



RIVER CROSSINGS: SILVERTOWN TUNNEL

SUPPORTING TECHNICAL DOCUMENTATION

ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT

Hyder Consulting

June 2014

This report outlines the methodology proposed to assess the environmental impacts of the Scheme and the information to be included within the Environmental Statement. It was submitted to the Planning Inspectorate for comment on 25 June 2014.

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 proposed scope, methodology and assessment of the environmental work. 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



Transport for London

Silvertown Tunnel

Environmental Impact Assessment - Scoping Report

June 2014

Hyder Consulting (UK) Limited

2212959

Firecrest Court
Centre Park
Warrington WA1 1RG
United Kingdom

Tel: +44 (0)1925 800 700

Fax: +44 (0)1925 572 462

www.hyderconsulting.com



Transport for London

Silvertown Tunnel

Environmental Impact Assessment - Scoping Report

June 2014

Author Nicky Hartley

A handwritten signature in blue ink that reads "N. S. Hartley".

Checker Andrew Saunders

A handwritten signature in blue ink that reads "A. Saunders".

Approver Caroline Soubry-Smith

A handwritten signature in blue ink that reads "C. S. Smith".

Report No 0002-UA005651-UE31R-03-F

Date June 2014

This report has been prepared for Transport for London in accordance with the terms and conditions of appointment for Environmental Impact Assessment - Scoping Report dated May 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

Abbreviations	iv
Glossary.....	vi
Figures.....	viii
1 Introduction.....	1
1.1 Introduction to the Scheme.....	1
1.2 Location of the Scheme.....	1
1.3 The Team	2
1.4 The Purpose and Structure of the Scoping Report.....	2
2 The Scheme	5
2.1 Background to the Scheme	5
2.2 Scheme Objectives.....	7
2.3 The Scheme	7
2.4 Traffic Forecasting.....	15
2.5 The Rochdale Envelope	19
2.6 Scheme Timescales	19
3 The Consideration of Alternatives	21
3.1 The Alternatives Considered	21
3.2 Development of the Preferred Scheme	24
4 Consultation.....	25
4.1 Consultation Undertaken to Date.....	25
4.2 Environmental Statement Consultation	26
4.3 Future Consultation for the Development Consent Order.....	27
5 Environmental Impact Assessment Methodology	28
5.1 The EIA Process.....	28
5.2 The EIA Regulatory Context.....	28
5.3 Consultation on the EIA Scoping Report	29
5.4 The Design Manual for Roads and Bridges.....	29
5.5 Study Areas	31
5.6 Baseline Data Gathering.....	31
5.7 Assessment of Effects	31
5.8 Mitigation Measures, Enhancements and Residual Effects	35
5.9 Assessment of Cumulative Effects	35
5.10 Health Impact Assessment.....	35
5.11 Habitats Regulations Assessment Screening.....	36

5.12	Energy Strategy	36
5.13	Sustainability Statement	36
6	Scope of the EIA.....	37
6.1	Environmental Topics to be Included in the ES	37
6.2	Topics to be Scoped Out Under EIA.....	37
6.3	Air Quality	38
6.4	Community and Private Assets.....	48
6.5	Cultural Heritage.....	54
6.6	Ecology and Nature Conservation	56
6.7	Effects on All Travellers	61
6.8	Geology and Soils	66
6.9	Materials	70
6.10	Noise and Vibration	73
6.11	Townscape and Visual	78
6.12	Water Environment.....	80
6.13	Cumulative Effects.....	83
6.14	Transboundary Screening	85
7	Structure of the Proposed ES.....	87
8	References	89

Tables

Table 1-1	The Team	2
Table 1-2	Suggested Scoping Report Contents in PINS Advice Note 7	3
Table 5-3	Environmental Value (or Sensitivity) and Typical Descriptors	32
Table 5-4	Magnitude of Change and Typical Descriptors	32
Table 5-5	Arriving at the Significance of Effect Category	33
Table 5-6	Descriptors of the Significance of Effect Categories	34
Table 6-7	Scope of the Air Quality Assessment	38
Table 6-8	Scope of the Community and Private Assets Assessment	48
Table 6-9	Scope of the Cultural Heritage Assessment	54
Table 6-10	Scope of the Ecology and Nature Conservation Assessment	56
Table 6-11	Scope of the Effects on All Travellers Assessment	61
Table 6-12	Scope of the Geology and Soils Assessment	66
Table 6-13	Scope of the Materials Assessment	70
Table 6-14	Scope of the Noise and Vibration Assessment	73
Table 6-15	Scope of the Townscape and Visual Assessment	78

Table 6-16	Scope of the Water Environment Assessment	80
Table 6-17	Significance Criteria for Determining Cumulative Effects	84
Table 6-18	Information to Inform a Transboundary Screening Decision by PINS	85

Appendices

- Appendix A
- Figures
- Appendix B
- Significance Criteria
- Appendix C
- Air Quality Monitoring Location Maps

Abbreviations

AADT	Average Annual Daily Traffic
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BAP	Biodiversity Action Plan
BPM	Best Practicable Means
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CRTN	Calculation of Road Traffic Noise
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
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
ES	Environmental Statement
EU	European Union
FRA	Flood Risk Assessment
GiGL	Greenspace Information for Greater London
GLA	Greater London Authority
GLHER	Greater London Historic Environment Record
HA	Highways Agency
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HRA	Habitat Regulations Assessment
IAN	Interim Advice Note
IP	Inter Peak
KER	Key Ecological Receptor
LAARC	London Archaeological Archive and Research Centre

LAQM	Local Air Quality Management
LNR	Local Nature Reserve
MOL	Metropolitan Open Land
MOU	Measure of Uncertainty
MTS	Mayor's Transport Strategy
NMR	National Monuments Record
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
OP	Off Peak
PCM	Pollution Climate Mapping
PINS	Planning Inspectorate
PPV	Peak Particle Velocity
SAC	Special Area of Conservation
SAF	Strategic Assessment Framework
SAM	Scheduled Ancient Monument / Scheduled Monument
SFRA	Strategic Flood Risk Assessment
SINC	Site of Importance for Nature Conservation
SoCC	Statement of Community Consultation
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TfL	Transport for London
UDP	Unitary Development Plan
WFD	Water Framework Directive
WHO	World Health Organisation
WHS	World Heritage Site
WWII	World War Two
ZoI	Zone of Influence

Glossary

AADT	Annual Average Daily Traffic is a measure used in transportation engineering and is the number of vehicles that will use a new or improved road on an average day
AQMA	Places where air quality objectives are not likely to be achieved. 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.
BPM	The selection of the best option for a process or technique with respect to environmental protection where local conditions, individual circumstances, the current state of technical knowledge and financial implications are carefully considered.
CEMP	A site specific plan developed to ensure that appropriate environmental management practices are followed during the construction phase of a project.
Desk-based Assessment	A data collection exercise using existing sources of cultural heritage data. The purpose is to identify relevant known cultural heritage resources.
Early Medieval Period	AD410 to 1066
EIA	The assessment of the impacts on the environment of a development project.
ELHAM	East London Highway Assignment Model predicts flow and routing of traffic for selected boroughs within East London.
ES	An Environmental Statement documents the findings of an Environmental Impact Assessment.
HIA	A combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population.
HRA	Assessment tool developed by the European Commission to help competent authorities (as defined in the Habitats Regulations) to carry out assessment to ensure that a project, plan or policy will not have an adverse effect on the integrity of any European designated site.
Medieval Period	AD 1066 to 1540
Mitigation	Measures including any process, activity, or design to avoid, reduce, remedy or compensate for negative environmental impacts or effects of a development
Modern period	AD 1914 to present

NSIP	NSIPs are large scale developments such as new harbours, power generating stations (including wind farms), and electricity transmission lines, which require a type of consent known as 'development consent' under procedures governed by the Planning Act 2008 (and amended by the Localism Act 2011).
Post-medieval period	AD 1540 to 1914
Prehistoric period	Pre 30,000 BC to AD 43
Receptor	A component of the natural or man-made environment that is affected by an impact, including people.
Roman Period	AD 42 to AD 410
Setting	The surroundings within which a heritage asset is experienced and any element which contributes to the understanding of its significance.
SPZ	Area established around a groundwater fed source of public drinking water supply as a means of pollution prevention. Within the SPZ potentially polluting activities are monitored by the Environment Agency

Figures

Figure	
STWTN-ATK-GEN-XXXX-DR-Z-00002	Scheme Location and Application Site Boundary
STWTN-ATK-GEN-ANXX-DR-Z-00001	Northern Junction Arrangement
STWTN-ATK-GEN-ASXX-DR-Z-00001	Southern Junction Arrangement
Figure 6.1	Air Quality Constraints Map Greenwich/Newham Area
Figure 6.2	Community and Private Assets
Figure 6.3	Cultural Heritage Constraints Plan
Figure 6.4	Effects on All Travellers
Figure 6.5	Townscape and Visual Considerations

1 Introduction

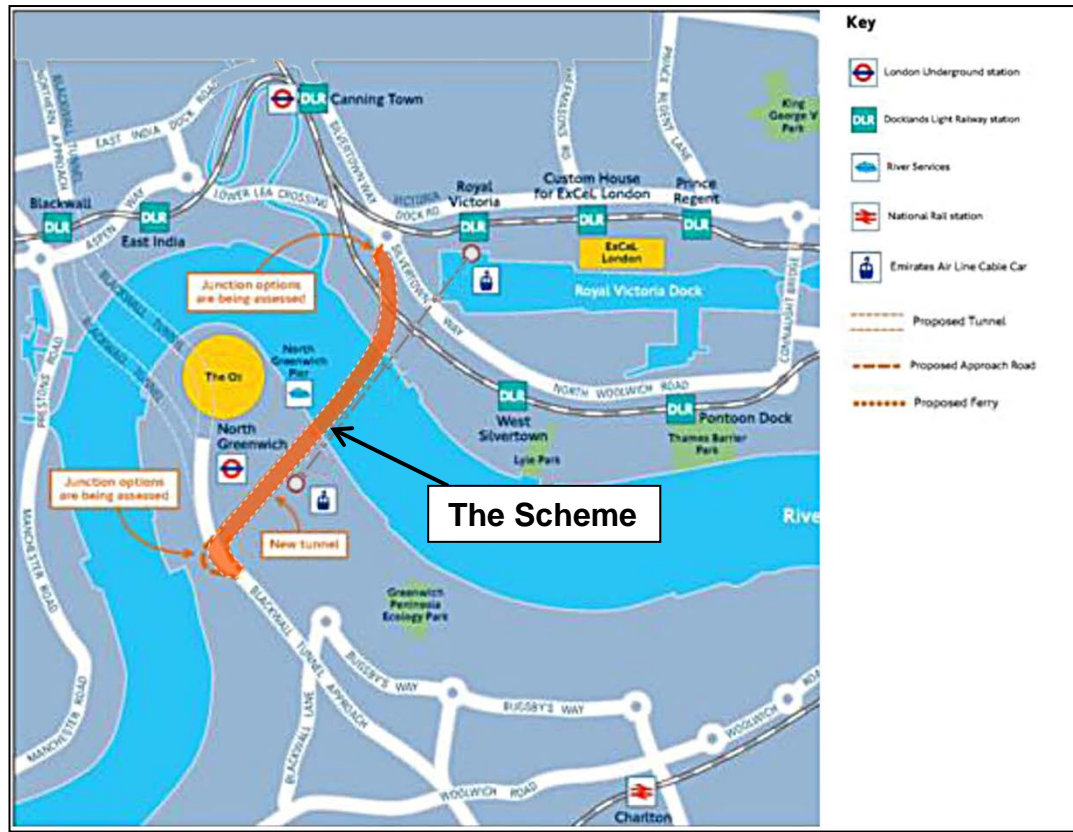
1.1 Introduction to the Scheme

- 1.1.1 Transport for London (TfL) is proposing 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). The purpose of the Scheme is to reduce delays and closures at the Blackwall Tunnel by improving connections and offering alternative crossing options.
- 1.1.2 A new road tunnel would double the available river crossing capacity in the area and would significantly reduce delays experienced at the Blackwall Tunnel which are often around 20 minutes. The Scheme would support the continued growth of London's economy and population and would help to regenerate the area.
- 1.1.3 Following a request from the Mayor, the Secretary of State for Transport confirmed that the Scheme is of national significance and, by exercising her powers under section 35 of the Planning Act 2008, directed on 26 June 2012 that the Scheme be treated as a development for which a Development Consent Order (DCO) is required.
- 1.1.4 TfL intends to submit a DCO application to the Planning Inspectorate (PINS). The application will be accompanied by an Environmental Statement (ES) prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (Statutory Instrument 2009/2263) as amended by the Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2012 (Statutory Instrument 2012/787) (the Regulations).

1.2 Location of the Scheme

- 1.2.1 The location of the Scheme is shown on Plate 1-1 below with the application site boundary and Scheme infrastructure shown in more detail on Drawing STWTN-ATK-GEN-XXXX-DR-Z-00002 in Appendix A.

Plate 1-1 Location of the Silvertown Tunnel Scheme



1.3 The Team

1.3.1 The Scheme team members are summarised in Table 1-1. This table will be updated as the Scheme progresses and further organisations join the Scheme team.

Table 1-1 The Team

Organisation	Role
TfL	The Applicant
Hyder	Environmental Impact Assessment (EIA) Consultant
Pinsent Masons	Legal Advisors
Atkins	Preliminary Highways Design
Mott MacDonald	Preliminary Tunnel Design
Atkins	Reference Design

1.4 The Purpose and Structure of the Scoping Report

1.4.1 The Regulations set out the requirements for an applicant who proposes to request a scoping opinion from PINS. Regulation 8(3) of the Regulations requires a request for a scoping opinion to include:

- A plan sufficient to identify the land
- A brief description of the nature and purpose of the development and of its possible effects on the environment
- Such other information or representations as the person making the request may wish to provide or make

1.4.2 PINS Advice Note 7: *Environmental Impact Assessment, Screening and Scoping* provides advice on the information that should be provided in the Scoping Report. Table 1-2 also lists the suggested information requirements and identifies where they are presented in this Scoping Report.

Table 1-2 Suggested Scoping Report Contents in PINS Advice Note 7

Suggested Scoping Report Contents (Based on Advice Note 7)	Relevant Sections in this Scoping Report
<p>A plan showing:</p> <ul style="list-style-type: none"> ▪ The proposed draft DCO site boundary (identified by a red line) including any associated development; ▪ any permanent land take required for the proposed development; ▪ any temporary land take required for construction, including construction compounds; ▪ any existing infrastructure which would be retained or upgraded for use as part of the scheme ▪ proposed development and any existing infrastructure which would be removed; and ▪ features including planning constraints and designated areas on and around the site such as national parks or historic landscapes. 	Appendix A
A description of the proposed development including both the NSIP and any of the associated development	Section 2
<p>In dealing with the description of the development and its possible effects on the environment, applicants should:</p> <ul style="list-style-type: none"> ▪ Set out the information using the headings in Schedule 3 to the EIA Regulations, being: <ul style="list-style-type: none"> ▪ characteristics of the development; ▪ location of the development; and ▪ characteristics of the potential impacts. ▪ ensure that all aspects of the environment likely to be significantly affected by the development are addressed. 	Section 2 and Section 6
An outline of the main alternatives considered and the reasons for selecting a preferred option	3.1

Suggested Scoping Report Contents (Based on Advice Note 7)	Relevant Sections in this Scoping Report
Results of desktop and baseline studies where available	Sections 6.3 to 6.13
Referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal.	Appendix A
Guidance and practice to be relied upon, and whether this has been agreed with the relevant bodies together with copies of correspondence to support these agreements	Sections 6.3 to 6.13
Methods used or proposed to be used to predict impacts and the significance criteria framework used	Sections 6.3 to 6.13
Any mitigation proposed and predicted residual impacts	Sections 6.3 to 6.13
Where cumulative development has been identified, how the developer intends to assess these impacts in the ES	Section 6.13
An indication of any European designated nature conservation sites that are likely to be significantly affected by the proposed development and the nature of the likely significant impacts on these sites	Section 5.11 and 6.6
Where a developer seeks to scope out matters, a full justification for scoping out such matters, preferably supported by evidence of agreement with the relevant bodies	Section 6.2
Key topics covered as part of the developer's scoping exercise	Section 6.1 and then Sections 6.3 to 6.13
An outline of the structure of the proposed ES	Section 7

1.4.3 In accordance with Regulation 6(1) b of the Regulations, TfL has confirmed to PINS the intention to provide an ES for the Scheme.

2 The Scheme

2.1 Background to the Scheme

- 2.1.1 Work has already been undertaken to improve public transport in this area of East London and more is expected. The London Overground, Emirates Air Line cable car, Docklands Light Railway (DLR) extensions and upgraded Jubilee line have all been completed and allow access across the river by public transport. By 2018, Crossrail will provide another connection.
- 2.1.2 There is a need to provide crossings for the commercial traffic that is important for local businesses, goods delivery and servicing. In recent years, investment in the road network has not kept up with increasing demand.
- 2.1.3 At present, the number of routes available to vehicles is limited. There is a width restriction at the Rotherhithe Tunnel and a height restriction at the Blackwall Tunnel. These can lead to tunnel closures and delays for all vehicles. The Woolwich Ferry is ageing and may not be in the best location for current and future needs. Since the number of crossings here is so limited, any incidents or closures mean that people need to make long diversions in order to find an alternative.
- 2.1.4 This lack of resilience and alternative options can lead to further delay and congestion for drivers, at the Blackwall Tunnel this is on average 20 minutes per vehicle in the morning peak. For business users, this is an additional cost and can discourage investment.
- 2.1.5 The Mayor's Transport Strategy (MTS) published in 2010 sets out the transport strategy for London, based upon the work undertaken by the Greater London Authority (GLA) for the London Plan. 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.
- 2.1.6 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
- 2.1.7 The MTS sets out a commitment to take forward a package of new river crossings for east and southeast London: The package of improvements considered for the area 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 separate consenting regime).

- 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 subject of this Scoping Report.

2.1.8 Consequently, a series of technical reports were commissioned by the Applicant 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.

2.1.9 It is envisaged that whilst addressing congestion and traffic resilience problems, the Scheme would allow for growth in this area of London. The east sub-region accounts for 37% of the forecast increase in the London population by 2031 and 22% of new jobs created.

2.1.10 A tunnel could double the available river crossing capacity for road traffic in this area. This could significantly reduce the delays experienced at the Blackwall Tunnel. As the area grows, more people will need to cross the river.

2.1.11 The Scheme would also help reduce the impact of closures of the Blackwall Tunnel. Firstly, it would be able to accommodate tall vehicles in both directions which cannot use the Blackwall Tunnel. It should also reduce the number of overheight vehicles attempting to use the Blackwall Tunnel northbound, therefore, reducing the number of times the tunnel has to close. Secondly, having another crossing in the area would mean that, even if one tunnel closes, there would be alternative options for road users.

Gallions/Woolwich Replacement Scheme

- 2.1.12 There is a need for a further scheme to address the fact that the Woolwich ferry is nearing the end of its operating life and to enhance transport connections across the Thames in this area. Whilst consultations to date have addressed both the Silvertown and Woolwich Replacement schemes, they are now being developed separately and are the subject of separate consenting regimes. It is currently unknown what form a Woolwich Replacement scheme will take as options are currently being reviewed and will be the subject of further consultation.

2.2 Scheme Objectives

- 2.2.1 The MTS and the London Plan outline the rationale for new river crossings. The principal needs are to address:

- The imbalance between highway network capacity and demand around the Blackwall Tunnel that results in significant congestion.
- The unreliability of the Blackwall Tunnel and the limited ability of the surrounding road network to cope with incidents when they occur.
- The possibility that the Woolwich Ferry may be withdrawn from service due to the condition of the asset which would significantly reduce connectivity in the area.

- 2.2.2 Any river crossing needs to address the above problems. The following local objectives have also been identified:

- To improve the efficiency of the highway network in the London Thames Gateway, especially at river crossings, and provide greater resilience for all transport users.
- To support the needs of existing businesses in the area and to encourage new business investment.
- To support the provision of public transport services in the London Thames Gateway.
- To integrate with local and strategic land use policies.
- To minimise any adverse impacts of any proposals on health, safety and the environment.
- To ensure where possible that any proposals are acceptable in principle to key stakeholders, including affected boroughs.
- 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.

2.3.2 The Scheme would pass under the River Thames, inside an area of land that has been safeguarded for this purpose.

2.3.3 The Backwall Tunnel does not meet current dimensional and geometrical design standards and this contributes to a high number of traffic incidents that causes necessitate temporary closure of one or other bore (circa 1,400 closures in 2012). For example the older northbound bore (opened in the 1880s) can only accommodate vehicles less than 4m high and taller vehicles must therefore divert to longer, less direct routes. The new tunnel would be built to modern standards, and 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, but can use the nearby Emirates Air Line.

2.3.4 The Scheme layout and application site boundary is shown in Drawing STWTN-ATK-GEN-XXXX-DR-Z-00002 in Appendix A.

2.3.5 The Scheme design and alignment provides for:

- A grade-separated, free-flow link from the A102 Blackwall Tunnel approach, to the south of Blackwall Tunnel, to the Silvertown Tunnel south portal.
- 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.
- Reconnection of Tunnel Avenue to the west of the A102 on the Greenwich Peninsula to improve local accessibility.
- Public Transport and non-motorised user links to improve accessibility and safety.
- Considerations of emergency/contingency planning including impacts on the wider network.
- Integration with land development proposals (e.g. Greenwich Peninsula Masterplan).

2.3.6 Further details about the Scheme are provided in the following sections.

Scheme Alignment

2.3.7 The northern highway arrangement is shown on Drawing STWTN-ATK-GEN-ANXX-DR-Z-00001 in Appendix A.

2.3.8 The Scheme would require the elongation of the existing Tidal Basin roundabout to the south to provide a suitable tie-in for the tunnel approach road. This modification incorporates a 'hamburger' 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. The benefits of this design in addition to it sitting wholly within the safeguarded corridor are:

- Maintaining all existing connections at the Tidal Basin roundabout with additional connectivity to the tunnel.
- A direct connection onto the tunnel for traffic approaching from the Lower Lea Crossing without needing to navigate the full circulatory, thereby creating a high capacity link for southbound river crossing traffic.
- Compatibility with the free-flow/green wave principles allowing a clear path to be provided for traffic exiting the tunnel in the event of an emergency by means of traffic signal control.
- Good pedestrian and cyclist access and routes around the junction due to the signalised nature of the roundabout.

2.3.9 The southern highway arrangement is shown on Drawing STWTN-ATK-GEN-ANXX-DR-Z-00001 of Appendix A.

2.3.10 The southern section has been designed to 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.

2.3.11 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.

2.3.12 Consideration is also being given to a dedicated bus link from Millennium Way to the northbound tunnel approach via a priority junction.

2.3.13 Extensive retaining walls would be utilised to accommodate the significant level differences between carriageways and thereby reduce overall landtake.

2.3.14 The benefits of this design are:

- A direct free-flow connection to the tunnel from the A102 which would maximise capacity
- A direct link from Millennium Way to the tunnel for the extensive bus routes that serve the Peninsula which would help minimise journey times and make public transport a more attractive option for cross-river journeys.
- The reconnection of northern and southern sections of Tunnel Avenue would provide more convenient access to the development and industrial land to the west of the A102 from the south without circuitous routing via Millennium Way and the A102.

Highway Drainage

2.3.15 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.

- 2.3.16 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.
- 2.3.17 Pollution control measures in the form of oil interceptors or other agreed facilities would be integral to the Scheme drainage system.

Highway Drainage - North

- 2.3.18 The catchment area for the surface water run-off that would need to be intercepted at the tunnel portal is estimated to be 3,007m². A drainage sump 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.
- 2.3.19 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.

Highway Drainage – South

- 2.3.20 The catchment area for the surface water run-off that would need to be intercepted at the tunnel portal is estimated to be 7,660m². A drainage sump 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 and be gravity drained to an outfall.
- 2.3.21 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.

Structures

Highway Structures - North

- 2.3.22 The cutting from the tunnel portal to the tie-in at the Tidal Basin roundabout would be retained using secant piles or diaphragm walls, the impermeability of which would prevent groundwater penetration. The two retaining walls either side of the carriageway would be connected by a reinforced concrete slab under

the carriageway which would prevent the upward seepage of groundwater. This groundwater exclusion zone would substantially reduce the volume of water to be managed at the portal and, therefore, the risk of flooding in the tunnel.

Highways Structures – South

- 2.3.23 The cutting from the tunnel portal to the tie-in at the A102 would be retained in the same manner as the northern cutting as outlined in paragraph 2.4.22.
- 2.3.24 A new highway bridge would be constructed to take the realigned southbound A102 carriageway over the top of the proposed northbound approach to the Silvertown tunnel.
- 2.3.25 Due to the vertical alignment of the existing and proposed road arrangement and the span required, the bridge would be either steel composite multi-girder¹ or half through steel girder² with a concrete deck slab and contiguous piles or group piled foundations.

Tunnel Design

- 2.3.26 The proposed design comprises twin 11.0m internal diameter, 1.0km long bored tunnels, with cross passages for evacuation at maximum 350m centres with cut and cover tunnel approaches.
- 2.3.27 The speed limit within the tunnel and on the approach roads would be 30mph.
- 2.3.28 The following constraints have influenced the tunnel design:
- The horizontal and vertical alignment of the bored tunnels should take account of the Emirates Air Line (cable car) exclusion zone constraint and the location of the cable car foundations.
 - Maximising the land available to developers on the Greenwich Peninsula, by keeping the alignment as far south as possible, without encroaching closer than 6.5m to the South Cable Car Station Piles.
 - Maintaining a separation between the tunnel bores of 12.8m (approximately one external diameter), except at portals where separation is reduced.
 - Maximising cover to the river bed at the tunnel low point.
 - Maintaining a minimum clear distance to the DLR piers foundation piles of 3.0m
 - Use of cut and cover techniques through the redundant Western Entrance to the Royal Victoria Dock.

¹ This comprises longitudinal fabricated steel plate girders connected by cross-bracing and acting compositely with a cast in-situ reinforced concrete deck slab above (Atkins, 2013).

² This comprises a longitudinal steel girder along each edge of the deck with steel cross girders composite with a cast in-situ reinforced concrete deck slab (Atkins, 2013).

- Avoiding encroachment into lands south of the dock entrance, currently occupied by a drinks distribution warehouse, Laing O'Rourke and Lafarge Tarmac sites.

Tunnel Linings

- 2.3.29 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.

Tunnel Ventilation

- 2.3.30 The tunnel would be ventilated longitudinally in the direction of traffic flow (to ensure ventilation in normal operation and provide smoke control in the event of an emergency) using jet fans located in the tunnel crown in pairs above the traffic envelope.
- 2.3.31 Ventilation stacks would be located at the tunnel portals to conduct vitiated air vertically clear of adjacent buildings, with fans located in a double stacked configuration.
- 2.3.32 The stack heights would be approximately 25m above ground level (subject to detailed design). They would likely be constructed from concrete with an appropriate architectural finish to be sympathetic in line with adjacent land uses and development.
- 2.3.33 Jet fans at the tunnel portals would be reversible so that they may be used in the event of an in-tunnel fire incident to increase the relative pressure in the non-incident tunnel and thereby prevent passage of smoke from incident to the non-incident bore.

Tunnel Cross-passages

- 2.3.34 Intervention cross-passages would be required for the emergency services. Following discussions with the London Fire Brigade during the concept design a maximum cross-passage spacing of 350m has been proposed. The final cross-passage spacing will be the subject of detailed design which considers fire life safety and construction safety risks.

Tunnel Cladding

- 2.3.35 Internal wall cladding may be installed in the tunnel from certain height above the carriageway. This would consist of a panel cladding system with a reflective coating, or a secondary lining that has a robust durable reflective paint system applied.
- 2.3.36 Detailed specifications, including the fire rating of materials, would need to be developed in future stages of design.
- 2.3.37 The current preference would be for a secondary lining option based on the information obtained to date from the tunnel operators.

Lighting

- 2.3.38 Tunnel lighting would be designed in accordance with BD 78/99 and BS 5489 Part 2. Luminaires would be suspended from the tunnel crown and deployed symmetrically about the centreline of the carriageway in each bore.
- 2.3.39 Lighting levels at the entrance and exit portals would be higher than in the middle of the tunnel to compensate for high ambient daytime light levels outside the tunnel. This would be achieved by means of additional rows of luminaires at the portals. Lighting levels in all zones would be in accordance with the luminance reduction curve which can be found in BS 5489-2.
- 2.3.40 For the tunnel it is anticipated that LED lighting would be installed rather than fluorescent lamps. The use of LED lighting in road tunnels is becoming more cost effective when the whole life cost is considered due to the longer life of the lamp. This choice would have to be assessed during the design of the tunnel as technology is continuously developing and it is anticipated that modern lighting systems such as LED lamps would be in widespread use by the time the tunnel is constructed, making their use even more cost effective than fluorescent lamps.
- 2.3.41 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

- 2.3.42 Based upon the current Scheme 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.
- 2.3.43 The extent of the permanent and temporary works and associated land take for the Scheme is shown on Drawing STWTN-ATK-GEN-XXXX-DR-Z-00002 in Appendix A.

Waste

- 2.3.44 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 barge and thereby reduce adverse impacts on local roads. However disposal by road transport remains an option at this stage.
- 2.3.45 As the reference design develops there would be consideration given to the potential re-use and disposal options for the excavated material produced, in particular re-use options for the London Clay.

- 2.3.46 As part of the development of the Scheme design an Outline Site Waste Management Plan has been prepared that will continue to be updated as the Scheme Reference design is produced.

Barge/Wharfage Details

- 2.3.47 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, transport by barge is a logical option.
- 2.3.48 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.
- 2.3.49 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

- 2.3.50 Landscaping detail will be developed during the next phase of design, cost allowance for this has been made within the current estimates.

User Charging

- 2.3.51 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 and to fund the scheme via a Private Finance Initiative (PFI) concession. Users would be charged for using either tunnel upon the opening of Silvertown Tunnel.
- 2.3.52 Due to the close proximity of the Scheme to the Blackwall Tunnel, once the Scheme is operational and subject to user charging that will require that the Blackwall Tunnel users also be charged. The option of the Scheme to remain free may cause serious delays at the Blackwall Tunnel as more traffic would be likely to use this route and thereby block the approaches to Silvertown Tunnel.
- 2.3.53 Although it is also relatively close, the Rotherhithe Tunnel serves a different set of destinations and is unlikely to be affected significantly by the traffic changes as a result of these crossings. Currently there are no plans to introduce a user charge to the Rotherhithe Tunnel.
- 2.3.54 The user charging for the scheme is under development and will be subject to public consultation. The following sets out some broad working assumptions, though these are only indicative
- The level of charges is not yet set, we expect to set the charges at a level that helps to manage the traffic and promote economic growth
 - Because traffic is heavier northbound in the morning and southbound in the evening, the charge may need to vary depending on the direction of the travel, the time of day, and the day of the week

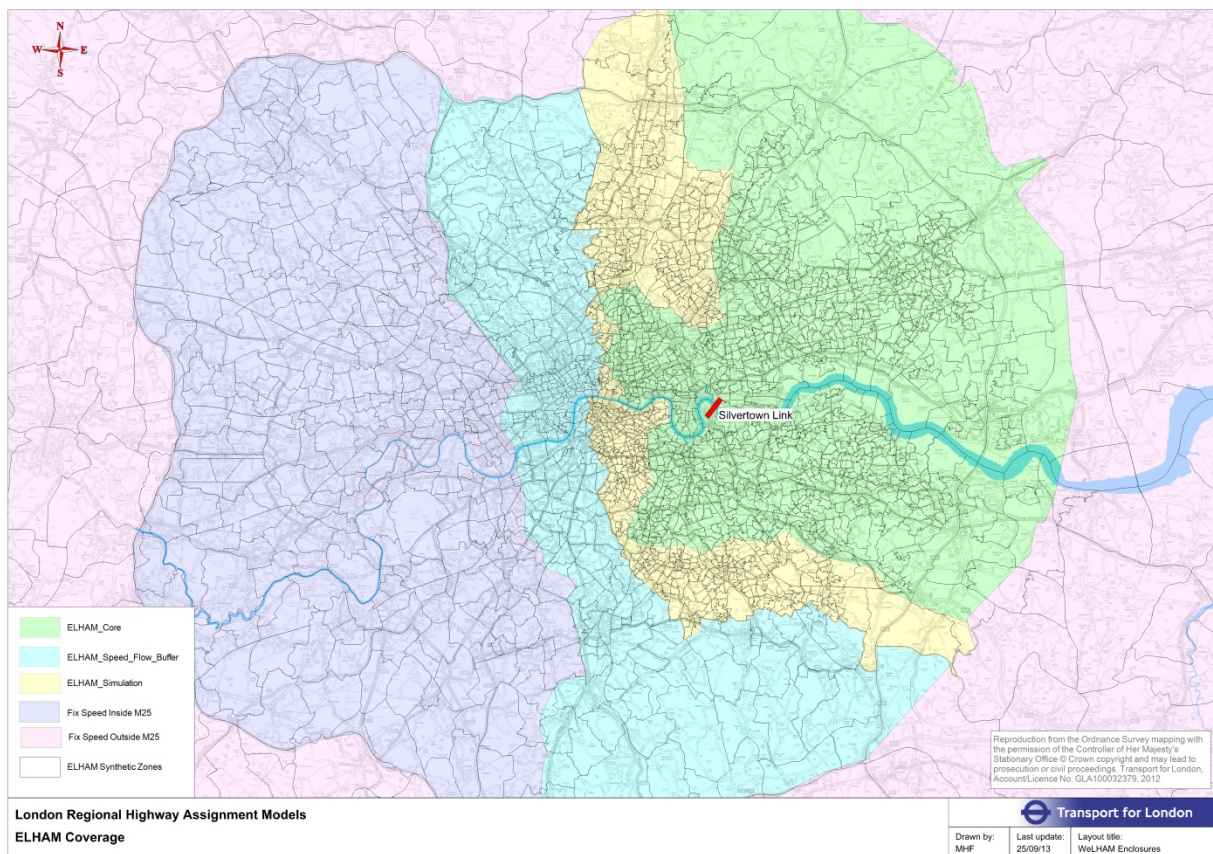
- Charges might only apply during certain hours of the day – for instance there might not be any charge at night when there is less traffic
- There could be different charges for different types of vehicle
- There could be discounts or concessions for individuals, organisations with a compelling case, or to incentivise people to become account-holders
- Drivers would be offered various ways of paying to ensure that paying charges was as easy and convenient as possible.

2.3.55 The user charging model 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 The London Regional Demand Model and the River Crossings Highway Assignment Model will be used to strategically assess the demand and assignment impacts of the Scheme. The extent of the modelled highway network is shown on Plate 2-1 below.

Plate 2-1 Traffic model extent



2.4.2 The results of this traffic modelling will then be used to inform specific environmental topic assessments. A more detailed VISSIM model has also

been created by Network Performance within TfL to assess the impact of the Scheme on the road network in more detail for a smaller area of interest. In order to ensure that the models are 'fit for purpose' to both TfL and the East London Boroughs, a separate consultant (SDG) has been appointed to review the River Crossings Highway Assignment Model. This review will be steered by the boroughs of Bexley and Newham (who represent the East London Boroughs) with support from TfL.

- 2.4.3 Forecast years tested in the model are 2021 and 2031 and a base year of 2012. Future year traffic flows will be extracted from the model for the purposes of the different environmental assessment topics, for example, air quality and noise and vibration.
- 2.4.4 Whilst the scenarios to be modelled and then assessed in the ES will be discussed and agreed with consultees it is currently anticipated that the following will be assessed:
- 2012 Base year (i.e. no Scheme and reflects the existing situation)
 - 2021 (Opening Year) Reference Case (i.e. Do Minimum without the Scheme and to include the schemes in para 2.4.7-2.4.10 below).
 - 2021 (Opening Year) - Do Something (Silvertown and Blackwall charged which will also include all of the schemes included in the Reference Case)
 - Design Year 2036 Do Minimum (without the Scheme and to include the schemes in para 2.4.7 - 2.4.10 below).
 - Design Year 2036 – Do Something (Silvertown and Blackwall charged which will also include all of the schemes included in the reference case)
- 2.4.5 Traffic models are being prepared for the base year 2012, 2021, 2031 and 2041 and the data required for the environmental assessments will be interpolated from these models where required.
- 2.4.6 The opening year is currently forecast to be 2021. The programme will be reviewed prior to final traffic modelling to ensure a realistic opening year is modelled.
- 2.4.7 The traffic scenarios to be assessed in the ES do not include the Woolwich Replacement scheme, as it is not yet known what form this would take.
- 2.4.8 There are three main sets of changes from the 2012 base in the reference network structure, namely a scheme on A206 Woolwich Road, the Stratford area post-Olympic Games and changes to the operation of the Dartford crossing.
- 2.4.9 The junctions of the A206 Woolwich Road/ Gallions Road and Gallions Road/ Bugsby's Way have been converted from priority control to signal control as a result of a new supermarket, with signal staging taken from the development's Transport Assessment documentation.
- 2.4.10 The road network in the Olympic Park area of Stratford changes significantly from 2012 with the addition of many new links for through traffic. Plate 2-2 below shows the new links included in the reference case network. Plate 2-3

shows the revised bus routes through the area which have been included in the reference network.

Plate 2-2 Stratford Area Changes (Source: Mott Macdonald)

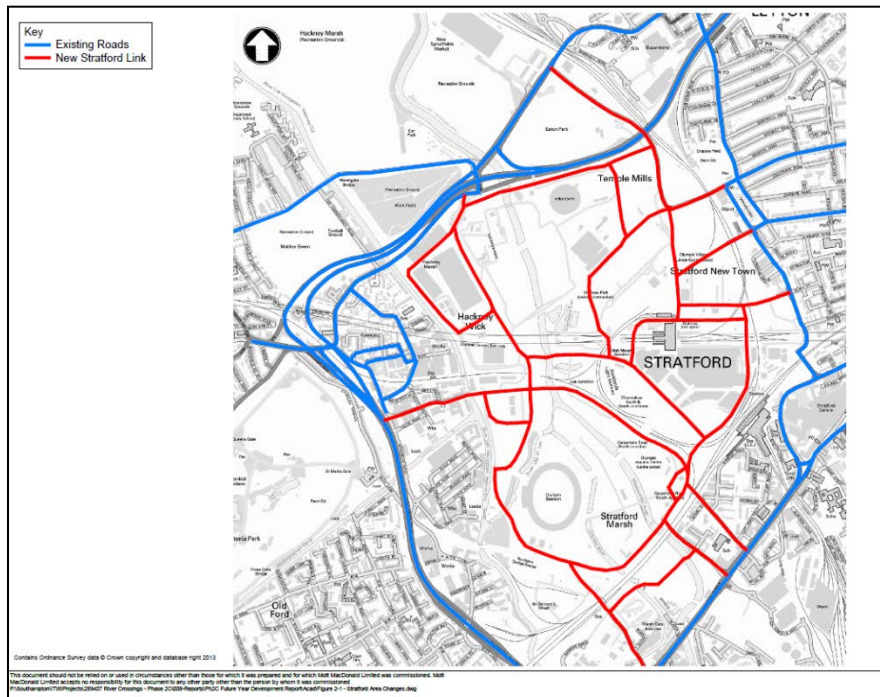
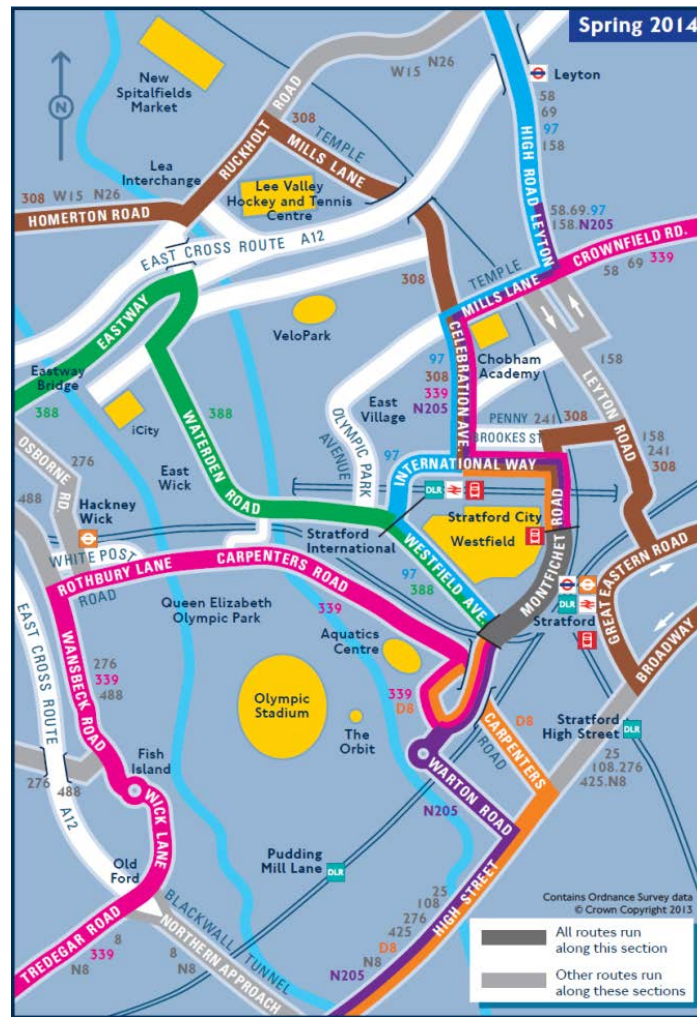


Plate 2-3 Stratford Area bus route revisions



- 2.4.11 The reference networks further include increases to the capacity of the Dartford crossing due to the introduction of free-flow electronic tolling i.e. removal of the toll booths. Revised capacities of 6687 pcu/hr southbound and 5900 pcu/hr northbound have been coded which is consistent with the DfT’s M25 modelling of the scheme for the Lower Thames Crossing Project.
- 2.4.12 There is an ongoing review of the schemes included in the strategic traffic models. Any additional scheme designs which are likely to have a significant impact on traffic flows will be included in the strategic models upon the completion of the review.
- 2.4.13 Population and employment forecasts included within the models will reflect forecasts produced by the Greater London Authority which underpin the “Draft Alterations to the London Plan”, these will be open to public scrutiny in Summer 2014 via an examination in public of the document. As such these forecasts will provide the basis for all central forecasting work. At a future point sensitivity tests will need to be conducted which reflect the full development aspirations in the London Thames Gateway, once these employment and population aspirations have been defined TfL will be able to test the impact of them on traffic flows using TfL’s strategic models.

- 2.4.14 Regarding scheme user charging, work is underway to create a spreadsheet based tool that will be used to test the broad traffic and revenue impacts of various combinations of potential charges for use of the crossing. Once shortlisted user charging regimes have been developed, these will then be tested in TfL's main strategic models to provide a more detailed understanding of the traffic impacts involved.

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.
- 2.5.2 Within this Scoping 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 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 reflecting iterative working 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 206 weeks. 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 the existing highway interface.
- 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.
 - Disruption to the strategic traffic route through the Blackwall Tunnel
 - Local connections particularly access to the O2 Arena.
 - 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 driven from Silvertown to Greenwich, rotation of the tunnel boring machine at Greenwich to reverse its direction and 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 driving of the tunnel boring machine as it has more space, can be readily serviced by barge or by road for delivery of segments and spoil removal by ship. There are constraints associated with the DLR viaduct and the Cable Car north immediate tower but these could be effectively managed.
- 2.6.6 The current construction programme assumes that some enabling works would commence during 2016/2017 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.

3 The Consideration of Alternatives

3.1 The Alternatives Considered

3.1.1 In December 2012 an Options Assessment report was produced for the river crossings. This outlined that the river crossings programme seeks to address problems across a long section of the Thames in east/south east London. The following investment criteria were also defined that the preferred options needed to address:

- The imbalance between highway network capacity and demand around the Blackwall Tunnel, which results in significant congestion;
- The unreliability of the Blackwall Tunnel, and the limited ability of the surrounding road network to cope with incidents when they occur; and
- The possibility that the Woolwich Ferry may be withdrawn from service due to the condition of the asset, which would significantly reduce connectivity in the area. In assessing options for addressing this issue, consideration should be given to means of reducing current and future impacts of crossings on the road network.

3.1.2 Four main options 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)

3.1.3 The above groups of options were then subdivided into more specific options:

- Option A – Do Nothing (assumes that the Blackwall Tunnel continues to operate and that the Woolwich Ferry is retained and closed by 2024)
- Option B1: Congestion charging at Blackwall
- Option B2: DLR extension to Eltham/Falconwood
- Option C1: Silvertown Ferry Crossing
- Option C2: Woolwich Ferry Crossing (the current ferry location, and effectively the “Do Minimum”)
- Option C3: Gallions Reach Ferry Crossing
- Option D1: Third Blackwall bore
- Option D2: Silvertown lifting bridge
- Option D3: Silvertown bored tunnel
- Option D4: Silvertown immersed tunnel
- Option D5: Woolwich lifting bridge
- Option D6: Woolwich tunnel
- Option D7: Thames Gateway Bridge

- Option D8: Local bridge at Gallions Reach
- Option D9: Local immersed tunnel at Gallions Reach

3.1.4 These options were subject to the following level of appraisal:

- The options were tested against the “expected outcomes” set out in the MTS, using the Strategic Assessment Framework (SAF)³. SAF uses a scoring framework ranging from strong negative impact to strong positive impact.
- The options were tested against specific programme objectives

3.1.5 Based upon the appraisal 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
- A new local road bridge or tunnel at Gallions Reach (in conjunction with Silvertown tunnel)

3.1.6 Packages of the above options were then 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, for example, new infrastructure, as well as user charging to manage the effects of the generated traffic. The package identified as most closely meeting the Mayor’s policies and the investment criteria was the one comprising package B:

- Silvertown Bored Tunnel
- Gallions Reach Ferry⁴
- User Charging at the Blackwall Tunnel (only with new infrastructure)

3.1.7 For further information regarding the options assessment refer to the Options Assessment Report (2012).

³ TfL has a duty to facilitate the implementation of the Mayor’s Transport Strategy in the most cost effective way and monitor its delivery. A Strategic Assessment Framework was, therefore, developed to introduce a consistent approach across TfL.

⁴ Separately from this Project, options for a ferry at Gallions Reach as well as tunnel, ferry and/or bridge crossing are therefore being considered at Woolwich, Gallions Reach and Belvedere

Silvertown Construction Options

3.1.8 The next stage of the design development process was to consider in further detail alternative construction options for the Silvertown Tunnel. The options considered were⁵:

- 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

3.1.9 The options were appraised to determine the potential environmental risks as well as the deliverability of each option from an environmental perspective.

3.1.10 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

3.1.11 The options study report (2013) also concluded that the environmental risks associated with the shortened options are higher than the long options due to 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:

⁵ River Crossings, Silvertown Tunnel Options Study, Hyder Consulting Ltd, November 2013

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

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

3.1.13 A bored Silvertown Tunnel, in conjunction with user charging at the Blackwall Tunnel is being progressed as a standalone scheme and will be the subject of a Development Consent Order. Further options are being considered in a separate study for a replacement of the Woolwich Ferry in view of the consultation responses received to date (refer to Section 2.1).

3.2 Development of the Preferred Scheme

3.2.1 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 views that will be raised during the upcoming consultation.

4 Consultation

4.1 Consultation Undertaken to Date

- 4.1.1 The consultations outlined below have been undertaken before formally preparing a Statement of Community Consultation (SoCC) in consultation with the relevant London Boroughs.

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. This consultation, for example, 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.

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 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
- 4.1.8 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.
- 4.1.9 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.
- 4.1.10 Further details of the consultation are documented in the River Crossings Consultation Report (April, 2013).

4.2 Environmental Statement Consultation

- 4.2.1 During the preparation of 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.

4.3 Future Consultation for the Development Consent Order

- 4.3.1 A non-statutory consultation event is planned for September 2014 to present the preferred Scheme. A high level environmental appraisal report that outlines baseline data collected and preliminary assessment results will be presented at this consultation event.
- 4.3.2 A statutory consultation event is planned for Summer 2015. A Statement of Community Consultation (SoCC) is in preparation and will be published as required under the Planning Act in advance of the statutory consultation. This will be prepared following the guidance in Advice Note 16 *The developer's pre application consultation, publicity and notification duties*.
- 4.3.3 A Preliminary Environmental Information Report will also be prepared for the statutory consultation in accordance with Planning Act requirements.

5 Environmental Impact Assessment Methodology

5.1 The EIA Process

5.1.1 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. In general terms, the main stages in the EIA are as follows:

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

5.2 The EIA Regulatory Context

5.2.1 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 NSIPs in the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 as amended by the Infrastructure Planning Environmental Impact Assessment (Amendment) Regulations 2012.

5.2.2 The Marine Works Environmental Impact Assessment Regulations 2007 as amended may also be relevant to the Scheme depending upon the requirement for a marine licence.

5.2.3 Amendments to the EIA Directive 2011/92/EU have been made, and the new Environmental Impact Assessment (EIA) Directive (2014/52/EU) entered into force on 15 May 2014. Although not yet transposed into UK legislation, the applicant will have regard to the changes of the new EIA Directive during the assessment of the Scheme.

5.2.4 Following a request from the Mayor, the Secretary of State for Transport confirmed that the Scheme is of national significance 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.

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

5.3 Consultation on the EIA Scoping Report

- 5.3.1 Consultation will be carried out by PINS in advance of adopting the scoping opinion. PINS has a duty under the Regulations to consult widely before adopting a scoping opinion. Providing no additional information is required, PINS will, within 42 days beginning with the date of receipt of a scoping request, adopt a scoping opinion and send a copy to the person who made the request.
- 5.3.2 PINS has prepared advice notes including Advice Note 3 and Advice Note 7 which relate to Scoping Opinion Consultation.
- 5.3.3 PINS will take the consultation responses received into account in adopting a scoping opinion. In addition, TfL / Hyder Consulting (UK) Ltd will consult with appropriate bodies as the EIA progresses in order to obtain views on the Scheme, discuss mitigation and to obtain information relating to constraints as appropriate.
- 5.3.4 The ES will demonstrate consideration of the points raised by statutory consultees and provide a table summarising their scoping responses and how they are considered in the ES.

5.4 The Design Manual for Roads and Bridges

- 5.4.1 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. The DMRB and IANs are published by the Department for Transport.
- 5.4.2 Volume 11, Section 2, Part 1, *General Principles and Guidance on Environmental Impact Assessment* outlines the approach to assessment that may be relevant dependent upon the potential environmental effects and the stage of the project. The assessment levels are: scoping, simple assessment and detailed. These levels are not intended to be sequential, but consequential. The different levels of assessment are defined further below:
- Scoping – this stage is used to define the scope of the assessment (and is the purpose of this Scoping Report). This establishes the need for further assessment and whether some environmental topics or issues within topics can be excluded from further assessment.
 - Simple Assessment – This level of assessment is typically based on the assembly of data and information that is readily available. The Simple Assessment fulfils one of three functions:
 - To address potential aspects identified at the scoping level

- To reach an understanding of the likely environmental effects to inform the final design or assessment
- To reach an understanding of the likely environmental effects that identified the need for a Detailed Assessment

The Simple Assessment would be sufficient if it established confidently that the forecast environmental effect would not be a fundamental issue in the decision-making process.

- Detailed Assessment – These assessments are likely to require detailed field surveys and/or quantified modelling techniques. Detailed assessments would be undertaken where there is the potential to cause significant effects on environmental resources and receptors. The objective of this level of assessment is to gain an in-depth appreciation of the beneficial and adverse effects of the project.

5.4.3 Volume 11, Section 1, Part 1 of the DMRB supplemented by IAN 125/09 Supplementary guidance for users of DMRB Volume 11 'Environmental Assessment' identifies the topics the scoping of the EIA should consider:

- Air Quality
- Noise and Vibration
- Nature Conservation
- Landscape
- Cultural Heritage
- Geology and Soils
- Materials
- Effects on All Travellers
- Community and Private Assets
- Road Drainage and the Water Environment
- Combined and Cumulative Effects

5.4.4 For each environmental topic a different level of assessment may be appropriate.

5.4.5 Some of the above topics are 'new' and combine previous environmental topics included within Volume 11 of the DMRB. This includes the 'Community and Private Assets' topic that combines elements of the former Land Use topic with elements of the former 'Pedestrians, Cyclists, Equestrians and Community Effects' topic. The topic 'Effects on All Travellers' combines the former Vehicle Travellers and relevant parts of the Pedestrians, Cyclists, Equestrians and Community Effect. Guidance is not available for either of these topics and, therefore, the methodology draws upon the previous guidance and professional judgement.

5.4.6 Guidance for the new 'Materials' topic is provided in IAN 153/11 *Guidance on the Environmental Assessment of Materials*.

5.5 Study Areas

- 5.5.1 The study areas for each environmental topic are defined in Sections 6.3 to 6.13. 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.

5.6 Baseline Data Gathering

- 5.6.1 The baseline environment needs to be defined to allow the assessment of changes that would be caused by the Scheme. For the assessment of environmental effects the baseline needs to be the situation immediately before the implementation of the Scheme. Therefore, the identification of the baseline requires the description of the existing situation and then a prediction of how it is likely to change in the absence of the Scheme which is often referred to as the 'future baseline'.
- 5.6.2 The definition of the baseline for each environmental topic will also be affected by the assessment scenario that needs to be reported (refer to Section 5.7 below).
- 5.6.3 The description of the baseline conditions should clearly identify receptors that may be affected by the Scheme and also their 'value' or 'sensitivity' to potential change.

5.7 Assessment of Effects

Defining Assessment Years, Scenarios and Phases

- 5.7.1 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.
- 5.7.2 Dependent upon the topic, the effects need to be assessed for the Do-Minimum and Do-Something scenarios in the baseline year and a future assessment year or a series of future assessment years (for example 15 years after opening, or the worst year in the first 15 years of operation).
- 5.7.3 The ES will assess the construction and operational effects of the Scheme. It will have a design life of 120 years. Decommissioning of the Scheme will be addressed in the Scheme Description of the ES. This will outline how the Scheme will be designed to maximise the scope for materials re-use in the event of decommissioning as well as considering the design life and maintenance requirements of the Scheme design. In view of the long design-life, it is not considered appropriate for this to form part of each environmental topic assessment, rather the focus will be upon seeking to minimise disruption and to re-use materials that will also form part of the Materials assessment.

Identifying Potential Impacts

5.7.4 Schedule 4 to the EIA Regulations requires: “A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:

(a) the existence of the development

(b) the use of natural resources;

(c) the emission of pollutants, the creation of nuisances and the elimination of waste;

and the description by the applicant of the forecasting methods used to assess the effects on the environment”.

Assessing Significance

5.7.5 The significance of an environmental effect is a function of the ‘value’ of the receptor and the ‘magnitude’ or ‘scale’ of the impact.

5.7.6 Volume 11, Section 2, Part 5 HA 205/08 ‘Assessment and Management of Environmental Effects’ of the DMRB, provides advice on typical descriptors of environmental value, magnitude of change and significance of effects. Tables 5-1 to 5-4 reproduce these descriptors and demonstrate how the significance of effect category can be derived.

Table 5-3 Environmental Value (or Sensitivity) and Typical Descriptors

Value (Sensitivity)	Typical Descriptors
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low (or Lower)	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Table 5-4 Magnitude of Change and Typical Descriptors

Magnitude of Change	Typical Criteria Descriptors
Major	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive

Magnitude of Change	Typical Criteria Descriptors
	restoration or enhancement; major improvement of attribute quality (Beneficial).
Moderate	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Minor	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

5.7.7 Table 5-3 demonstrates how combining the environmental value of the resource or receptor with the magnitude of change produces a significance of effect category.

Table 5-5 Arriving at the Significance of Effect Category

Magnitude of Change	Value / Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Major	Very Large	Large / Very Large	Moderate / Large	Moderate	Slight
Moderate	Large / Very Large	Moderate / Large	Moderate	Slight	Neutral
Minor	Moderate / Large	Moderate	Slight	Neutral	Neutral
Negligible	Slight	Slight	Neutral	Neutral	Neutral
No Change	Neutral	Neutral	Neutral	Neutral	Neutral

5.7.8 The DMRB recognises *“the approach to assigning significance of effect relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations. For some disciplines, predicted effects may be compared with quantitative thresholds and scales in determining significance. Assigning each effect to one of the five significance categories enables different topic issues to be placed upon the same scale, in order to*

assist the decision-making process at whatever stage the project is at within that process”.

5.7.9 Table 5-4 illustrates how the DMRB describes the significance of effect categories. In arriving at the significance of effect, the assessor will also consider whether they are direct, indirect, secondary, cumulative, short, medium or long-term, permanent or temporary, positive or negative.

Table 5-6 Descriptors of the Significance of Effect Categories

Significance Category	Typical Descriptors of Effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

5.7.10 Not all of the environmental topics will use the above criteria or approach. For example, some topics do not use a matrix based approach, instead using numerical values to identify impacts (for example, Noise and Vibration), or some topics do not have agreed methods of assessment or scales of measurement for either value or sensitivity (for example, Geology and Soils). Therefore, each environmental topic specialist will use the information provided above, their topic specific guidance as well as their professional judgement to assess the significance of effects.

5.7.11 Further details of the topic specific significance criteria that will be used in the ES are discussed in Sections 6.3 to 6.13 and presented in Appendix B.

5.7.12 In addition to the above assessment process, the Regulations require an assessment of what effects would be considered ‘significant’ in terms of the Regulations. This assessment will be based on professional judgement, and the reasoning behind such assessment will be clearly outlined in the ES.

5.8 Mitigation Measures, Enhancements and Residual Effects

5.8.1 Mitigation of adverse environmental effects will be an iterative part of the Scheme development following the hierarchy below:

- Avoidance – incorporate measures to avoid the effect, for example, alternative design options or modifying the Scheme programme to avoid environmentally sensitive periods)
- Reduction – incorporate measures to lessen the effect, for example, fencing off sensitive areas during construction, use of a Construction Environmental Management Plan (CEMP).
- Compensation/Remediation – where it is not possible to avoid or reduce a significant effect then offsetting measures should be considered, for example the provision of replacement of habitat to replace that lost to the Scheme.

5.8.2 There may be a requirement for a range of mitigation measures and as the Scheme develops they will be discussed with statutory consultees and third parties. Only those mitigation measures that are either a firm commitment or likely to be delivered will be considered in the assessment.

5.8.3 There may also be scope for enhancement measures to be delivered through the Scheme that may not be targeted at a specific adverse environmental impact. These should be identified as beneficial impacts of the Scheme.

5.8.4 Impacts that remain after mitigation are referred to as residual impacts. The assessment of the significance of the residual effects after mitigation /enhancement is therefore the key outcome of the EIA.

5.9 Assessment of Cumulative Effects

5.9.1 Cumulative effects are the result of multiple actions on environmental receptors or resources. There are principally two types of cumulative impact:

- The combined action of a number of different environmental topic specific impacts upon a single resource/receptor.
- The combined action of a number of different projects, in combination with the project being assessed, on a single resource/receptor.

5.9.2 Further details on the scope of the cumulative effects assessment is provided in Section 6.13.

5.10 Health Impact Assessment

5.10.1 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 spring/summer 2014.

5.11 Habitats Regulations Assessment Screening

- 5.11.1 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.

5.12 Energy Strategy

- 5.12.1 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.

5.13 Sustainability Statement

- 5.13.1 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 communicate the principles of 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.

6 Scope of the EIA

6.1 Environmental Topics to be Included in the ES

6.1.1 Based upon the Scoping exercise the following environmental topics will be included in the ES:

- 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

6.2 Topics to be Scoped Out Under EIA

6.2.1 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.

6.2.2 Whilst no other topics will be scoped out of the EIA there are elements of certain environmental topic assessments 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 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. 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 following consultation to confirm the absence of local geological sites from the study area.
- Materials - The potential environmental effects associated with the extraction and transport of primary raw materials, the manufacture of products and their subsequent transport to and use on construction sites will be scoped out of the assessment. This is consistent with the guidance in IAN 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. For this reason the assessment focuses on the use of materials in the Scheme itself.
- Townscape and Visual Assessment – 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, more lighting on the portals of the tunnel is likely to have a negligible effect and an assessment of these effects is not anticipated to be required; however this will be reviewed as the Scheme progresses.

6.2.3 The following sections provide details of the scope of each environmental topic.

6.3 Air Quality

Table 6-7 Scope of the Air Quality Assessment

Item 1 - Consultations – undertaken and proposed
<p>Consultations will be undertaken with Officers responsible for air quality in those local authorities that could be affected by the Scheme. At present, the air quality study area is unknown; however impacts are not expected outside the area covered by the Applicant’s East London Highway Assignment Model (ELHAM), which is to be used to generate the traffic data for use in the air quality assessment. The following local authorities are located within the boundary of the ELHAM and as a result will be consulted for baseline data for use in the air quality assessment:</p> <ul style="list-style-type: none"> ▪ The City of London ▪ 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
- Essex County Council
- Hertfordshire County Council
- Kent County Council
- Sevenoaks District Council
- Thurrock Council

In addition, Natural England will be consulted for the locations of designated sites that are nitrogen-sensitive that could be affected by the Scheme.

Item 2 - Baseline information obtained/surveys undertaken (refer to Figure 6.1 in Appendix A)

Air Quality Management Areas (AQMAs)

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 Air Quality Management Area (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.

Locations of AQMAs as of April 2013 have been obtained from the Department for Environment, Food and Rural Affairs (Defra). Those AQMAs that have been designated within the boundary of the ELHAM model are presented in Table 1.

Table 1 – Designated Air Quality Management Areas

Local Authority	AQMA ID	Authority-wide?	NO₂	PM₁₀
Bromley Council, London Borough of	Bromley AQMA	n	1	
Hackney, London Borough of	Hackney AQMA	y	1	1
Dartford Borough Council	Dartford AQMA No.2		1	
Bexley, London Borough of	Bexley AQMA	y	1	1
Sevenoaks District Council	AQMA No. 8 (Swanley Town Centre)		1	
Sevenoaks District Council	AQMA No.4 (A20(T))		1	
Dartford Borough Council	Dartford AQMA No.3		1	
Dartford Borough Council	Dartford AQMA No.4		1	
Havering, London Borough of	Havering AQMA	y	1	1
Dartford Borough Council	Dartford AQMA No.1		1	1
Newham, London Borough of	Newham AQMA	y	1	1
Gravesham Borough Council	Northfleet Industrial Area AQMA			1
Thurrock Council	Thurrock AQMA		1	1
Waltham Forest, London Borough of	Waltham Forest AQMA	y	1	1
Corporation of the City of London	City of London AQMA	y	1	1
Lewisham, London Borough of	Lewisham AQMA		1	1
Southwark, London Borough of	Southwark AQMA		1	1
Greenwich, London Borough of	Greenwich AQMA	y	1	1
Tower Hamlets, London Borough of	Tower Hamlets AQMA	y	1	1
Redbridge, London Borough of	Redbridge AQMA	y	1	1
Brentwood Borough Council	Brentwood AQMA No.1		1	
Brentwood Borough	Brentwood AQMA		1	

Council	No.2			
Barking and Dagenham, London Borough of	Barking and Dagenham AQMA	y	1	1

It is unlikely that all of the AQMAs detailed above would be affected by Scheme.

Air Quality Focus Areas (AQFAs)

AQFAs are areas identified by TfL and 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.

Those AQMAs, AQFAs and designated sites within 5km of the Scheme are shown in Figure 6.1 in Appendix B.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated

Traffic Data

Traffic data will be obtained for the base year of 2012, 2021, 2031 and 2041. The data required for the environmental assessments will be interpolated from these models accordingly. Traffic data will be required for each link within the ELHAM model for the following parameters:

- Annual Average Daily Traffic (AADT)
- Heavy Duty Vehicles (HDV) percentage (of the AADT)
- Traffic Speeds of the AADT (kph)
- Total vehicle flow for the AM (07:00-10:00), Inter-peak (IP) (10:00-16:00), PM (16:00-19:00), and off-peak (OP) (19:00-07:00) periods
- Percentage HDV of each of the AM, IP, PM, and OP periods.
- Average traffic speed of each of the AM, IP, PM, and OP periods.
- Link lengths and type.

Traffic data will also be obtained for the construction phase to determine whether the impacts of construction vehicles are likely to be significant on air quality. The traffic data will be required in AADT format as outlined above. It is not considered necessary that the traffic profiles for the various periods will be required to assess the construction impacts.

Local fleet composition and emissions rates will be accounted for by selecting the most appropriate parameters for the assessed area in Defra’s Emission Factor Toolkit (EFT v5.2c). The EFT uses NOx emission factors taken from the European Environment Agency COPERT 4 (v8.1) emission calculation tool. Emission Factors for PM10 and regional pollutants are those published by DfT (2009). These are combined with information from TfL and the National Atmospheric Emissions Inventory (NAEI) on fleet composition on different road types, in order to calculate emissions on a particular section of road.

Extent of the Construction Works

A list of the location and types of construction to be carried will be obtained to inform the construction dust assessment.

Tunnel

The Silvertown Tunnel Report by Mott McDonald (2013) concluded that the best means of ventilating the Silvertown Tunnel was by evacuating emissions using 25m ventilation stacks at either end of the tunnel. The assessment also notes that ventilation stacks and portals could not be used concurrently to evacuate tunnel emissions. Assuming that the conclusions and recommendations of the tunnelling report are to be taken forward, final information will be required on the tunnel and the confirmed means of ventilation. The following needs to be confirmed:

- Whether a ventilation option has been finalised as per Mott McDonald's recommendation.
- If so, the location and dimensions of any ventilation shafts need to be confirmed (XY coordinates and m²).
- Air flow if the tunnel is to be mechanically ventilated for the portals and ventilation shafts (m³/s).

Property count information

An address layer 2 (AL2) GIS dataset will also be obtained. This data request will be made once the study area has been defined. Additionally the location and extent of future land use changes in the vicinity of the Scheme needs to be defined. Initial scoping has suggested that there is a significant amount of proposed development which would require consideration in an air quality assessment.

Compliance Assessment

To determine whether the Scheme has an impact on compliance with the European Union (EU) Directive, Defra's road network used for submission to the EU Commission will be obtained from Ricardo-AEA, including the Pollution Climate Mapping (PCM) total NO₂ concentrations for the latest reported year and reference years 2015, 2020, 2025 and 2030 projection.

Air Quality Monitoring Data

The local authority monitoring data were collected to determine whether any additional air quality monitoring would be required. An additional monitoring campaign is being undertaken for a twelve month period using nitrogen dioxide (NO₂) diffusion tubes collocated with a suitable automatic analyser. The location of the air quality monitoring tubes is presented in Appendix C.

Additional monitoring of PM₁₀ is not considered necessary, the baseline NO₂ monitoring can be used to provide the additional information necessary to verify the air quality model.

Item 4 - Key Environmental Receptors and their Value

DMRB Volume 11, Section 3, Part 1 *Air Quality* (HA 207/07)) does not provide a method for assessing the 'value' or 'sensitivity' of receptors. In effect, the guidance considers all residential properties to be sensitive because of the potential for regular exposure of individuals to poor air quality. Areas away from residential properties are therefore not considered to be sensitive with the exception of those non-residential properties where vulnerable members of the population such as children, the elderly and infirm are likely to be regularly exposed. Key environmental receptors likely to be affected by the Scheme will be identified once the study area is defined (refer to Item 5). However, the

approach to be adopted suggests that all receptors within 200m of affected roads (see Item 5) will be assessed for each of the traffic scenarios that are provided.

In addition to the land use types detailed above, the impact of the Scheme to ecological receptors will be assessed. The following ecological designations are recommended for assessment in terms of nitrogen deposition in DMRB Vol 11, Section 3, Part 1 HA

207/07 Air Quality

- SAC
- SPA
- Sites of Special Scientific Interest (SSSI)
- Ramsar sites

Figure 6.1 in Appendix A shows the location of those ecological sites within 5km of the proposed Scheme which are the most likely to be adversely affected by the Scheme. However, depending upon the extent of traffic changes that occur as a result of the Scheme there may be other sites that need to be identified and considered in the assessment.

Item 5 - Study Area for the EIA

Local Air Quality Assessment

A 200m study area around the potentially affected highway network is proposed for air quality impacts associated with road traffic for both the construction and operation phases. The assessment will take into account any affected roads which meet any of the following criteria, as outlined in DMRB Volume 11, Section 3, Part 1 HA 207/07 Air Quality:

- Road alignment will change by 5 m or more
- Daily traffic flows will change by 1000 AADT or more
- Heavy Duty Vehicle flows will change by 200 AADT or more
- Daily average speed will change by 10 km/hr or more
- Peak hour speed will change by 20 km/hr or more

Regional Assessment

The study area for regional air quality assessment 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 (AADT 24)
- A change in daily average speed of more than 20km/hour

Construction Assessment

A 200m study area extending from the location of any construction/demolition activities is proposed for the construction dust assessment.

Assessment of Tunnel

Emissions associated with the ventilation stacks will be modelled in the dispersion model, the impact of the emissions on receptors will define the extent of the modelled study area.

Item 6 - Methodology (including any relevant software)

The air quality assessment will be undertaken in accordance with DMRB Volume 11,

Section 3, Part 1 (HA207/07) *Air Quality*.

National Legislation

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 which are applicable to this assessment (NO₂ and PM₁₀) are presented in Table 2.

The key traffic related pollutants are *nitrogen dioxide (NO₂) and particles (PM₁₀) in relation to human health and oxides of nitrogen (NO_x) in relation to vegetation and ecosystems*, AQMAs within the study area have been designated for exceedances of the AQS objectives/EU Limit Values for these pollutants. In relation to other pollutant's emitted from vehicles they are not considered to be at risk of exceeding their respective AQS Objectives/EU Limit values and therefore will not be considered,

Table 2: 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	200 µg.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
	40 µg.m ⁻³	annual mean	31 December 2005	40 µg.m ⁻³	1 January 2010
PM ₁₀	50 µg.m ⁻³	24-hour mean (not to be exceeded more than 35 times per year)	31 December 2010	50 µg.m ⁻³ (35 Exceedences)	January 2005 (June 2011*)
	40 µg.m ⁻³	annual mean	31 December 2004	40 µg.m ⁻³	1 January 2005

*Extension was granted to comply with Directive to 2011

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.

Compliance with Limit Values

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 nitrogen dioxide (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.

Local Air Quality Assessment

The extent of the study area will depend on the number and location of roads that are likely to be affected by the proposals. 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 accordance with DMRB HA207/07 and the latest interim advice notes (IAN) *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)*.

Five years of baseline monitoring data will be collected to confirm that the trend in monitored concentrations is consistent with the advice outlined in IAN 170/12.

The assessment will consider worst case sensitive receptor locations within 200m of affected routes. Modelling predictions will be compared against UK AQS objectives / EU Limit Values as appropriate.

Modelling will be undertaken using ADMS Roads. Modelled pollutant concentrations calculated using base year (2012) traffic data are to 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). 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

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.

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.

Following advice from Defra (2012) the background NO_x and NO₂ concentrations will be reduced by 15% to account for 2010 being an unusually high year in relation to the trends in background concentrations.

Construction Assessment

During the construction phase, there is the potential for air quality impacts associated with fugitive dust emissions. These would be assessed using methodologies detailed in the following documents:

- Institute of Air Quality Management (IAQM, 2014) *Guidance on the assessment of the impacts of Construction on Air Quality and the Determination of their Significance*,
- Mayor of London (2013), Sustainable Design and Construction Supplementary Planning Guidance (SPG) Draft,
- the London Councils' Guidance 'The Control of Dust and Emissions from Construction and Demolition' (November, 2006). If required, mitigation measures will be proposed using the Buildings Research Establishment's Guidance 'Control of Dust from Construction and Demolition Activities' (February, 2003).

Ecological Assessment

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

If any of the affected roads overlap with those identified in Defra's PCM model, then a compliance risk assessment would be carried out as per the methodology set out in HA IAN 175/13. The purpose of the assessment is to ascertain whether the proposed Scheme represents a risk to possible compliance with EU Directive (2008/50/EC).

Regional Assessment

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

Tunnel Emissions

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.

Item 7 - Significance Criteria

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 B1 to B3 in Appendix B.

Item 8 - Description of possible significant effects on receptors

The Scheme has the potential to significantly impact on traffic flows and hence change emissions on the local road network. The study area contains a large number of AQMAs and therefore the baseline air quality is likely to be poor and exceeding AQS Objectives/EU Limit Values. There are likely to be both improvements in air quality and deterioration in air quality at receptors as a result of the change in traffic flows as a result of the Scheme. The study area will be defined by the change in traffic flows as a result of the Scheme as described in Item 5, sensitive receptors within 200m of these roads will be considered to determine the impact of the Scheme on air quality.

Item 9 - Potential Mitigation Measures

The impacts of the Scheme will 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.

Ventilation of the tunnel can be designed in order to mitigate any significant impact on receptors (for example increased stack height would aid dispersion).

The construction impacts particularly construction dust will be mitigated in accordance with best practice with the measures documented in a CEMP.

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

Odour

Odour is an issue which is usually associated with other pollutants (such as Bioaerosols) than those emitted by traffic. *Odour Guidance for Local Authorities* (Defra, 2009) lists the common sources of odour; none of those quoted are traffic related. Some odorous pollutants such as Hydrogen Sulphide are released by traffic, but in such small quantities that odour is a problem which is not usually associated with traffic-based air quality assessments.

As previously stated, guidance issued in *DMRB Volume 11, Section 3, Part 1 Air Quality* (HA 207/07) is typically used for undertaking highways-based air quality assessments but does not make any reference to the assessment of odour. Odour is not an issue that requires consideration as part of a highways-based air quality assessments. The CEMP will also detail measures to control any contaminated materials that are encountered during the construction works.

Item 11 - Assessment Period/Scenarios

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 and to provide modelled Base Year concentrations at receptors.
- Projected Base Year (2021) – Base year traffic data inputted into air quality tools as opening year – for purposes of gap analysis as per IAN 170/12 (see Item 6).

- Do-Minimum and Do-Something scenarios in the opening year (2021) of the Scheme and a future design year (2036),

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).
- The Do-Something scenario in the opening year and design year.

During the construction phase construction-related traffic will be assessed providing that the DMRB criteria cited in item 5 is met on one or more links. If the criteria are met an assessment of the impact of the construction traffic will be assessed in the worst case year.

The construction dust assessment does not require an assessment year or particular scenario in order to be completed.

Item 12 - Other relevant information

No other information is relevant to the scope of the assessment.

6.4 Community and Private Assets

Table 6-8 Scope of the Community and Private Assets Assessment

Item 1 - Consultations – undertaken and proposed

The GLA, London Boroughs of Greenwich, Tower Hamlets and Newham will be consulted to confirm community assets within the study area.

Item 2 - Baseline information obtained/surveys undertaken (refer to Figure 6.2 in Appendix A)

The northern portal lies in the London Borough of Newham. The current development plans for the area focus on the Silvertown Quays to the east of Silvertown Way for mixed residential and commercial development. Mixed residential and recreational land uses dominate around the perimeter of the Royal Victoria Docks and light commercial uses to the south of the elevated Silvertown Way and the DLR. 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.

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 with the O2 arena and commercial buildings located to the north west and a leisure facility to the south east. The majority of the land on the Peninsula is owned by 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. This is located in relatively close proximity of the highway realignment works.

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. The area is still classed as relatively deprived although it is likely to see significant population change as development continues.

Demolition and Private Property

The land required for the Scheme has been confined to the Scheme's safeguarded area (refer to Figure 6.2 in Appendix A). This includes Thames Wharf, Alexandra Wharf and Royal Victoria Dock to the north of the Thames and the area around Edmund Halley Way on the Greenwich Peninsula on the southern side of the Thames.

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.

Community Land

Areas of public open space are limited to Central Park on the Greenwich Peninsula, which has been designated as 'Metropolitan Open Land' (MOL). MOL is 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. MOL provides useful and attractive breaks in the built development and contributes to the green character of London. Essential facilities for appropriate uses will only be acceptable where they do not have an adverse impact on the openness of MOL.

There are also five parks/recreation grounds within 1km of the Scheme:

- Kier Hardie Recreation Ground
- Lyle Park
- Mudchute Farm
- Milwall Park
- St John's Park

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 (the Royal Docks) or elevated road and rail infrastructure (the Royal Docks and Lea Park/East India Dock basin). Central Park is relatively quiet partly due to the vacant development plots adjacent and low traffic levels during the day.

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

The following medical facilities lie within 1km of the Scheme:

- Island Medical Centre
- PSU Surgery

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

The only community centre within 1km of the Scheme is Island House Community Centre located on the Northern bank of the Thames in Tower Hamlets. There are two cinemas on Greenwich Peninsula, as shown on Figure 6.2 in Appendix A.

Land Allocated for Development

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.

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 (see Figure 6.2 in Appendix A).

The Newham Core Strategy (Newham Council, 2012) identifies areas for intensive development:

Silvertown Quays

This is a residential-led mixed use development of 2,500 homes but it also includes 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. Indicative residential typology - medium density, medium family. Work on the site is expected to start in 2014/15 with the first businesses opening in 2017.

Minoco Wharf (Royal Docks)

The release of land 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) will assist in the development of a new neighbourhood at West Silvertown. A new local centre should address North Woolwich Road providing a focus to the new neighbourhood as a whole and provide connections to both DLR stations, and pedestrian and cycle links to Silvertown Quays. Development should include pedestrian and cycle access to the river. Indicative residential typology – medium density, medium family.

Thames Wharf

Proposed release from Strategic Industrial Location. There is scope to reconfigure the safeguarded 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. Indicative residential typology - medium density, medium family. 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.

Royal Victoria West

New residential, leisure and cultural uses will be supported at this gateway site to the Royal Docks. The Siemens building and cable car link to Greenwich Peninsula were completed in 2012 providing new visitor attractions. Public realm improvements, including an enhanced pedestrian and cycle link to Canning Town, and active water space, are key priorities in this location. Indicative residential typology - medium density, low family.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated

A site visit will be required to confirm the land uses including community land as discussed above. Updated baseline mapping will be produced.

The requirement for any property demolition for the Scheme will be confirmed.

Information will also be gathered about future land use changes as described in Item 5 to inform the air quality and noise and vibration assessments.

A number of socio-economic studies have been prepared and they will be reviewed to help assess the impacts on existing businesses and future business investment in the area of the Scheme.

Item 4 - Key Environmental Receptors and their Value

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 Figure 6.2 of Appendix A. Community and Private Assets is a relatively new topic area and as such, formal guidance as to the value of key 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 from 'Pedestrians, Equestrians, Cyclists and Community Effects' and that on 'Land Use'. With this in mind, the significance of receptors for the purposes of this ES 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

Item 5 - Study Area for the EIA

For the purposes of collating baseline information to inform the preparation of this Scoping Report a study area of approximately 1km from the Scheme was used. This

study area is proposed for the assessment in the ES but will be reviewed in view of the traffic changes predicted for the Scheme (this is particularly relevant in relation to assessing community severance effects – refer to Item 6).

It is acknowledged that there is likely to be a significant amount of development in this part of London. Therefore, there would be a requirement for this topic assessment and the data gathered in relation to future development uses to feed into the air quality and noise assessments to enable the effects on these receptors to be understood. Future land uses will be identified within the relevant study areas of the air quality and noise assessments for the following:

- Schemes under construction
- Permitted Applications (but not yet implemented)
- Submitted application(s) not yet determined
- Projects on the National Infrastructure's Programme of Projects
- Projects Identified in the Relevant Development Plans
- Projects Identified in other Plans and Programmes where such development is likely to come forward

Item 6 - Methodology (including any relevant software)

In the absence of new guidance for this topic, the methodology will follow DMRB Volume 11, Section 3, Part 6 - *Land Use* as well as the Community Severance part of the Pedestrians, Cyclists, Equestrians and Community Effects section of DMRB (Vol 11, Section 3, Chapter 10, Part 8). The key elements of the assessment will be:

- Identify demolition of 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.

The impact assessment will also consider the socio-economic impacts on existing and new businesses in the area of the Scheme.

Item 7 - Significance Criteria

Within the DMRB guidance there are no specific methods for measuring the value or sensitivity of the community and private assets receptors, and there is no agreed scale against which they can be measured. Therefore, the potential significance of environmental effects will be determined using the criteria outlined in Tables 5-1 to 5-4 of this Scoping Report. The approach to assigning significance of effects will be based upon professional judgement.

Item 8 - Description of possible significant effects on receptors

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 assessment.

At present the land uses in the immediate vicinity of the Scheme mainly comprise derelict land and industrial premises. The allocated development as described in Item 2 will lead to a significant increase in development and subsequently population in the area. The programme for the Scheme will need to be considered in conjunction with the programmes and 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.

It is not currently expected that there will be any loss of open space as a result of the Scheme.

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 the existing footbridge which crosses the Blackwall Tunnel Approach in the vicinity of Boord Street (see Figure 6.2 in Appendix A).

There is the potential for levels of community severance to reduce as a result of improved traffic flows and reduced congestion.

The Scheme will have potential to support existing businesses and encourage new investment in the area.

Item 9 - Potential Mitigation Measures

A new footbridge will need to be constructed to replace the one to be demolished that crosses the Blackwall Tunnel approach. This will need to be designed in conjunction with future development plans for the Peninsula.

In the event of community land being lost to the Scheme this would need to be replaced.

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

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.

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.

Item 11 - Assessment period/Scenarios

The assessment will consider the construction and operation phases of the Scheme and will be undertaken for the Scheme opening year.

Item 12 - Other relevant information

Effects on land use and community assets relating to other environmental topics such as noise, visual amenity and air quality will be addressed in the respective topic-specific chapters of this EIA. These effects will only be reported in this chapter where a particular effect may be realised above and beyond the impacts identified in the topic specific chapters or where the effects may combine so as to affect the amenity value of properties, community infrastructure or private assets.

6.5 Cultural Heritage

Table 6-9 Scope of the Cultural Heritage Assessment

<p>Item 1 - Consultations – undertaken and proposed</p>
<p>Consultations will be carried out with the Archaeological Advisors to the London Boroughs of Newham and Greenwich. If appropriate, consultations will also be carried out with the English Heritage Inspector of Ancient Monuments. Information held by the Greater London Historic Environment Record (GLHER), the National Monuments Record (NMR) and if appropriate the London Archaeological Archive and Research Centre (LAARC).</p>
<p>Item 2 - Baseline information obtained/surveys undertaken (refer to Figure 6.3 in Appendix A)</p>
<p>For the purposes of this report data on the baseline Cultural Heritage resources has been gathered from the Heritage List for England and LAARC. This has been supplemented by a Ground Investigation desk study carried out at the application site by Mott MacDonald in May 2013.</p> <p>The application site has been in use since 1868 and has a legacy of industrial use. The two sides of the river have a similar industrial history. The northern part of the site encompasses the Royal Victoria Docks, including the historic Western Entrance to the docks which was closed in 1957. The docks are a key feature in the historic development of this area of London.</p> <p>The southern part of the site is also industrial in nature and was dominated by a gasworks until 1987. From the 1990s onwards redevelopment of the site included extensive remediation to make it suitable for residential, commercial and industrial uses. This area is now dominated by the O2 Arena.</p> <p>The study area is located in an area of East London which is known to have been heavily bombed during the Second World War (WWII).</p> <p>The Heritage List for England identifies 14 listed buildings within 1.5km of the application site. This includes a number of structures associated with the Royal Victoria Docks including warehouses, grain silos and a number of cranes on the dockside.</p> <p>Approximately 1.5 km to the south west of the application site is the boundary of the World Heritage Sites (WHS) of Maritime Greenwich and the Scheduled Greenwich Palace.</p> <p>LAARC identifies four archaeological investigations which have been carried out within approximately 500m of the application site. An evaluation on the site of the Greenwich Peninsula Hotel recorded peat deposits dating to the Neolithic and Bronze age.</p> <p>A geoarchaeological watching brief at the Victoria Deep Water Terminal also recorded a layer of peat overlain by a peaty soil. Struck flints were recovered from the interface of the soil and peat, which may be of Neolithic date since the bottom of the peat was radiocarbon dated to 4,330+/-70BP (3100-2870 BC). The peat was overlain by layers of made-ground. Tarry contamination, found in the lower levels of the made ground, is likely to relate to the use of the site from the 1840s by the Improved Wood Pavement Company who made coal tar-soaked wood blocks for paving, using the waste products of the gas industry.</p> <p>A watching brief to the south of the application site recorded 19th and 20th century made ground.</p> <p>Another watching brief to the north east of the application site recorded that river erosion,</p>

possibly in the Iron Age, has removed all earlier prehistoric deposits that may have existed in this area. This erosion could be the result of the confluence of the Rivers Thames and Lea moving west or south west of its original location, possibly as a result of changes in relative sea level or climatic deterioration. The area would have been suitable for grazing and was probably used as such in the medieval period and later. In the 1850s upcast from the excavation of the basin for the Royal Victoria Dock was deposited in this area and sealed the pre-Victorian land surface. This re-deposited alluvium was truncated in the 20th century by construction work for a boat yard and the Silvertown Way flyover. The findings of the previous archaeological investigations in the study area indicate that there is the 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.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated

As well as searches of the GLHER, NMR and LAARC the EIA will also draw on data and information gathered from a site walkover survey, a visit to the relevant archives and local studies library, a cartographic analysis and recent geotechnical information presented in the May 2013 Ground Investigation desk study carried out at the application site by Mott MacDonald.

In addition use will also be made of the results of the Townscape and Visual Impact assessment.

The Desk-based Assessment produced as part of the EIA may determine that further surveys are required to fully determine the significance of the heritage resource. The requirement for or exact nature of these surveys cannot be determined at this stage but they could include the following: photographic survey, measured survey, archaeological trial trench evaluation and/or geophysical survey (marine or terrestrial).

Item 4 - Key Environmental Receptors and their Value

The key environmental receptors comprise the following:

WHS Maritime Greenwich – Very High

SAM Greenwich Palace – High

Listed Buildings – Medium

Royal Victoria Docks – Medium

Archaeological potential identified by previous investigations – Medium to Low

Refer to Figure 6.3 in Appendix A for the location of the above receptors.

Item 5 - Study Area for the EIA

The study area will cover an area of 500m from the application site boundary for undesignated assets and 1km from the application site boundary for designated assets. It is considered that a study area of this size is appropriate to determine the potential for the Scheme to have a direct physical impact on heritage assets and to highlight any assets that may experience impacts to their setting without including large numbers of assets that are not relevant to the assessment. Where assets of particular significance are highlighted by consultees as being of relevance to the assessment but fall outside of the defined study area these will also be considered.

Item 6 - Methodology (including any relevant software)

As part of the EIA a Desk-based Assessment will be produced; this will form the baseline

of the ES. The ES will also contain an impact assessment. The impact assessment will follow the methodology set out in DMRB Volume II Section 3, HA208/07 *Cultural Heritage*.

The Cultural Heritage assessment will be undertaken in accordance with the 'Code of Conduct and Standards and Guidance for Archaeological Desk Based Assessments' of the Institute for Archaeologists. The study will also conform to the requirements of the National Planning Policy Framework.

Item 7 - Significance Criteria

Assessments of significance will consider how far heritage asset(s) contribute to an understanding of the Historic Environment, through their individual or group qualities, either directly or potentially. These are professional judgements, but they will be guided by legislation, national policies, acknowledged standards, designations, criteria and priorities. Where it has been appropriate to provide a summary of the significance of an asset, this will be done through a combination of professional judgement, applying information supplied by the NMR and the guidance set out in PPS5 Planning for the Historic Environment Practice Guide. Refer to Tables B4 to B10 in Appendix B.

Item 8 - Description of possible significant effects on receptors

A heritage asset will be determined to have experienced a significant effect when the asset can be described as having experienced substantial harm. Substantial harm will be quantified through a combination of the information derived from the significance of effects matrix as set out in DMRB Volume II Section 3, HA208/07, the guidance set out in PPS5 Planning for the Historic Environment Practice Guide and professional judgement.

Item 9 - Potential Mitigation Measures

Potential mitigation measures will include intrusive and non-intrusive surveys of archaeological, built heritage and historic landscape assets. These could include, but not be restricted to, archaeological excavation, archaeological watching brief, photographic survey, measured survey, building recording including internal and external inspection, remote sensing and diver or ROV survey of the riverbed.

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

At this stage there are no heritage impacts that have been scoped out of the EIA.

Item 11 - Assessment period

The assessment will cover the construction and operational phases.

Item 12 - Other relevant information

Should there be a requirement for in-river structures it may be necessary to assess potential impacts on heritage assets on the riverbed or in the river gravels although this is not currently envisaged.

6.6 Ecology and Nature Conservation

Table 6-10 Scope of the Ecology and Nature Conservation Assessment

Item 1 - Consultations – undertaken and proposed

No consultation has been undertaken to date, although existing ecological information has been reviewed regarding the key ecological issues and designations.

Consultation will be 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 will be 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.

Item 2 - Baseline information obtained/surveys undertaken

A high level desk study and review of aerial photographs has been undertaken to determine likely ecological issues associated with the proposals. In addition, a tunnel engineering report commissioned by the Applicant (Mott MacDonald, July 2013) along with a highway design report (Atkins, April 2013) have also been reviewed, as both include some ecological baseline analysis. An extended Phase 1 Habitat Survey has been undertaken in November 2013 and March 2014. This information has therefore been used to inform the baseline description provided below.

The application 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 two kilometres of one Local Nature Reserve (LNR) and 16 non-statutory Sites of Importance for Nature Conservation (SINC), none of these sites will be directly affected. 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)
- Greenwich Peninsula Ecology Park SINC (an area of freshwater habitat approximately 0.5km south east of the southern part of the application site)
- Bow Creek Peninsula Ecology Park SINC (an area of meadow, pond and stream habitat 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)

Whilst none of these sites will be directly affected, the EIA will need to assess whether or not the qualifying habitats and/or species could be affected indirectly by the proposals (e.g. through disturbance of birds using the mudflats or impacts on local water quality).

The area required for the construction of the southern (Greenwich) end of the Scheme largely comprises 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. All other areas of green space within the application site appear to comprise landscape planting of limited nature conservation value.

The northern part of the application site (located on the border between Tower Hamlets and Newham) is again dominated by industrial infrastructure of limited nature conservation importance, although there are small areas of semi-natural habitat within the application boundary. One comprises 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) appears to comprise a derelict post-industrial area of bare ground, ephemeral vegetation/grassland and scrub.

None of these areas of habitat are identified on the Greenspace Information for Greater London (GIGL) plans, and the site visits confirmed that they comprise of relatively poor quality habitat. However they have the potential for supporting protected species.

The extended Phase 1 Habitat Surveys confirmed that there were areas of Japanese Knotweed (Greenwich and Silvertown) and suitable habitat for notable invertebrates (Silvertown), nesting birds (Greenwich and Silvertown) and common species of reptiles (Greenwich and Silvertown). Habitat beyond Dock Road in Silvertown appeared suitable for foraging and nesting black redstart. The Scheme at Silvertown is directly adjacent to the river Thames. There is no saltmarsh vegetation in the study area; however there is a small amount of exposed mud at low tide suitable for wading birds. It is considered unlikely that 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.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated

The extended Phase 1 Habitat Survey confirmed the potential for the site to support notable invertebrates, nesting and foraging black redstarts, roosting bats and common species of reptiles. Further survey work will be required to determine if these species are present and inform the EIA as they are a material consideration in the planning process. 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.

Item 4 - European designated nature conservation sites

It is considered that no European sites will be affected by the proposals. The closest site is the Lee Valley SPA and Ramsar site which is approximately 8 km north west of the application boundary. Whilst it is possible that the Annex 1 birds associated with this site (shoveller *Anas clypeata*, gadwall *Anas strepera* and bittern *Botaurus stellaris*) may occasionally use the mudflats and other wetland features in and around the application site, it is not considered that these areas would represent an important part of their range. Similarly, whilst birds associated with the Thames Estuary & Marshes SPA and Ramsar site (the westernmost point of which is located approximately 15 km east of the application boundary) may also occasionally visit suitable habitats near to the application site, again it is not considered that they could be significantly be affected by the proposals.

Another European Site, Epping Forest SAC is located approximately 7km north of the Scheme. Again it is considered that there are no impact pathways that could lead to significant impacts upon the qualifying features of this site, which include Beech forest, heathland and the stag beetle *Lucanus cervus*.

It is thus considered that a HRA could be ruled out at the screening stage.

Item 5 - Key Environmental Receptors and their Value

It is currently considered that the Key Ecological Receptors are likely to be:

- 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 *Phoenicurus ochruros*
- Common species of reptiles

This assessment will need to be confirmed through the Phase 1 walkover survey and any subsequent surveys (if considered necessary), and on the basis of a more robust understanding of the likely impacts of the proposals.

Item 6 - Study Area for the EIA

The Chartered Institute of Ecology and Environmental Management (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.

For example, the hydrology of the area will need to be understood in order to determine whether or not any impacts on water quality could affect important freshwater or estuarine habitats downstream of the works. Whilst this is considered unlikely, the study area may need to include the River Thames and Tidal Tributaries SINC as well as the aquatic elements of the Greenwich Peninsula Ecology Park, Bow Creek Ecology Park, East India Dock Basin and the Royal Docks.

Similarly, the study area for wading birds (which could be affected by disturbance) may need to extend beyond the immediate foreshore mudflats on the north and south bank of the river, however the walkover survey determined that the extent of suitable habitat here was very limited and already subject to much visual and noise disturbance.

Item 7 - Methodology (including any relevant software)

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. The extended Phase 1 walkover survey, and any subsequent detailed surveys (as required), will be used to identify the distribution and condition/status of those habitats and species populations present within the zone of influence of the proposals and thus determine their ecological value. This information will be used to inform initial scheme design, with particularly valuable features (if any are present) avoided if at all possible in the Scheme layout.

Only those habitats and/or species considered to be of sufficient nature conservation value *and* which would be likely to be adversely affected by the proposals will be classified as Key Ecological Receptors for inclusion in the detailed assessment. The potential impacts upon these receptors will then be characterised in accordance with the CIEEM guidelines (i.e. extent, magnitude, reversibility, etc.) and an assessment will be made regarding whether or not these impacts will be significant with regard to the integrity of the relevant habitat or species population (refer to Appendix B for details of the assessment process). The geographic scale at which the impact will be significant will also be stated (e.g. significant at the local level, borough level, regional level, etc.). This will be important for decision-making, should it not be possible through mitigation design to avoid all significant impacts, as it will provide the geographical scale of any residual impacts.

Item 8 - Significance Criteria

The significance criteria that will be used for the assessment are presented in Appendix B.

Item 9 - Description of possible significant effects on receptors

The Scheme will involve tunnelling beneath the River Thames which is designated as the River Thames & Tidal Tributaries SIN. Given that the River Thames will not be directly affected by the tunnelling the Scheme is likely only to result in indirect effects on ecology within the River Thames from, for example, elevated noise levels or the risk of accidental spillages during construction. In general terms, the inter-tidal mudflats of the River Thames do support populations of wintering birds. However, surveys conducted by Mott MacDonald on the Greenwich Peninsula during winter 2010/2011 do not indicate that wintering birds are prevalent in this location.

Whilst the tunnel portals will be constructed in areas of land that are largely urban and are not particularly regarded as ecologically sensitive, the loss of the areas of scrub/ grassland and woodland habitat described under Item 2, above, could be significant in a district/borough context given the shortage of such habitat locally. This will especially be the case should the Phase 1 and further ecological survey work identify the presence of protected species or other habitats and species of nature conservation importance (e.g. bats, reptiles, nesting birds, rare plants and invertebrates).

In addition, the buildings within the application boundary could be used for nesting and foraging by Black Redstarts, especially given the presence of post-industrial scrubby ephemeral habitats nearby. The loss of such features could represent a significant impact upon the local population of this important species.

Item 10 - Potential Mitigation Measures

Wherever possible, and depending upon the results of the ecological survey work, it would be appropriate to retain as much as possible of the semi-natural habitat within the Scheme layout. Any scrub/woodland habitat that could not be retained will be cleared of trees and shrubs before the bird nesting season immediately prior to the construction of the works. Consideration would be given to incorporating similar habitat types within the design of the completed Scheme, in particular in those areas that would only be temporarily affected to facilitate construction of the tunnel (e.g. materials storage areas, site compounds, etc.).

Measures will be incorporated into the CEMP to ensure that there would be no significant impacts on nearby aquatic habitats associated with sedimentation or pollution (including the River Thames itself and the nearby SINs designated for their freshwater habitats and species). Should reptiles be recorded during the surveys, these will be captured and relocated to an appropriate receptor site prior to works commencing. Similarly, should the surveys identify the presence of bat roosts within any of the trees or buildings that will be lost under the footprint of the Scheme, these will be felled/demolished under licence and alternative roosting and foraging habitat provided.

Should Black Redstarts be found to be present within the application boundary, it would be necessary to mitigate for the loss of foraging and/or nesting habitat within the Scheme design, potentially including green/brown roofs and the provision of areas of scrub/bare ground/grassland mosaic.

Item 11 - Aspects/impacts scoped out of the EIA (including justification)

The CIEEM Guidelines requires the assessment to 'scope out' receptors at an early stage to allow the assessment to concentrate on those ecological receptors that are considered

to be 'key' (i.e. those ecological resources that are considered could experience significant effects – that is, those that could adversely affect the integrity of the habitat or the favourable conservation status of a species' local population) *and* which are identified as being of sufficient value to be material to decision-making (District/Borough level or above)). This process will be fully documented in the ES.

Given the lack of clear impact pathways between the Scheme and any European Sites, it is not considered that a HRA will be required, as discussed under Item 4, above.

Fish surveys and other surveys of habitats and species within the Thames itself are also likely to be scoped out, given that the tunnel is to be bored underneath the river, and that the tunnel portals will be set back some distance from the river bank.

The decision to scope out these items (and any others following the survey work) will be reviewed following consultations, the receipt of the scoping opinion and as the Project design progresses.

Item 12 - Assessment period

The assessment will cover the construction and operational phases of the Scheme.

Item 13 - Other relevant information

It is worth noting that those species and habitats that might be scoped out of an assessment for a development in the countryside might be included in an urban assessment such as this, owing to the relative scarcity of semi-natural habitat within such environments and thus the enhanced value of these features in the context of a city development.

6.7 Effects on All Travellers

Table 6-11 Scope of the Effects on All Travellers Assessment

Item 1 - Consultations – undertaken and proposed

No consultation has been undertaken yet other than within the design/project team. Liaison with the Applicant has confirmed that no Non-Motorised User surveys have been completed for the study area. The design team will also be consulted to further understand provision for Non-Motorised Users as part of the Scheme. Both of these issues will be relevant to the journey length and severance assessments.

Consultation will be undertaken with the London Boroughs of Newham, Tower Hamlets and Greenwich regarding rights of way and usage where appropriate.

Some consultation may be required with the above London Boroughs and/or key identified community facilities to characterise usage and travel patterns and catchment areas.

Item 2 - Baseline information obtained/surveys undertaken (refer to Figure 6.4 in Appendix A)

Existing Rights of Way

Recreational routes include the Thames Path and National Cycle Route 1 that follow the riverside along the Greenwich Peninsula, as shown on Figure 6.4 of Appendix A and National Cycle Route 13 to the north of the River Thames. An extensive network of bicycle lanes and public footpaths is currently present on the existing highways in the area.

Existing and Proposed Facilities, Concerns and Potential Known Severance Issues

Pedestrian and cycle connectivity is a fundamental element of London's multimodal transport system, enabling easy journeys to be made on foot or by bicycle using a permeable network of streets and footways. It is vital to consider the impact of the accesses to the new crossing on pedestrian and cycle movement north and south of the river to minimise severance effects caused by the new road connection, and facilitate local movement between neighbourhoods and places.

The Peninsula Masterplan envisages the development of a new entertainment/sports complex to the east 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.

A river bus service also runs from Queen Elizabeth II pier on the Peninsula to central London.

Amenity and Views from the Road

Views from the existing roads comprise the current mix of dense residential, commercial and industrial properties north of the River Thames and disused/derelict land to the south of the river.

The streets shown on figure 6.4 in Appendix A as 'key movement corridors and linear gateways' as defined in Newham's Core Strategy (Newham Borough Council, 2012) will be the subject of public realm and regenerative improvements that reinforce their role as high quality movement corridors and linear gateways.

Driver Stress

Based upon the high levels of traffic flow and the existing levels of congestion, driver stress levels are expected to be high within the area.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated

A Transport Assessment is being undertaken which will provide information to inform the assessment of Effects on All Travellers.

The location of community facilities will be plotted on a map. Preliminary information about community facilities is shown on Figure 6.2 of Appendix A and described in Table 6-2.

Traffic flows will be required to identify severance impacts along important routes used by pedestrians and cyclists.

Further information about existing levels of amenity is required. This may include existing traffic data, footpath widths, locations, quality of street furniture, planting and streetscape, signage for cyclists, presence of cycle lanes, underpasses, difficult junctions etc. consideration should be given to the levels of fear/safety, noise, dirt, air quality and visual appearance. A site walkover will be required.

Further details on existing severance issues associated with rights of way and community facilities will also be obtained.

A site survey will be completed to confirm baseline views from the road. Traffic data will also be obtained from the Transport Assessment to undertake the Driver Stress assessment.

Item 4 - Key Environmental Receptors and their Value

The key environmental receptors for this assessment will be non-motorised users such as pedestrians and cyclists and vehicle drivers for the view from the road and driver stress assessments. The DMRB does not assign a value to these for the assessments

although they would all be considered of high value for the purpose of the ES.

Item 5 - Study Area for the EIA

For Effects on all Travellers, the study area has been chosen to ensure that the effect on all receptors as a result of the Scheme is determined. The study area is variable and is dependent on the receptor under consideration.

Journey Length

Catchment areas for key community facilities near to the Scheme will be identified. Specific attention will be given to those facilities on either side of the Scheme and near to roads which might experience an increase or decrease in traffic flows of more than 30%. A degree of professional judgement and pragmatism will be required to ensure that the study area remains reasonable and realistic.

Changes in Amenity

The DMRB does not indicate an appropriate study area. Using guidance drawn from the Air Quality and Noise topics, only those roads which are likely to experience an increase or decrease in traffic flows of more than 20% would be included.

New Severance

The DMRB suggests that new severance may occur where pedestrian and cyclist journeys may increase by 250m or more, where a pedestrian at-grade crossing is provided on a road carrying up to 8,000 vehicles a day (AADT) or a new bridge or subway needs to be traversed.

Relief from severance

Impacts will be considered where there is a reduction in traffic by 30% or more.

Views from the Road

This section is principally concerned with factors on the road which affect drivers' potential views. Therefore, the assessment has been undertaken using the study area determined as part of the townscape assessment which extends 500m either side of the Scheme portals and highways links.

Driver Stress

An appropriate study area will be defined once analysis of traffic data has been completed but this is expected to focus on the approach roads to the tunnel and the links approaching the Blackwall Tunnel.

Item 6 - Methodology (including any relevant software)

The Highways Agency IAN 125/09 Supplementary guidance for users of DMRB Volume 11 'Environmental Assessment' will be applied and tailored to the context of the Scheme. This guidance created the new topic, 'Effects on All Travellers' and states that a mixture of the methodologies in the DMRB Section 3 Part 8 Pedestrians, Cyclists Equestrians and Part 9 Vehicle Travellers should be followed as appropriate.

Journey Length

The methodology for this will follow the guidance presented in DMRB Volume 11, Section 3, Part 8, Chapters 2 and 3.

Changes in Amenity

The methodology for this will follow the guidance presented in DMRB Volume 11, Section 3, Part 8, Chapter 4.

New severance

The methodology for this will follow the guidance presented in DMRB Volume 11,

Section 3, Part 8, Chapters 5, 6 and 8.

Relief from severance

The methodology for this will follow the guidance presented in DMRB Volume 11, Section 3, Part 8, Chapters 5, 7 and 8.

Views from Road

The methodology for this will follow the guidance presented in DMRB Volume 11, Section 3, Part 9, Chapter 2. It will also draw on the Townscape and Visual impact assessment as detailed in Section 6.11.

Driver Stress

The three main components of driver stress will be assessed: frustration, fear of potential accidents and uncertainty relating to the route being followed. The methodology for this will follow the guidance presented in DMRB Volume 11, Section 3, Part 9, Chapters 3 and 4.

Item 7 - Significance Criteria

Significance criteria from the appropriate DMRB sections will be applied where it exists as follows:

Journey Length

The DMRB does not provide significance criteria for the assessment of changes in journey length. The output of this assessment will be a description and numerical quantification of any likely changes.

Changes in Amenity

The DMRB does not provide significance criteria for the assessment of changes in amenity. A descriptive assessment only is recommended in the guidance.

New severance

Using criteria in the DMRB new severance will be described using a three point scale: Slight, Moderate or Severe severance. These descriptions will be coupled with an estimate of the numbers of people affected, their location and the community facilities from which they are severed.

Relief from severance

Using criteria in the DMRB relief from existing severance will be described using a three point scale: Slight, Moderate or Substantial. The category of level of relief from severance for a built up area will be applied.

Views from Road

Using the category description in the DMRB views from the road will be assessed according to travellers' ability to see the surrounding landscape on a four point scale: No view, Restricted view, Intermittent view, Open view.

Driver Stress

Using the criteria in the DMRB driver stress will be assessed according to a three point descriptive scale: Low, Moderate or High.

Item 8 - Description of possible significant effects on receptors

The construction of the Scheme will require the demolition of the existing footbridge which crosses the Blackwall Tunnel Approach in the vicinity of Boord Street (refer to Figure 6.4 of Appendix A).

There is the potential for the construction of the Scheme to lead to changes in the multiple pedestrian crossings that currently exist on the A1202 roundabout on the

northern side of the Thames and on the roads on the southern side that lead to the Emirates Airline.

There is the potential for increased severance and also reduced severance on certain roads depending upon the traffic changes caused by the Scheme.

Driver stress is likely to reduce as a result of reduced congestion and enhanced road layout.

There are likely to be improvements to public transport connections particularly through the provision of a direct bus link from the Millennium Way to the tunnel for the extensive bus routes that serve the Peninsula.

There is the potential for reduced amenity for the users of the cycle routes and footpaths in the vicinity of the Scheme during construction.

It is considered unlikely that there would be significant changes to views from the road as a result of the Scheme, as the works largely comprise modified highway arrangements at each tunnel portal.

Bus access from the north is expected to be along the Lower Lea Crossing or via the junction with Dock Road. At the south there is an aspiration for a bus link to the tunnel from North Greenwich. Further discussion regarding the bus network will be required with the Bus Network Planning team.

Item 9 - Potential Mitigation Measures

Potential mitigation measures include:

- The construction of a new footbridge to replace the footbridge that needs to be demolished near Boord Street
- Ensuring the Scheme design makes appropriate provision for pedestrian crossings when designing the new highway arrangements at each of the tunnel portals.
- Minimising footpath and cycle route diversions both during construction and also those that may be needed permanently during Scheme operation.
- Ensuring clear signage as part of the Scheme for motorised and Non-Motorised Users.
- Ensuring the design team liaises closely with the bus network planning team to ensure that the design of the Scheme reflects public transport needs.

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

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.

Item 11 - Assessment period

Changes in journey length, relief from severance and new severance will all require traffic data from the opening year.

In accordance with the DMRB, the assessment of driver stress will be undertaken for the worst case scenario (for this assessment, this is 15 years after opening). Traffic links with comparable speeds or flows that are at least 1km in length will be used.

For the view from road assessment, both the year of opening and 15 years afterwards

will be used.
Item 12 - Other relevant information
No other specific requirements have been identified at this stage.

6.8 Geology and Soils

Table 6-12 Scope of the Geology and Soils Assessment

<p>Item 1 - Consultations – undertaken and proposed</p> <p>No consultation has been undertaken to date.</p> <p>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.</p> <p>Consultation will be undertaken with the Environment Agency (EA) regarding the assessment approach including the mitigation measures proposed.</p> <p>Consultation will be undertaken with GiGL to confirm the absence of local geological sites that could be affected by the Scheme. Based on information obtained from other schemes it is believed that there are no such features that could be affected.</p>
<p>Item 2 - Baseline information obtained/surveys undertaken</p> <p>A Ground Investigation Desk Study (also known as a Preliminary Sources Study) was commissioned by TfL for the Scheme (Mott MacDonald, May 2013) and this has been used to inform the presentation of the baseline information outlined below.</p> <p><u>Designated Sites</u></p> <p>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 (refer to Figure 6.1 of Appendix A). The absence of local geological sites will also be confirmed.</p> <p><u>Geology and Hydrogeology</u></p> <p>There is the 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 sediments 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. Mostly, and originally, Made Ground was placed to raise the level of the land above the original level of the marshes which formed the area. The marshes were prone to regular flooding, for example during construction of the Royal Victoria Dock. Subsequently Made Ground is likely to be associated with the demolition and redevelopment of sites in the area.</p> <p>The Scheme will be situated within an area where the superficial deposits are classified as a ‘Secondary Aquifer’ however the Thanet Sand and White Chalk are classified as a ‘Principal Aquifer’. The crossing does not lie in close proximity to a source protection zone or source protection zone borehole.</p> <p>The nearest surface water features are the River Thames and the Royal Victoria Dock. The River Lea joins the River Thames adjacent to the northern approaches for the crossing alignment.</p>

Soils

The Scheme will be situated in an area with soils classified as having a high leaching potential according to the groundwater vulnerability map.

Contaminated Land

The potential for ground and groundwater contamination within the Scheme area has been addressed in 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. The principal contamination sources 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. In addition landfills have been identified in the area on both sides of the River Thames.

On the Greenwich Peninsula the principal contamination source relates to the former South Metropolitan Gasworks which dominated this area between the 1860s and 1980s. A single remaining gas holder is the only above ground remnant of this former facility. 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 at depth beneath much of the site. Additionally, asbestos was encountered in the 'inert' backfill to the Western Entrance Lock to the Royal Victoria Dock during the ground investigation for the London Cable Car project.

There are no sites determined as Contaminated Land under Part IIA of the Environmental Protection Act 1990 within 250m of the Scheme.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated

Site investigations are being 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.

Information regarding the storage of materials, particularly the waste spoil from the excavation of the tunnel will be obtained.

Item 4 - Key Environmental Receptors and their Value

Based on the current understanding of the study area the key environmental receptors are:

- Geological and soil resources in and around the Scheme.
- Controlled Waters (Principal and Secondary Aquifers and water courses including the River Thames).
- Nearby commercial and residential land uses (and their users) as a result of the disturbance of contaminated land.

There is no defined methodology for assessing the value of geology and soils receptors so assessment of significance will be undertaken using professional judgement.

However, a source, pathway receptor approach in accordance with Environment Agency CLR11 Model Practices would be adopted for assessing risks from contaminated land.

Assessment of significance will be undertaken using professional judgement with

guidance based on CIRIA C552.

Item 5 - Study Area for the EIA

The study area will comprise the Scheme footprint including construction compound and storage areas and an area 500m around the Scheme. Effects on geology and soils resources will be limited to the area of the works 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.

Item 6 - Methodology (including any relevant software)

The assessment will be undertaken following the guidance in Volume 11, Section 3, Part 11 Geology and Soils of the DMRB. This requires an assessment of the effects on:

- Designated Sites – statutory and non-statutory
- Geology and Geomorphology
- Soils
- Contaminated Land

The assessment will:

- Obtain updated information
- Map any updated information as appropriate
- Assess the effects of the Scheme on geology and soils noting the items to be scoped out (refer to Item 10)
- Identify potential mitigation measures
- Report residual effects

Assessment of effects on contaminated land will be undertaken based on guiding principles of the Environment Agency CLR11 guidance.

A separate geotechnical investigation is being undertaken as part of the Scheme design and will not form part of the ES.

Item 7 - Significance Criteria

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*.

For determination of significance criteria for the assessment of effects on contaminated land, guidance would be sought from CLR11, CIRIA C552 and professional judgement (Refer to Tables B11 and B12 in Appendix B for further details).

Item 8 - Description of possible significant effects on receptors

There are no designated sites that are likely to be affected by the Scheme.

Significant effects of the Scheme could include:

- Dust created by on-site construction activity, particularly excavation and transportation of soil materials.
- Disturbance of potentially contaminated land such as landfill and areas of Made Ground.
- Mobilising contaminants in the soil that would otherwise be immobile.

- Creation of new pollutant pathways, for example the creation of new pathways for contamination to reach groundwater and surface water resources.
- Creation of contaminated run-off that could affect surface and groundwater resources.
- Effects on future users of the tunnel as well construction and maintenance workers.
- Effects of the tunnel construction on ground stability – this would be assessed as part of the geotechnical assessment with relevant information presented in this topic assessment.

Effects on surface and groundwater receptors will be assessed in the Water Environment assessment (refer to Table 6-10) and dust effects will be assessed in the Air Quality assessment (refer to Table 6-1).

Item 9 - Potential Mitigation Measures

Potential mitigation measures will include:

- 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 Environment Agency Pollution Prevention Guidelines
- Use of a CEMP
- 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)

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

Effects on agricultural land quality and agricultural soils will be scoped out of the assessment as the Scheme is located within an entirely urban environment and, therefore there will be no effects on this environmental receptor.

If the consultation exercise confirms that there are no local geological conservation sites within the study area that could be affected by the Scheme then an assessment on designated sites both statutory and non-statutory will be scoped out of the assessment. The desk study completed to date has confirmed that there are no geological SSSIs that could be affected by the Scheme.

A separate geotechnical investigation is being undertaken as part of the Scheme design and will not form part of the ES.

Item 11 - Assessment period

The assessment will report the effects during the construction and operational phases of the Scheme. The assessment will focus primarily on construction effects with operational effects on Geology and Soils being more restricted and limited to the proposed maintenance regime for the completed Scheme.

Item 12 - Other relevant information

There are close links between this and the following assessments:

- Water environment
- Air Quality
- Materials

Waste management will be addressed in the Materials assessment.

6.9 Materials

Table 6-13 Scope of the Materials Assessment

Item 1 - Consultations – undertaken and proposed
<p>No consultation has been undertaken to date for the materials assessment.</p> <p>Meetings will be held with the design team to progress the assessment. These will be combined with meetings to be undertaken as part of the Energy and Sustainability Studies for the Scheme to discuss the potential for efficient use of materials and also to review wastes that are likely to be generated as part of the Scheme’s construction and how they will be managed.</p> <p>Consultation will be undertaken with the relevant London Boroughs and the EA to obtain information about waste management facilities that could be used during the Scheme’s construction.</p>
Item 2 - Baseline information obtained/surveys undertaken
<p>Information regarding the baseline geology and soils around the Scheme is outlined in Table 6-6 and will be described further in the ES.</p> <p>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.</p> <p>No surveys have been undertaken for this topic.</p>
Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated
<p>Baseline information will be collated on the location of appropriate waste management facilities for the types of waste forecast to be generated by the Scheme including landfill sites, materials recovery facilities and transfer stations.</p> <p>To inform the assessment the following Scheme design information will be collated:</p> <ul style="list-style-type: none"> ▪ The types and quantities of construction materials that would be required, for example bulk earthwork materials, topsoil, aggregates, concrete ▪ 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.

The geology and soils baseline will provide further details on the likelihood of the construction works encountering contaminated soils.

Details will also be provided regarding the high level policy and strategy targets influencing materials resources use and waste management.

Item 4 - Key Environmental Receptors and their Value

There is no guidance available for determining receptor values in the materials assessment and the value of the environmental receptors that could be affected by materials use and waste management would be presented in other environmental topic chapters of the ES. The receptors comprise: soils; surface and ground water resources; human beings, flora and fauna and community assets.

Item 5 - Study Area for the EIA

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. Appropriate waste management facilities will be identified that lie outside of this study area.

Item 6 - Methodology (including any relevant software)

The assessment will be undertaken following the guidance in IAN 153/11 *Guidance on the Environmental Assessment of Material Resources*.

The assessment will focus on two key parameters:

- The use of primary/secondary/recycled/manufactured materials
- The generation and management of waste

The assessment will be presented using Tables B14 and B15 in Appendix B as outlined in IAN 153/11.

The assessment of effects will be presented by project activity:

- Site remediation/preparation
- Demolition
- Site construction
- Operation and maintenance of asset

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

Item 7 - Significance Criteria

There are no widely accepted significance criteria for assessing the significance of effect for the materials topic. The significance of effect will be determined using professional judgement and drawing upon the guidance provided in HA 205/08 *Assessment and Management of Environmental Effects*.

When applying professional judgement regarding the significance of environmental effects consideration would also be given to prevailing policy and legislation, for example in relation to waste management.

Item 8 - Description of possible significant effects on receptors

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

The assessment will confirm the procedures for storing and transporting waste including the potential for the River Thames to be used to transport materials.

The assessments presented in the other environmental topic chapters will document any effects that would arise during the construction phase as a result of materials use and waste management on specific receptors. The materials assessment will include cross-referencing to the relevant environmental topic assessments.

Item 9 - Potential Mitigation Measures

It is anticipated that the following mitigation measures will be used:

- A CEMP documenting control measures for the use, storage and transportation of materials as well as the storage and transportation of wastes. An outline CEMP will be included in the ES.
- A Site Waste Management Plan that will outline the types and quantities of wastes that would be generated and how they would be reduced, re-used, managed and disposed of. This will incorporate a Materials Management Plan to document how the materials will be managed, stored and used on site.
- Proactive engagement with the design team to encourage the selection of materials taking account of their potential environmental effects. This process will be informed by the Energy and Sustainability Statements that are being undertaken in parallel.

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

The potential environmental effects associated with the extraction and transport of primary raw materials, the manufacture of products and their subsequent transport to and use on construction sites will be scoped out of the assessment. This is consistent with the guidance in IAN 153/11. These effects could occur off site and potentially outside of the UK. They may include the depletion of non-renewable resources and the production of waste at the point of extraction and during manufacturing. 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. For this reason the assessment focuses on the use of materials in the Scheme itself.

Item 11 - Assessment period

The assessment will consider the construction and operational phases of the Scheme. As outlined in Section 5.7, de-commissioning including the use and selection of materials will

be considered through the Scheme design.

The use of materials and waste generation will be far greater during the construction phase.

Item 12 - Other relevant information

The scope presented in this table and the final ES chapter should be read in conjunction with the Geology and Soils assessment. The level of detail in the assessment will be driven by the level of information regarding the Scheme design. As the assessment progresses it may become apparent that certain information may not become available until detailed design, in which case this will be noted in the assessment and any uncertainty in the assessment results explained. There may also be uncertainties regarding the details of the maintenance regime for the Scheme once operational.

6.10 Noise and Vibration

Table 6-14 Scope of the Noise and Vibration Assessment

Item 1 - Consultations – undertaken and proposed
To date no consultation has been undertaken. Prior to the noise and vibration assessment consultation will be undertaken with the Environmental Health Departments of the London Boroughs of Greenwich, Tower Hamlets and Newham.
Item 2 - Baseline information obtained/surveys undertaken
No recent noise surveys have been undertaken in the area of the Scheme. A desktop review of the study area indicates that the dominant source of noise in the area would be from road traffic. Road traffic noise on the southern side from the A102 and on the northern side from the A1011 and A13 would be the most likely sources of road traffic noise. Air traffic noise from London City Airport would most likely elevate noise levels in the local area and towards the east of the Scheme the buildings appear to be industrial and it would be possible that noise generated from these buildings could also affect noise levels in the area. Defra has produced Noise Action Plans which address the management of noise issues and effects from major roads in England under the terms of the Environmental Noise (England) Regulations 2006. The Action Plans are intended to apply in particular to the most 'important areas' identified by the noise maps. Therefore, a set of Important Areas and First Priority Locations have been identified for each of the Noise Action Plans. The identification of the first priority locations and Important Areas has been based on the results of the strategic noise mapping. There are First Priority Locations situated towards the north of the scheme along the A13 and B125 and towards the south of the scheme along the A102 and Trafalgar Road. There is also an Important Area situated on the A102 towards the south east of the scheme.
Item 3 - Other baseline information to be obtained/surveys to be undertaken
Baseline surveys of existing noise conditions will be undertaken to determine the underlying day and night-time acoustic conditions. It is anticipated that surveys will be required near to existing dwellings on the north and

south of the Scheme with additional monitoring at residential dwellings in the vicinity of the tunnel ventilation shafts.

The location and duration of these surveys will be discussed and agreed with the relevant London boroughs prior to commencement.

Item 4 - Key Environmental Receptors and their Value

Sensitive receptors in terms of noise are defined as residential dwellings, hospitals, schools, community facilities, designated areas (e.g. Area of Natural Beauty (AONB), National Parks, SAC, SPA, SSSI, Scheduled Ancient Monument (SAM)), and public rights of way.

The majority of residential receptors within the anticipated noise study area are located on the northern side of the Scheme in Canning Town. The location of non-residential receptors within the study area will be identified using the most update mapping available prior to the start of the assessment. This will be informed by the Community and Private Assets baseline.

A methodology has not yet been developed to assign significance according to both the value of resources and the magnitude of an impact. In terms of noise and vibration only the magnitude will be used to describe any adverse or beneficial effects as a result of the Scheme.

Item 5 - Study Area for the EIA

Construction Noise and Vibration

The construction noise and vibration assessment would be undertaken at identified sensitive receptors within close proximity of the Scheme as representative of worst case.

Road Traffic Noise

The operational road traffic noise study area will be determined in accordance with the guidance on qualifying criteria contained in DMRB, Volume 11, Section 3, Part 7. The study area will be determined by defining a 600m boundary from any roads subject to an increase of 1dB(A) or more in the opening or 3dB(A) or more in the future assessment years within 1km of the Scheme. For any affected road traffic links which are more than 1km away from the scheme a 50m boundary will be defined and property counts undertaken.

Airborne Traffic Vibration

Airborne traffic vibration will be assessed at all residential receptors within 40m of the scheme.

Ventilation Noise

The operational noise assessment for any associated mechanical ventilation from the project will consider sensitive receptors which are predicted to have a rating noise level (as defined in BS4142) of greater than 35dB(A) within the study area.

Item 6 - Methodology

Construction Noise and Vibration

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).

Part 1 of BS 5228 provides guidance on predicting and measuring construction noise and assessing its impact on the environment.

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

Noise calculations for properties and receptors within the study area will be carried out in accordance with the methods prescribed in the 'Calculation of Road Traffic Noise' (CRTN). These calculations would be undertaken using Wolfel's environmental noise propagation software IMMI.

It is anticipated that a DMRB 'detailed' assessment would be required. 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).

For night-time noise impacts, only comparisons in the long term will be considered for receptors predicted to exceed an $L_{\text{night, outside}}$ of 55 dB(A) in accordance with DMRB.

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).

Traffic induced airborne vibration nuisance will also be considered for the same scenarios for all identified sensitive receptors within 40m of any affected roads.

All predictions and comparisons will be presented in the reporting tables specified in DMRB HD213/11.

Ventilation Noise

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.

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.

Item 7 - Significance Criteria

Construction Noise

BS 5228-1 Annex E recommends the ABC method to establish construction noise limits for environmental impact assessments. The ABC method involves rounding the existing ambient noise levels to the nearest 5dB for the appropriate time period (night,

evening/weekends or day) and then comparing these levels to the total noise level, including construction noise. If the total noise level exceeds the existing rounded value, then a significant effect is deemed to have occurred. The ABC method is further explained in Table B16 of Appendix B.

Construction Vibration

BS5228-2 Annex B provides guidance on human response to vibration in buildings in terms of peak particle velocity (PPV). The guideline values for construction vibration have been used to base the significance of effect on and are presented in Appendix B.

Road Traffic Noise

For the assessment of road traffic noise and vibration covered by DMRB Volume 11 Section 3 Part 7, a classification is only provided for the magnitude of impact, as currently the methodology has not been developed to assign significance according to both the value of a resource and the magnitude of an impact.

Interim Advice Note 125/09 published in October 2009 provides the following guidance – *“It is also recognised that the approach to applying significance criteria given in Section 2, Part 5 may not be applicable to the assessment of particular section 3 topics (e.g. ‘Air Quality’ and ‘Noise and Vibration’) for which recent guidance has been published (paragraphs 3.2 and 3.3 in Volume 11, Section 3, Part 7 - Noise and Vibration (HA213/08) should no longer be followed”*.

Given that Interim Advice Note 125/09 suggests that significance based upon professional judgement should not be used, only the magnitude of change will be reported within the operational road traffic noise and vibration section and the value of resource is not required. Tables B18 and B19 in Appendix B present the magnitude of noise impacts as defined in DMRB HD213/11.

Ventilation Noise

Significance criteria for ventilation noise will be derived from the criteria contained within BS 4142. The criteria in BS 4142 and significance descriptors associated with the change in noise level are further explained in Appendix B. Where predicted rating noise levels are found to be below 35dB (A) then consideration will be given to World Health Organization (WHO) guideline noise levels.

Item 8 - Description of possible significant effects on receptors

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.

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 and the bored tunnelling programme.

Item 9 - Potential Mitigation Measures

Specific mitigation measures will be recommended as required and practicable to the findings of the noise assessment. The following generic noise mitigation measures will be considered:

Construction

Measures to minimise noise and vibration impacts from the construction phase would involve adopting Best Practicable Means’ (BPM) (as outlined in Section 72 of the Control of Pollution Act 1974) and the recommendations of good practice presented in BS5228. These methods would be implemented through the use of a CEMP.

Operational

Thin/low-noise surfacing: the application of a new thin/low-noise surface can reduce noise levels by up to 3.5dB(A) where the average speed of the traffic is above 75 kph. Below this speed there is a reduced benefit from a thin/low-noise surface due to vehicle engine noise contributing more to the overall noise level.

Noise barriers

The use of noise barriers can reduce the noise level at dwellings by reducing sound propagation. To be most effective, barriers are required to be either very close to the source (the road) or the receptor (the dwellings).

The effectiveness of noise barriers as a mitigation measure will depend on site specific circumstances. Where a noise barrier is located close to the road, the effect on noise propagation is usually effective to about 300m. It may not always be possible to locate barriers close to the road as they can have adverse effects on pedestrian environment and also on visibility splay for drivers and cyclists in junction situations.

Reduced speed limits

A reduction in the average speed of vehicles can result in a reduction in traffic noise.

Modifications to Charging Regime

The attractiveness of the Scheme could be influenced by user charges.

Traffic calming

Traffic calming measures such as speed humps and chicanes can reduce the level of traffic and also the traffic speed. The use of traffic calming measures on main roads, is however often not practical. Traffic calming measures can also generate adverse effects due to vehicle accelerations and decelerations or from body rattle, especially from heavy vehicles. Some traffic calming features also have the potential to increase the level of vibration.

Item 10 - Aspects/impacts scoped out of the EIA

Ground-borne Traffic Vibration

Extensive research on a wide range of buildings of various ages and types has been carried out (Watts G.R, 1990), but no evidence has been found to support the theory that traffic induced vibrations are a source of significant damage to buildings.

DMRB HD 213/11 states 'significant ground-borne vibrations may be generated by irregularities in the road surface. Such vibrations are unlikely to be important when considering disturbance from new roads and an assessment will only be necessary in exceptional circumstances'

Given that DMRB HD213/11 indicates that ground borne vibration should only be assessed in exceptional circumstances and that there are no suitable methods of prediction, no impacts from ground borne road traffic vibration would be assessed in the noise and vibration chapter. Methods will also be incorporated into the CEMP to control vibration from the construction works.

Item 11 - Assessment period

Construction

The assessment will cover construction noise and vibration for the entire construction period of approximately 4 years.

Operation

The operational assessment will consider the opening year of the scheme and the design year of the scheme when traffic flows are predicted to be highest. The design year of the

scheme is usually 15 years after opening.

Item 12 - Other relevant information

The area around the southern portal on the Greenwich Peninsula is currently undergoing significant redevelopment with the Greenwich Peninsula Masterplan indicating the construction of a number of residential and commercial properties in close proximity to the tunnel.

The draft NPS indicates that consent will not be granted for a Scheme unless the Secretary of State is satisfied there will be no "significant adverse impacts on health and quality of life from noise". The concept of "significant adverse" is taken from the Noise Policy Statement for England, which in turn draws on WHO guidance.

6.11 Townscape and Visual

Table 6-15 Scope of the Townscape and Visual Assessment

Item 1 - Consultations – undertaken and proposed

The Royal Borough of Greenwich and London Borough of Newham Councils will be consulted on the visual receptors and any visualisations that will be used in the assessment.

Item 2 - Baseline information obtained/surveys undertaken

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. As a result, the Scheme will need to be considered in the context of Greenwich Unitary Development Plan (UDP) Policy W2 (Thames Policy Area) and Newham Core Strategy Policy INF7 (Blue Ribbon Network) which set out local planning policy for protection and enhancement of townscape and views within respective Thames Policy Areas. In addition, the Local Views identified in Greenwich UDP Policy D27, together with views from sensitive visual receptors such as national recreational trails/routes/facilities, including the Thames Path (south of the River Thames), National Cycle Route 1 (south of the River Thames), National Cycle Route 13 (north of the River Thames) and Emirates Air-Line, will need to be taken into account in the assessment.

Baseline townscape and visual features are shown on Figure 6.5 of Appendix A.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be obtained

Local urban/townscape character assessments will be reviewed. In addition, a site visit will be undertaken to establish the likely visual influence of the Scheme, inform viewpoint analysis, undertake viewpoint photography and enable the evaluation of townscape character.

Item 4 - Key Environmental Receptors and their Value

The townscape and views within the regionally valued Blue Ribbon Network/Thames Policy Areas will need to be considered. In addition, the Local Views identified in Greenwich UDP Policy D27, together with views from sensitive visual receptors such as national recreational trails/routes/facilities, including the Thames Path (south of the River Thames), National Cycle Route 1 (south of the River Thames), National Cycle Route 13

(north of the River Thames) and Emirates Air-Line, will need to be taken into account in the assessment.

Item 5 - Study Area for the EIA

In relation to townscape and visual amenity, effects will be localised and centred on the tunnel portals/highway links rather than the tunnel itself. In general, the study area is not anticipated to extend more than 500m from the tunnel portals/highway links (at Tidal Basin Road, on the north side of the River Thames, and Blackwall Tunnel Approach, on the south side of the River Thames). Beyond these extents, there may be a need to undertake viewpoint assessment in respect of some of the Local Views identified in Greenwich UDP Policy D27; this will be established through site survey to identify the likely visual influence of the Scheme.

Item 6 - Methodology (including any relevant software)

The Highways Agency IAN135/10 detailed assessment methodology will be applied and tailored to the townscape context of the Scheme. As set out in IAN 135/10, this requires detailed desk and fieldwork to identify townscape character and visual receptors/associated views, together with respective sensitivity, that may be affected by the Scheme. Potential impacts will be determined taking into account a design in sufficient detail to enable this assessment to take place. Any mitigation to avoid, reduce or remedy the proposed change will be taken into consideration in determining the significance of the resultant effects.

Item 7 - Significance Criteria

Highways Agency IAN 135/10 criteria will be applied, as set out in Tables B21 to B28 in Appendix B.

Item 8 - Description of possible significant effects on receptors

There are possible significant effects in respect of townscape character and views within the designated Blue Ribbon Network/Thames Policy Areas. In addition, there is potential for visual effects to occur in relation to Local Views identified in Greenwich UDP Policy D27, together with views from sensitive visual receptors such as national recreational trails/routes/facilities, including the Thames Path (south of the River Thames), National Cycle Route 1 (south of the River Thames), National Cycle Route 13 (north of the River Thames) and Emirates Air-Line.

Item 9 - Potential Mitigation Measures

The principal mitigation measures are likely to involve achieving finishes to engineering structures that are appropriate to townscape context and visual amenity as well as appropriate landscaping.

Ensuring an appropriate lighting design.

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

The assessment will consider townscape (urban landscape) rather than landscape, given the urban location of the Scheme. There are currently not anticipated to be significant night-time visual effects, therefore an assessment of these effects is not anticipated to be required; however this will be reviewed as the Scheme progresses.

Item 11 - Assessment period

The assessment will cover the construction and operational phases. For the operational phase, the effect on visual receptors likely to experience potential change in their view as

a result of the Scheme will be assessed. Given the urban context of the Scheme, comprising predominantly built elements rather than vegetation, and likely mitigation measures described above, it is not anticipated that the conventional IAN 135/10 visual assessment scenarios will be relevant – as follows:

- During the daytime in winter in the year of opening (Year 1)
- During the daytime in summer 15 years after the Project opening to take account of proposed the landscape planting mitigation as well as the screening potential of any intervening existing vegetation (Summer Year 15)
- During the daytime in winter 15 years after the Project opening to take account of seasonal changes in planting (Winter Year 15)

Instead, a single operational phase assessment score will be provided for views. Night-time views will also be assessed if appropriate (if there are likely to be significant changes to night-time visual amenity as a result of the Scheme). This will depend on whether or not the current night-time ambient Environmental Zone, as defined in Institution of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light, is likely to change as a result of the Scheme). There are currently not anticipated to be significant night-time visual effects, therefore an assessment of these effects is not anticipated to be required.

Item 12 - Other relevant information

Not applicable

6.12 Water Environment

Table 6-16 Scope of the Water Environment Assessment

<p>Item 1 - Consultations – undertaken and proposed</p> <p>Previously consultations have been undertaken with the Environment Agency to obtain initial comments on the scheme and the potential impacts of the various tunnel options considered. However, it is proposed to consult with the EA to gather further data to define the quality of local surface and groundwater bodies and to obtain a more detailed understanding of flood risk within the study area. Requirements in terms of surface water drainage arrangements and flood protection/mitigation will also be discussed. Thames Water will be consulted to gather data to define the existing sewer network and the London Boroughs of Newham and Greenwich will be consulted in their role as Lead Local Flood Risk Authorities and to check for records of any private water supplies.</p>
<p>Item2 - Baseline information obtained/surveys undertaken</p> <p>The northern portal of the Scheme is located in close proximity to the tidally influenced River Thames and the confluence of the River Thames and its tributary, the River Lea. The Royal Victoria Dock, a tidal basin, is located to the east of the northern portal. Around the southern portal the River Thames is the predominant feature of the water environment. 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. It is understood that waters within the Victoria Dock are not monitored by the EA.</p> <p>At both the northern and southern portals, the Scheme crosses the defended floodplain of the tidal River Thames. Areas of land within the application boundary are located</p>

within both Flood Zone 3 (High Risk) and Flood Zone 2 (Medium Risk). However, when the effect of existing flood defences is accounted for, the likelihood of flooding has been assessed by the EA as Low. The main source of flood risk to the Scheme is therefore from breach of existing flood defences. Hydraulic modelling of breach scenarios, undertaken to inform the Newham Strategic Flood Risk Assessment (SFRA) and the Greenwich SFRA, predicted 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.

The application site is not located within, or in close proximity to, a groundwater Source Protection Zone (SPZ). Superficial aquifers beneath the study area are classified as Secondary (undifferentiated), whilst the bedrock geology is largely classified as unproductive strata.

Further details regarding geology are provided in Section 6-6.

Item 3 - Other baseline information to be obtained/surveys to be undertaken and design information to be collated

Additional baseline data will be collected from a number of published documents, including the Newham and Greenwich SFRA's and Surface Water Management Plans, the EA's Thames River Basin Management Plan and Thames Catchment Flood Management Plan and the Silvertown Tunnel Flood Risk Analysis report, prepared by Mott MacDonald. Specific data requests will also be made for:

- Details of existing licensed abstractions (from surface and groundwater) and consented discharges
- Details of any private water supplies
- Records of any pollution incidents to controlled waters
- Records of any historical flood events from any source
- Mapping providing details of the local sewer network

In addition to the baseline data described above the following information is required to inform the assessment:

- Two-way traffic flow (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

Future baseline conditions will be forecast, considering factors such as the likely impacts of climate change on river flows and tidal flood levels and the likely effect of implementation of future cycles of WFD management plans on the ecological and chemical quality of waterbodies.

Item 4 - Key Environmental Receptors and their Value

Key surface water receptors are the River Thames, the Royal Victoria Dock and the lower reaches of the River Lea. Groundwater bodies include the Greenwich Tertiaries and, from a review of available information, it is also understood that several licensed abstractions are supported by groundwater resources in the vicinity of the application boundary.

Based on the information available to date, and in accordance with the definitions of receptor value set out in Table B29 in Appendix B, the Thames and River Lea are assigned Medium value. The Royal Victoria Dock is assigned Low value and groundwater resources within the study area are assigned Medium value.

Item 5 - Study Area for the EIA

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.

The study area has been defined to reflect the surrounding water environment and following consideration of the distance over which significant effects can reasonably have the potential to occur. This approach is in line with the DMRB guidelines.

Item 6 - Methodology (including any relevant software)

A full understanding of the existing water environment will be developed using a desk study approach, gathering baseline data in consultation with key bodies, including the EA. The desk study would also be informed by a site walkover survey and a meeting with the EA is proposed to scope the degree of Flood Risk Assessment (FRA) that is required. As the Scheme encroaches into Flood Zone 3, in line with the National Planning Policy Framework (NPPF) a stand-alone FRA will be prepared. It is anticipated that this will be informed by the results of detailed modelling undertaken by the EA and the flood risk analysis undertaken to date by Mott MacDonald (Silvertown Tunnel Flood Analysis, April 2013). No site-specific hydrological or hydraulic modelling is proposed.

The potential for the proposed Scheme to impact on the water quality of receiving waters will be made in accordance with the DMRB methodologies for assessing both pollution from routine runoff (using the Highways Agency Water Risk Assessment Tool) and the risk of pollution due to an accident spillage.

Informed by the results of these analyses, an assessment of the potential for the Scheme to impact on the water environment will be made utilising the criteria set out in Appendix B. Where appropriate, mitigation methods to reduce any identified detrimental impacts will be described.

Item 7 - Significance Criteria

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). The method and significance tables are included in Appendix B (Tables B29 to B31).

Item 8 - Description of possible significant effects on receptors

Possible significant effects include increased flood risk as a result of works in close proximity to, or the crossing of, existing flood defences, the introduction of impermeable surfaces and loss of floodplain storage where the linking highway network is constructed. In addition, there is also potential for detriment to the water quality of groundwater and surface waterbodies associated with heavily silted, or otherwise contaminated, runoff from construction sites.

Item 9 - Potential Mitigation Measures

Potential mitigation measures include:

- Provision of storage to attenuate the rates of discharge of surface water drainage

- Implementation of best-practice pollution prevention methods as outlined in the EA's Pollution Prevention Guidelines
- Treatment of operational drainage discharges prior to entry to the water environment

Mitigation measures will be documented in a CEMP.

Item 10 - Aspects/impacts scoped out of the EIA (including justification)

It is considered that sufficient baseline data is available to characterise the water quality of surface water receptors. Water quality sampling and analysis is not therefore proposed, however this approach will be confirmed in consultation with the EA.

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.

Item 11 - Assessment period

The assessment will consider both the construction and operational phases of the Scheme. In line with DMRB guidelines, the significance of environmental effects will be defined for Do-Minimum and Do-Something scenarios in the baseline year and a future (design) year. The future year is typically defined as Year 15 following completion of all construction works.

Item 12 - Other relevant information

There is no other relevant information to include.

6.13 Cumulative Effects

- 6.13.1 Environmental effects can result from incremental changes caused by the interactions between impacts within a project and/or the interaction with the effects from other developments. The assessment of cumulative effects will use the guidance provided in DMRB Volume 11 Section 2 Part 5 *Assessment and Management of Environmental Effects* as well as the advice contained in PINS advice notes.

Cumulative Effects with Other Major Developments

- 6.13.2 As outlined in Section 2.4, the traffic model will take account of other transportation schemes as well as future predicted traffic growth as a result of new development. Therefore, the assessments that utilise traffic forecasts will consider vehicle movements associated with planned development. The other developments and growth scenarios included in the traffic forecasting will be outlined in the ES.

- 6.13.3 PINS Advice Note 9 states:

“The potential cumulative impacts with other major developments will also need to be carefully identified such that the likely significant impacts can be shown to have been identified and assessed against the baseline position (which would include built and operational development). In assessing cumulative impacts, other major development should be identified through consultation with local planning authorities and other relevant authorities on the basis of those that are:

- *Under construction;*
- *Permitted application(s), but not yet implemented;*
- *Submitted application(s) not yet determined;*
- *Projects on the Planning Inspectorate’s Programme of Projects;*
- *Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited; and*
- *Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.”*

6.13.4 As the environmental assessment progresses, the following will be clarified with regards to each of the potential developments to be considered in the cumulative assessment:

- The development type and details
- The timescales for construction and operation
- The certainty of the development occurring (this is particularly important as it will affect the level of detail available for each development and therefore the confidence in the cumulative effects assessment).

6.13.5 The interactive cumulative effects with other Schemes will be reported in each environmental topic assessment chapter to demonstrate how the effects of the Scheme on environmental topic receptors are affected by other planned major developments.

Multiple Effects on Individual Receptors

6.13.6 The cumulative effects assessment chapter will report where an environmental receptor is affected by different projects effects.

6.13.7 The cumulative effects assessment will be undertaken once the assessment of all other environmental effects of the project is complete. The temporal limit of the assessment will be the design year (i.e. 15 years after opening of the Scheme) and the spatial boundaries of the assessment will be defined by the scope of each of the individual environmental topic assessments. Where appropriate, receptors will be grouped for the purposes of the cumulative effects assessment and the significant of cumulative effects will be determined using the criteria in Table 6-11 taken from the DMRB.

Table 6-17 Significance Criteria for Determining Cumulative Effects

Significance	Effects
Severe	Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.
Major	Effects that may become a key decision-making issue

Significance	Effects
Moderate	Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance
Minor	Effects that are locally significant.
Not Significant	Effects that are beyond the current forecasting ability or are within the ability of the resource to absorb such change

6.14 Transboundary Screening

- 6.14.1 In accordance with the requirements of PINS Advice Note 12: *Development with significant transboundary impacts consultation*, PINS will screen on the Secretary of State's behalf whether the Scheme is likely to have significant effects on the environment of another EEA State. PINS Advice Note 12 states: *"It would assist the Secretary of State to meet the duty under Regulation 24 of the EIA Regulations if developers carried out their own preparatory work to complete a screening matrix."* Table 6-12 provides an indication of where the information is contained within this Scoping Report to inform the transboundary screening exercise.

Table 6-18 Information to Inform a Transboundary Screening Decision by PINS

Screening Criteria	Commentary and Location of Relevant Information in this Scoping Report
Characteristics of the Development	Characteristics of the scheme are outlined in Section 2.
Geographical area	The Scheme would not require development or potential environmental impacts on any area under the jurisdiction of any other EEA State.
Location of the Development	The Scheme is located in East London and comprises a road tunnel connecting areas north and south of the River Thames between the Greenwich Peninsula and Silvertown. The Scheme would run directly underneath the River Thames. Further details about the Scheme context and land uses are provided in Table 6-2 of this Scoping Report.
Cumulative impacts	There are a number of other schemes being developed near the Scheme and these will be identified in detail through consultation with the London Boroughs.
Carrier	Potential for pollution via air, land and water. Potential impact pathways are identified in Tables 6-3 to 6-13 of this Scoping Report.
Environmental Importance	Information regarding environmental constraints and designations is provided in Tables 6-3 to 6-13 of this Scoping Report.

Screening Criteria	Commentary and Location of Relevant Information in this Scoping Report
Extent	Based on the information collated to date as part of the scoping exercise, no significant effects are identified that could impact on another EEA Member State. This position will be clarified as the environmental topic assessments proceed.
Magnitude	
Probability	
Duration	
Frequency	
Reversibility	

7 Structure of the Proposed ES

7.1.1 The ES will comprise three volumes:

- Volume 1A – Main ES text
- Volume 1B – ES Figures
- Volume 2 – ES Appendices

7.1.2 A Non-Technical Summary will also be produced

7.1.3 Volume 1A of the ES will be structured as outlined below:

1: Introduction

2: Project Description

3: Design Iterations and Alternatives Considered

4: EIA Methodology

5: Air Quality (the structure of the air quality chapter would be replicated for other assessment chapters)

- Introduction
- Regulatory/Policy Framework
- Methodology
- Existing baseline
- Receptors potentially affected
- Mitigation and enhancement measures
- Residual effects
- Cumulative effects (this will address cumulative effects with other schemes i.e. interactive effects)
- Difficulties Encountered in compiling the ES
- Summary - this will include a table summarising the significance of effects both prior to and following the implementation of mitigation
- References

6: Community and Private Assets

7: Cultural Heritage

8: Ecology and Nature Conservation

9: Effects on all Travellers

10: Geology and Soils

11: Materials

12: Noise and Vibration

13: Townscape and Visual

14: Water Environment

15: Cumulative Effects (this will document multiple effects of the Scheme on individual receptors)

8 References

- 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 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*

TfL (April 2013) *River Crossings Consultation Report*

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

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

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

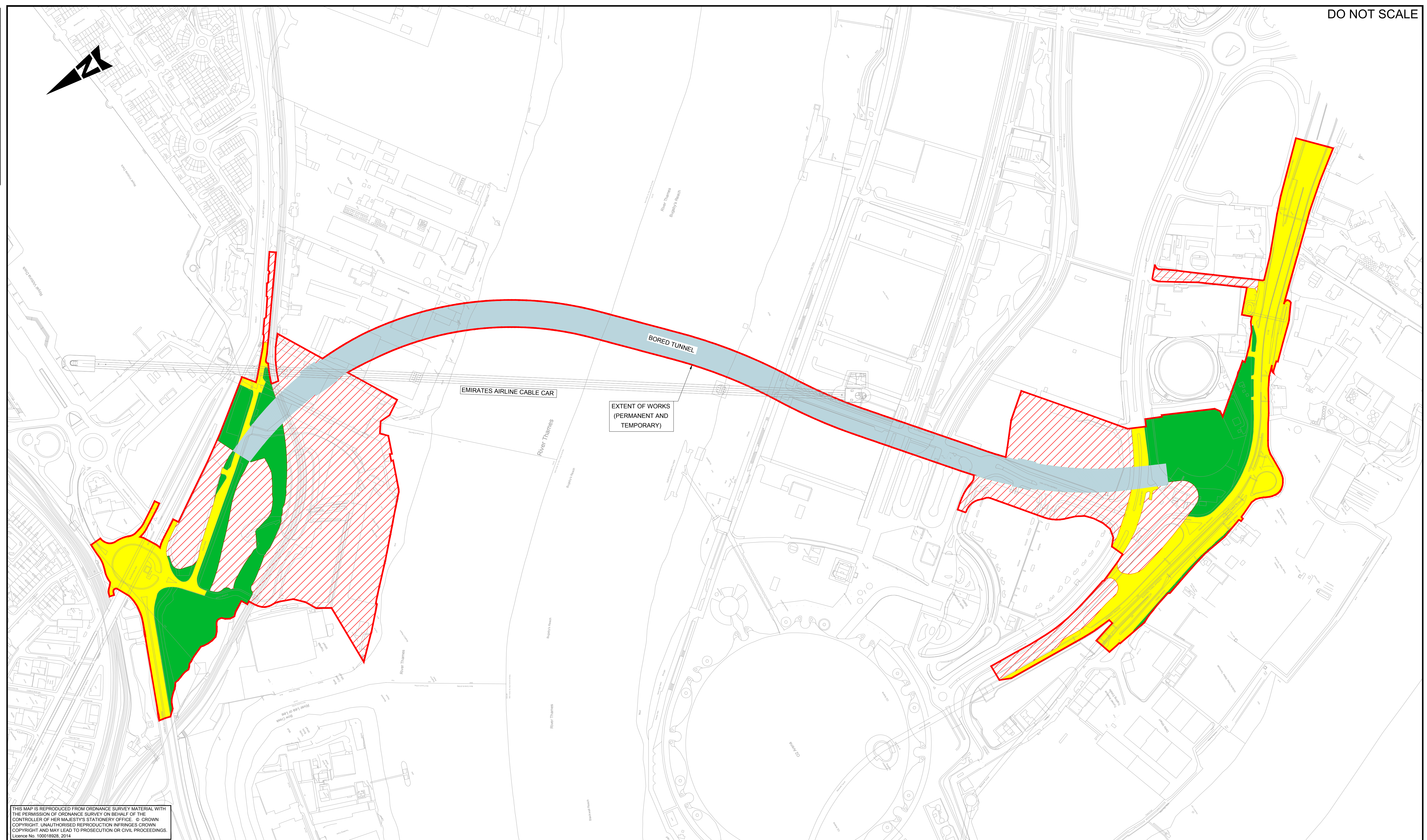
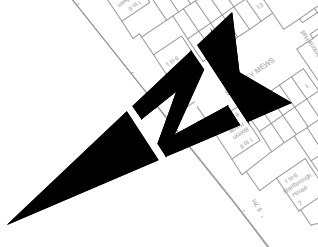
Watts, G.R. (1990). *Traffic induced vibration in buildings. TRRL RR246, Transport and Road Research*

Appendix A



Figures

0 10 100
Millimetres



THIS MAP IS REPRODUCED FROM ORDNANCE SURVEY MATERIAL WITH THE PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. Licence No. 100018928, 2014.

KEY:

	SCHEME FOOTPRINT (25.4)
	PERMANENT WORKS ON EXISTING HIGHWAY FOOTPRINT (5.7 Ha)
	PERMANENT LAND TAKE - SURFACE (5.1 Ha)
	PERMANENT LAND TAKE - SUB SURFACE (5.2 Ha)
	TEMPORARY LAND TAKE FOR TEMPORARY WORKS OR SITE COMPOUNDS (11.1 Ha)

NOTES:

- THIS DRG HAS BEEN PREPARED USING INFORMATION TAKEN FROM:
 - MOTT MACDONALD EXTENT OF WORKS DRGS MD-298348-Z-DR-00-ZZ-1001 TO 1003;
 - MOUCHEL LANDOWNERSHIP PLANS SHEETS 1 TO 4, DATED 30/10/13.
- THE INFORMATION SHOWN ON THIS DRAWINGS IS TO BE CONFIRMED THROUGH THE REFERENCE DESIGN DEVELOPMENT AND CONFIRMATION OF LAND OWNERSHIP DETAILS.
- ENVIRONMENTAL AND PLANNING CONSTRAINTS ARE ILLUSTRATED ON SEPARATE DRAWINGS.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION			
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:			
CONSTRUCTION			
MAINTENANCE/CLEANING			
DECOMMISSIONING/DEMOLITION			
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement			

Rev.	Date	Description	By	CHK'd	App'd
P2	23/04/14	FOR INFORMATION	TT	MK	MRM
P1	14/04/14	FOR INFORMATION	PJH	MK	MRM

Drawing Status: **FOR INFORMATION**

ATKINS

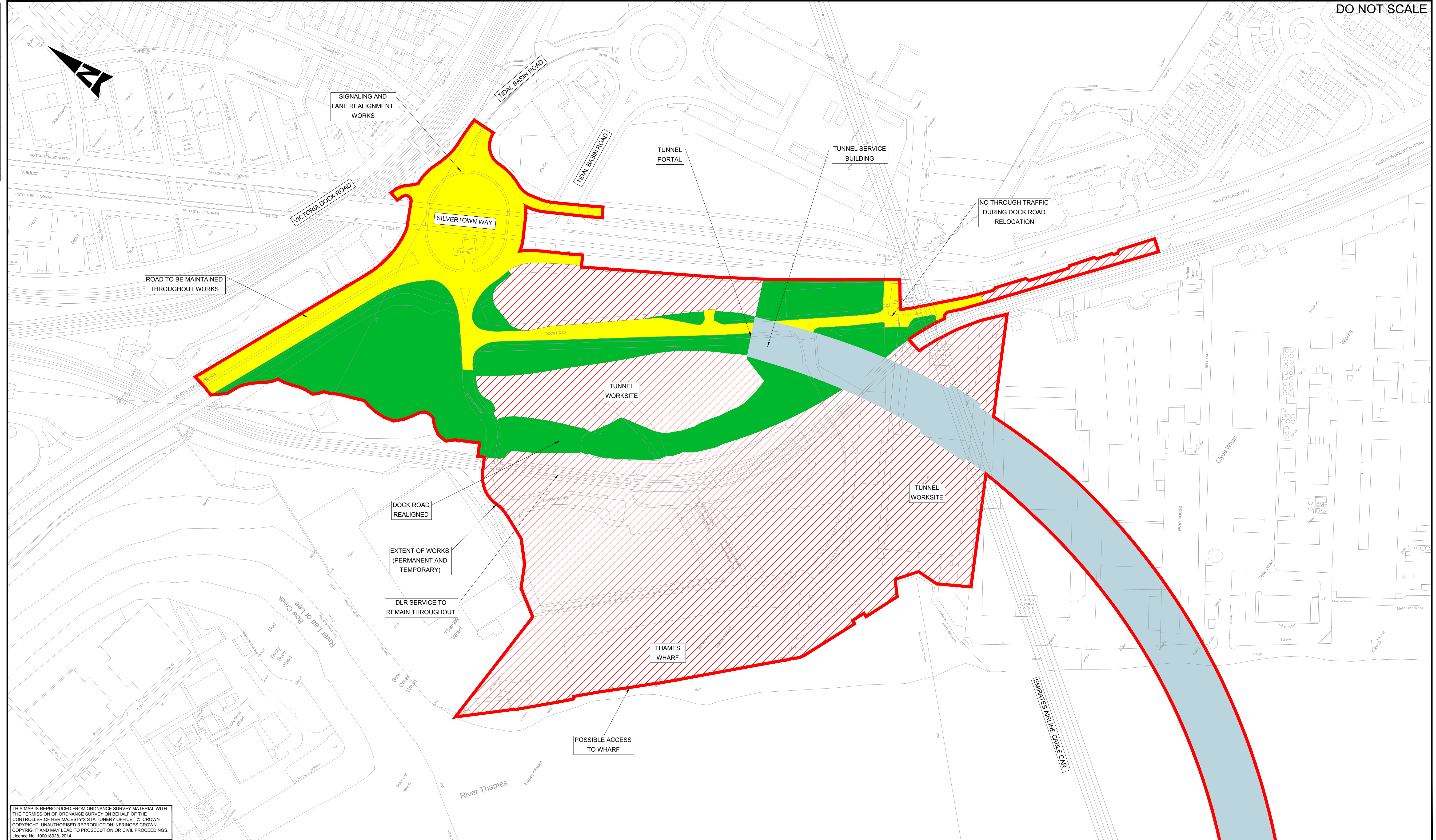
Woodcote Grove
Ashley Road
Epsom
Surrey
KT18 5BW
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Copyright © Atkins Limited (2013)

Client: **Transport for London**

Subsidiary: S2		Project Title: SILVERTOWN TUNNEL REFERENCE DESIGN			
Drawing Title: LAND TAKE REFERENCE PLAN OVERVIEW		Scale: 1:2500	Designed: -	Drawn: PJH	Checked: MK
Original Size: A1	Date: -	Date: 02/04/14	Date: 02/04/14	Date: 02/04/14	Date: 02/04/14
Drawing Number: STWTN-ATK-GEN-XXXX-DR-Z-00002					Revision: P2

100
0 10
Millimetres



THIS MAP IS REPRODUCED FROM ORDNANCE SURVEY MATERIAL WITH THE PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. Licence No. 100018928, 2014

KEY:

	SCHEME FOOTPRINT
	PERMANENT WORKS ON EXISTING HIGHWAY FOOTPRINT (1.5 Ha)
	PERMANENT LAND TAKE - SURFACE (2.6 Ha)
	PERMANENT LAND TAKE - SUB SURFACE
	TEMPORARY LAND TAKE FOR TEMPORARY WORKS OR SITE COMPOUNDS (7.3 Ha)

NOTES:

- THIS DRG HAS BEEN PREPARED USING INFORMATION TAKEN FROM:
 - MOTT MACDONALD EXTENT OF WORKS DRGS MD-298348-Z-DR-00-ZZ-1001 TO 1003;
 - MOUCHEL LANDOWNERSHIP PLANS SHEETS 1 TO 4, DATED 30/10/13.
- THE INFORMATION SHOWN ON THIS DRAWINGS IS TO BE CONFIRMED THROUGH THE REFERENCE DESIGN DEVELOPMENT AND CONFIRMATION OF LAND OWNERSHIP DETAILS.
- ENVIRONMENTAL AND PLANNING CONSTRAINTS ARE ILLUSTRATED ON SEPARATE DRAWINGS.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION						
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:						
CONSTRUCTION						
MAINTENANCE/CLEANING						
DECOMMISSIONING/DEMOLITION						
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement						
Rev.	Date	Description	By	CHK'd	App'd	
P5	23/04/14	FOR INFORMATION	TT	MK	MRM	
P4	14/04/14	FOR INFORMATION	PJH	MK	MRM	
P3	09/04/14	FOR INFORMATION	PJH	MK	MRM	
P2	04/04/14	FOR INFORMATION	PJH	MK	MRM	
P1	02/04/14	FOR INFORMATION	PJH	MK	MRM	

Drawing Status: **FOR INFORMATION**

ATKINS

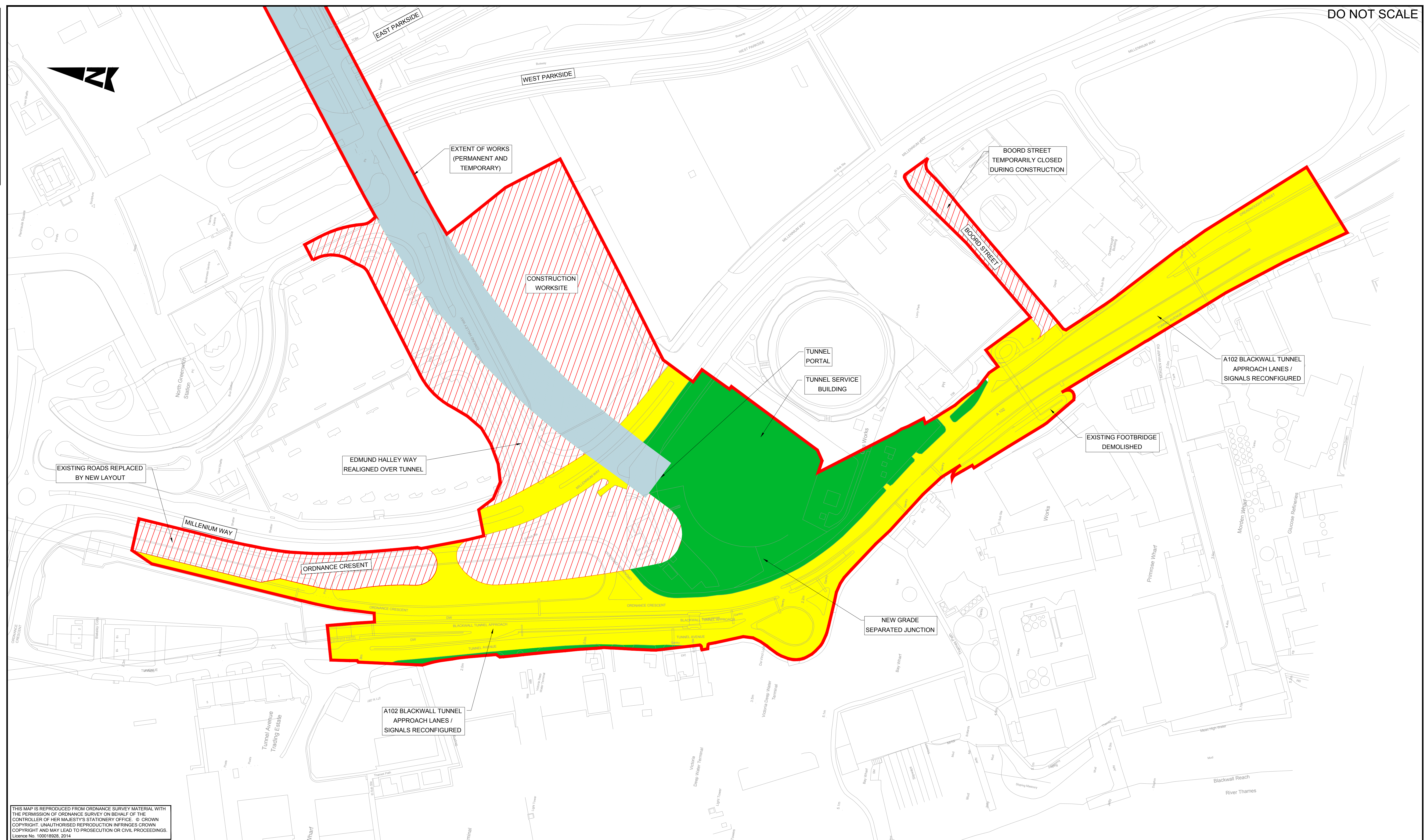
Woodcote Grove
Ashley Road
Epsom
Surrey
KT18 5BW
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Copyright © Atkins Limited (2013)

Client: **Transport for London**

Stability: S2	Project Title: SILVERTOWN TUNNEL REFERENCE DESIGN			
Drawing Title: LAND TAKE REFERENCE PLAN NORTHERN AREA				
Scale: 1:1250	Designed: -	Drawn: PJH	Checked: MK	Authorised: MRM
Original Size: A1	Date: -	Date: 02/04/14	Date: 02/04/14	Date: 02/04/14
Drawing Number: STWTN-ATK-GEN-ANXX-DR-Z-00001	Revision: P5			

0 10 100
Millimetres



THIS MAP IS REPRODUCED FROM ORDNANCE SURVEY MATERIAL WITH THE PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. © CROWN COPYRIGHT. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. Licence No. 100018928, 2014

KEY:

	SCHEME FOOTPRINT
	PERMANENT WORKS ON EXISTING HIGHWAY FOOTPRINT (4.2 Ha)
	PERMANENT LAND TAKE - SURFACE (2.5 Ha)
	PERMANENT LAND TAKE - SUB SURFACE
	TEMPORARY LAND TAKE FOR TEMPORARY WORKS OR SITE COMPOUNDS (3.8 Ha)

NOTES:

- THIS DRG HAS BEEN PREPARED USING INFORMATION TAKEN FROM:
 - MOTT MACDONALD EXTENT OF WORKS DRGS MD-298348-Z-DR-00-ZZ-1001 TO 1003;
 - MOUCHEL LANDOWNERSHIP PLANS SHEETS 1 TO 4, DATED 30/10/13.
- THE INFORMATION SHOWN ON THIS DRAWINGS IS TO BE CONFIRMED THROUGH THE REFERENCE DESIGN DEVELOPMENT AND CONFIRMATION OF LAND OWNERSHIP DETAILS.
- ENVIRONMENTAL AND PLANNING CONSTRAINTS ARE ILLUSTRATED ON SEPARATE DRAWINGS.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:	
CONSTRUCTION	
MAINTENANCE/CLEANING	
DECOMMISSIONING/DEMOLITION	
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement	

Rev.	Date	Description	By	CHK'd	App'd
P5	23/04/14	FOR INFORMATION	TT	MK	MRM
P4	14/04/14	FOR INFORMATION	PJH	MK	MRM
P3	09/04/14	FOR INFORMATION	PJH	MK	MRM
P2	04/04/14	FOR INFORMATION	PJH	MK	MRM
P1	02/04/14	FOR INFORMATION	PJH	MK	MRM

Drawing Status: **FOR INFORMATION**

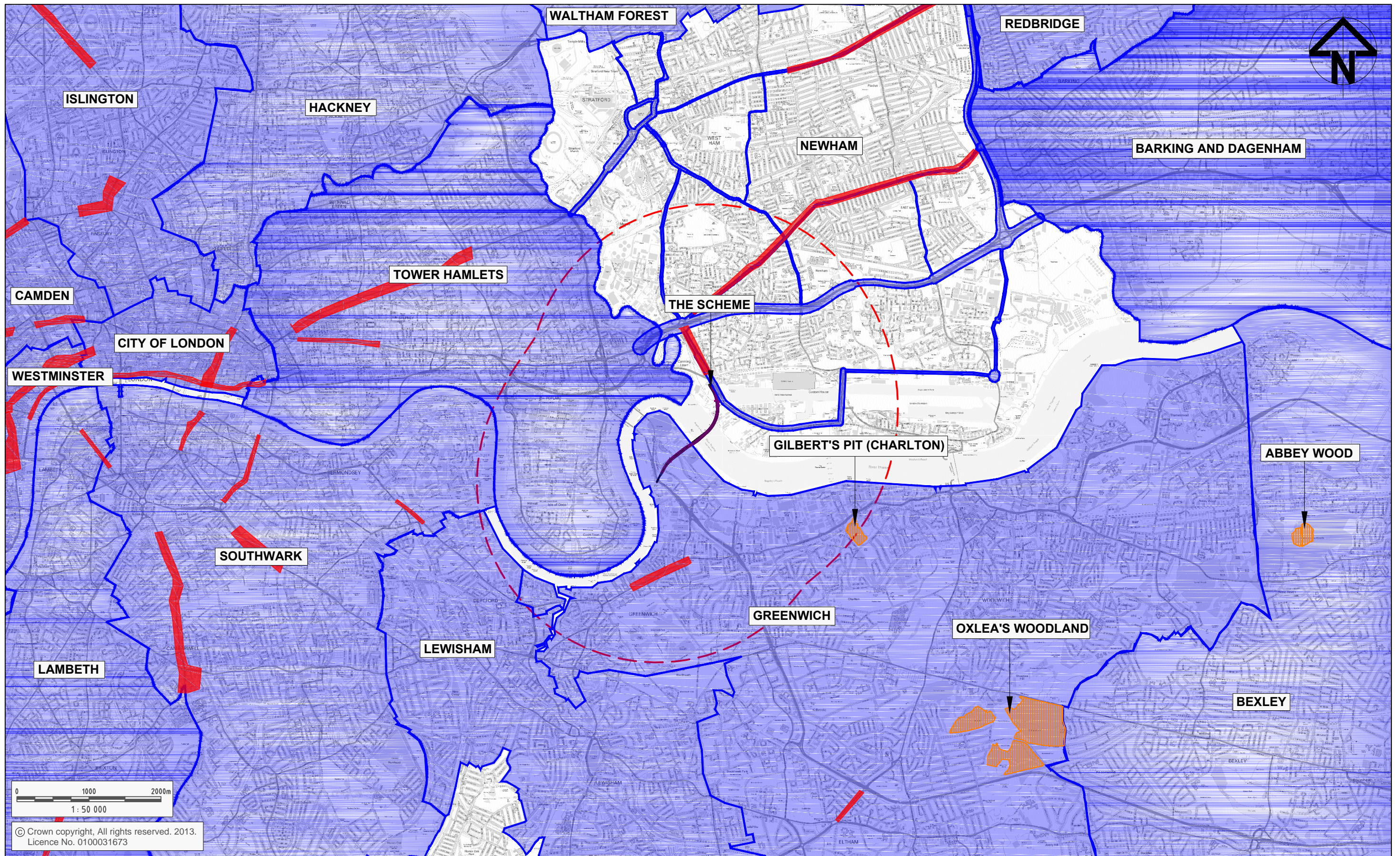
ATKINS

Woodcote Grove
Ashley Road
Epsom
Surrey
KT18 5BW
Tel: +44 (0)1372 726140
Fax: +44 (0)1372 740055
www.atkinsglobal.com

Copyright © Atkins Limited (2013)

Client: **Transport for London**

Subsidiary: S2	Project Title: SILVERTOWN TUNNEL REFERENCE DESIGN			
Drawing Title: LAND TAKE REFERENCE PLAN SOUTHERN AREA				
Scale: 1:1250	Designed: -	Drawn: PJH	Checked: MK	Authorised: MRM
Original Size: A1	Date: -	Date: 02/04/14	Date: 02/04/14	Date: 02/04/14
Drawing Number: STWTN-ATK-GEN-ASXX-DR-Z-00001	Revision: P5			



Issue	Description	Date
02		27 MAR 14
01		21 AUG 13

Notes	
	THE SCHEME
	APPROXIMATE 5km STUDY AREA
	AIR QUALITY MANAGEMENT AREA
	SITE OF SPECIAL SCIENTIFIC INTEREST
	AIR QUALITY FOCUS AREA

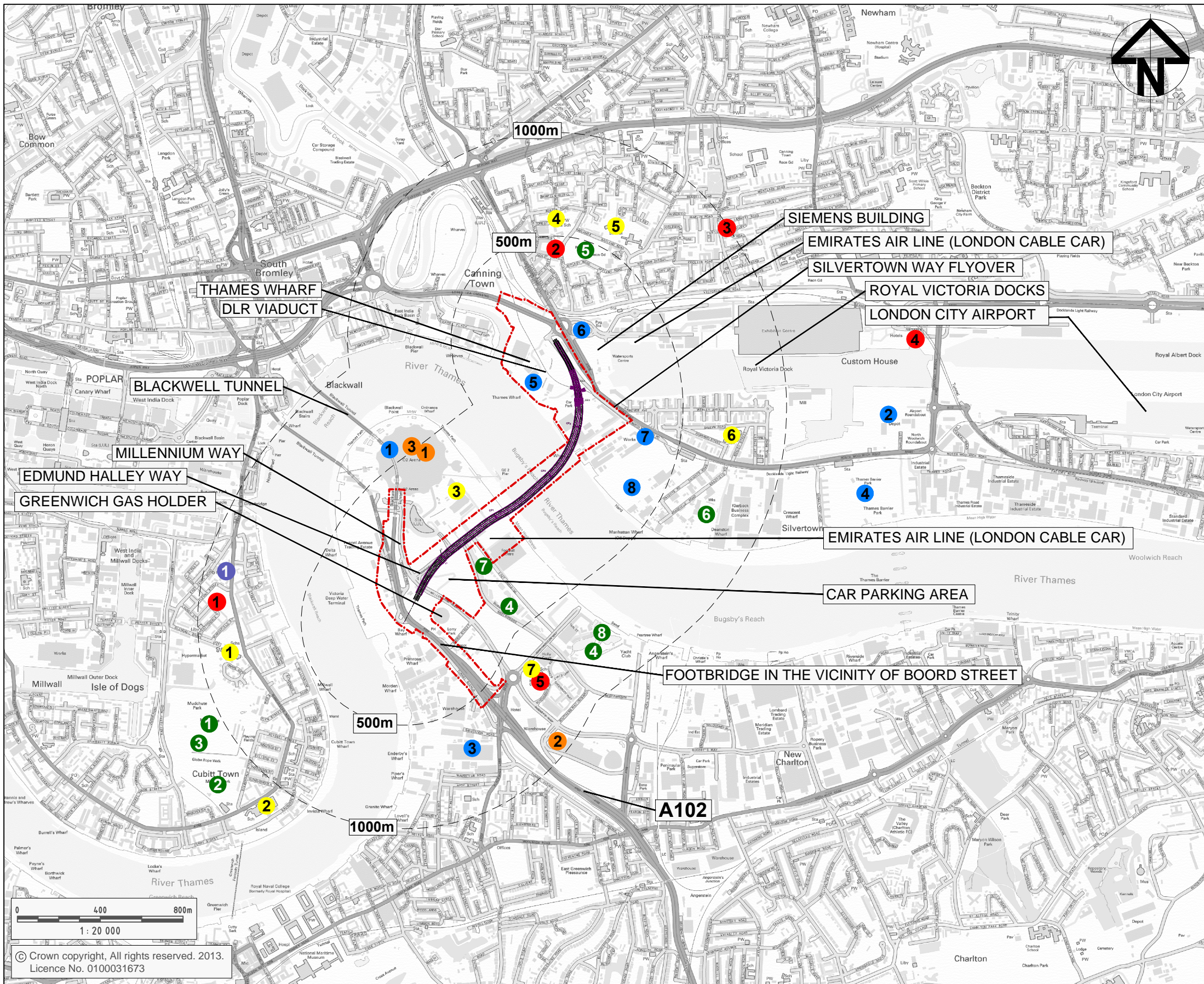
Client

Status	EIA SCOPING REPORT	
Scales	1:50,000	Current Issue Signatures
Original Size	A3	Author J.NORMAN
Datum	DATUM	Checker T.WRIGHT
Grid	GRID	Approver N.HARTLEY
Filename	6.1-UA005651-UE31D-02-AQ.DWG	
© Copyright reserved		

Project	SILVERTOWN TUNNEL
Title	AIR QUALITY CONSTRAINTS MAP GREENWICH/NEWHAM AREA

Hyder Consulting (UK) Limited
330 Firecrest Court
Centre Park
Warrington
WA1 1RG
Tel: +44 (0)1925 800700
Fax: +44 (0)1925 572462

Drawing No.	Project No.	Issue
Fig 6.1	UA005651	02



THE SCHEME
 SAFEGUARDED AREA

MEDICAL FACILITIES

- ISLAND MEDICAL CENTRE
- PSU SURGERY
- CUSTOM HOUSE TEACHING & TRAINING PRACTICE
- THE PRACTICE BRITANNIA
- GREENWICH PENINSULA PRACTICE

EDUCATIONAL FACILITIES

- CUBITT TOWN JUNIOR SCHOOL
- ST LUKE'S CHURCH OF ENGLAND PRIMARY SCHOOL
- RAVENSBORNE UNIVERSITY
- ST LUKE'S PRIMARY SCHOOL
- HALLSVILLE PRIMARY SCHOOL
- BRITANNIA VILAGE PRIMARY SCHOOL
- MILLENNIUM PRIMARY SCHOOL

ENTERTAINMENT FACILITIES

- O2 DOME
- CINEWORLD AT O2
- ODEON IMAX

COMMUNITY CENTRES

- ISLAND HOUSE COMMUNITY CENTRE

LAND ALLOCATED FOR DEVELOPMENT

- PENINSULA MASTERPLAN
- SILVERTOWN QUAYS
- NORTH GREENWICH DISTRICT CENTRE
- MINOCO WHARF (ROYAL DOCKS)
- THAMES WHARF
- ROYAL VICTORIA WEST
- NORTH WOOLWICH ROAD
- THAMESIDE WEST

OPEN SPACES

- MUDCHUTE FARM
- MILLWALL PARK
- ST JOHN'S PARK
- METROPOLITAN OPEN LAND ON GREENWICH PENINSULA
- KIER HARDIE RECREATION GROUND
- LYLE PAK
- CENTRAL PARK
- GREENWICH PENINSULA ECOLOGY PARK

0 400 800m
 1 : 20 000
 © Crown copyright. All rights reserved. 2013.
 Licence No. 0100031673

01		21 AUG 13
Issue	Description	Date
50mm on Original		

Notes

Client

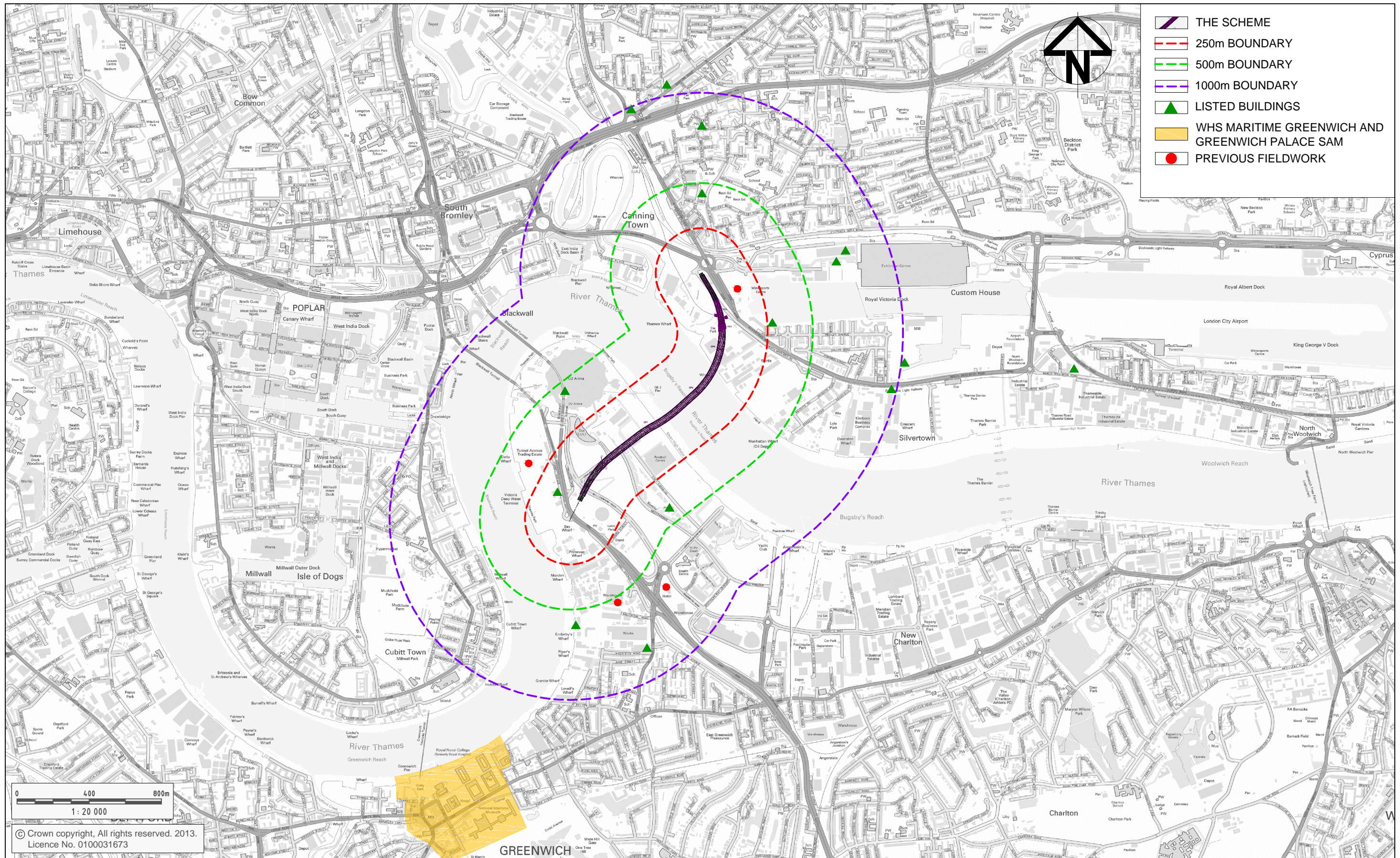
Status EIA SCOPING REPORT	
Scales	1:20,000
Original Size	A3
Datum	DATUM
Grid	GRID
Filename: 6.2-UA005651-UE31D-01-COMM.DWG	

Project
 EAST OF SILVERTOWN
 CROSSINGS: ENVIRONMENTAL
 OPTIONS STUDY

Title
 COMMUNITY AND PRIVATE
 ASSETS

Hyder Consulting (UK) Limited
 330 Firecrest Court
 Centre Park
 Warrington
 WA1 1RG
 Tel: +44 (0)1925 800700
 Fax: +44 (0)1925 572462

Drawing No. | Project No. | Issue
 Fig 6.2 – UA005651 – 01



Issue	Description	Date
01		21 AUG 13

Notes

Client

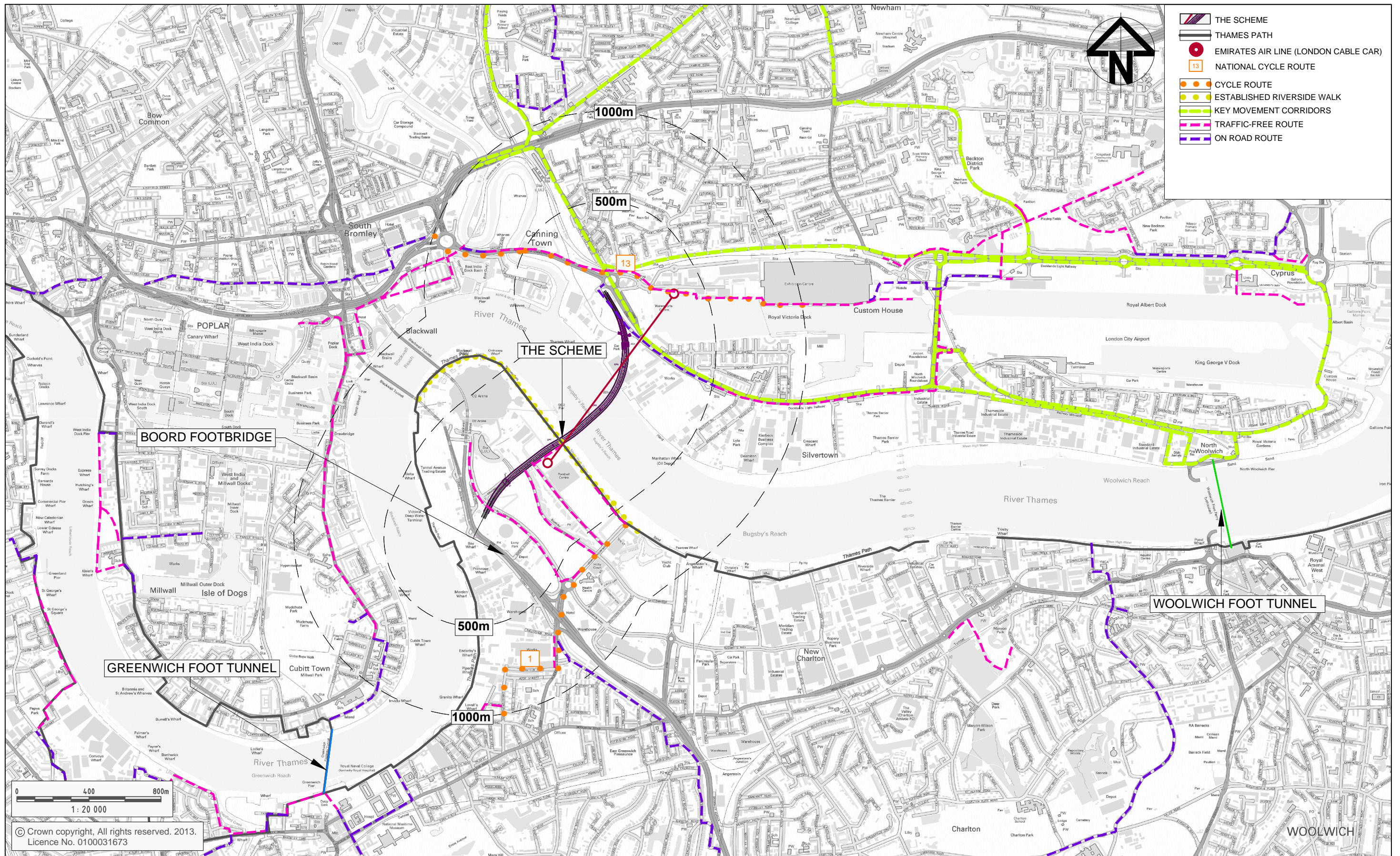
Status	EIA SCOPING REPORT	
Scales	1:20,000	Current Issue Signatures
Original Size	A3	Author J.NORMAN
Datum	DATUM	Checker J.WYLIE
Grid	GRID	Approver N.HARTLEY
Filename	6.3-UA005651-UE31D-01-CH.DWG	

Project
SILVERTOWN TUNNEL

Title
CULTURAL HERITAGE CONSTRAINTS PLAN

Hyder Consulting (UK) Limited
330 Firecrest Court
Centre Park
Warrington
WA1 1RG
Tel: +44 (0)1925 800700
Fax: +44 (0)1925 572462

Drawing No. | Project No. | Issue
Fig 6.3 — UA005651 — 01



Issue	Description	Date
01		21 AUG 13

Notes

Client

Client

Status		EIA SCOPING REPORT	
Scales	1:20,000	Current Issue Signatures	
Original Size	A3	Author	J.NORMAN
Datum	DATUM	Checker	S.VAN DE PETTE
Grid	GRID	Approver	N.HARTLEY
Filename	6.4-UA005651-UE31D-01-TRAVELLERS.DWG		
© Copyright reserved			

Project

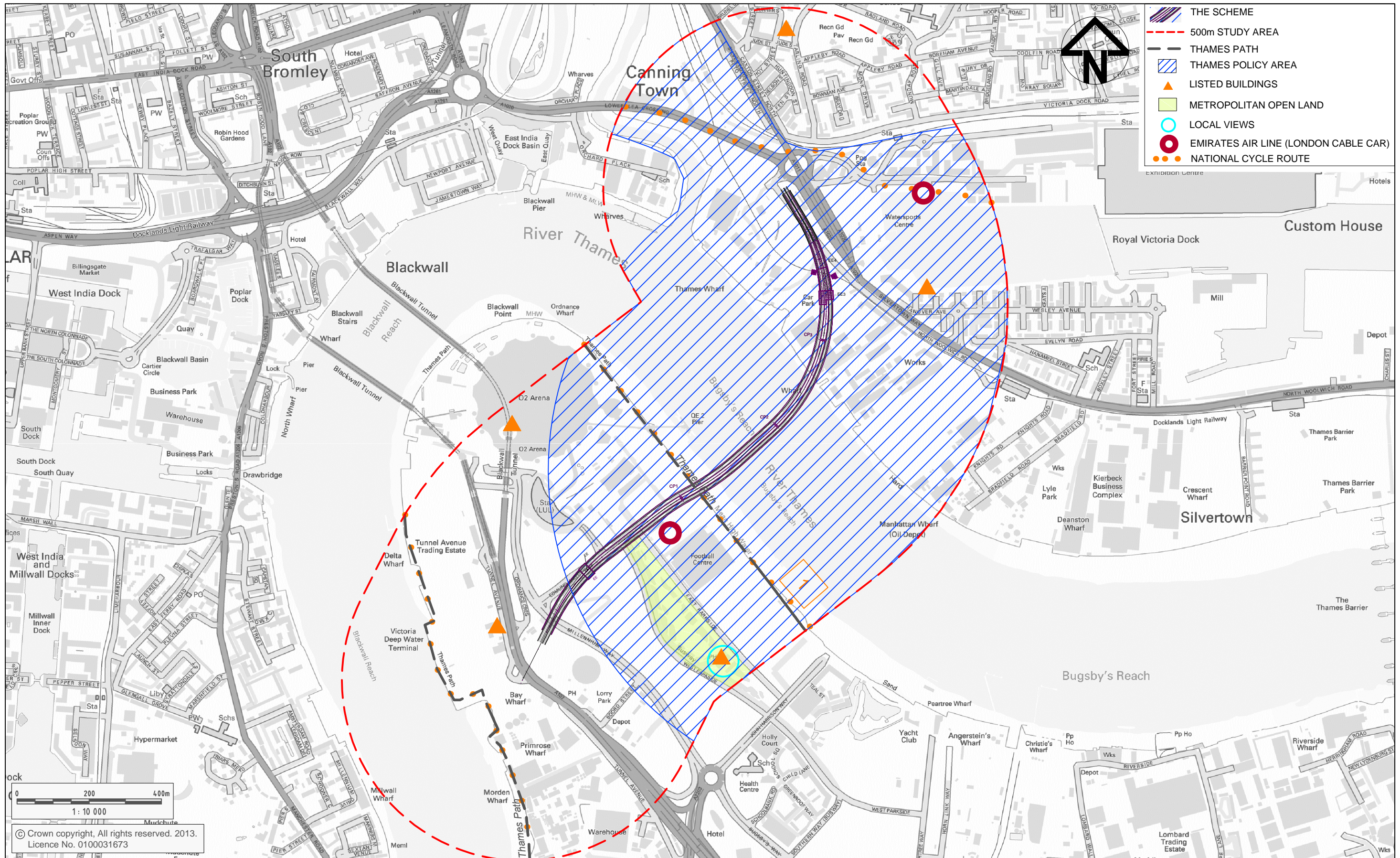
SILVERTOWN TUNNEL

Title

EFFECTS ON ALL TRAVELLERS

Hyder Consulting (UK) Limited
 330 Firecrest Court
 Centre Park
 Warrington
 WA1 1RG
 Tel: +44 (0)1925 800700
 Fax: +44 (0)1925 572462

Drawing No. | Project No. | Issue
 Fig 6.4 – UA005651 – 01



Issue	Description	Date
01	FIRST ISSUE	21 AUG 13

Notes

Client



Status	EIA SCOPING REPORT	
Scales	1:10,000	Current Issue Signatures
Original Size	A3	Author J.NORMAN
Datum	DATUM	Checker M.CARTWRIGHT
Grid	GRID	Approver N.HARTLEY
Filename	6.5-UA005651-UE31D-01-LANDSCAPE.DWG	

Project	SILVERTOWN TUNNEL
Title	TOWNSCAPE AND VISUAL CONSIDERATIONS

Hyder Consulting (UK) Limited
 330 Firecrest Court
 Centre Park
 Warrington
 WA1 1RG
 Tel: +44 (0)1925 800700
 Fax: +44 (0)1925 572462

Drawing No. | Project No. | Issue
 Fig 6.5 — UA005651 — 01

Appendix B

Significance Criteria

Air Quality

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 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 B1 presents the magnitude of change criteria presented in the IAN, and can be applied to annual average nitrogen dioxide (NO₂) and PM₁₀ concentrations.

Table B1- 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 will be an impact as a result of the scheme. The results from the air quality modelling at receptors are used to populate Table B2 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 B2. The total numbers of receptors are then aggregated, in order to calculate the total number of receptors in each of the six categories.

Table B2 - Local Air Quality Receptors Informing Scheme Significance

Magnitude of Change in Annual Average NO₂ or PM₁₀ (µg/m³)	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 B3. These are guideline values only, and are to be used to inform professional judgement on significant effects of the scheme.

Table B3 - Guideline Values to Determine Significance

Magnitude of Change in NO₂ (µg/m³)	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

Cultural Heritage

Table B4 presents the scale of values that will be assigned to archaeological remains.

Table B4 - Cultural Heritage Assessment - Criteria for Determining the Value (Significance) of Archaeological Assets

Value	Example
Very High	World Heritage Sites (including nominated sites) Assets of acknowledged international importance Assets that can contribute significantly to acknowledged international research objectives
High	Scheduled Monuments (including proposed sites) Undesignated assets of Schedulable quality and importance Assets that can contribute significantly to acknowledged national research objectives
Medium	Designated or undesignated assets that contribute to regional research objectives
Low	Designated and undesignated assets of local importance Assets compromised by poor preservation and/or poor survival of contextual associations Assets of limited value, but with potential to contribute to local research objectives
Negligible	Assets with very little or no surviving archaeological interest
Unknown	The importance of the resource has not been ascertained

Table B5 presents the scale of values that will be assigned to historic buildings.

Table B5 - Cultural Heritage Assessment - Criteria for Determining the Value (Significance) of Built Heritage Assets

Value	Example
Very High	Structures inscribed as of universal importance as World Heritage Sites Other buildings of recognised international importance
High	Scheduled Monuments with standing remains Grade I and Grade II* Listed Buildings Other Listed Buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade Conservation Areas containing very important buildings Undesignated structures of clear national importance

Value	Example
Medium	Grade II Listed Buildings Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical associations Conservation Areas containing buildings that contribute significantly to its historic character Historic townscape or built up areas with important historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Low	'Locally Listed' buildings Historic (unlisted) buildings of modest quality in their fabric or historical association Historic townscape or built up areas of limited historic integrity in their buildings or built settings (e.g. including street furniture and other structures)
Negligible	Buildings of no architectural or historical note; buildings of intrusive character
Unknown	Buildings with some hidden (i.e. inaccessible) potential for historic significance

Table B6 presents the scale of values that will be assigned to historic landscapes.

Table B6 - Cultural Heritage Assessment - Criteria for Determining the Value (Significance) of Historic Landscape Assets

Value	Example
Very High	World Heritage Sites inscribed for their historic landscape qualities Historic landscapes of international value, whether designated or not Extremely well preserved historic landscapes with exceptional coherence, time-depth, or other critical factor(s)
High	Undesignated historic landscapes of outstanding interest Undesignated historic landscapes of high quality and importance, and of demonstrable national value Well preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factor(s)
Medium	Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factor(s)
Low	Robust undesignated historic landscapes Historic landscapes with importance to local interest groups Historic landscapes whose value is limited by poor preservation

Value	Example
	and/or poor survival of contextual associations
Negligible	Landscapes with little or no significant historical interest

Magnitude of Impact

The determination of magnitude of impact will be based on the vulnerability of the study area, its current state of survival/condition and the nature of the impact upon it. The survival and extent of archaeological deposits is often uncertain and consequently, the magnitude of impact can be difficult to predict with any certainty.

Table B7 presents the magnitude of impact criteria related to archaeological assets.

Table B7 - Cultural Heritage Assessment - Criteria for Determining the Magnitude of Impact on Archaeological assets

Magnitude of Impact	Example
Major	Change to most or all key archaeological materials, such that the resource is totally altered Comprehensive changes to setting
Moderate	Changes to many key archaeological materials, such that the resource is clearly modified Considerable changes to setting that affect the character and significance of the asset
Minor	Changes to key archaeological materials, such that the asset is slightly altered Slight change to setting that affects its significance
Negligible	Very minor changes to archaeological materials, or setting
No Change	No change

Table B8 presents the magnitude of impact criteria related to historic buildings.

Table B8 - Cultural Heritage Assessment - Criteria for Determining the Magnitude of Impact on Built Heritage Assets

Magnitude of Impact	Example
Major	Change to key historic building elements, such that the resource is totally altered Comprehensive changes to the setting
Moderate	Change to many key historic building elements, such that the

Magnitude of Impact	Example
	resource is significantly modified Changes to the setting of an historic building, such that it is significantly modified and its significance is affected
Minor	Change to key historic building elements, such that the asset is slightly different Change to setting of an historic building, such that it is noticeably changed and its significance is affected
Negligible	Slight changes to historic building elements or setting that hardly affect it
No Change	No change to fabric or setting

Table B9 presents the magnitude of impact criteria related to historic landscapes.

Table B9 - Cultural Heritage Assessment - Criteria for Determining the Magnitude of Impact on the Historic Landscape

Magnitude of Impact	Example
Major	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit.
Moderate	Changes to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, noticeable differences in noise or sound quality, considerable changes to use or access; resulting in moderate changes to historic landscape character.
Minor	Changes to few key historic landscape elements, parcels or components, slight visual changes to few key aspects of historic landscape, limited changes to noise levels or sound quality; slight changes to use or access: resulting in limited changes to historic landscape character.
Negligible	Very minor changes to key historic landscape elements, parcels or components, virtually unchanged visual effects, very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.
No Change	No change to elements, parcels or components; no visual or audible changes; no changes arising from in amenity or community factors.

Significance of Effects

Table B10 illustrates how information on the value of the asset and the magnitude of impact will be combined to arrive at an assessment of the significance of effect. The matrix is not intended to ‘mechanise’ judgement of the significance of effect but to act as a check to ensure that judgements regarding value, magnitude of impact and significance of effect are reasonable and balanced. In order to allow for professional judgement, in some cases the matrix allows a choice of significance of effect when a magnitude of impact and a value are combined. In these cases the individual attributes of a specific asset, along with any relevant site specific factors and consideration of other influencing elements, will be taken into account when considering which is the most appropriate significance of effect to apply.

Based on professional judgement and the guidance set out in the PPS5 practice guide, a “significant” effect is considered to be one of moderate significance or above and/or one where it can be said that an asset will experience substantial harm. All effects that are considered to be significant are highlighted in bold in Table B10.

Table B10 - Cultural Heritage Assessment - Criteria for Determining the Significance of Effects

		Magnitude of Impact				
		<i>No Change</i>	<i>Negligible</i>	<i>Minor</i>	<i>Moderate</i>	<i>Major</i>
Value	<i>Very High</i>	Neutral	Slight	Moderate/Large	Large or Very Large	Very Large
	<i>High</i>	Neutral	Slight	Moderate/Slight	Moderate/Large	Large/Very Large
	<i>Medium</i>	Neutral	Neutral/Slight	Slight	Moderate	Moderate/Large
	<i>Low</i>	Neutral	Neutral/Slight	Neutral/Slight	Slight	Slight/ Moderate
	<i>Negligible</i>	Neutral	Neutral	Neutral/Slight	Neutral/Slight	Slight

Ecology and Nature Conservation

The criteria for determining the significance of ecological impacts differ from most other environmental disciplines within EIA. This is because significance is assessed with regard to the long term viability or integrity of species populations or habitats, and impacts are considered to be either significant or not significant. Gradation in the severity of the significant effect is provided by the geographic scale at which the ecological receptor has been assessed as being of importance.

Assessment Methodology

In accordance with the CIEEM 'Guidelines for Ecological Impact Assessment (2006)', a comprehensive assessment will be carried out to collate all of the existing baseline information and predict confidently all of the significant effects of the construction and operational phases of the Scheme on Key Ecological Receptors (KERs), both with and without mitigation. Where significant adverse effects are predicted, the assessment will present measures to mitigate these effects, where possible. In addition, measures will be developed to address the legislative requirements associated with protected species, for which significant effects are not expected, and which are therefore not classified as KERs, but which nevertheless warrant mitigation.

A KER can be defined as a receptor that is sufficiently important to be material in the decision-making process, and where impacts on that receptor, which could result from the Scheme in isolation or in combination with other developments, could generate a significant effect.

Potential KERs have been considered during the scoping process of this EIA, and are set out in Section 6.6, above. Investigations will be undertaken as part of the desk study and field surveys to confirm the presence or likely absence of notable habitats, species or assemblages from within the area where effects of the Scheme could occur (the Zone of Influence). The process used to determine which of those habitats, species or assemblages are identified as KERs for this the purpose of this assessment is described below.

Zone of Influence

The Zone of Influence (Zol) describes the area over which the activities associated with the Scheme could influence ecological resources. This will be established on the basis of a desk-based review of ecological resources in the general vicinity of the application site, together with the results of field surveys, a review of the likely impact parameters associated with the Scheme, and the outcomes of the consultation exercise. As with the study area, the Zol varies with each species/species group identified as a potential KER.

Determining value of ecological resources

In order to determine the likelihood of a significant effect, it will first be necessary to identify whether a receptor is sufficiently valuable for any impact upon it to be able to generate a significant effect. To achieve this, where possible, habitats, species and populations will be valued on the basis of a

combination of their rarity, status and distribution, using contextual information where it exists. The following frame of reference for the valuation of ecological resources will be used:

- International
- UK
- National (England)
- Regional (south east England)
- County (Greater London)
- District/borough (Newham, Greenwich, Tower Hamlets)
- Local (Silvertown area)

Table B11 (taken from DMRB Interim Advice Note 130/10) provides an indication of the types of receptor that would be classified in each category.

Table B11 - Nature Conservation Assessment - Criteria for Determining the Value of ecological resources

<p>International or European Value</p> <p>Natura 2000 sites including: Sites of Community Importance (SCIs); Special Protection Areas (SPAs); potential SPAs (pSPAs); Special Areas of Conservation (SACs); candidate or possible SACs (cSACs or pSACs1); and Wetlands of International Importance (Ramsar sites).</p> <p>Biogenetic Reserves, World Heritage Sites and Biosphere Reserves.</p> <p>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.</p> <p>Resident, or regularly occurring, populations of species which may be considered at an International or European level where:</p> <ul style="list-style-type: none">• the loss of these populations would adversely affect the conservation status or distribution of the• species at this geographic scale; or• the population forms a critical part4 of a wider population at this scale; or• the species is at a critical phase5 of its life cycle at this scale.
<p>UK or National Value (England)</p> <p>Designated sites including: Sites of Special Scientific Interest (SSSIs); Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNRs).</p> <p>Areas which meet the published selection criteria (e.g. JNCC (1998)) for those sites listed above but which are not themselves designated as such.</p>

Areas of key/priority habitats identified in the UK Biodiversity Action Plan (BAP), including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity.

Areas of Ancient Woodland (e.g. woodland listed within the Ancient Woodland Inventory).

Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:

- the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or
- the population forms a critical part of a wider population at this scale; or
- the species is at a critical phase of its life cycle at this scale.

Regional Value (south east England)

Areas of key/priority habitats identified in the Regional BAP (where available); areas of key/priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats (for example, South West Nature Map); and areas of key/priority habitat listed within the Highways Agency's BAP.

Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within the HABAP where:

- the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or
- the population forms a critical part of a wider population; or
- the species is at a critical phase of its life cycle.

County or District/Borough Value (Greater London/ Newham, Greenwich, Tower Hamlets)

Designated sites including: Sites of Importance for Nature Conservation (SINCs); County Wildlife Sites (CWSs); and Local Nature Reserves (LNRs) designated in the county or district/borough area context.

Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.

Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent).

Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:

- the loss of these populations would adversely affect the conservation status or distribution of the species across the County or district/borough; or

- the population forms a critical part of a wider population; or
- the species is at a critical phase of its life cycle.

Local Value (Silvertown area)

Trees that are protected by Tree Preservation Orders (TPOs).

Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees, scrub/grassland mosaic, etc.), including features of value for migration, dispersal or genetic exchange.

In accordance with the CIEEM Guidelines, the assessment will focus on those activities that could potentially generate significant effects on KERs. Within this EIA, those receptors considered to be of 'district/borough' value or greater will be identified as potential KERs. Effects on receptors of lower value will not be assessed in detail. However, consideration will be given separately to 'other ecological receptors requiring mitigation'. These will include habitats and species within the application site that do not constitute KERs based upon their nature conservation value, and that will not form part of the detailed assessment. However, they will still warrant consideration during the design and mitigation of the Scheme on the basis of their legal protection or other issues such as animal welfare and mitigation best practice.

Once the ecological resources within the ZoI have been identified and valued (in order to determine which could possibly be material in the decision-making process), it will then be necessary to investigate potential effects on those receptors in order to understand how they might be affected by the Scheme.

Effect characterisation

The impact assessment will be based on an understanding of the likely activities associated with the Scheme, the biophysical changes that could be predicted as a result of these activities, and the area over which such effects might be experienced by different receptors. These effects will be considered for the construction and operational phases of the Scheme. They will be characterised and described in detail using the following parameters as set out in the CIEEM Guidelines:

- Positive or negative
- Magnitude (the 'size' or 'amount' of an impact)
- Extent (the area over which the impact occurs)
- Duration (the time for which the impact is expected to last prior to recovery or replacement of the resource or feature)
- Reversibility (permanent or temporary)

- Timing and frequency

In order to determine which potential KERs could be sufficiently affected by the Scheme so that a significant effect could be generated, a preliminary assessment of the likely impacts of the Scheme will first be undertaken. Where it is determined that a potential KER could be sufficiently impacted for a significant effect to be possible, that receptor would be 'scoped in' to the detailed impact assessment. Those receptors that are not considered to be sufficiently valuable, or where the potential impacts on them are considered unlikely to generate a significant effect, will be 'scoped out' of the detailed impact assessment. A justification of the scoping in or scoping out of the potential KERs would be provided in the ES.

Significance criteria

The significance of an effect will be determined on the basis of an analysis of the factors that characterise the effect, irrespective of the value of the receptor. A significant effect is defined as one which is considered likely to affect the integrity or conservation status of a KER. Where a significant effect is identified, the value of the receptor will be used to help determine the geographical scale at which the effect is significant. Thus, any negative effect which is considered to significantly affect the integrity of a receptor of, for example, national value will be identified as being a nationally significant effect.

The significance of the likely effects upon the KERs will be assessed both before and after consideration of the additional mitigation measures. The latter will represent the assessment of the residual effects of the Scheme.

Table B11 below illustrates an approach to relating significant impacts on receptors at different levels of value, taken from Table B10 above, to the overall 'significance categories' used by other topic areas. This approach (which is set out in DMRB IAN 130/10) takes account of other sources of references, but does not specifically align with any single published methodology.

Table B11 - Nature Conservation Assessment - Significance of Effects

Significance Category	Typical Descriptors of Effect (Nature Conservation)
Very Large	A significant impact on one or more receptor(s) of International, European, UK or National Value. [NOTE: only adverse effects are normally assigned this level of significance. They should be considered to represent key factors in the decision-making process.]
Large	A significant impact on one or more receptor(s) of Regional Value. [NOTE: these effects are considered to be very important considerations and are likely to be material in the decision-making process.]
Moderate	A significant impact on one or more receptor(s) of County or Unitary Authority Area Value.

	[NOTE: these effects may be important, but are not likely to be key decision-making factors.]
Slight	A significant impact on one or more receptor(s) of Local Value. [NOTE: these effects are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.]
Neutral	No significant impacts on key nature conservation receptors. [NOTE: absence of effects, or those that are beneath levels of perception.]

Geology and Soils

The value (importance) of the resource will be described using the guidance outlined in Table B12. Receptors considered within this assessment form the headings.

Table B12 - Determining the Value of Receptors

Importance combined with sensitivity of resource or receptor	Receptor: Geology and Soils	Receptor: Human Health * (Soils)	Receptor: Human Health /Buildings and Structures ** (Ground Gas)	Receptor: Controlled Waters (groundwater and surface water bodies)
Very High	Geological and geomorphological sites of international importance (including geological SSSI)	Future users of residential properties with private gardens.	Low rise residential properties.	<p>High water quality and rare resource. Important at a regional or national scale, with limited potential for substitution, e.g.</p> <ul style="list-style-type: none"> ▪ Supply of high quality potable water to a large population <p><u>Groundwater:</u></p> <ul style="list-style-type: none"> ▪ Principal aquifer ▪ Within Source Protection Zone 1 or 2 <p><u>Surface water:</u> Attributed with a high quality and rarity resource. Important at a regional or national scale, with limited potential for substitution.</p>
High	Geological and geomorphological sites of national importance (including geological SSSI)	Future users of allotments. Construction Workers^.	Residential properties other than low rise.	<p>High water quality and rare resource. Important at a local scale with limited potential for substitution, e.g.</p> <ul style="list-style-type: none"> ▪ Supply of a small volume of potable water for local use <p><u>Groundwater:</u></p> <ul style="list-style-type: none"> ▪ Secondary A aquifer ▪ Within Source Protection Zone 3 <p><u>Surface water:</u> Attributed with a high quality and rarity, important at a local scale with limited potential for substitution.</p>

Importance combined with sensitivity of resource or receptor	Receptor: Geology and Soils	Receptor: Human Health * (Soils)	Receptor: Human Health /Buildings and Structures ** (Ground Gas)	Receptor: Controlled Waters (groundwater and surface water bodies)
Medium	Geological and geomorphological sites of regional importance (including RIGS)	Future users of residential properties without private gardens.	Public building e.g. managed apartments, schools and hospitals	<p>Moderate water quality and low rarity. Important at a local scale e.g.</p> <ul style="list-style-type: none"> ▪ Supply of a small volume of water for agricultural or industrial use or limited potential for potable supply <p><u>Groundwater:</u></p> <ul style="list-style-type: none"> ▪ Secondary B aquifer ▪ Not within Source Protection Zone <p><u>Surface water:</u></p> <p>Attributed with a medium quality and rarity, important at the local scale with limited potential for substitution or high quality with medium rarity, important at the local scale and medium potential for substitution.</p>
Low	Geological and geomorphological sites which are not designated sites but which have local importance	Future users of public open space	Commercial buildings	<p>Poor water quality and low rarity e.g.</p> <ul style="list-style-type: none"> ▪ Limited potential to supply a small volume of water for agricultural or industrial use. No or limited potential for potable supply <p><u>Groundwater:</u></p> <ul style="list-style-type: none"> ▪ Secondary B aquifer ▪ Not within Source Protection Zone <p><u>Surface water:</u></p> <p>Attribute with a medium quality with low rarity, important at the local scale with medium potential for substitution.</p>

Importance combined with sensitivity of resource or receptor	Receptor: Geology and Soils	Receptor: Human Health * (Soils)	Receptor: Human Health /Buildings and Structures ** (Ground Gas)	Receptor: Controlled Waters (groundwater and surface water bodies)
Negligible	Geological or geomorphological sites with little or no significance of importance.	Future users of commercial/ industrial properties	Industrial buildings (where open and well ventilated; office pods might require separate assessment as classified as commercial)	<p>Poor or bad water quality and low rarity. Important at a local scale e.g.</p> <ul style="list-style-type: none"> ▪ No or very limited potential to supply water for agricultural or industrial use <p><u>Groundwater:</u></p> <ul style="list-style-type: none"> ▪ Non designated aquifer or unproductive strata ▪ Not within Source Protection Zone <p><u>Surface water:</u></p> <p>Attribute with a low / negligible quality and rarity, important at the local scale with high potential for substitution.</p>

Notes

*Duration of exposure to contamination and number of pathways of exposure to contamination increases from commercial/industrial (minimum) to residential with private garden (maximum) land uses.

** Duration of occupancy and perception of risk increases from industrial buildings (minimum) to low rise residential properties (maximum). Amount of ventilation and management increases from low rise residential properties (minimum) to industrial buildings (maximum).

^Construction workers will only be exposed to contamination for a short duration, however, they may enter enclosed spaces and will be directly handling the soils.

The magnitude of each impact is assessed using the criteria provided in Table B13 below.

Table B13 - Determining the Magnitude of Impact

Magnitude of Impact	Geology and Soils	Human Health (Construction workers and future site users)	Building / Structure	Controlled Waters
Very High	Loss of feature	Acute risk to	Catastrophic	Loss in water body

Magnitude of Impact	Geology and Soils	Human Health (Construction workers and future site users)	Building / Structure	Controlled Waters
	or attribute (or creation of new feature or attribute where positive)	human health likely to result in 'significant harm' as defined by the Environmental Protection Act 1990, Part IIA.	damage to buildings/property. E.g. explosion resulting in building collapse.	or permanent significant detrimental effect on water quality which permanently affects its use to or potential to supply water.
High	Partial loss of feature or attribute	Chronic damage to human health as defined by the Environmental Protection Act 1990, Part IIA.	Significant damage to buildings, structures and services.	Temporary loss of water body. Significant temporary detrimental effect on water quality but does not affect its use or moderate temporary detrimental effect on water quality, which does affect its use for supply purposes.
Medium	Moderate impact on integrity of feature or attribute	Significant chronic harm but to less sensitive receptors.	Damage to sensitive buildings, structures, services or the environment.	Moderate temporary detrimental effect on water quality, which does not affect its use for supply purposes.
Low	Slight impact on integrity of feature or attribute	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing).	Easily repairable effects of damage to buildings, structures and services.	Minor temporary detrimental effect on water quality.
Negligible	Insufficient magnitude to impact integrity	No discernible effect	No discernible effect	No discernible effect

Materials

Table B14 - Materials Assessment Reporting Matrix

Scheme Activity	Potential Impacts Associated with material Resources/Waste Arisings	Description of the Impacts
Site remediation/preparation	This would provide a summary of the impacts associated with: <ul style="list-style-type: none"> • Material use • Waste management 	This would identify the nature of the impact: Adverse/beneficial Permanent/temporary Direct/indirect Magnitude of Change
Demolition		
Site construction		
Operation and Maintenance of Asset		

Table B15 – Materials Mitigation Measures Reporting Matrix

Scheme Activity	Potential Impacts Associated with material Resources/Waste Arisings	Description of mitigation measures	How the measures will be implemented, measured and monitored
Site remediation/preparation	This would provide a summary of the impacts associated with: <ul style="list-style-type: none"> • Material use • Waste management 	This would describe the mitigation measures for each impact	This would provide details of how the mitigation measures would be implemented, measured and monitored.
Demolition			
Site construction			
Operation and Maintenance of Asset			

Noise and Vibration

Construction Phase

Annex E of BS 5228 gives several examples of methods for predicting the significance of noise impacts. The method followed for the impact assessment is that described in BS 5228 as the “ABC method”, where the change in the ambient noise level with construction noise is assessed against defined threshold values. The relevant data from Table E.1 of example threshold values in BS 5228 is reproduced below:

Table B16 Impact Significance from Construction Noise

Assessment category and threshold value period	Threshold Level		
	Category A	Category B	Category C
Night-time (23.00 – 07.00)	45	50	55
Evenings & weekends ¹	55	60	65
Daytime (07.00 – 19.00) and Saturday mornings ²	65	70	75
¹ 19.00 - 23.00 weekdays, 13.00 - 23.00 Saturdays and 07.00 – 23.00 Sundays ² 07.00 – 13.00 Saturdays			
<p>A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.</p> <p>B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.</p> <p>C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.</p>			

- A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.
- If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.
- Applied to residential receptors only.

Construction Vibration

Table B17 - Impact Significance from Construction Vibration

Vibration level (PPV)	Effect	Significance of Impact
Less than 0.14 mm·s ⁻¹	Vibration is not considered perceptible	No Impact
0.14 mm·s ⁻¹	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible
0.3 mm·s ⁻¹	Vibration might be just perceptible in residential environments.	Minor
1.0 mm·s ⁻¹	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	Moderate
10 mm·s ⁻¹	Vibration is likely to be intolerable for any more than a very brief exposure to this level	Major

Operational Phase

Road Traffic Noise

The scale of magnitude of impact, which is applicable to both increases and decreases in traffic noise that will be adopted for the assessment are presented below for short-term and long term noise impacts.

Table B18 - Magnitude of Noise Impacts (dBA) In the Short Term

Noise change, L _{A10 18hour}	Magnitude of Impact
0	No change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5+	Major

Table B19 - Magnitude of Noise Impacts (dBA) 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

Tunnel Ventilation Noise

The impact significance for the operational noise of the tunnel ventilation has been derived from the criteria contained in BS 4142. This method of evaluating noise impacts compares the source noise level (in dB LAeq) to the background noise level (in dB LA90) at the noise-sensitive property. This impact criterion states that a change in noise levels due to operations of +10dB above the background levels is likely to lead to complaints from the noise-sensitive property, a +5dB increase has a medium likelihood of complaints and -10dB change is an indication that complaints are unlikely. The impact significance is presented below.

Table B20 - Magnitude of Noise Impacts (dBA) In the Long Term

Noise change (Rating Level)	Significance of Impact
-10	No Impact
-9.9 – 0	Negligible
0 – 4.9	Minor
5 – 9.9	Moderate
> 10	Major

Townscape and Visual

Table B21 - Landscape Sensitivity and Typical Examples

Sensitivity	Typical Descriptors
High	<p>Landscapes and townscapes which by nature of their character would be unable to accommodate change of the type proposed. Typically these would be:</p> <p>Of high quality with distinctive elements and features making a positive contribution to character and sense of place.</p> <p>Likely to be designated, but the aspects which underpin such value may also be present outside designated areas, especially at the local scale.</p> <p>Areas of special recognised value through use, perception or historic and cultural associations.</p> <p>Likely to contain features and elements that are rare and could not be replaced.</p>
Moderate	<p>Townscapes which by nature of their character would be able to partly accommodate change of the type proposed. Typically these would be:</p> <p>Comprised of commonplace elements and features creating generally unremarkable character but with some sense of place.</p> <p>locally designated, or their value may be expressed through non-statutory local publications.</p> <p>Containing some features of value through use, perception or historic and cultural associations.</p> <p>Likely to contain some features and elements that could not be replaced.</p>
Low	<p>Landscapes which by nature of their character would be able to accommodate change of the type proposed. Typically these would be:</p> <p>Comprised of some features and elements that are discordant, derelict or in decline, resulting in indistinct character with little or no sense of place.</p> <p>Not designated.</p> <p>Containing few, if any, features of value through use, perception or historic and cultural associations.</p> <p>Likely to contain few, if any, features and elements that could not be replaced.</p>

Table B22 - Magnitude and Nature of Impact and Typical Descriptors

Magnitude of Impact	Typical Criteria Descriptors
Major Adverse	Total loss or large scale damage to existing character or distinctive features and elements, and/or the addition of

Magnitude of Impact	Typical Criteria Descriptors
	new but uncharacteristic conspicuous features and elements.
Moderate Adverse	Partial loss or noticeable damage to existing character or distinctive features and elements, and/or the addition of new but uncharacteristic noticeable features and elements.
Minor Adverse	Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.
Negligible Adverse	Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.
No Change	No noticeable loss, damage or alteration to character or features or elements.
Negligible Beneficial	Barely noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Minor Beneficial	Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.
Moderate Beneficial	Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic features.
Major Beneficial	Large scale improvement of character by the restoration of features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.

Table B23 - Significance of Townscape Effect Categories

		Magnitude of Impact				
		No change	Negligible	Minor	Moderate	Major
Townscape Sensitivity	High	Neutral	Slight	Slight/ Moderate	Moderate/ Large	Large/ Very Large
	Moderate	Neutral	Neutral/ Slight	Slight	Moderate	Moderate/ Large
	Low	Neutral	Neutral/	Neutral/	Slight	Slight/

			Slight	Slight		Moderate
--	--	--	--------	--------	--	----------

Table B24 - Typical Descriptors of Significance of Townscape Effect Categories

Significance Category	Typical Criteria Descriptors
Very Large Beneficial (Positive) Effect	The project would: Greatly enhance the character (including quality and value) of the townscape Create an iconic high quality feature and/or series of elements. Enable a sense of place to be created or greatly enhanced.
Large Beneficial (Positive) Effect	The project would: Enhance the character (including quality and value) of the townscape. Enable the restoration of characteristic features and elements lost as a result of changes from inappropriate management or development. Enable a sense of place to be enhanced.
Moderate Beneficial (Positive) Effect	The project would: Improve the character (including quality and value) of the townscape. Enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development. Enable a sense of place to be restored.
Slight Beneficial (Positive) Effect	The project would: Complement the character (including quality and value) of the townscape. Maintain or enhance characteristic features and elements. Enable some sense of place to be restored.
Neutral Effect	The project would: Maintain the character (including quality and value) of the townscape. Blend in with characteristic features and elements. Enable a sense of place to be retained.
Slight Adverse (Negative) Effect	The project would: Not quite fit the character (including quality and value) of the townscape. Be at variance with characteristic features and elements. Detract from a sense of place.
Moderate Adverse (Negative Effect)	The project would: Conflict with the character (including quality and value) of

Significance Category	Typical Criteria Descriptors
	<p>the townscape.</p> <p>Have an adverse impact on characteristic features or elements.</p> <p>Diminish a sense of place</p>
Large Adverse (Negative) Effect	<p>The project would:</p> <p>Be at considerable variance with the character (including quality and value) of the townscape.</p> <p>Degrade or diminish the integrity of a range of characteristic features and elements.</p> <p>Damage a sense of place.</p>
Very Large Adverse (Negative) Effect	<p>The project would:</p> <p>Be at complete variance with the character (including quality and value) of the townscape.</p> <p>Cause the integrity of characteristic features and elements to be lost.</p> <p>Cause a sense of place to be lost.</p>

Table B25 - Visual Sensitivity and Typical Descriptors

Sensitivity	Typical Descriptors
High	<p>Residential properties.</p> <p>Users of Public Rights of Way or other recreational trails (e.g. National Trails, footpaths, bridleways etc.).</p> <p>Users of recreational facilities where the purpose of that recreation is enjoyment of the countryside (e.g. Country Parks, National Trust or other access land etc.).</p>
Moderate	<p>Outdoor workers</p> <p>Users of scenic roads, railways or waterways or users of designated tourist routes.</p> <p>Schools and other institutional buildings, and their outdoor areas.</p>
Low	<p>Indoor workers</p> <p>Users of main roads (e.g. trunk roads) or passengers in public transport on main arterial routes.</p> <p>Users of recreational facilities where the purpose of that recreation is not related to the view (e.g. sports facilities).</p>

Table B26 - Magnitude of Visual Impact and Typical Descriptors

Magnitude of Impact	Typical Criteria Descriptors
Major	The project, or a part of it, would become the dominant feature or focal point of the view.
Moderate	The project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor.
Minor	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.
Negligible	Only a very small part of the project would be discernable, or it is at such a distance that it would form a barely noticeable feature or element of the view.
No change	No part of the project, or work or activity associated with it, is discernible.

TableB27 - Significance of Visual Effect Categories

		Magnitude of Impact				
		No change	Negligible	Minor	Moderate	Major
Visual Sensitivity	High	Neutral	Slight	Slight/ Moderate	Moderate/ Large	Large/ Very Large
	Moderate	Neutral	Neutral/ Slight	Slight	Moderate	Moderate/ Large
	Low	Neutral	Neutral/ Slight	Neutral/ Slight	Slight	Slight/ Moderate

Table B28 - Typical Descriptors of Significance of Visual Effect Categories

Significance Category	Typical Criteria Descriptors
Very Large Beneficial (Positive) Effect	The project would create an iconic new feature that would greatly enhance the view.
Large Beneficial (Positive) Effect	The project would lead to a major improvement in a view from a highly sensitive receptor.
Moderate Beneficial (Positive) Effect	The proposals would cause obvious improvement to a view from a moderately sensitive receptor, or perceptible improvement to a view from a more sensitive receptor.
Slight Beneficial	The project would cause limited improvement to a view

(Positive) Effect	from a receptor of medium sensitivity, or would cause greater improvement to a view from a receptor of low sensitivity.
Neutral Effect	No perceptible change in the view.
Slight Adverse (Negative) Effect	The project would cause limited deterioration to a view from a receptor of medium sensitivity, or cause greater deterioration to a view from a receptor of low sensitivity.
Moderate Adverse (Negative Effect)	The project would cause obvious deterioration to a view from a moderately sensitive receptor, or perceptible damage to a view from a more sensitive receptor.
Large Adverse (Negative) Effect	The project would cause major deterioration to a view from a highly sensitive receptor, and would constitute a major discordant element in the view.
Very Large Adverse (Negative) Effect	The project would cause the loss of views from a highly sensitive receptor, and would constitute a dominant discordant feature in the view.

Water Environment

Significance assessment criteria are drawn from the Highways Agency (HA) Design Manual for Roads and Bridges (DMRB) - Volume 11, Section 3, Part 10 Road Drainage and the Water Environment: HD 45/09 and the paper Practical Methodology for Determining the Significance of Impacts on the Water Environment (Mustow et al, 2005).

The assessment methodology comprises a number of stages. The first stage involves making a judgement as to the value (sensitivity) of the affected attributes of the surface and groundwater receptors identified, which is assigned to one of the categories defined in Table B29.

Table B29 - Definitions of Receptor Value (Sensitivity)

Value (Sensitivity) of Receptor	Examples
High	<p>Feature or attribute with high quality and rarity, important at a National or International scale.</p> <p>Examples include: a watercourse achieving WFD Class 'High or Good', an EC designated Salmonid or Cyprinid fishery, a designated washland or a large and active floodplain where there is high potential for flooding of a large number of residential properties and infrastructure, a water feature that supports a potable water supply or an industrial/agricultural abstraction of > 500m³/day, an aquifer classified as Principal by the Environment Agency (EA) or a Groundwater Source Protection Zone (SPZ) 1.</p>
Medium	<p>Feature or attribute with medium quality and rarity, important at County or Regional scale or a feature of low quality and rarity, important at a national/international scale.</p> <p>Examples include a watercourse achieving WFD Class 'Moderate', a water feature that supports an abstraction for agricultural or industrial use of between 50 and 499m³/day, an area where there is existing flood risk for a small number of properties or agricultural land, an aquifer classified by the EA as Secondary A or B, or a Groundwater SPZ 2 or 3.</p>
Low	<p>Feature or attribute with low quality and rarity, important at a Local/Borough scale.</p> <p>Examples include: a watercourse that is not a fishery, achieving WFD Class 'Poor', a floodplain with limited existing development that experiences infrequent inundation, a water feature that supports an abstraction for agricultural or industrial use of < 50m³/day, an aquifer classified by the EA as non-productive, not in a Groundwater SPZ.</p>

The magnitude of an effect on the baseline can then be assessed considering the scale, extent of change, nature and duration of effect. Definitions of magnitude are given within Table B30 which provides the definitions of magnitude used for the purposes of this assessment, which were adapted from the above references.

Table B30 - Definitions of Magnitude of Effect

Magnitude	Examples
High	<p>Results in loss of attribute and/or quality and integrity of the attribute. Examples include:</p> <p>Loss or extensive change to a fishery or designated Nature Conservation Site.</p> <p>Change in the WFD class of a river reach or pollution of a source of potable water supply.</p> <p>Flood Risk: Increase in peak flood level (1 in 100 year) of >100mm or increasing the risk of flooding to >100 residential properties</p> <p>Groundwater: Loss of, or extensive change to a nationally important aquifer used for potable supply, potential high risk of pollution</p>
Medium	<p>Results in effect on the integrity of attribute, or loss of part of attribute. Examples include:</p> <p>Surface Water: Partial loss in productivity of a fishery, contribution of a significant proportion of effluent in the receiving river, but insufficient to change its WFD class.</p> <p>Flood Risk: Increase in peak flood level (1 in 100 year) of 50mm to 100mm or increasing the risk of flooding to < 100 residential properties</p> <p>Groundwater: Partial loss or major change to an aquifer of regional importance, medium risk of pollution from runoff</p>
Low	<p>Results in some measurable change in attribute quality or vulnerability. For example:</p> <p>Surface Water: discharges to a watercourse that result in no significant loss of quality, fishery or biodiversity value</p> <p>Flood Risk: Increase in peak flood level (1 in 100 year) of < 50mm or increasing the risk of flooding to < 10 industrial properties</p> <p>Groundwater: Potential low risk of pollution to groundwater from routine runoff to an aquifer of local importance</p>
Negligible	<p>Results in effect on attribute, but of insufficient magnitude to affect the use or integrity. For example:</p> <p>Surface Water: no predicted change to quality, fishery or biodiversity value</p> <p>Flood Risk: negligible change in flood peak levels (+/-</p>

Magnitude	Examples
	10mm) Groundwater: No predicted change in quality of any type of aquifer and/or its use as a resource

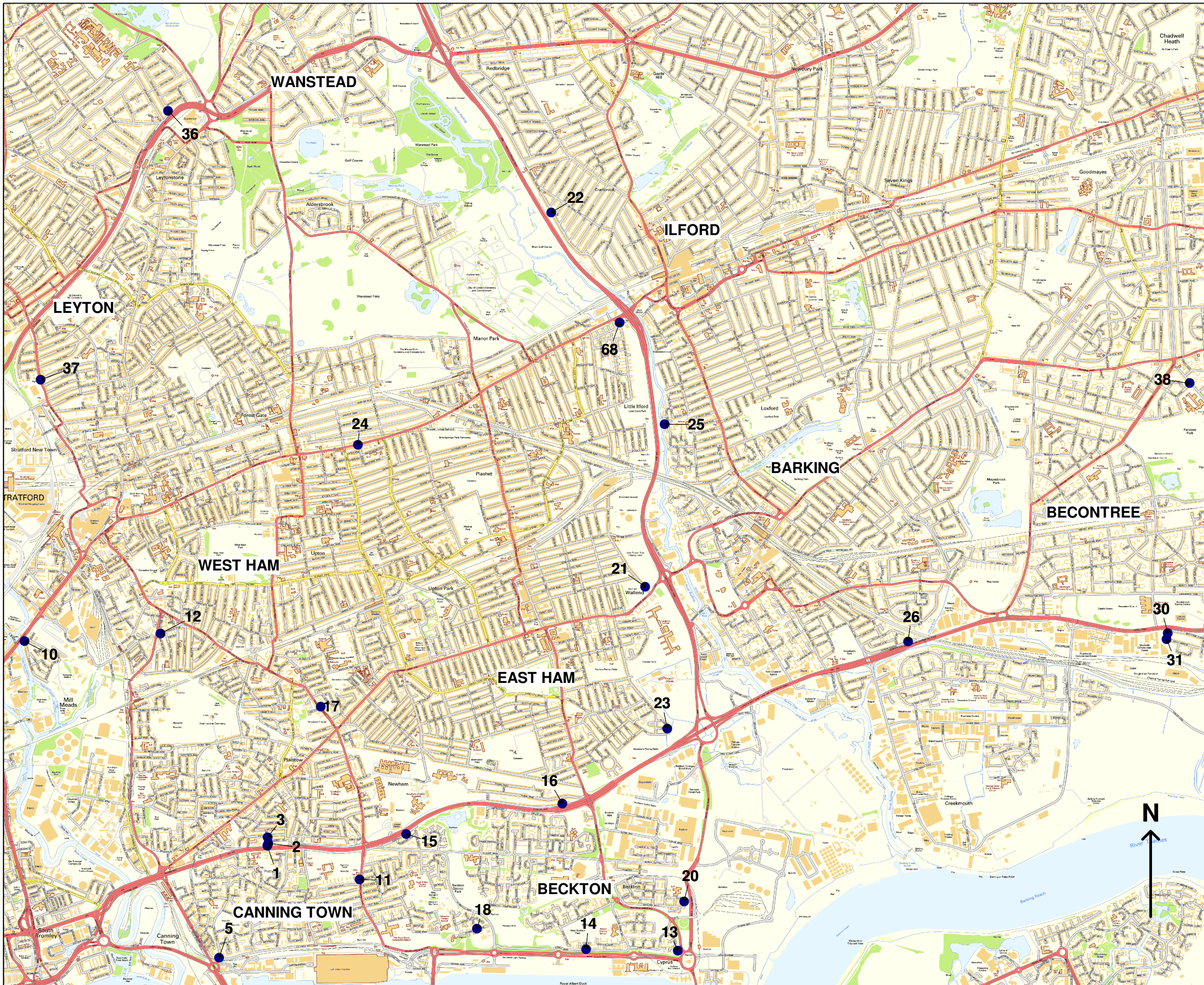
Using these definitions, a combined assessment of sensitivity/value and magnitude can then be undertaken to determine how significant overall an effect is, as demonstrated in Table B31 below. Effects can be either beneficial or detrimental. Where an effect is considered to be not significant or have no influence, its magnitude and overall significance is classified as negligible.

Table B31 - Significance Matrix

Value (Sensitivity) of Receptor	Magnitude of Effect			
	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate	Negligible
Medium	Major/Moderate	Moderate	Moderate/Minor	Negligible
Low	Moderate	Moderate/Minor	Minor	Negligible

Appendix C

Air Quality Monitoring Location Maps



Legend

- HYDER AIR QUALITY MONITORING SITE

Rev	Rev Date	Purpose of Revision	Drawn	Check	App
Client					
Project SILVERTOWN TUNNEL ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT					
Drawing Title APPENDIX C1: LOCATION OF HYDER AIR QUALITY MONITORING SITES (1)					
Drawing status SCOPING REPORT					
Scale		NTS	Date - MAR 2014		
Drawn By		T.WRIGHT			
Checked By		H.BESWICK			
Approved By		S.PYATT			
Project No.		UA005651	Original Size	A3	
Drawing Number			Rev	01	





Legend

- HYDER AIR QUALITY MONITORING SITE

Rev	Rev Date	Purpose of Revision	Drawn	Check	App

Client

Project

SILVERTOWN TUNNEL
ENVIRONMENTAL IMPACT ASSESSMENT
SCOPING REPORT

Drawing Title

APPENDIX C2: LOCATION OF
HYDER AIR QUALITY MONITORING
SITES (2)

Drawing status

SCOPING REPORT

Scale	NTS	Date	MAR 2014
Drawn By	T.WRIGHT		
Checked By	H.BESWICK		
Approved By	S.PYATT		

Project No.	UA005651	Original Size	A3
Drawing Number			01



Legend

- HYDER AIR QUALITY MONITORING SITE

Rev	Rev Date	Purpose of Revision	Drawn	Check	App
Client					

Transport for London

Hyder

Project: SILVERTOWN TUNNEL ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT

Drawing Title: APPENDIX C3: LOCATION OF HYDER AIR QUALITY MONITORING SITES (3)

Drawing status: SCOPING REPORT

Scale	NTS	Date	MAR 2014
Drawn By	T.WRIGHT		
Checked By	H.BESWICK		
Approved By	S.PYATT		
Project No.	UA005651	Original Size	A3
Drawing Number			Rev 01





Legend

- HYDER AIR QUALITY MONITORING SITE

Rev	Rev Date	Purpose of Revision	Drawn	Check	App

Client

Project

SILVERTOWN TUNNEL ENVIRONMENTAL IMPACT ASSESSMENT SCOPING REPORT

Drawing Title

APPENDIX C4: LOCATION OF HYDER AIR QUALITY MONITORING SITES (4)

Drawing status

SCOPING REPORT

Scale	NTS	Date	MAR 2014
Drawn By	T.WRIGHT		
Checked By	H.BESWICK		
Approved By	S.PYATT		
Project No.	UA005651	Original Size	A3
Drawing Number			Rev 01