emissions to water</i></p> <p>When considering a baseline (of existing water quality) and in the assessment and future monitoring of impacts these:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <input type="checkbox"/> Should include assessment of potential impacts on human health and not focus solely on ecological impacts <input type="checkbox"/> <input type="checkbox"/> Should identify and consider all routes by which emissions may lead to population exposure (e.g. surface watercourses; recreational waters; sewers; geological routes etc.) <input type="checkbox"/> <input type="checkbox"/> Should assess the potential off-site effects of emissions to groundwater (e.g. on aquifers used for drinking water) and surface water (used for drinking water abstraction) in terms of the potential for population exposure <input type="checkbox"/> <input type="checkbox"/> Should include consideration of potential impacts on recreational users (e.g. from fishing, canoeing etc) alongside assessment of potential exposure via drinking water 			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Land quality</p> <p>We would expect the promoter to provide details of any hazardous contamination present on site (including ground gas) as part of the site condition report. Emissions to and from the ground should be considered in terms of the previous history of the site and the potential of the site, once operational, to give rise to issues. Public health impacts associated with ground contamination and/or the migration of material off-site should be assessed³ and the potential impact on nearby receptors and control and mitigation measures should be outlined.</p> <p>Relevant areas outlined in the Government’s Good Practice Guide for EIA include:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Effects associated with ground contamination that may already exist <input type="checkbox"/> Effects associated with the potential for polluting substances that are used (during construction / operation) to cause new ground contamination issues on a site, for example introducing / changing the source of contamination <input type="checkbox"/> Impacts associated with re-use of soils and waste soils, for example, re-use of site-sourced materials on-site or offsite, disposal of site-sourced materials offsite, importation of materials to the site, etc <p>Waste</p> <p>The EIA should demonstrate compliance with the waste hierarchy (e.g. with respect to re-use, recycling or recovery and disposal). For wastes arising from the installation the EIA should consider:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The implications and wider environmental and public health impacts of different waste disposal options <input type="checkbox"/> Disposal route(s) and transport method(s) and how potential impacts on public health will be mitigated <p>Other aspects</p> <p>Within the EIA PHE would expect to see information about how the promoter would respond to accidents with potential off-site emissions e.g. flooding or fires, spills,</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>leaks or releases off-site. Assessment of accidents should: identify all potential hazards in relation to construction, operation and decommissioning; include an assessment of the risks posed; and identify risk management measures and contingency actions that will be employed in the event of an accident in order to mitigate off-site effects.</p> <p>The EIA should include consideration of the COMAH Regulations (Control of Major Accident Hazards) and the Major Accident Off-Site Emergency Plan (Management of Waste from Extractive Industries) (England and Wales) Regulations 2009: both in terms of their applicability to the installation itself, and the installation's potential to impact on, or be impacted by, any nearby installations themselves subject to the these Regulations. There is evidence that, in some cases, perception of risk may have a greater impact on health than the hazard itself. A 2009 report, jointly published by Liverpool John Moores University and the HPA, examined health risk perception and environmental problems using a number of case studies. As a point to consider, the report suggested: "Estimation of community anxiety and stress should be included as part of every risk or impact assessment of proposed plans that involve a potential environmental hazard. This is true even when the physical health risks may be negligible." PHE supports the inclusion of this information within EIAs as good practice.</p> <p>Electromagnetic fields (EMF) [include for installations with associated substations and/or power lines]</p> <p>There is a potential health impact associated with the electric and magnetic fields around substations and the connecting cables or lines. The following information provides a framework for considering the potential health impact. In March 2004, the National Radiological Protection Board, NRPB (now part of PHE), published advice on limiting public exposure to electromagnetic fields. The advice was based on an extensive review of the science and a public consultation on its website, and recommended the adoption in the UK of the EMF exposure guidelines published by the International Commission on Non-ionizing Radiation Protection (ICNIRP):- http://www.hpa.org.uk/Publications/Radiation/NPRBArchive/DocumentsOfTheNRPB/</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>Absd1502/</p> <p>The ICNIRP guidelines are based on the avoidance of known adverse effects of exposure to electromagnetic fields (EMF) at frequencies up to 300 GHz (gigahertz), which includes static magnetic fields and 50 Hz electric and magnetic fields associated with electricity transmission.</p> <p>PHE notes the current Government policy is that the ICNIRP guidelines are implemented in line with the terms of the EU Council Recommendation on limiting exposure of the general public (1999/519/EC):</p> <p>http://www.dh.gov.uk/en/Publichealth/Healthprotection/DH_4089500</p> <p>For static magnetic fields, the latest ICNIRP guidelines (2009) recommend that acute exposure of the general public should not exceed 400 mT (millitesla), for any part of the body, although the previously recommended value of 40 mT is the value used in the Council Recommendation. However, because of potential indirect adverse effects, ICNIRP recognises that practical policies need to be implemented to prevent inadvertent harmful exposure of people with implanted electronic medical devices and implants containing ferromagnetic materials, and injuries due to flying ferromagnetic objects, and these considerations can lead to much lower restrictions, such as 0.5 mT as advised by the International Electrotechnical Commission. At 50 Hz, the known direct effects include those of induced currents in the body on the central nervous system (CNS) and indirect effects include the risk of painful spark discharge on contact with metal objects exposed to the field. The ICNIRP guidelines give reference levels for public exposure to 50 Hz electric and magnetic fields, and these are respectively 5 kV m⁻¹ (kilovolts per metre) and 100 µT (microtesla). If people are not exposed to field strengths above these levels, direct effects on the CNS should be avoided and indirect effects such as the risk of painful spark discharge will be small. The reference levels are not in themselves limits but provide guidance for assessing compliance with the basic restrictions and reducing the risk of indirect effects. Further clarification on advice on exposure guidelines for 50 Hz electric and magnetic fields is provided in the following note on the HPA website:</p> <p>http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/11957338050</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>36</p> <p>The Department of Energy and Climate Change has also published voluntary code of practices which set out key principles for complying with the ICNIRP guidelines for the industry.</p> <p>http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/consents_planning/codes/codes.aspx</p> <p>There is concern about the possible effects of long-term exposure to electromagnetic fields, including possible carcinogenic effects at levels much lower than those given in the ICNIRP guidelines. In the NRPB advice issued in 2004, it was concluded that the studies that suggest health effects, including those concerning childhood leukaemia, could not be used to derive quantitative guidance on restricting exposure.</p> <p>However, the results of these studies represented uncertainty in the underlying evidence base, and taken together with people’s concerns, provided a basis for providing an additional recommendation for Government to consider the need for further precautionary measures, particularly with respect to the exposure of children to power frequency magnetic fields. The Stakeholder Advisory Group on ELF EMFs (SAGE) was then set up to take this recommendation forward, explore the implications for a precautionary approach to extremely low frequency electric and magnetic fields (ELF EMFs), and to make practical recommendations to Government. In the First Interim Assessment of the Group, consideration was given to mitigation options such as the 'corridor option' near power lines, and optimal phasing to reduce electric and magnetic fields. A Second Interim Assessment addresses electricity distribution systems up to 66 kV. The SAGE reports can be found at the following link: http://sagedialogue.org.uk/ (go to “Document Index” and Scroll to SAGE/Formal reports with recommendations) The Agency has given advice to Health Ministers on the First Interim Assessment of SAGE regarding precautionary approaches to ELF EMFs and specifically regarding power lines and property, wiring and electrical equipment in homes:</p> <p>http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/12042766825</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p>32?p=1207897920036</p> <p>The evidence to date suggests that in general there are no adverse effects on the health of the population of the UK caused by exposure to ELF EMFs below the guideline levels. The scientific evidence, as reviewed by PHE, supports the view that precautionary measures should address solely the possible association with childhood leukaemia and not other more speculative health effects. The measures should be proportionate in that overall benefits outweigh the fiscal and social costs, have a convincing evidence base to show that they will be successful in reducing exposure, and be effective in providing reassurance to the public. The Government response to the SAGE report is given in the written Ministerial Statement by Gillian Merron, then Minister of State, Department of Health, published on 16th October 2009:</p> <p>http://www.publications.parliament.uk/pa/cm200809/cmhansrd/cm091016/wmstext/91016m0001.htm</p> <p>http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_107124</p> <p>HPA and Government responses to the Second Interim Assessment of SAGE are available at the following links:</p> <p>http://www.hpa.org.uk/Publications/Radiation/HPAResponseStatementsOnRadiationTopics/rpdadvice_sage2</p> <p>http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_130703</p> <p>The above information provides a framework for considering the health impact associated with the proposed development, including the direct and indirect effects of the electric and magnetic fields as indicated above.</p> <p>Liaison with other stakeholders, comments should be sought from:</p> <p><input type="checkbox"/> <input type="checkbox"/> The local authority for matters relating to noise, odour, vermin and dust nuisance</p>			

Comment (Ref in the Scoping Opinion Report)	Comment Raised by	Relevant EIA Topic	How this will be addressed in the EIA process
<p> <input type="checkbox"/> <input type="checkbox"/> The local authority regarding any site investigation and subsequent construction (and remediation) proposals to ensure that the site could not be determined as 'contaminated land' under Part 2A of the Environmental Protection Act <input type="checkbox"/> <input type="checkbox"/> The local authority regarding any impacts on existing or proposed Air Quality Management Areas <input type="checkbox"/> <input type="checkbox"/> The Food Standards Agency for matters relating to the impact on human health of pollutants deposited on land used for growing food/ crops <input type="checkbox"/> <input type="checkbox"/> The Environment Agency for matters relating to flood risk and releases with the potential to impact on surface and groundwaters <input type="checkbox"/> <input type="checkbox"/> The Environment Agency for matters relating to waste characterisation and Acceptance the Clinical Commissioning Groups, NHS commissioning Boards and Local Planning Authority for matters relating to wider public health </p> <p> Environmental Permitting Amongst other permits and consents, the development will require an environmental permit from the Environment Agency to operate (under the Environmental Permitting (England and Wales) Regulations 2010). Therefore the installation will need to comply with the requirements of best available techniques (BAT). PHE is a consultee for bespoke environmental permit applications and will respond separately to any such consultation. </p>			

Appendix 5A



Diffusion Tube Monitoring Data

Table A Local Authority Diffusion Tube Monitoring Data – 2012

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO ₂ Annual Average (µg/m ³)	% Data Capture
Dartford Borough Council	DA01	554190	173985	40	100.0
Dartford Borough Council	DA05	558622	172771	54	91.7
Dartford Borough Council	DA07	550749	171924	24	100.0
Dartford Borough Council	DA10	559189	174872	35	100.0
Dartford Borough Council	DA14	555484	174441	60	100.0
Dartford Borough Council	DA16	554108	173318	43	100.0
Dartford Borough Council	DA17	552732	173689	41	100.0
Dartford Borough Council	DA18	559734	174077	24	83.3
Dartford Borough Council	DA20	555660	174863	41	100.0
Dartford Borough Council	DA21	555497	174025	35	100.0
Dartford Borough Council	DA22	555600	174030	53	100.0
Dartford Borough Council	DA24	555632	173558	35	100.0
Dartford Borough Council	DA25	555801	173194	41	66.7
Dartford Borough Council	DA34	555373	173763	43	100.0
Dartford Borough Council	DA35	553848	173994	38	100.0
Dartford Borough Council	DA38	558331	174596	36	91.7
Dartford Borough Council	DA39	555129	173802	39	100.0
Dartford Borough Council	DA41	554123	172805	36	100.0
Dartford Borough Council	DA43	554580	173992	54	100.0
Dartford Borough Council	DA44	555656	174053	44	83.3
Dartford Borough Council	DA49	554902	173893	38	91.7
Dartford Borough Council	DA50	553783	172319	41	91.7
Dartford Borough Council	DA53	557693	174666	24	100.0
Dartford Borough Council	DA54	553642	174616	27	100.0
Dartford Borough Council	DA56	554222	173460	30	83.3
Dartford Borough Council	DA60	553895	174678	35	100.0
Dartford Borough Council	DA61	553578	174175	45	100.0
Dartford Borough Council	DA62	555796	173902	47	66.7
Dartford Borough Council	DA63	555612	173210	31	100.0
Dartford Borough Council	DA67	556900	171294	29	91.7
Dartford Borough Council	DA68	555724	174377	34	100.0
Dartford Borough Council	DA70	558687	172610	35	100.0

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO ₂ Annual Average (µg/m ³)	% Data Capture
Dartford Borough Council	DA71	552618	174410	30	100.0
Dartford Borough Council	DA72	556433	172124	38	100.0
Dartford Borough Council	DA75	558593	172815	43	100.0
Dartford Borough Council	DA78	553686	174905	36	100.0
Dartford Borough Council	DA79	556230	173564	34	100.0
Dartford Borough Council	DA80	553921	174325	39	100.0
Dartford Borough Council	DA81	556368	172344	39	100.0
Dartford Borough Council	DA83	555617	175330	35	100.0
Dartford Borough Council	DA84	555574	174068	58	91.7
Dartford Borough Council	DA85	554556	174034	33	100.0
Dartford Borough Council	DA86	555775	174054	38	100.0
Dartford Borough Council	DA87	558616	172778	35	100.0
London Borough of Bexley	BEX1	545000	175098	47.8	92.0
London Borough of Bexley	BEX3	545080	175067	49.2	92.0
London Borough of Bexley	BEX16	547676	174328	40.5	92.0
London Borough of Bexley	BEX43	549591	173766	39.4	92.0
London Borough of Bexley	BEX47	549587	173566	38.9	83.0
London Borough of Bexley	BEX49	549663	173520	35.9	92.0
London Borough of Bexley	BEX53	549738	173418	49.1	92.0
London Borough of Bexley	BEX66	548905	174363	55.2	58.0
London Borough of Bexley	BEX74	546160	171524	26.6	92.0
London Borough of Bexley	BEX78	546207	171455	28.7	75.0
London Borough of Bexley	BEX79	549978	179064	26.3	92.0
London Borough of Bexley	BEX80	551767	177741	36.8	83.0
London Borough of Bexley	BEX82	552236	177689	30.4	92.0
London Borough of Bexley	BEX83	551861	176379	26.6	92.0
London Borough of Bexley	BEX89	552641	175336	42.8	83.0
London Borough of Bexley	BEX95	549692	175724	44.7	92.0
London Borough of Bexley	BEX96	549641	175631	38.5	92.0
London Borough of Bexley	BEX98	547209	175321	24.7	92.0
London Borough of Bexley	BEX100	543983	174656	21.1	83.0
London Borough of Bexley	BEX301	546167	171977	32	92.0
London Borough of Bexley	BEX303	547260	173240	24.6	92.0

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO ₂ Annual Average (µg/m ³)	% Data Capture
London Borough of Bexley	BEX309	547322	174162	32.4	92.0
London Borough of Bexley	BEX315	547676	175538	37.1	92.0
London Borough of Bexley	BEX318	545995	175936	66.4	92.0
London Borough of Bexley	BEX321	546359	175876	39	92.0
London Borough of Bexley	BEX325	551579	177431	51	92.0
London Borough of Bexley	BEX328	550311	177289	34.4	92.0
London Borough of Bexley	BEX330	551295	174990	45	92.0
London Borough of Bexley	BEX333	549506	173595	62	92.0
London Borough of Bexley	BEX337	549457	173565	56.4	83.0
London Borough of Bexley	BEX342	549736	173337	48.1	83.0
London Borough of Bexley	BEX343	549731	173316	44.2	92.0
London Borough of Bexley	BEX346	549686	173268	68.4	92.0
London Borough of Bexley	BEX350	549584	173133	46.2	33.0
London Borough of Bexley	BEX351	547734	177186	42.5	92.0
London Borough of Bexley	BEX402	547373	170998	38.9	92.0
London Borough of Bexley	BEX407	546226	172713	42.7	92.0
London Borough of Bexley	BEX411	546085	172920	36.2	92.0
London Borough of Bexley	BEX414	546260	174730	63.7	92.0
London Borough of Bexley	BEX417	546313	174493	45.8	92.0
London Borough of Bexley	BEX423	546663	176680	37.7	92.0
London Borough of Bexley	BEX424	546689	176715	39	92.0
London Borough of Bexley	BEX429	550179	176860	45	92.0
London Borough of Bexley	BEX432	550225	176992	50.7	58.0
London Borough of Bexley	BEX435	551781	174603	53.4	92.0
London Borough of Bexley	BEX440	551404	174774	43.8	92.0
London Borough of Bexley	BEX446	551062	174801	54.8	83.0
London Borough of Bexley	BEX448	548259	179473	23.8	92.0
London Borough of Lewisham	L1	536111	177579	37.8	100.0
London Borough of Lewisham	L2	537549	177444	31	91.7
London Borough of Lewisham	L3	536558	178470	37.9	100.0
London Borough of Lewisham	L4	536542	178921	34.9	100.0
London Borough of Lewisham	L5	539664	175061	39	100.0
London Borough of Lewisham	L6	540618	172340	37.5	100.0

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO ₂ Annual Average (µg/m ³)	% Data Capture
London Borough of Lewisham	L7	536555	171804	53.4	100.0
London Borough of Lewisham	L8	536229	174021	44.8	100.0
London Borough of Lewisham	L9	537491	174913	40.6	100.0
London Borough of Lewisham	L10	538101	175073	44	91.7
London Borough of Lewisham	L11	538007	176517	40	100.0
London Borough of Lewisham	L12	537147	175353	33.7	100.0
London Borough of Lewisham	LWS053	535798	171576	32.3	100.0
London Borough of Lewisham	LWS002	538475	175785	34.5	100.0
London Borough of Lewisham	LWS003	538220	176100	44.3	100.0
London Borough of Lewisham	LWS004	537740	175920	55	100.0
London Borough of Lewisham	LWS005	536241	176932	58.4	91.7
London Borough of Lewisham	LWS005	536241	176932	56	91.7
London Borough of Lewisham	LWS005	536241	176932	63.2	91.7
London Borough of Lewisham	LWS008/LWS051	535759	176982	45.4	83.3
London Borough of Lewisham	LWS009	536130	173337	54	100.0
London Borough of Lewisham	LWS010	538055	173810	34.3	100.0
London Borough of Lewisham	LWS011	537180	173370	56.5	91.7
London Borough of Lewisham	LWS018	538960	172740	35.1	91.7
London Borough of Lewisham	LWS014	535536	173192	28.3	100.0
London Borough of Lewisham	LWS015	536523	175925	48	100.0
London Borough of Lewisham	LWS016	539640	175934	37.3	100.0
London Borough of Lewisham	LWS017	540037	173748	59.3	100.0
London Borough of Lewisham	SCH8	537817	173323	32.1	91.7
London Borough of Lewisham	SCH13	535563	172740	31.1	91.7
London Borough of Lewisham	SCH16	536412	175131	25.4	91.7
London Borough of Lewisham	SCH18	536924	177707	29.6	100.0
London Borough of Lewisham	SCH20	538025	174749	51.4	100.0
London Borough of Lewisham	SCH21	535028	172327	30.4	75.0
London Borough of Newham	NEW1	538280	185359	54.3	100.0
London Borough of Newham	NEW2	539572	184659	52.1	83.3
London Borough of Newham	NEW3	541954	185430	53.1	83.3
London Borough of Newham	NEW4	542831	183618	54.7	92.0
London Borough of Newham	NEW5	538899	184283	51.5	100.0

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO ₂ Annual Average (µg/m ³)	% Data Capture
London Borough of Newham	NEW6	539859	182655	37.8	100.0
London Borough of Newham	NEW7	541492	182332	41.9	100.0
London Borough of Newham	NEW8	542688	183202	44.5	100.0
London Borough of Newham	NEW9	539747	181477	45.6	100.0
London Borough of Newham	NEW10	542583	180201	48.1	92.0
London Borough of Newham	NEW11	543762	180784	49.1	92.0
London Borough of Newham	NEW12	541134	184098	57.9	92.0
London Borough of Newham	NEW13	541286	183705	89.4	100.0
London Borough of Newham	NEW14	539155	185487	59.2	92.0
London Borough of Newham	NEW15	539164	185158	74.8	67.0
London Borough of Newham	NEW16	542729	185047	59.7	92.0
London Borough of Newham	NEW17	542216	184547	62.2	100.0
London Borough of Newham	NEW18	539906	181702	78.6	92.0
London Borough of Newham	NEW19	539456	181499	82.7	75.0
London Borough of Newham	NEW20	538657	183973	51.4	92.0
London Borough of Newham	NEW21	539701	181459	42.7	58.3
Royal Borough of Greenwich	GW23	540420	177706	40.6	100.0
Royal Borough of Greenwich	GW24	543806	177951	52.8	100.0
Royal Borough of Greenwich	GW25	540111	174879	44.8	83.3
Royal Borough of Greenwich	GW26	544015	173139	31.1	91.7
Royal Borough of Greenwich	GW27	541650	177872	49.1	100.0
Royal Borough of Greenwich	GW29	541192	178518	64	100.0
Royal Borough of Greenwich	GW32	540661	177227	48.7	91.7
Royal Borough of Greenwich	GW33	537971	176776	60.5	91.7
Royal Borough of Greenwich	GW34	545490	178543	46.4	100.0
Royal Borough of Greenwich	GW35	539527	178281	74.1	75.0
Royal Borough of Greenwich	GW36	539320	179234	53.6	91.7
Royal Borough of Greenwich	GW37	546630	179557	23.4	83.3
Royal Borough of Greenwich	GW38	541885	175045	36.2	100.0
Royal Borough of Greenwich	GW39	543986	174660	22.9	100.0
Royal Borough of Greenwich	GW40	544065	176996	24.4	100.0
Royal Borough of Greenwich	GW41	543391	172765	46	100.0
Royal Borough of Greenwich	GW42	538317	177652	50.5	100.0

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO ₂ Annual Average (µg/m ³)	% Data Capture
Royal Borough of Greenwich	GW43	537353	177632	64.2	100.0
Royal Borough of Greenwich	GW44	543096	174439	49.3	91.7
Royal Borough of Greenwich	GW48	538044	176960	49.5	66.7
Royal Borough of Greenwich	GW49	543472	179217	46.6	100.0
Royal Borough of Greenwich	GW50	540203	178367	73	100.0
Royal Borough of Greenwich	GW51	539638	179024	47.4	100.0
Royal Borough of Greenwich	GW52	542842	179108	43.9	100.0
Royal Borough of Greenwich	GW53	542181	176878	40.4	91.7
Royal Borough of Greenwich	GW54	541915	175039	61.2	100.0
Royal Borough of Greenwich	GW55	545005	175097	55.9	100.0
Royal Borough of Greenwich	GW56	543658	172604	55.2	83.3
Royal Borough of Greenwich	GW57	538968	177955	40.3	100.0
Royal Borough of Greenwich	GW58	538143	176712	46.6	100.0
Royal Borough of Greenwich	GW59	541885	175016	42.9	100.0
Royal Borough of Greenwich	GW60	544086	178882	37.5	100.0
Royal Borough of Greenwich	GW61	540175	179000	38.5	100.0
Royal Borough of Greenwich	GW101	544727	178884	74.7	91.7
Royal Borough of Greenwich	GW102	544075	178898	67.5	100.0
Royal Borough of Greenwich	GW103	540935	176575	51	91.7
Royal Borough of Greenwich	GW104	540743	177072	50.2	75.0
Royal Borough of Greenwich	GW105	541143	174294	53.6	100.0
Royal Borough of Greenwich	GW106	543505	178576	40.4	75.0
Royal Borough of Greenwich	GW28	542656	176207	39.1	91.7
Royal Borough of Greenwich	GW30	541372	177070	42.8	50.0
Royal Borough of Greenwich	GW31	543383	175664	36.4	100.0
Thurrock Council	THR1	559711	179629	53.4	>75
Thurrock Council	THR2	563855	184772	23.8	>75
Thurrock Council	THR3	563864	176308	46.9	>75
Thurrock Council	THR4	561830	179878	27.4	>75
Thurrock Council	THR5	561572	178154	35.7	>75
Thurrock Council	THR6	560946	179549	52.9	>75
Thurrock Council	THR7	557595	181060	35	>75
Thurrock Council	THR8	561108	178922	33.5	>75

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO ₂ Annual Average (µg/m ³)	% Data Capture
Thurrock Council	THR9	559118	179462	30.5	>75
Thurrock Council	THR10	557570	177789	52.9	>75
Thurrock Council	THR11	556738	177926	62.4	>75
Thurrock Council	THR12	558148	183532	39.6	>75
Thurrock Council	THR13	557959	178698	63.8	>75
Thurrock Council	THR14	555311	179417	68	>75
Thurrock Council	THR15	560624	177811	38.3	>75
Thurrock Council	THR16	559785	177910	48.8	>75
Thurrock Council	THR17	558483	177678	43.5	>75
Thurrock Council	THR18	569306	182737	34	>75
Thurrock Council	THR19	567781	182400	33	>75
Thurrock Council	THR20	561066	177894	31.4	>75
Thurrock Council	THR21	555389	178145	35.3	>75
Thurrock Council	THR22	561469	178063	32.8	>75
Thurrock Council	THR23	568501	182459	30	>75
Thurrock Council	THR24	561683	177833	30.8	>75
Thurrock Council	THR25	557087	177904	50.5	>75
Thurrock Council	THR26	556314	178765	40.1	>75
Thurrock Council	THR27	561958	180967	31.4	>75
Thurrock Council	THR28	560772	178434	25.2	>75
Thurrock Council	THR29	559137	179082	32.3	>75
Thurrock Council	THR30	568162	182296	27.8	>75
Thurrock Council	THR31	567655	179003	31.1	>75
Thurrock Council	THR32	563498	176483	49.9	>75
Thurrock Council	THR33	563645	176348	49.3	>75
Thurrock Council	THR34	563595	176323	50.7	>75
Thurrock Council	THR35	563995	176291	45.2	>75
Thurrock Council	THR36	563877	176305	42.7	>75
Thurrock Council	THR37	563900	176282	41.7	>75
Thurrock Council	THR38	556257	178438	48.8	>75
Thurrock Council	THR39	560057	179873	35.6	>75
Thurrock Council	THR40	556713	180167	46.5	>75
Thurrock Council	THR41	556661	180180	38.6	>75

Local Authority Name	Site ID	Location X Co-ordinates National Grid Reference	Location Y Co-ordinates National Grid Reference	Bias Corrected NO₂ Annual Average (µg/m³)	% Data Capture
Thurrock Council	THR42	558785	182323	31.7	>75
Thurrock Council	THR43	564122	176152	38.5	>75
Thurrock Council	THR44	560279	178944	30.6	>75
Thurrock Council	THR45	555286	179501	40.7	>75
Thurrock Council	THR46	555329	179397	37.5	>75
Thurrock Council	THR47	555299	179453	52.9	>75
Thurrock Council	THR48	555357	179362	46.7	>75

Appendix 5B



Legislative Background

Part IV of the Environment Act (1995) requires the UK Government to produce a national AQS which contains standards, objectives and measures for improving ambient air quality. The AQS sets out objectives that are maximum ambient concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale.

The ambient air quality standards and objectives are given statutory backing in England through the Air Quality (England) Regulations 2000, the Air Quality (England) (Amendment) Regulations 2002.

The AQS objectives/EU Limit Values for the protection of human health applicable to this assessment are presented in Table A.

Table A Air Quality Objectives and EU Limit Values for NO₂ and PM₁₀

Air Quality Objectives and European Directives for the Protection of Human Health					
Air Quality Objectives				EU Limit Values	
Pollutant	Concentration	Averaging Period	Compliance Date	Concentration	Compliance Date
NO ₂	200µg/m ³	1-hour mean (not to be exceeded more than 18 times per year)	31 December 2005	200 µg/m ³ (18 Exceedences)	1 January 2010
	40µg/m ³	annual mean	31 December 2005	40 µg/m ³	1 January 2010
PM ₁₀	50µg/m ³	24-hour mean (not to be exceeded more than 35 times per year)	31 December 2010	50 µg/m ³ (35 Exceedences)	June 2011
	40µg/m ³	annual mean	31 December 2004	40 µg/m ³	1 January 2005

DMRB Volume 11, Section 3, Part 1 (HA207/07) (Highways Agency, 2007) states that ‘The pollutants of most concern near roads are NO₂ and PM₁₀ in relation to human health and oxides of nitrogen (NO_x) in relation to vegetation and ecosystems’, therefore these are the pollutants considered in this assessment.

The Air Quality Objectives only apply where members of the public are likely to be regularly present for the averaging time of the objective (i.e. where people will be exposed to pollutants). The annual mean objectives apply to all locations where members of the public might be regularly exposed; these include building façades of residential properties, schools, hospitals, care homes, etc. The 24 hour mean objective applies to all locations where the annual mean objective would apply, together with hotels and gardens of residential properties. The 1 hour mean objective also applies at these locations as well as at any outdoor location where a member of the public might reasonably be expected to stay for 1 hour or more, such as

shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.

The EU Ambient Air Quality Directive (2008/50/EC) and the 4th Air Quality Daughter Directive (2004/107/EC) set the air quality standards against which national and local ambient air quality policies are formulated. The directives set limit values and target values for various pollutants in ambient air including NO₂ and require EU member states to assess and report compliance and take action to rectify any exceedences of those values. Assessments for compliance are carried out by Defra and are based on national monitoring and modelling. The national monitoring network and model ensure compliance with the siting criteria and data quality requirements as set out in Annex XV of the directive.

Appendix 5C

Air Quality Assessment Criteria

IAN 174/13 provides advice on determining the significance of a scheme's impact on air quality. The advice provides a means of evaluating the significance of local air quality effects in line with the requirements of the existing EIA Directive for highway schemes.

Air quality assessments are based on modelled results verified against monitoring data, and are used to inform a judgement on significance.

However, whilst the modelled results are reasonable, there is still some element of residual uncertainty, referred to in the IAN as the Measure of Uncertainty (MoU). This is due to the inherent uncertainty in air quality monitoring, modelling and the traffic data used in the assessment.

Table A presents the magnitude of change criteria presented in the IAN, and can be applied to annual average NO₂ and PM₁₀ concentrations.

Table A Magnitude of Change Criteria

Magnitude of Change in Concentration	Value of Change in Annual Average NO₂ and PM₁₀
Large (>4)	Greater than full MoU value of 10% of the air quality objective (4µg/m ³).
Medium (>2 to 4)	Greater than half of the MoU (2µg/m ³), but less than the full MoU (4µg/m ³) of 10% of the air quality objective.
Small (>0.4 to 2)	More than 1% of objective (0.4µg/m ³) and less than half of the MoU i.e. 5% (2µg/m ³). The full MoU is 10% of the air quality objective (4µg/m ³).
Imperceptible (≤ 0.4)	Less than or equal to 1% of objective (0.4µg/m ³).

The larger the change, the more certainty there is that there would be an impact as a result of the scheme. The results from the air quality modelling at receptors are used to populate Table B to inform the overall significance of the scheme. Only receptors which exceed the EU Limit Value (annual mean of 40µg/m³) in either the Do-Minimum or Do-Something scenarios are used to inform significance.

Where the differences in concentrations are less than 1% of the air quality threshold (e.g. less than 0.4µg/m³ for annual average NO₂), then the change at these receptors is considered to be imperceptible, and are scoped out of the judgement on significance.

Any changes in concentrations above the threshold of imperceptibility are assigned to one of the six categories presented in Table B. The total numbers of receptors are then aggregated, in order to calculate the total number of receptors in each of the six categories.

Table B Local Air Quality Receptors Informing Scheme Significance

Magnitude of Change in Annual Average NO ₂ or PM ₁₀ (µg/m ³)	Total Number of Receptors with:	
	Worsening of air quality objective already above objective or creation of a new exceedence	Improvement of an air quality objective already above objective or the removal of an existing exceedence
Large (>4)		
Medium (>2 to 4)		
Small (>0.4 to 2)		

The IAN provides guidelines on the number of receptors for each of the magnitude criteria that might result in a significant effect, as presented in Table C. These are guideline values only, and are to be used to inform professional judgement on significant effects of the Scheme.

Table C Guideline Values to Determine Significance

Magnitude of Change in NO ₂ (µg/m ³)	Number of Receptors with:	
	Worsening of air quality objective already above objective or creation of a new exceedence	Improvement of an air quality objective already above objective or the removal of an existing exceedence
Large (>4)	1 to 10	1 to 10
Medium (>2 to 4)	10 to 30	10 to 30
Small (>0.4 to 2)	30 to 60	30 to 60

Appendix 7A



Gazetteer of Heritage Assets

Appendix 7A Gazetteer of Heritage Assets

See drawing xxx

Asset No.	Source	HER No.	Type	Asset name and description	Period
1	NHLE	-	Listed Building	Isle House – early 19 th century house, forms a group with assets 2 and 3. Grade II listed	Post-medieval
2	NHLE	-	Listed Building	3 Cold Harbour – early 19 th century house, forms a group with assets 1 and 3. Grade II listed	Post-medieval
3	NHLE	-	Listed Building	5 and 7 Cold Harbour – pair of early 19 th century houses, forms a group with assets 1 and 2. Grade II listed	Post-medieval
4	NHLE	-	Listed Building	15 Cold Harbour – house, constructed 1843-44. Grade II listed	Post-medieval
5	NHLE	-	Listed Building	Blackwall River Police Station – river police station, constructed 1894. Grade II listed	Post-medieval
6	NHLE	-	Listed Building	The Gun – 19 th century public house. Grade II listed	Post-medieval
7	NHLE	-	Listed Building	Millwall Wharf – range of circa 1879 warehouses. Grade II listed	Post-medieval
8	NHLE	-	Listed Building	Enderby House – early to mid-19 th century offices and house, constructed for the whaling firm of Samuel Enderby. Grade II listed	Post-medieval
9	NHLE	-	Listed Building	Rothbury Hall – former Congregational mission, constructed 1893-94 by TW Hollands. Grade II listed	Post-medieval
10	NHLE	-	Listed Building	Entrance to Blackwall Tunnel – arched tunnel entranceway and offices, constructed mid 1890s by T Blashill. Grade II listed	Post-medieval
11	NHLE	-	Listed Building	70-84 Riverway – row of eight cottages, constructed 1801. Grade II listed	Post-medieval
12	NHLE	-	Listed Building	Southern Ventilation shaft to the Blackwall Tunnel – ventilation shaft, constructed 1964-67 by Terry Farrell. Grade II Listed	Modern

Asset No.	Source	HER No.	Type	Asset name and description	Period
13	NHLE	-	Listed Building	Blackwall Pier and Entrance Lock to former East India Dock Basin – pier and lock, constructed circa 1803. Grade II listed	Post-medieval
14	NHLE	-	Listed Building	Trinity House Buoy Wharf and Orchard Dry Dock – wharf and dry dock, constructed circa 1860. Grade II listed	Post-medieval
15	NHLE	-	Listed Building	Trinity House Chain Locker and Lighthouse Block – storehouse and lighthouse, constructed circa 1860. Grade II listed	Post-medieval
16	NHLE	-	Listed Building	Church of St Luke – church, constructed 1873-75 by Giles and Gane. Grade II listed	Post-medieval
17	NHLE	-	Listed Building	Chapel of St George and St Helena – chapel to former mission settlement, constructed 1929-30 by Geoffrey Raymond. Grade II listed	Modern
18	NHLE	-	Listed Building	Stothert and Pitt Cranes – group of 14 cranes on the north and south sides of the Royal Victoria Dock, constructed between 1920 and 1960. Grade II listed	Modern
19	NHLE	-	Listed Building	Warehouse W – warehouse, constructed circa 1860-65. Grade II listed	Post-medieval
20	NHLE	-	Listed Building	Warehouse K – tobacco warehouse, constructed circa 1850-55, Grade II listed	Post-medieval
21	NHLE	-	Listed Building	Silo D – concrete grain silo, constructed 1920. Grade II listed	Modern
22	NHLE	-	Listed Building	Silvertown War Memorial – war memorial, constructed circa 1920. Grade II listed	Modern
23	HER	MLO71663 MLO71664 MLO71665	Deposits and Features	Eastwood Road – group of three deposits identified during an archaeological watching brief and thought to represent a post-medieval, quarry, yard surface and culvert.	Post-medieval
24	HER	MLO72792	Landfill Site	Royal Victoria Lock – site of 19 th and / or 20 th landfill identified from British Geological Survey data	Post-medieval / Modern

Asset No.	Source	HER No.	Type	Asset name and description	Period
25	HER	MLO25824	Medieval Manor	Canning Town – site of the medieval manor of Covelees	Medieval
26	HER	MLO3990	HER Record	Along River Front – site of medieval flood defences	Medieval
27	HER	MLO74212	HER Record	Thames Foreshore – putative causeway	Unknown
28	HER	MLO77888	Peat Deposit	Greenwich Peninsula – peat deposits identified during geoarchaeological investigations, dated to the Neolithic period	Prehistoric
29	HER	MLO78024	Alluvial Deposit	Greenwich Peninsula – alluvial deposits identified during geoarchaeological investigations, dated to the Iron Age period onwards	Prehistoric to Post-medieval
30	HER	MLO105389	Findspot	Tunnel Avenue (Bay wharf) – incomplete whales skeleton identified during archaeological watching brief on dredging operations, dated to 18 th century	Post-medieval
31	HER	MLO103726	Silos	Tunnel Avenue (Morden Wharf) – grain silos constructed for the Tunnel Glucose Company's works between the 1930s and 1970s	Modern

Phase 1 Habitat Survey Target Notes

Phase 1 Habitat Survey Target Notes (see Drawing 8-3)

	Number	Description
Greenwich	G1	Unmanaged grassland with typical species including False Oat-grass (<i>Arrhenatherum elatius</i>), and Yarrow (<i>Achillea millefolium</i>). Potential foraging habitat for reptiles although isolated by roads.
	G2	Mature plantation woodland, dominated by Sycamore (<i>Acer pseudoplatanus</i>) and Silver Birch (<i>Betula pendula</i>). Likely to be of local value for breeding birds.
	G3	Virginia Creeper (<i>Parthenocissus quinquefolia</i>) present on fence. This is an invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).
	G4	Japanese Knotweed (<i>Fallopia japonica</i>) present along fenceline of adjacent compound. This is an invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).
	G5	Patches of species-poor unmanaged grassland within dense scrub. Suitable habitat for foraging reptiles, although the habitat is isolated within a network of roads and urban development.
	G6	Dense Bramble (<i>Rubus fruticosus</i> agg.) and Grey Willow (<i>Salix cinerea</i>) scrub, likely to be of value for nesting birds.
	G7	Large mature London Plane (<i>Platanus x acerifolia</i>) trees.
	G8	Large mature London Plane trees. An area of Dwarf Elder (<i>Sambucus ebulus</i>) was also present.
Silvertown	S1	Large area of Japanese Knotweed spreading as far south as the pylon and onto the adjacent underground land.
	S2	Thin species-poor semi-improved grassland and ephemeral herbs interspersed with bare ground, Bramble and Butterfly-bush (<i>Buddleja davidii</i>) scrub. High potential for notable invertebrates and reptiles.
	S3	Thin species-poor semi-improved grassland, Ivy (<i>Hedera helix</i>) Bramble and Butterfly-bush (<i>Buddleja davidii</i>) scrub. High potential for notable invertebrates and reptiles.
	S4	Brick shed within ASD metals. Missing mortar and crevices between brick and concrete plinth indicate a low potential for supporting roosting bats – the site is noisy and well lit.
	S5	Species-poor semi-improved grassland and Grey Willow (<i>Salix cinerea</i>) scrub. Potential for supporting reptiles and notable invertebrates to a lesser extent. Steeply sloping and dangerous slope towards sludge lagoon.
	S6	Very dense Butterfly-bush, Elder (<i>Sambucus nigra</i>) and Bramble scrub surrounding outlet from pond into River Thames. The outlet appears to be tidal. Some areas of Common Reed (<i>Phragmites australis</i>) are apparent in the outlet; the water is silt laden and appears to be brackish.

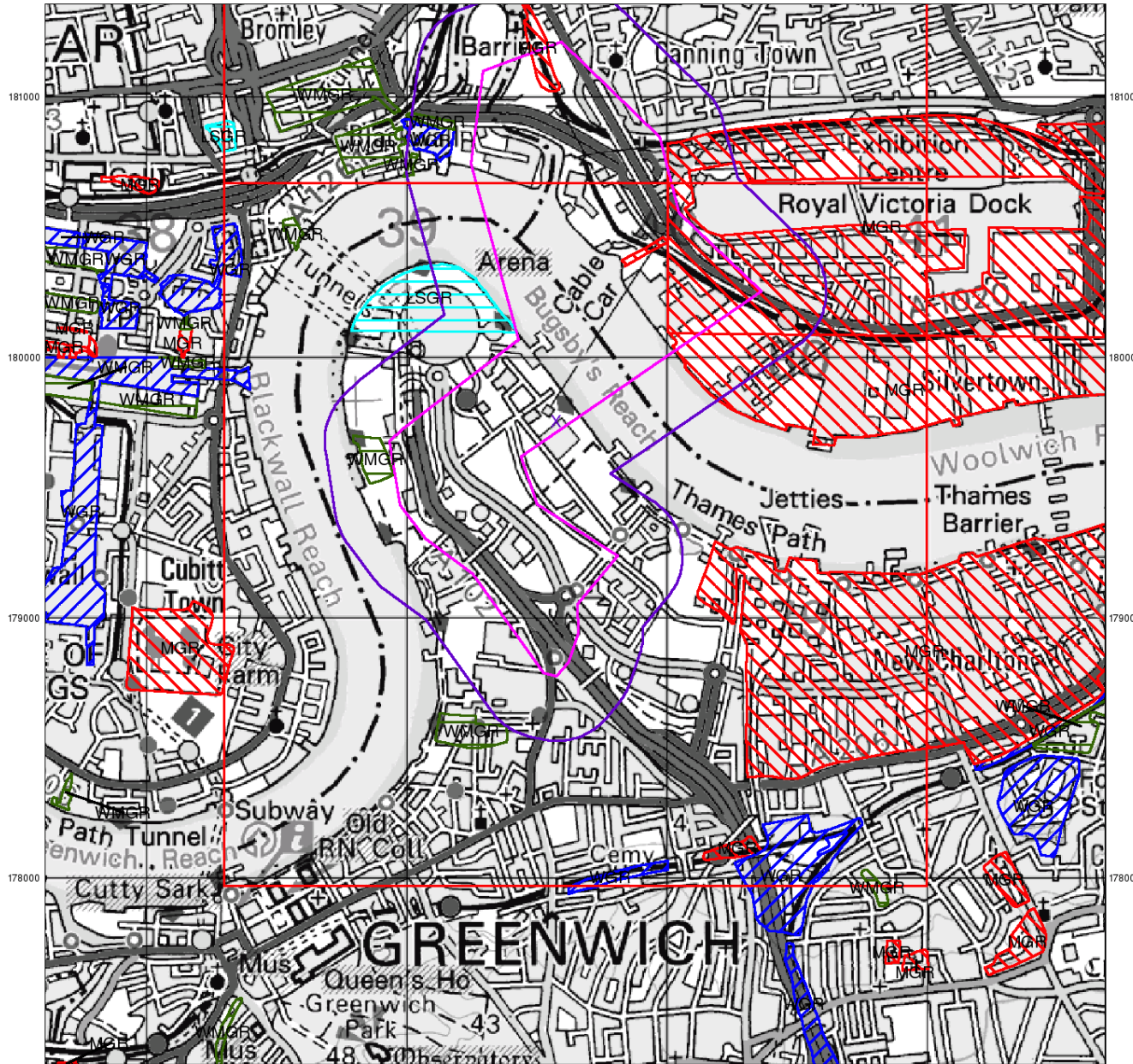
S7	Embankment of the underground line. This supported species-poor grassland, with the appearance of having been recently resown with a fine-grass mix. An occasional bush of Butterfly-bush was present. Low potential for supporting reptiles due to lack of cover.
S9	Sludge pond at the base of steep embankments. This supported small areas of reedswamp but no submerged vegetation. The water was silt laden and appeared poor quality, (possibly brackish) with a connection to the River Thames. The reeds may be used by birds for nesting (such as by reed buntings (<i>Emberiza schoeniclus</i>)).
S10	Wharfs and jetties along the river frontage, with associated areas of scrub. Potential habitats for foraging and nesting black redstarts (<i>Phoenicurus ochruros</i>) when associated with nearby buildings.
S11	Area of fraying concrete with ephemeral herbs and Butterfly-bush and Bramble scrub, (particularly along east boundary). May be used by foraging black redstarts.

Appendix 10A



Envirocheck Report

538000 539000 540000 541000



© Crown Copyright. All Rights Reserved. License Number 100022432.



Artificial Ground and Landslip

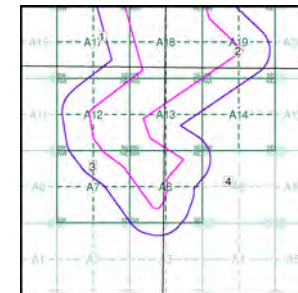
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



Order Details:

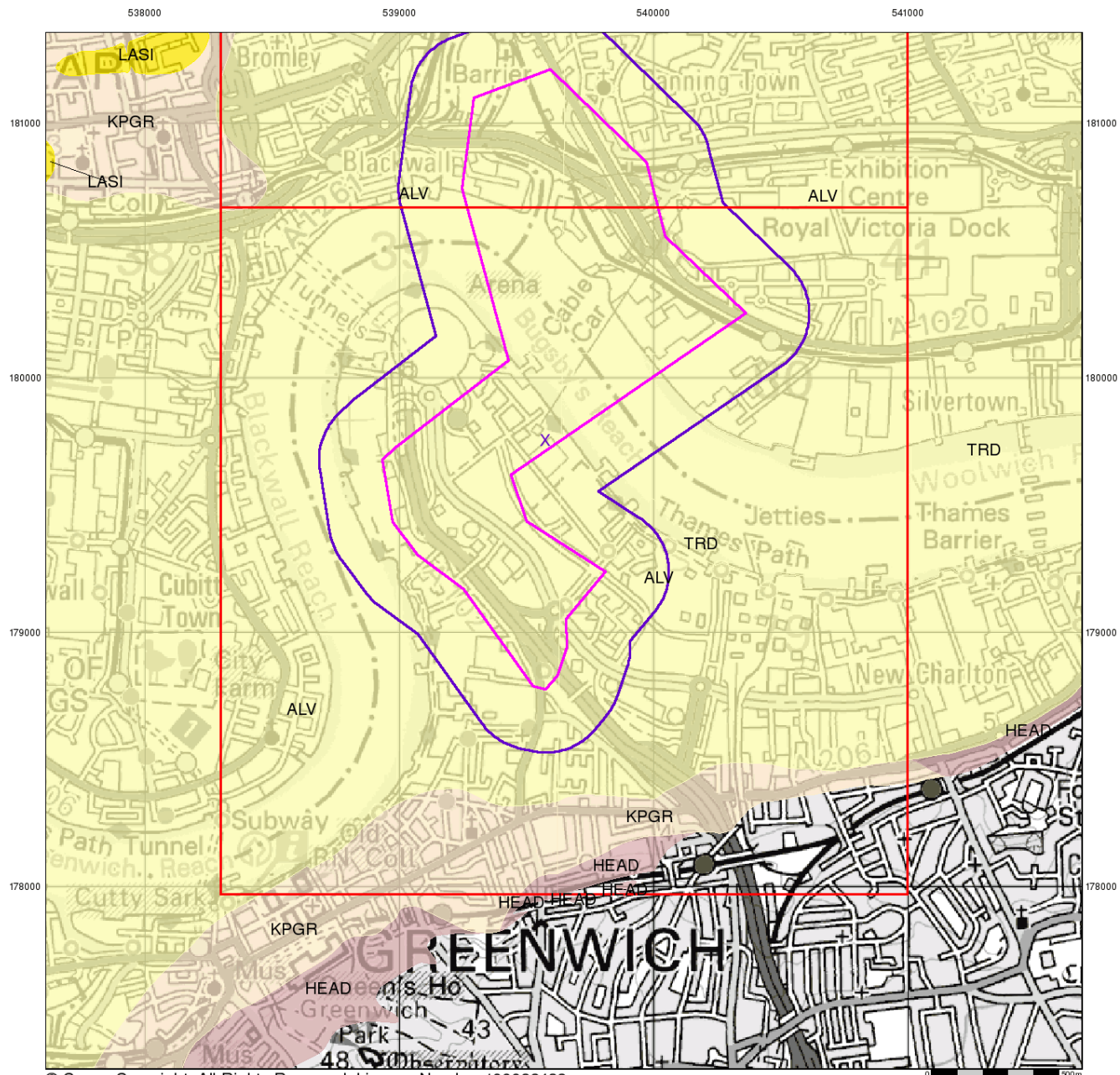
Order Number: 44579755_1_1
 Customer Reference: 320530BB01
 National Grid Reference: 539580, 179760
 Slice: A
 Site Area (Ha): 143.07
 Search Buffer (m): 250

Site Details:

Site at 539648, 179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



© Crown Copyright. All Rights Reserved. License Number 100022432.



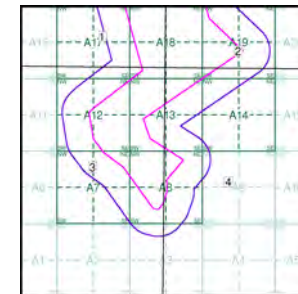
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details:

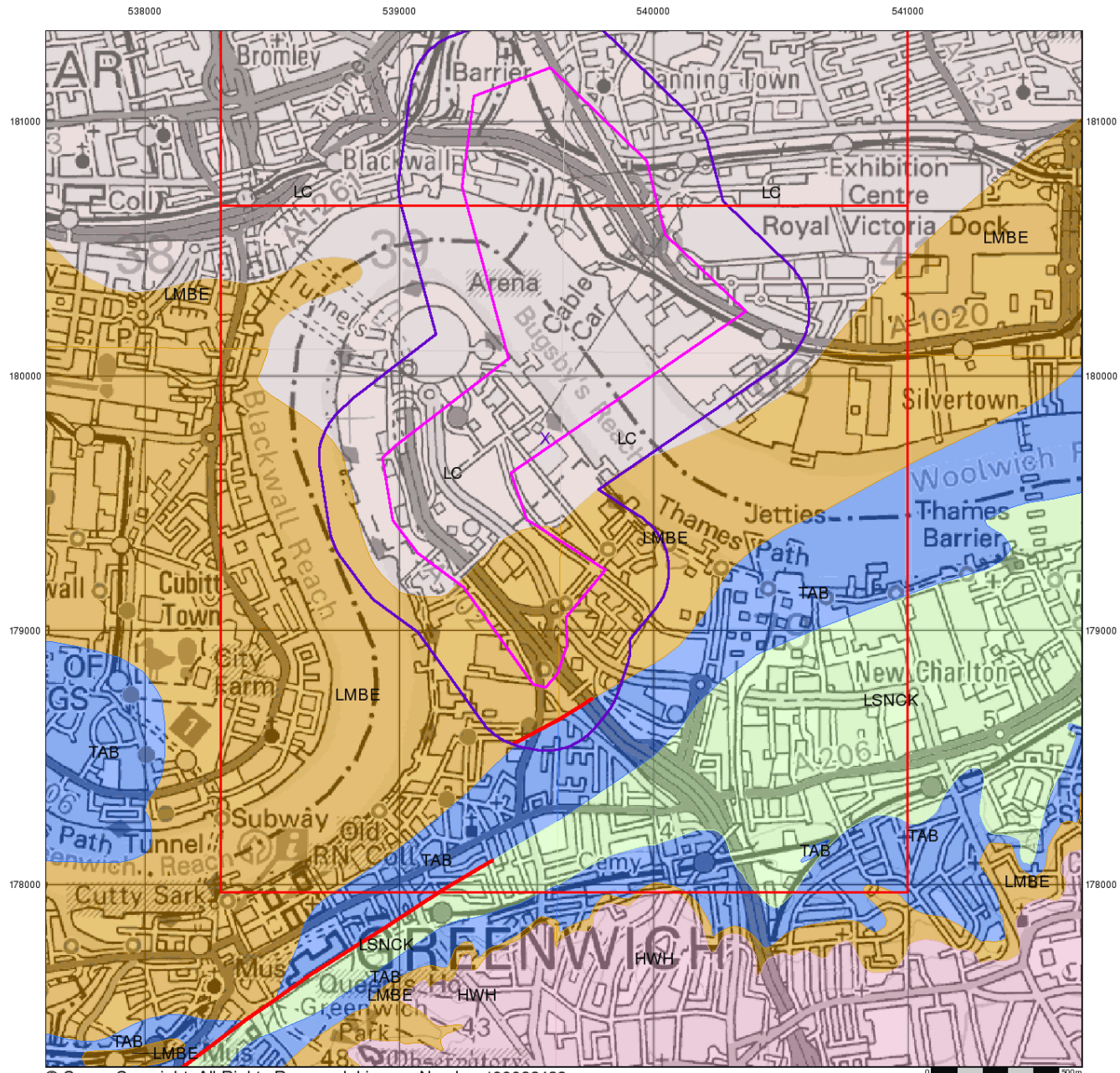
Order Number:	44579755_1_1
Customer Reference:	320530BB01
National Grid Reference:	539580, 179760
Slice:	A
Site Area (Ha):	143.07
Search Buffer (m):	250

Site Details:

Site at 539648, 179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



© Crown Copyright. All Rights Reserved. License Number 100022432.



Bedrock and Faults

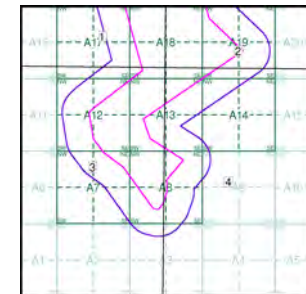
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



Order Details:

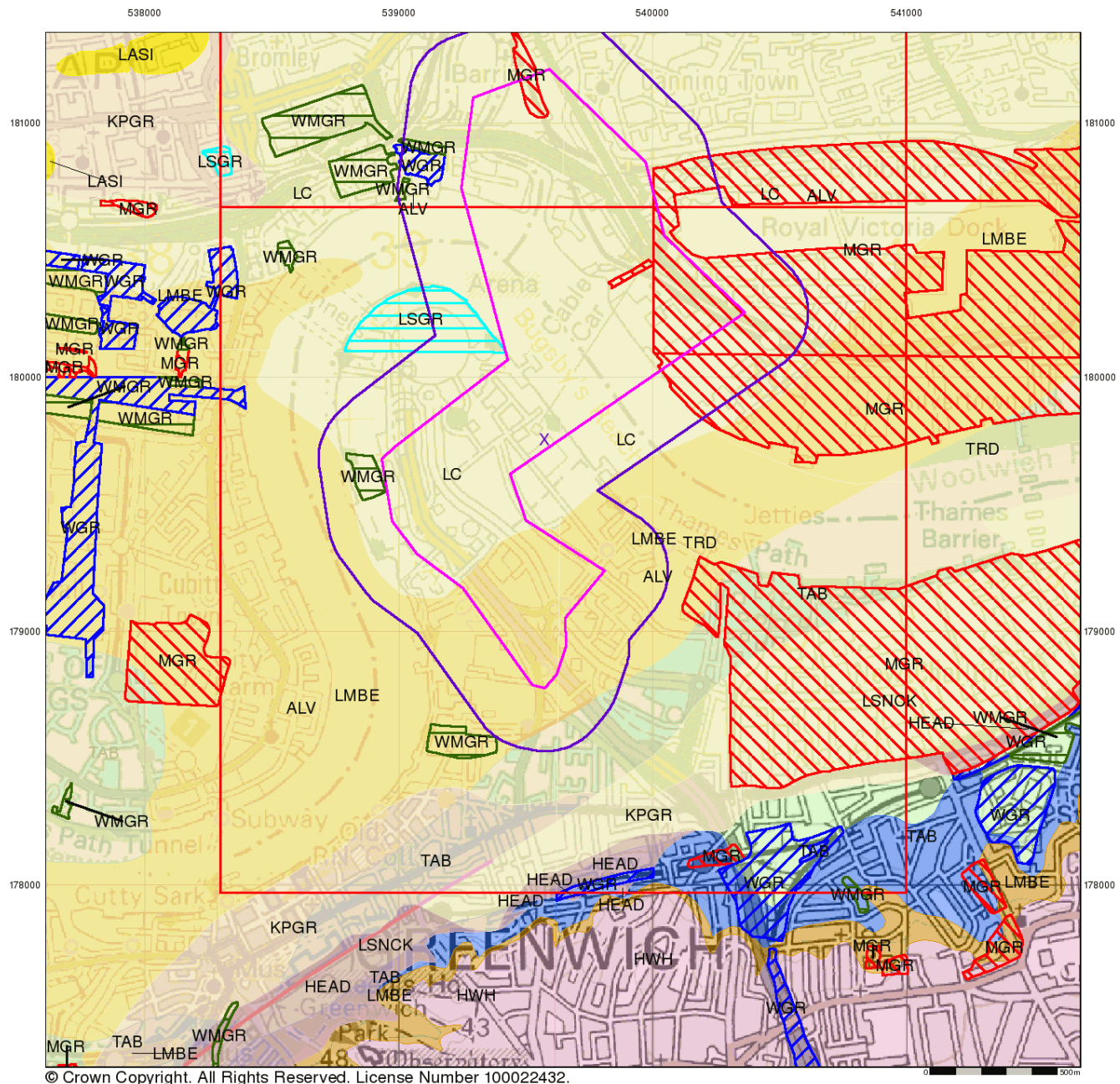
Order Number: 44579755_1_1
 Customer Reference: 320530BB01
 National Grid Reference: 539580, 179760
 Slice: A
 Site Area (Ha): 143.07
 Search Buffer (m): 250

Site Details:

Site at 539648, 179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



© Crown Copyright. All Rights Reserved. License Number 100022432.



Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

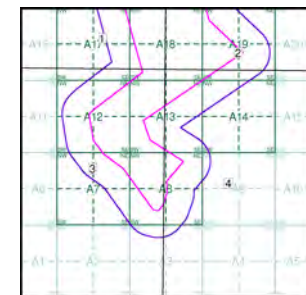
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
 Kingsley Dunham Centre
 Keyworth
 Nottingham
 NG12 5GG
 Telephone: 0115 936 3143
 Fax: 0115 936 3276
 email: enquiries@bgs.ac.uk
 website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number: 44579755_1_1
 Customer Reference: 320530BB01
 National Grid Reference: 539580, 179760
 Slice: A
 Site Area (Ha): 143.07
 Search Buffer (m): 250

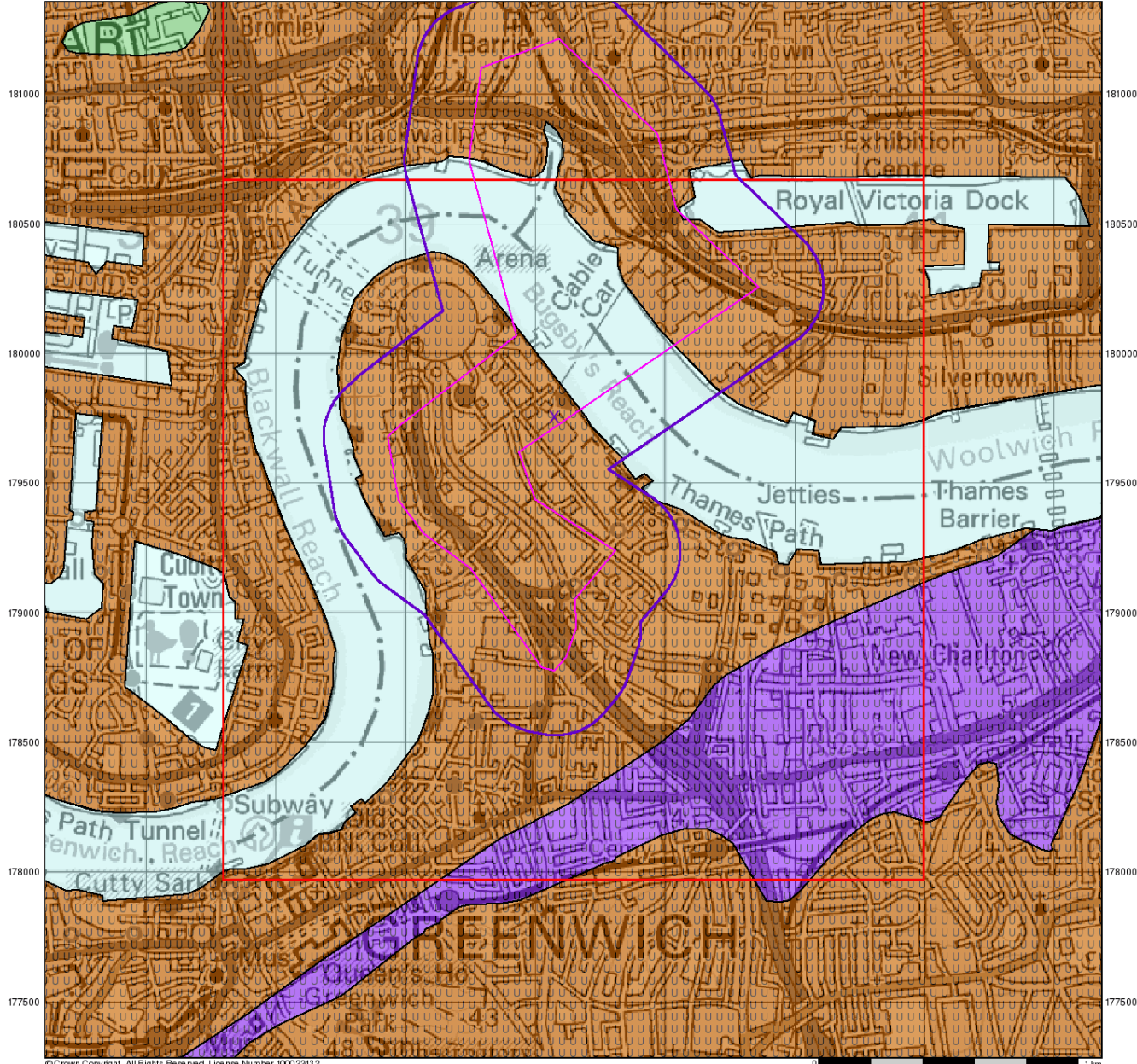
Site Details:

Site at 539648,179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

538000 538500 539000 539500 540000 540500 541000 541500



© Crown Copyright. All Rights Reserved. License Number 100022432



Groundwater Vulnerability

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

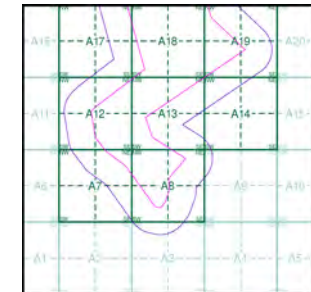
Agency and Hydrological

Geological Classes

- Major Aquifer (Highly Permeable)**
 - High (H) 1, 2, 3, U
 - Intermediate (I) 1, 2
 - Low
- Minor Aquifer (Variably Permeable)**
 - High (H) 1, 2, 3, U
 - Intermediate (I) 1, 2
 - Low
- Non Aquifer (Negligibly Permeable)**
 - High (H) 1, 2, 3, U
 - Intermediate (I) 1, 2
 - Low
- Water or Sea**
 -
- Drift Deposit**
 -

Soil Classes

Site Sensitivity Context Map - Slice A



Order Details

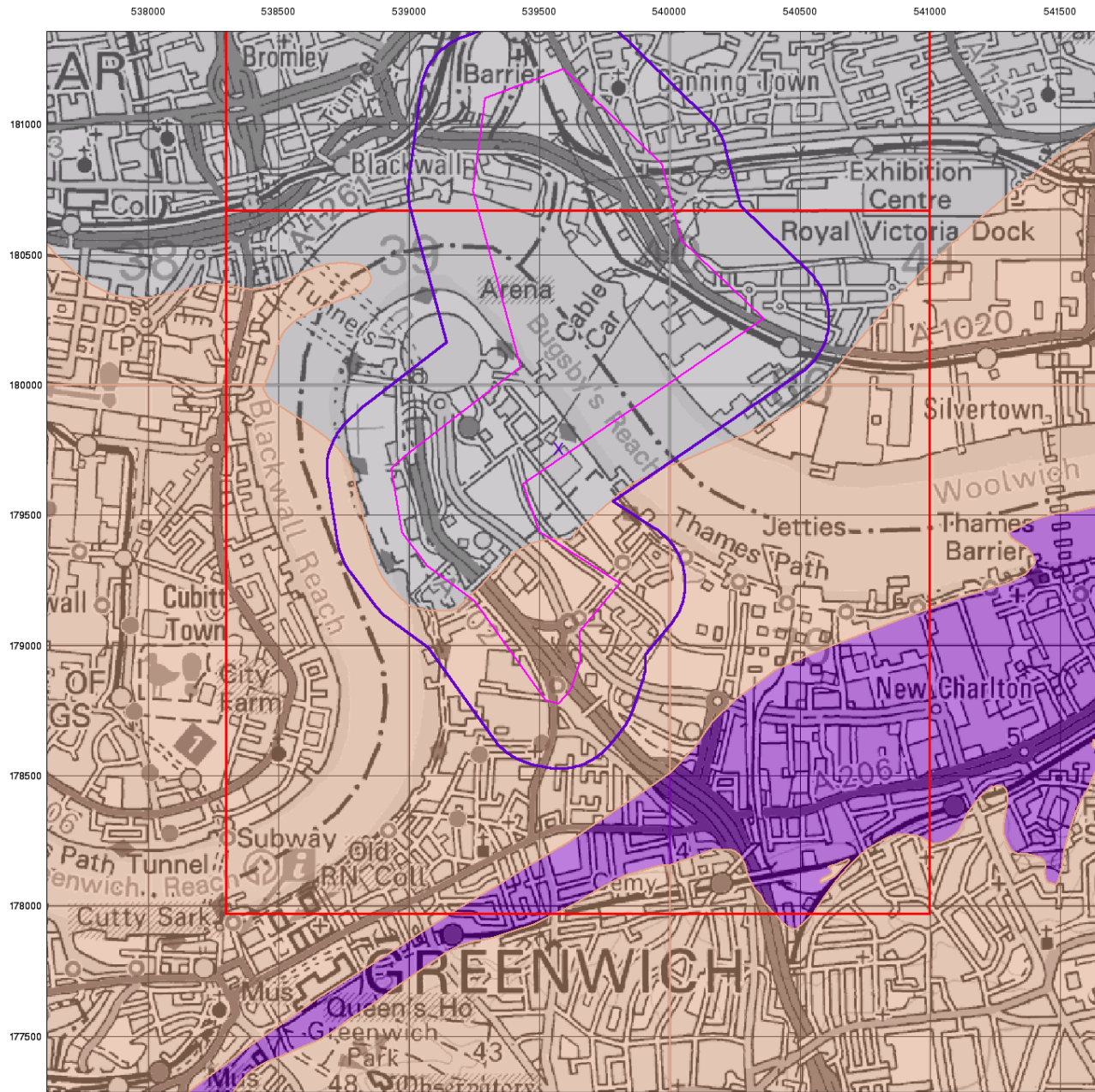
Order Number: 44579755_1.1
 Customer Ref: 320530BB01
 National Grid Reference: 539580, 179760
 Slice: A
 Site Area (Ha): 143.07
 Search Buffer (m): 250

Site Details

Site at 539648, 179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



© Crown Copyright. All Rights Reserved. License Number 100022432.



Bedrock Aquifer Designation

General

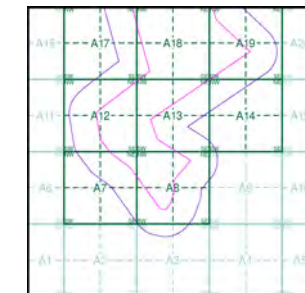
- ⬡ Specified Site
- ⬡ Specified Buffer(s)
- ✕ Bearing Reference Point
- ⬡ Slice
- B Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

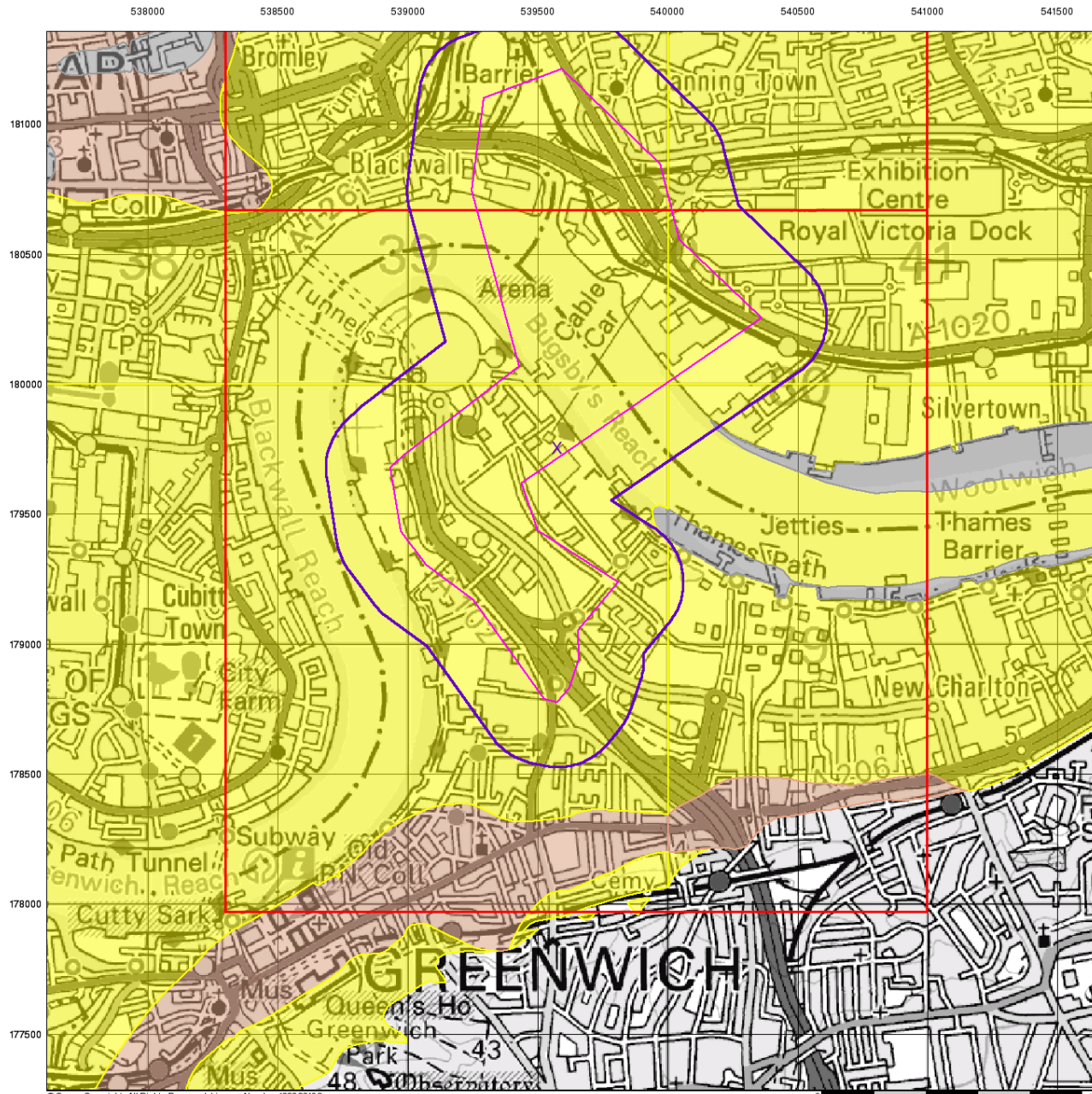
Order Number: 44579755_1.1
 Customer Ref: 320530BB01
 National Grid Reference: 539580, 179760
 Slice: A
 Site Area (Ha): 143.07
 Search Buffer (m): 250

Site Details

Site at 539648, 179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



© Crown Copyright. All Rights Reserved. License Number: 100022432



Superficial Aquifer Designation

General

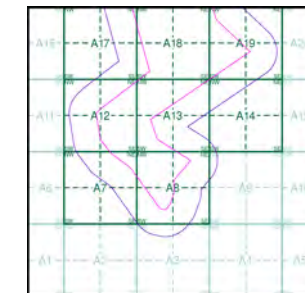
- ▭ Specified Site
- ▭ Specified Buffer(s)
- X Bearing Reference Point
- ▭ Slice
- Map ID

Agency and Hydrological

Geological Classes

- ▭ Principal Aquifer
- ▭ Secondary A Aquifer
- ▭ Secondary B Aquifer
- ▭ Secondary Undifferentiated
- ▭ Unproductive Strata
- ▭ Unknown

Site Sensitivity Context Map - Slice A



Order Details

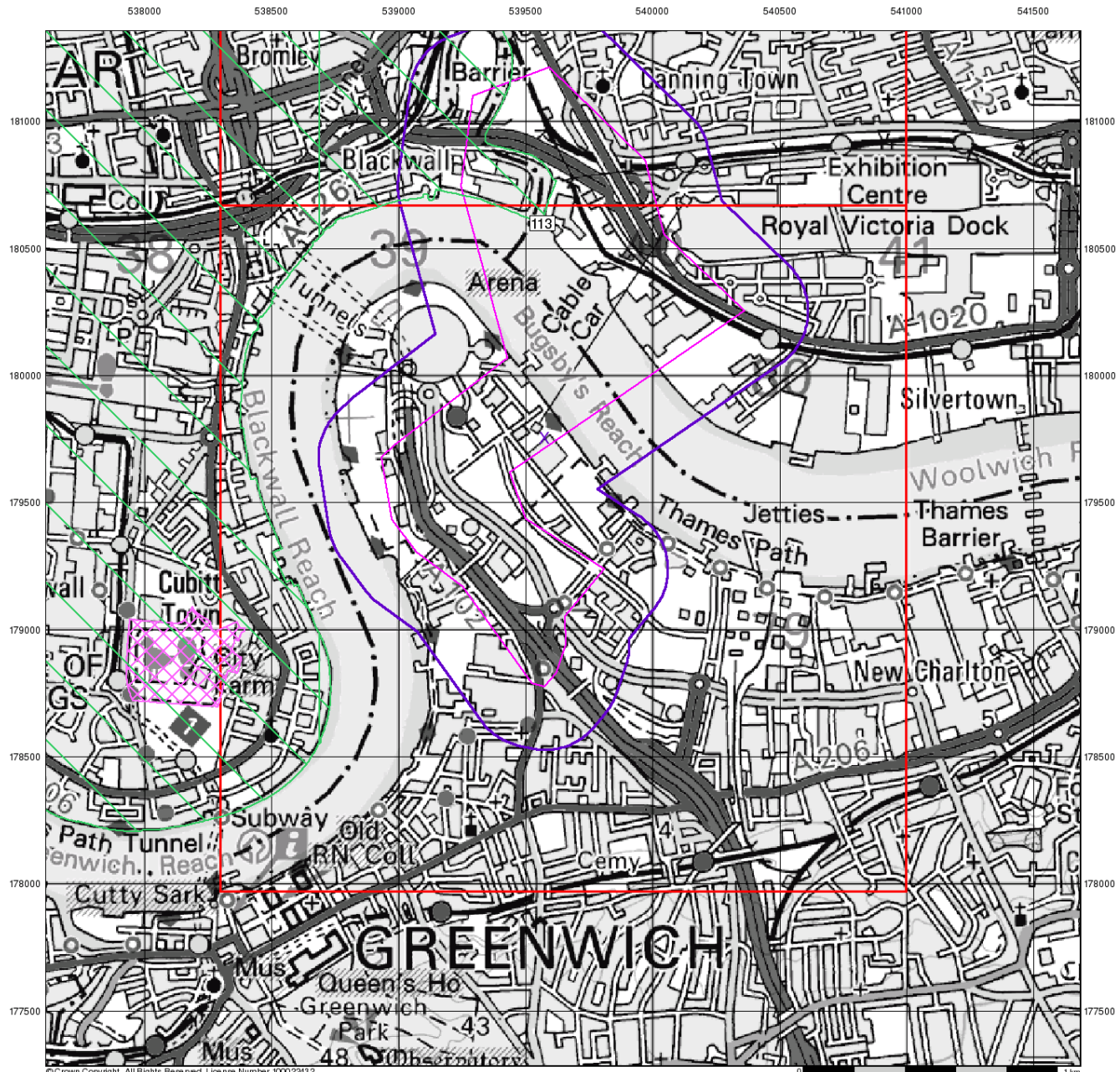
Order Number: 44579755_1.1
 Customer Ref: 320530BB01
 National Grid Reference: 539580, 179760
 Slice: A
 Site Area (Ha): 143.07
 Search Buffer (m): 250

Site Details

Site at 539648, 179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk








© Crown Copyright. All Rights Reserved. License Number: 100022832



Sensitive Land Uses

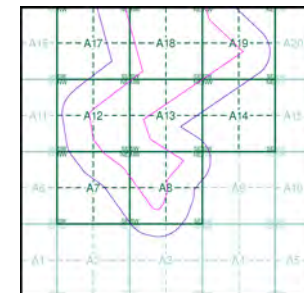
General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Slice
-  Map ID

Sensitive Land Uses

-  Area of Adopted Green Belt
-  Area of Unadopted Green Belt
-  Area of Outstanding Natural Beauty
-  Environmentally Sensitive Area
-  Forest Park
-  Local Nature Reserve
-  Marine Nature Reserve
-  National Nature Reserve
-  National Park
-  Nitrate Sensitive Area
-  Nitrate Vulnerable Zone
-  Ramsar Site
-  Site of Special Scientific Interest
-  Special Area of Conservation
-  Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

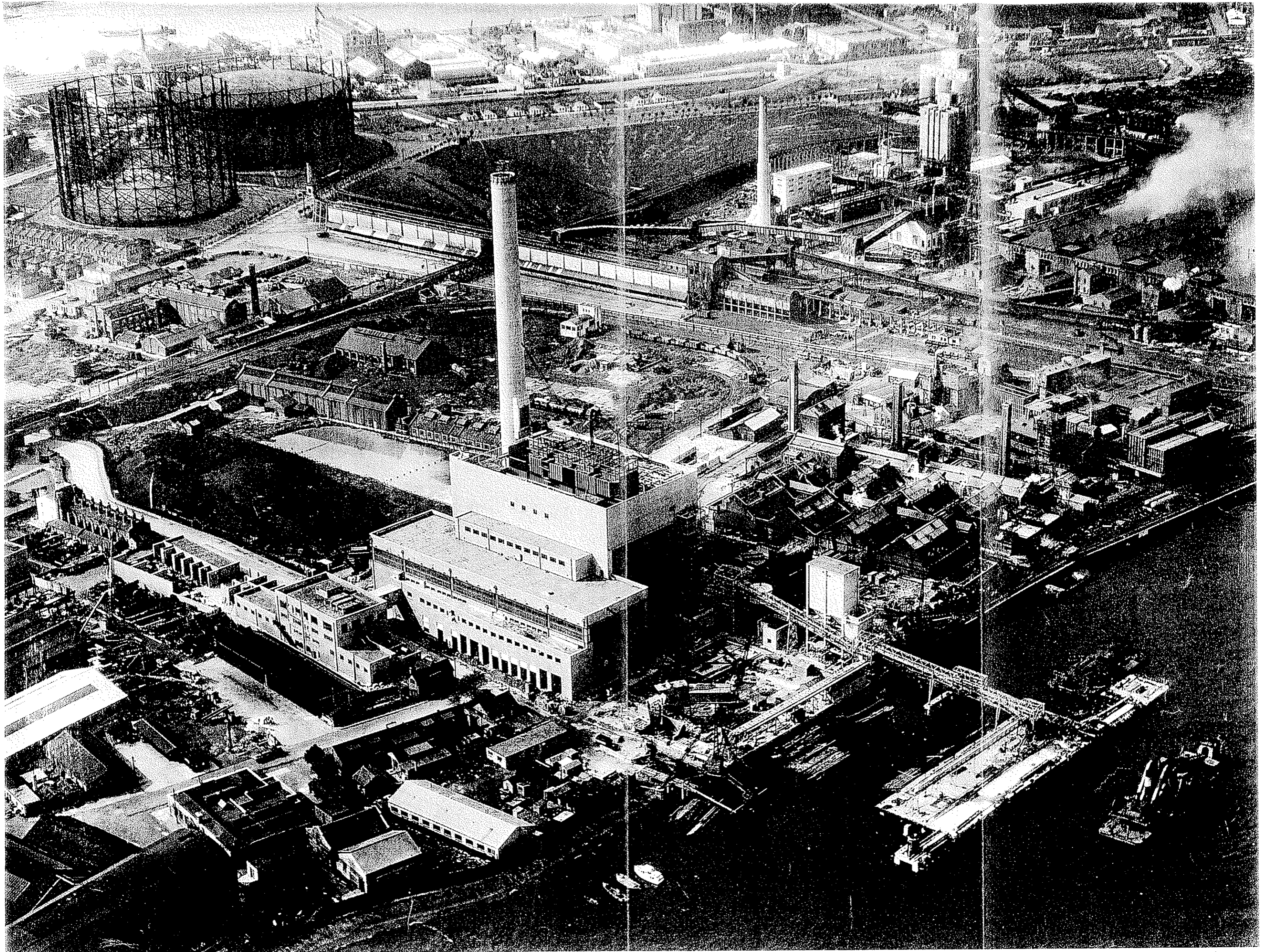
Order Number: 44579755_1.1
 Customer Ref: 320530BB01
 National Grid Reference: 539580, 179760
 Slice: A
 Site Area (Ha): 143.07
 Search Buffer (m): 250

Site Details

Site at 539648, 179995



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



Appendix 11A



Waste Management Infrastructure

Table 11-A highlights a number of treatment and recycling facilities within a reasonable proximity of the Site. However, this is a guide and the appointed waste contractor for the Site should contact the Environment Agency directly to determine the most appropriate waste transfer station to handle the waste material being produced. The transfer station will then arrange for the waste to be transported for final disposal at an appropriate landfill site.

Table 11-A Waste treatment sites

Site name	Site address	Material handled		Distance from Site (miles)
Brewsters Waste Management Ltd	Thames Wharf, Dock Road, Silvertown, London, E16 1AF Tel: 020 7474 3535 Email: barry@brewsterswaste.co.uk	Clay Hardcore Inert waste Metal ferrous Cardboard Fluorescent tubes Food General office paper Glass Pallets Plastic	Rubble Subsoil Topsoil Wood Mixed plastics Paper Printers and fax cartridges Drums/containers Plastic film Tyres	0
Bywaters (Leyton) Limited	Gateway Road, Leyton, London E10 5BY Tel: 020 7002 6000 Email: a.kirk@bywaters.co.uk	Clay Hardcore Inert waste Metal Plasterboard Ferrous Cardboard Fluorescent tubes Food General office paper Mixed plastics Printers and fax cartridges	Rubble Subsoil Topsoil Wood Asbestos sheet Glass Paper Pallets Plastic Plastic film Tyres Drums/containers	5
I.O.D. Skip Hire Ltd.	I.O.D. House, Oasis Park, 32 Stephenson Street, Canning Town, London, E16 4ST Tel: 020 7525 4058 Email: claude@iodskips.co.uk	Clay Hardcore Inert waste Metal	Rubble Subsoil Topsoil Wood	1
McNicholas Plc	709, Old Kent Road, London, SE15 1JZ Tel: 020 7732 3664	Clay Hardcore Inert waste Metal	Rubble Subsoil Topsoil Wood	3

Site name	Site address	Material handled		Distance from Site (miles)
HTL Waste Management	Dertford Recycling Centre Landmann Way, Deptford, London, SE14 5RS Tel: 020 8691 3074	Clay Hardcore Inert waste Metal	Rubble Subsoil Topsoil Wood	3
McGrath Bros (Waste Control) Ltd	David McGrath, McGrath House, Hepscoth Road, Hackney, London, E9 5HH Tel: 020 8985 8222 Email: info@mcgrathgroup.co.uk	Clay Hardcore Inert waste Metal Cardboard Glass Pallets Plastic	Rubble Subsoil Topsoil Wood Plastic film Machinery /parts Tyres	3
McGrath Bros (Waste Control) Ltd	54-58, River Road Barking, Essex, IG11 0DW Tel: 020 8507 8880	Clay Hardcore Inert waste Metal Plastic Plastic film Machinery /parts Tyres	Rubble Subsoil Topsoil Wood Cardboard Glass Pallets Plastic	4
City of Westminster	Westminster City Hall, Victoria Street, Vincent Square, London, SW1E 6QP Tel: 020 7642 6280	Other hazardous waste not included elsewhere	Contact operator to see if this includes soils	7
Silver Lining Industries Ltd	Unit 4, Stour Road, Bow, London, E3 2NT Tel: 0800 091 0000 Email: admin@wastecare.co.uk	Cardboard Glass Pallets Plastic Plastic film Fuel oil Lubricating oil Machinery/parts Tyres Ferrous Printers and fax cartridges	Fluorescent tubes Food General office paper Mixed plastics Paper Other hazardous wastes not included elsewhere Drums/containers	3

Table 11-B highlights a number of waste disposal facilities within a 25 mile radius to the Site and that also run a waste collection service.

Table 11-B Waste disposal sites

Site name	Site address	Landfill class	Distance from Site (miles)
Tripcock Point Landfill Site	Facility No. 3, Tripcock Point, Off Central Way, Thamesmead, London, SE28	A06 Landfill taking other wastes permitted to accept construction and demolition waste including canal dredgings, etc.	5
Aveley Clay Pit	Aveley Landfill, Sandy Lane, Aveley, South Ockendon, Essex, RM15 4XP	A04 Dredging sites Facility permitted to accept dredgings	13
Ayletts Farm Quarry	Warwick Lane, Rainham, Essex, RM13 9XW	A04 Dredging sites Facility permitted to accept dredgings	12
Beddington Farmlands Landfill	Beddington Lane, Croydon, Surrey, CR0 4TD	A04 Dredging sites Facility permitted to accept dredgings	15
Bournewood Inert Landfill	Off A20 by-pass, Swanley, Kent, BR8 7DP	L05 Landfill Directive Compliant Inert Landfill Facilities permitted to accept inert waste for landfill which are Landfill Directive compliant	14
Rainham Landfill	Rainham Landfill, Wennington Marshes, Ferry Lane, Rainham, Essex, RM13 9DA	A04 Dredging sites Facility permitted to accept dredgings	11
The East Tilbury Quarry	Princess Margaret Road, East Tilbury, Essex RM18 8PH	A06 Landfill taking other wastes permitted to accept construction and demolition waste including canal dredgings, etc.	24
Medebridge Road Landfill	Area 1, Medebridge Road, South Ockendon, Grays, Essex, RM16 5TZ	A01 Co-disposal landfill site Former landfill facility permitted to receive ranges of commercial, household and/or industrial waste which required special precautions in their handling including that which was classed as Hazardous under the Hazardous Waste Regulations (excluding bonded asbestos) together with municipal waste which is capable of decomposition, or similar degradable wastes.	17

Table 11-C highlights a number of soil treatment centres.

Table 11-C UK Soil Treatment Centres

Site name	Site address	Treatment method / waste accepted
Terramundo, Port Clarence, Teeside	Port Clarence Site Off Huntsman Drive Port Clarence Middlesbrough, Cleveland, TS2 1UE Tel: 016 4254 6836 Email: landresources@augeanplc.com	The soil treatment centres can tackle a broad range of contaminants. Bioremediation gives a potential 100% recovery of soils, while soil washing gives 80% recovery of sand and gravel. Soil treatment is made available for sites where on-site treatment is not a viable option, thereby promoting the clean-up of contaminated land.
Terramundo, Kingscliffe, Northamptonshire	East Northants Resource Management Facility Stamford Road, Kings Cliffe PE8 6XX Tel: 017 8044 4900 Email: landresources@augeanplc.com	Soil treatment can also be used as a pre-treatment to reduce contamination to acceptable levels before landfilling. Technologies used include: soil washing, cement stabilisation and bioremediation.
Biogenie, Redhill	Redhill Soil Treatment Facility, Patteson Court Landfill, Cormongers Lane, Nutfield, Redhill, Surrey RH1 4ER Tony Huke Tel: 07969690651 Email: thuke@biogenie.co.uk	01 – wastes resulting from exploration, mining, quarrying and physical and chemical treatment of minerals 05 – wastes from petroleum refineries, natural gas purification and pyrolytic treatment of coal 13 – oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05,12 and 19) 16 – waste not otherwise specified in the list 17 – construction and demolition wastes (including excavated soil from contaminated sites) 19 – wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial uses 20 – municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions

Site name	Site address	Treatment method / waste accepted
BIFFA-Biogenie, Risley, Warrington	Risley Soil Treatment Facility Moss Side Farm, Silver Lane, Risley, Warrington Cheshire WA3 6BY Chris Woods Email: cwoods@biogenie.co.uk	01 – wastes resulting from exploration, mining, quarrying and physical and chemical treatment of minerals 17 – construction and demolition wastes (including excavated soil from contaminated sites) 19 – wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial uses
BIFFA-Biogenie, Meece, Staffs	Meece Soil Treatment Facility Meece Landfill Site Swynnerton Coldmeece, Stone, Staffs ST15 0QN Jon Owens Tel: 07764788677 Email: jowens@biogenie.co.uk	01 – wastes resulting from exploration, mining, quarrying and physical and chemical treatment of minerals 05 – wastes from petroleum refineries, natural gas purification and pyrolytic treatment of coal 13 – oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05,12 and 19) 16 – waste not otherwise specified in the list 17 – construction and demolition wastes (including excavated soil from contaminated sites) 19 – wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial uses 20 – municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions
UK Remediation, Exeter, Devon	Unit 11a, Hill Barton Business Park, Sidmouth Road, Clyst St. Mary, Devon, EX5 1DR Tel: 013 9292 8028	The hazardous waste management license enables us to treat a range of contaminants including hydrocarbons, heavy metals, chlorinated solvents, poly aromatic hydrocarbons, common brownfield contaminants, persistent organic

Site name	Site address	Treatment method / waste accepted
		pollutants, asbestos, invasive plants, etc.
Connells / ER Oldham, Manchester, Waste Transfer Station	Environmental Recovery Ltd, Londsdale House, Blucher Street, Birmingham, B1 1 QU Tel: 012 1616 5020	Contaminated soil remediation, dredge, sludge and lagoon processing and weak soil stabilisation
Cory Churngold, Dudley	Churngold Group Limited, St Andrews House, St Andrews Road, Avonmouth, Bristol, BS11 9DQ Tel: 0117 900 7100	Treatment of the following contamination: asbestos, chlorinated solvents, heavy metal, hydrocarbon, invasive plants and persistent organic pollutants
Rem20	Elizabeth House, Duke Street, Woking, Surrey, GU21 5AS Tel: 014 8334 6048 Email: woking@rem20.co.uk	The treatment technologies use one or a combination of the following methods: <ul style="list-style-type: none"> ▪ Physical – wet and dry methods using differences in grain size and density of the materials to separate the different fractions ▪ Biological – the aerobic biodegradation of contaminants by naturally occurring micro-organisms into harmless carbon dioxide and water ▪ Chemical – transformation by chemical treatment, destroying the contaminants or reducing their toxicity

Appendix 12A



Noise Survey Data

Tunnel Avenue (See Figure 12.1)



Date	Time	Run Time	LAeq	LAmx	LA1	LA10	LA50	LA90	LA99	L Amin	Freq. Weighting
01/07/2014	12:31	00:15:00	59.0	73.0	63.5	61.0	58.2	56.4	55.0	54.1	A
01/07/2014	12:46	00:15:00	62.5	70.9	66.4	64.7	62.1	60.0	59.0	58.1	A
01/07/2014	13:01	00:15:00	63.8	75.4	69.3	64.9	63.3	61.6	60.1	59.1	A
01/07/2014	13:16	00:15:00	63.4	67.1	65.8	64.8	63.3	61.7	60.9	60.3	A

Clements Avenue (see Figure 12.1)



Date	Time	Run Time	LAeq	LAmax	LA1	LA10	LA50	LA90	LA99	LAmi	Freq. Weighting
01/07/2014	14:11	00:15:00	48.5	61.4	53.3	49.8	47.4	46.4	45.4	45.2	A
01/07/2014	14:26	00:15:00	48.9	63.3	52.3	49.2	47.3	46.2	45.4	45.0	A
01/07/2014	14:41	00:15:00	48.3	58.6	51.5	49.4	48.0	46.5	45.9	45.5	A
01/07/2014	14:56	00:15:00	49.3	54.1	51.2	50.6	49.4	47.2	46.6	46.1	A

Britannia Gate (see Figure 12.1)



Date	Time	Run Time	LAeq	LMax	LA1	LA10	LA50	LA90	LA99	LMin	Freq. Weighting
01/07/2014	15:37	00:15:00	57.5	64.5	63.4	60.3	53.9	52.7	52.1	51.7	A
01/07/2014	15:52	00:15:00	61.7	69.8	67.8	64.8	59.8	52.6	51.5	50.8	A
01/07/2014	16:07	00:15:00	64.3	70.6	68.8	67.4	63.3	56.2	54.8	54.5	A
01/07/2014	16:22	00:15:00	62.8	70.0	67.6	66.2	62.2	52.3	51.8	51.4	A

Appendix 15A

Mitigation Measures Summary Table

Table 15A summarises the potential adverse significant effects identified in the Introductory Environmental Assessment Report along with the proposed mitigation measures to avoid and/or to reduce the impacts.

Table 15A Summary of significant adverse impacts and potential mitigation measures

	Potential Significant Adverse Environmental Impact	Potential Mitigation Measures
Air Quality	Dust from construction activity	Construction Environmental Management Plan (e.g. wheel washes, covering materials during storage and transport and keeping a tidy site).
	Emissions from construction traffic.	A Travel Plan would be implemented to ensure the most economical use of construction vehicles and boats to minimise traffic movements.
	Change in emissions during operation	User charging.
	Emissions from traffic concentrated around the tunnel portals	Appropriate ventilation system and design.
Community and Private Assets	Construction activity (noise and disruption)	Communication with local businesses and residents along with a Code of Construction Practice to ensure disruption is kept to a minimum.
Cultural Heritage	The likely potential for archaeological remains will be further understood by field surveys.	Archaeological excavations in advance of development and watching briefs during construction.
Ecology and Nature Conservation	Temporary noise disturbance of species during the construction period.	Construction to be undertaken outside of nesting season (site clearance) or in the presence of ecologist
	Pollution from runoff could potentially impact on foraging and nesting birds and the River Thames Site of Importance for Nature Conservation.	Adopting best practice pollution prevention and control measures as outlined in the CEMP.
	Loss of existing habitat for birds, invertebrates and reptiles through land take.	If species are impacted as a result of unavoidable land take, suitable replacement habitat would be created.

Effects on all travellers	Diversion of pedestrian and cycling routes during construction	Alternative access routes, appropriate signage of alternative pedestrian and cycle access routes. Coordinated information campaign will be undertaken targeting the affected routes, stations and stops.
	Changes in traffic flows during operation	User charging
Geology and Soils	Dust during construction	Damping down and covering of spoil and lorries during transportation of material to minimise airborne dust.
	Disturbance of contaminated land such as landfill/Made Ground and the mobilisation of contaminants in the soil Creation of new contaminant pathways and contaminated run off.	Construction would adhere to a good site management plan, a Construction Code of Practice and Environment Agency Guidelines.
Materials	Increased pressure on waste management and disposal facilities.	Where possible, excavated materials will be re-used on-site.
	Carbon emissions and contaminants into the air from the transportation of waste materials	Use materials with low embodied carbon, use barges along the river where possible for transportation of materials. Implement a Transport Management Plan to specify route and timing restrictions to ensure minimal impact on the local highway network.
Noise and Vibration	Construction noise and vibration from plan and construction traffic.	Low noise surfacing or noise barriers will be investigated to minimise the noise impacts on the surrounding area.
	Change in noise levels at the tunnel portals from traffic.	
Townscape and Visual	Temporary disruption to townscape and views from construction activity, stockpiles of material and spoil and heavy vehicle movements.	Use screening and hoarding to limit disruption to townscape.
	Permanent impacts - potential for the Scheme to introduce elements such as portal service buildings that compromise existing views.	Carefully considered design, including landscape design, with strong potential to enhance the local visual amenity.

Water Environment	Construction works could be at risk from flooding.	Sign up for EA flood warnings; ensure that flood risk is included as part of the health and safety procedure and ensure that construction workers are aware of potential risks.
	Construction work may cause heavily silted or contaminated runoff to nearby water bodies.	Drainage discharge would be treated prior to entry into the water environment. We would adhere to the EA's Pollution Prevention Guidelines and a Construction Environmental Management Plan. Current drainage arrangements would be improved.
	The scheme would introduce impermeable surfaces which may increase both the risk of surface water flooding on site and flood water levels downstream.	Sign up for EA flood warnings and measures to close the tunnel in advance of a flood. Fix and improve current drainage system.