



SILVERTOWN TUNNEL  
**Environmental  
Statement Appendix 9G  
(6.3.9.7)**

**Habitat Regulation  
Assessment (HRA)**

Revision 1

November 2016

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**Version Control**

<b>Version Number</b>	<b>Date of Issue</b>	<b>Summary of Change(s)</b>
V0	3 <sup>rd</sup> May 2016	Environmental Statement Appendix 9.G as submitted to PINS.
V1	15 <sup>th</sup> November 2016	The HRA matrices have been updated in response to FWQ HRA5. The generic references in V1 have been replaced to provide specific cross-referencing for each individual cell within the matrix, to relevant paragraphs and sections within the supporting application documents. In addition, the Table of Contents has been correctly amended from the V1 version.

## Glossary

Design Manual for Roads and Bridges (DMRB)	A series of 15 volumes that provide official standards, advice notes and other documents relating to the design, assessment and operation of trunk roads, including motorways in the United Kingdom.
Habitats Directive	The European Commission produced <i>Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora</i> (the Habitats Directive) in order to obligate member states to implement conservation measures for threatened species and habitats. The Habitats Directive is transposed into UK law via the Habitats Regulations.
Habitats Regulations Assessment (HRA)	Natura 2000 sites (SACs, SPAs and Ramsar Sites) are protected under the Habitats Regulations. The Habitats Regulations require public bodies to consider the impacts of any scheme likely to cause effects on a Natura 2000 site, and grant consents, possibly following the proposed mitigation of the impacts. This process is known as a Habitats Regulations Assessment.
Mitigation	Measures including any process, activity, or design to avoid, reduce, remedy or compensate for negative environmental impact or effects of a development.
Order Limits	The extent of land and rights over land that will be needed temporarily to construct the Scheme, and permanently to operate, maintain and safeguard the Scheme (often referred to as 'the red line boundary')
Receptor	A receptor is defined as living organisms, ecological systems or property that may be harmed by contamination or hazards.
Significant Effects	It is a requirement of the EIA

	<p>Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated.</p> <p>The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the impact and the sensitivity of the receptor) that should be attached to the impact described.</p> <p>Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement.</p> <p>Significant – ‘noteworthy, of considerable amount or effect or importance, not insignificant or negligible’.</p>
<p>Special Area of Conservation (SAC)</p>	<p>A statutory designated site, protected under the Habitats Regulations. SACs are designated due to important populations of habitats or species listed in Annex I (habitats) or Annex II (species) of the Habitats Directive.</p>
<p>Special Protection Area (SPA)</p>	<p>A statutory designated site, protected under the Habitats Regulations. SPAs are designated due to the presence of important populations of birds species listed under Annex I of the Birds Directive.</p>
<p>Thames Tideway Tunnel (TTT)</p>	<p>A 25km tunnel running mostly under the River Thames through central London, intended to provide storage and conveyance of combined raw sewage and rainwater discharges that currently overflow into the river. Under construction for client Thames Water.</p>
<p>Transport for London (TfL)</p>	<p>A London government body responsible for most aspects of the transport system in Greater London. Its role is to implement transport strategy and to manage transport services across London.</p>



	<p>These services include: buses, the Underground network, Docklands Light Railway, Overground and Trams. TfL also runs Santander Cycles, London River Services, Victoria Coach Station and the Emirates Air Line.</p> <p>As well as controlling a 580km network of main roads and the city's 6,000 traffic lights, TfL regulates London's private hire vehicles and the Congestion Charge scheme.</p>
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## List of Abbreviations

cSAC	Candidate SAC
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EC	European Community
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
HA	Highways Agency
HDV	Heavy Duty Vehicles
HGV	Heavy Goods Vehicle
HRA	Habitats Regulations Assessment
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	nitrogen oxides
NSIP	Nationally Significant Infrastructure Project

pSPA	Potential SPA
SAC	Special Area of Conservation
SCI	Sites of Community Importance
SPA	Special Protection Area

## SUMMARY

S.1.1 A Habitats Regulations Assessment (HRA) has been undertaken with respect to Natura 2000 Sites and the Silvertown Tunnel Scheme.

S.1.2 This document:

- provides background and rationale for the HRA process;
- assesses Natura 2000 sites potentially within the Zone of Influence of the Scheme (30km);
- describes the elements of the Scheme and how they may affect the Natura 2000 sites or their qualifying features; and
- reviews the potential for adverse effects from the Scheme.

S.1.3 Seven Natura 2000 sites are within 30km of the Scheme, four of these were scoped out of further assessment. Three Natura 2000 sites were considered for further assessment:

- Epping Forest Special Area of Conservation (SAC);
- Lee Valley Special Protection Area (SPA) and Ramsar; and
- Thames Estuary and Marshes SPA and Ramsar.

S.1.4 The potential effects of the Scheme were assessed for:

- air quality;
- indirect degradation of water regimes; and
- functional habitat loss or degradation.

S.1.5 The outcome of the assessment is that the Scheme is not likely to result in significant effects on any Natura 2000 site, nor any of its qualifying features and that no further assessment is required.

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# 1. INTRODUCTION

## 1.1 Overview

1.1.1 This is a Stage 1 Habitat Regulation Assessment (HRA) Report for the proposed Silvertown Tunnel ('the Scheme'). The Scheme is the subject of an application to the Secretary of State for development consent under the Planning Act 2008 and involves creating a new highway below the River Thames connecting Silvertown to the north and Greenwich to the south. As part of this, an Environmental Impact Assessment (EIA), presented in an Environmental Statement (ES) has been undertaken to ensure the likely significant effects of the Scheme are properly understood by the decision maker. In tandem with the production of an EIA, an HRA is required in accordance with the Habitats Directive. The HRA assesses whether the development is likely to have a significant effect on any Natura 2000 sites or on any of their qualifying features, either directly or indirectly, alone or in combination with other plans/projects. This document comprises that HRA.

## 1.2 The Scheme overview

1.2.1 The Scheme – known as the Silvertown Tunnel, described in Chapter 4 – Scheme Description (Document Reference: 6.1.4) of the ES, would comprise a new 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/A1011 Silvertown Way by means of twin tunnel bores under the River Thames and associated highway improvement.

## 1.3 Need for the Scheme

1.3.1 The Silvertown Tunnel Scheme is proposed in response to the three transport problems which exist at the Blackwall Tunnel:

- congestion,
- frequent closures and
- a lack of resilience (owing to the lack of alternative local crossings).

1.3.2 These issues lead to adverse effects on the economy and local environment. In the context of continued significant growth, these problems can only get worse, and in turn their secondary effects will increase. Failing to address these problems could hamper the sustainable and optimal growth of London and the UK.

## **1.4 Aims of the document**

### 1.4.1 This document aims to:

- outline the legal requirements and guidance for undertaking an HRA, including the potential option stages;
- describe the baseline features of the Natura 2000 sites and assess how the development site may be used by their qualifying features;
- describe the development proposals;
- assess the likelihood of the significant effects of the development on Natura 2000 sites as identified in consultation with Natural England (NE);
- review relevant literature for the SPA bird species to assess the likelihood (or otherwise) of significant effects from the proposed development;
- outline additional mitigation recommendations (as required); and
- confirm the result of the HRA in accordance with NE's advice.



## 2. THE SCHEME DESIGN

- 2.1.1 The scheme – known as the Silvertown Tunnel – would comprise a new dual two-lane connection between the A102 Blackwall Tunnel Approach on Greenwich Peninsula (Royal Borough of Greenwich) and the Tidal Basin roundabout junction on the A1020 Lower Lea Crossing/Silvertown Way (London Borough of Newham) by means of twin tunnel bores under the River Thames and associated approach roads. The Silvertown Tunnel would be approximately 1.4km long and would be able to accommodate large vehicles including double-deck buses.
- 2.1.2 On the north side, the tunnel approach road connects to the Tidal Basin Roundabout, which would be altered to create a new signal-controlled roundabout linking the Silvertown Way, Dock Road and the Lower Lea Crossing. Dock Road would be realigned to accommodate the new tunnel and approach road. On the south side, the A102 would be widened to create new slip-road links to the Silvertown Tunnel. A new flyover would be built to take southbound traffic exiting the Blackwall Tunnel over the northbound approach to the Silvertown Tunnel. The Boord Street footbridge over the A102 would be replaced with a pedestrian and cycle bridge.
- 2.1.3 New portal buildings would be located close to each portal to house the plant and equipment necessary to operate the tunnel, including ventilation equipment.
- 2.1.4 The introduction of free-flow user charging on both the Blackwall and Silvertown Tunnels would play a fundamental part in managing traffic demand and support the financing of the construction and operation of the Silvertown Tunnel. The design of the tunnel would include a dedicated bus/coach and Heavy Goods Vehicle (HGV) lane, which would provide opportunities for TfL to provide additional cross-river bus routes.
- 2.1.5 Main construction works would likely commence in 2018 and would last approximately four years with the new tunnel opening in 2022/23. A Tunnel Boring Machine (TBM) would be used to bore the main tunnel sections under the river with shorter sections of cut and cover tunnel at either end linking to the portals. The proposal is to erect and launch the TBM from a specially constructed chambers at Silvertown and Greenwich Peninsula where the bored and cut and cover sections connect. The main site construction compound would be located at Silvertown to utilise Thames Wharf to facilitate the removal of spoil and delivery of materials by river. A secondary site

compound would be located adjacent to the alignment of the proposed cut and cover tunnel on the Greenwich peninsula.

2.1.6 Further details of the Scheme design are provided in the terrestrial ecology chapter of the Environmental Statement (Document Reference: 6.1.9).

### 3. BACKGROUND TO HABITAT REGULATIONS ASSESSMENT

3.1.1 This section describes the background behind Natura designations and the legislation surrounding its protection and therefore the rationale for this assessment. This also includes references to guidance followed.

#### 3.1 Natura 2000 site creation

3.1.2 In May 1992 Member States belonging to the European Union (EU) adopted legislation designed to protect the most seriously threatened habitats and species across Europe. This legislation is referred to as the Habitats Directive and complements the Birds Directive (adopted in 1979). At the heart of both these Directives is the creation of a network of sites called Natura 2000. Natura 2000 is a network of areas designated to conserve natural habitats and species that are rare, endangered, vulnerable or endemic within the EU.

3.1.3 The Birds Directive requires the establishment of SPAs for birds classified under Directive 2009/147/EC on the Conservation of Wild Birds (the codified version of Directive 79/409/EEC as amended<sup>1</sup>) for rare, vulnerable and regularly-occurring migratory bird species and internationally important wetlands.

3.1.4 The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora)<sup>2</sup>, similarly requires SACs to be designated for other species, and for habitats.

3.1.5 Together, SPAs and SACs make up the Natura 2000 series. All EU Member States contribute to the network of sites in a Europe-wide partnership from the Canaries to Crete and from Sicily to Finnish Lapland.

3.1.6 SPAs are classified under the Birds Directive to help protect and manage areas which are important for rare and vulnerable birds because they use them for breeding, feeding, wintering or migration.

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<sup>1</sup> Conservation of Wild Birds (the codified version of Directive 79/409/EEC as amended

<sup>2</sup> Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

## **3.2 Natura 2000 site protection**

3.2.1 Under Article 6 of the European Community (EC) Habitats Directive an assessment is required where a plan or project may give rise to significant effects upon a Natura 2000 site or sites (also known as 'European Sites').

3.2.2 In addition, it is a matter of law that candidate SACs (cSACs) and Sites of Community Importance (SCI) are considered in this process; furthermore, it is Government policy that sites designated under the 1971 Ramsar Convention for their internationally important wetlands (Ramsar sites) and potential SPAs (pSPAs) are also considered.

3.2.3 Paragraph 3, Article 6 of the Habitats Directive states that:

*'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to paragraph 4 (see below), the competent national authority shall agree to the plan or project only having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.'*

3.2.4 Paragraph 4, Article 6 of the Habitats Directive states that:

*'If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.'*

3.2.5 The requirements of the Habitats Directive are transposed into UK law by means of the Conservation of Habitats and Species Regulations 2010 (as

amended)<sup>3</sup>, hereafter referred to as the Habitats Regulations. The process of assessing the implications of development on European Sites is therefore known as HRA.

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<sup>3</sup> This was transposed into UK law by The Conservation of Habitats and Species Regulations 2010, as amended

## 4. HABITATS REGULATIONS ASSESSMENT METHOD

### 4.1 Overview

4.1.1 The requirements of the HRA comprise four distinct stages and according to prescribed guidance and methods. A flow chart deriving from the European Commission guidance (2001) is presented in Figure 4-1 overleaf.

### 4.2 Stage 1: Screening

4.2.2 This is the process which initially identifies the likely impacts upon a European Site of the project or plan, either alone or in combination with other projects or plans, and considers whether these impacts may be significant. If the effect may be significant, or is not known, that may trigger the need for an Appropriate Assessment (Stage 2). However case law (the Dilly Lane High Court Judgement<sup>4</sup>) ruled that:

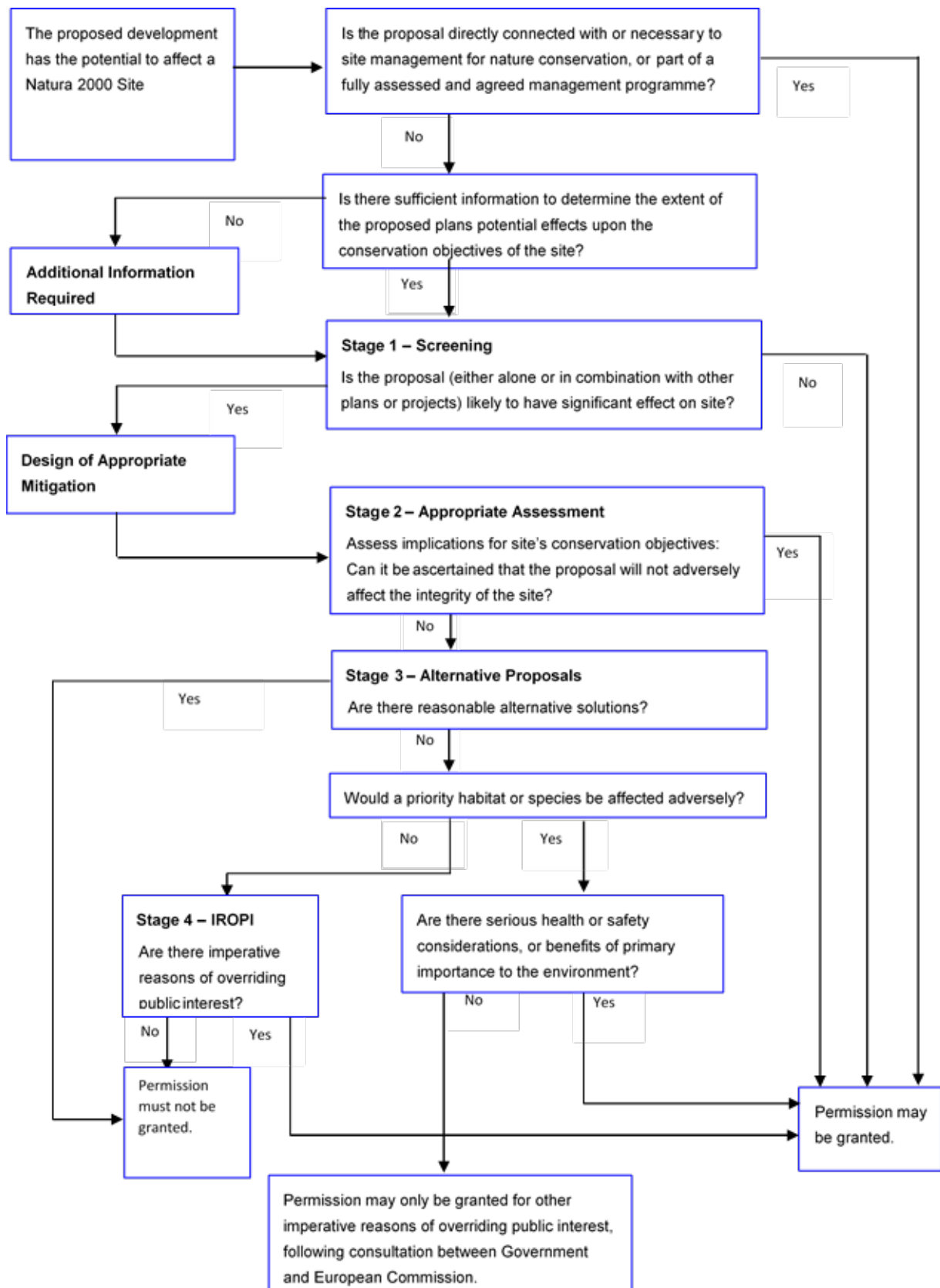
*‘as a matter of principle, the Secretary of State could not be required to ignore a package of avoidance and mitigation measures that had been put forward when determining whether a development is likely to have a significant adverse impact upon the local environment.’*

4.2.3 Thus mitigation may be implemented at Stage 1 as long as those mechanisms for implementation can be ensured.

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<sup>4</sup> Lunt, J., and Lischak, K. (2008) Natural England – a new dawn? Rights and responsibilities towards the natural environment and how these may change – the ‘Dilly Lane’ case. Environmental Law & Management 246 (2008) 20. Lawtext Publishing Limited [www.lawtext.com](http://www.lawtext.com): Case reference [2008] EWHC 1204 (Admin)

**Figure 4-1: HRA Flow Chart**



### **4.3 Stage 2: Appropriate Assessment**

4.3.1 This is the detailed consideration of the impact on the integrity of the European Site of the Project, either alone or in combination with other projects or plans, with respect to the site's conservation objectives and its structure and function. This is to determine whether or not there will be adverse effects on the integrity of the site. This stage also includes the development of any additional mitigation measures to avoid or reduce any possible impacts. Where there are adverse impacts, an assessment of mitigation options is carried out to determine adverse effect on the integrity of the site. If these mitigation options cannot avoid adverse effects then development consent can only be given if stages 3 and 4 are followed.

### **4.4 Stage 3: Assessment of alternative solutions**

4.4.1 This is the process which examines alternative ways of achieving the objectives of the Project that would avoid adverse impacts on the integrity of the European Site, should avoidance or mitigation measures associated with the Project be unable to cancel out adverse effects.

### **4.5 Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain**

4.5.1 Should no alternative solutions be available, at Stage 4 an assessment is made with regard to whether or not the development is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of the compensatory measures needed to maintain the overall coherence of the Natura 2000 network.

### **4.6 Relevant legislation and guidance**

4.6.1 The following legislation and guidance documents will be consulted in the preparation of the HRA:

- The Conservation of Habitats and Species Regulations 2010 (as amended);
- European Commission (2000), Managing Natura 2000 sites: The provisions of Article 6 of the Habitats Directive 92/43/EEC;
- European Commission (2007), Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC;



- European Commission (2001), Assessment of plans and projects significantly affecting Natura 2000 sites;
- The Planning Inspectorate Habitat Regulations Assessment Advice Note Ten: Habitat Regulations Assessment relevant to nationally significant infrastructure projects, Version 5, August 2013;
- UK Department for Transport's (DfT's) Transport Analysis Guidance (TAG) Unit A3: Environmental Impact Appraisal;
- The Highway Agency (HA) Interim Advice Note 141/11: Assessment of Implications (of Highways and/or Roads Projects) on European Sites (Including Appropriate Assessment) and the Planning Act 2008; and
- The Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 4 Other Assessment Techniques, Part 1, HD44/09, Assessment of Implications (of Highways and/or Roads Projects) on European sites (Including Appropriate Assessment), Section 4 Assessment Methods (adopted in February 2009). This report is structured in accordance with the requirements of this guidance.

#### **4.7 Consultation**

Statutory Consultation (S.42) of the Preliminary Environmental Information Report (PEIR) and associated documents including the HRA Stage 1 Assessment Report was held in October 2015. The aim of this was to seek agreement of the scope of the overall ecological impact assessment, and included interrogation of the methodology, scope and outcomes of the HRA Stage 1 Assessment.

## 5. NATURA 2000 SITES POTENTIALLY WITHIN THE ZONE OF INFLUENCE

### 5.1 Overview

5.1.1 All Natura 2000 sites within 30km were initially assessed for their potential to be affected by the Scheme. Their qualifying features, conservation objectives and existing vulnerabilities were used as baseline data along with their proximity to the Scheme. An initial high level screening assessment was undertaken to assess whether the scheme has the potential to affect the integrity of any of the sites or their qualifying features.

### 5.2 Approach to assessment

5.2.1 The potential impacts of the scheme is largely determined by three key factors:

- whether there were any sites or qualifying features that could be directly affected by the Scheme;
- whether there are any sufficiently mobile qualifying features of the sites that while distant from the scheme may rely on functional habitat that would be affected by the scheme (largely birds and bats - see section 5.3 on functional habitat); and
- whether any of the potential effects of the scheme have the potential to indirectly affect receptors some distance from the scheme due to the zone of influence (for example through effects on water regime or increased traffic flow).

5.2.2 Professional judgement has been used in this assessment, taking into account the conservation objectives for European Sites, to determine whether or not significant effects are likely to result from the proposals.

### 5.3 Other “Areas” included for screening: functional habitat

5.3.1 Functional habitat is the term given to undesignated areas located outside the boundary of a Natura 2000 site, which contains habitats that supports the qualifying features of the sites. This relates principally to mobile species, such as birds and bats that may rely on these areas for maintenance and support. Loss of functional habitat can be deemed, in some cases, to have a likely

significant effect (and potentially adverse effect on site integrity) for an SPA or Ramsar site.

## 6. BASELINE RESULTS

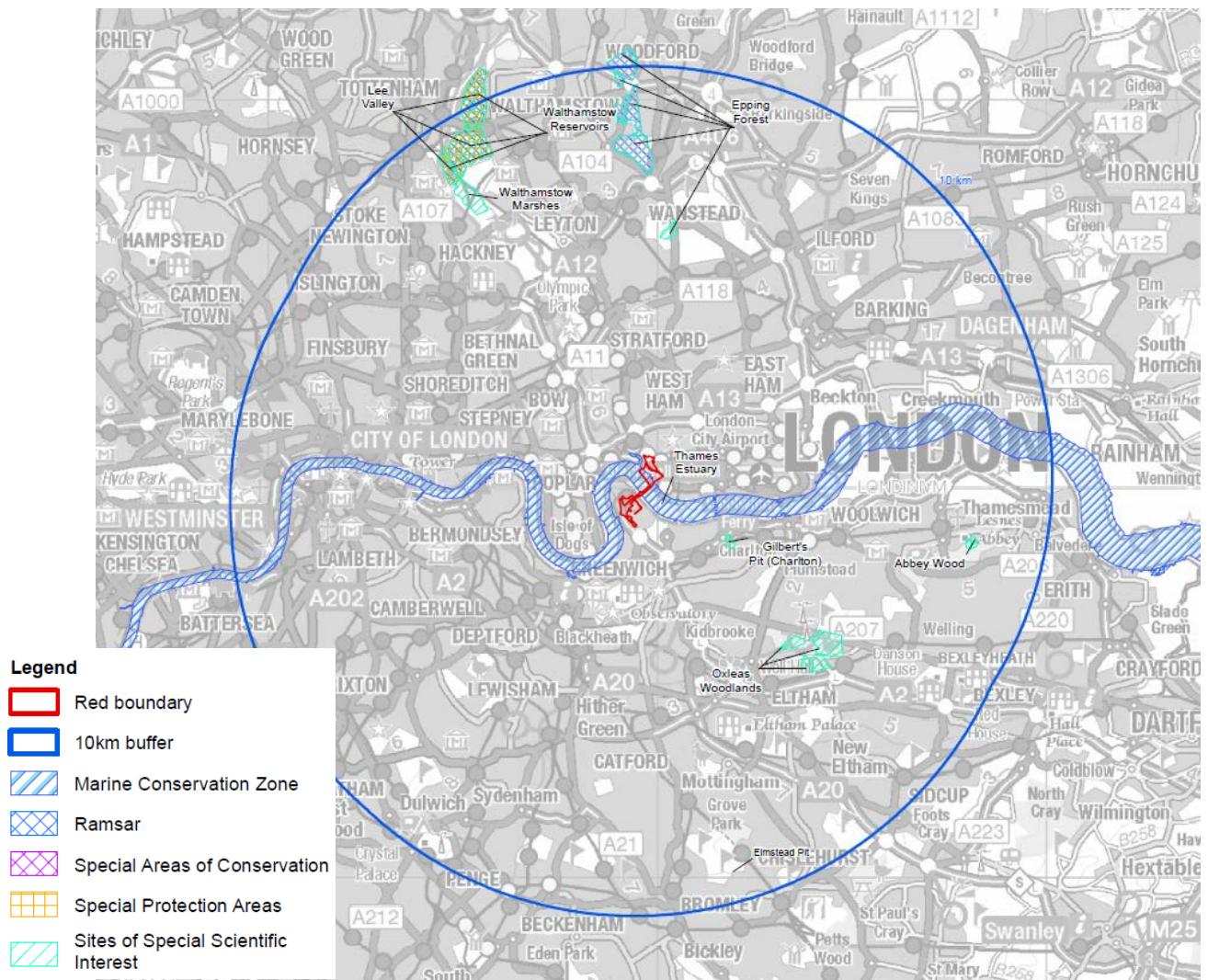
6.1.1 In total, seven Natura 2000 sites were identified within a 30km radius of the scheme required to assess bat impacts as directed by DMRB and also to ensure that potential functionally linked land for qualifying wintering bird species was considered. There were no SACs qualified for bats within 30km of the scheme, see Table 6-1.

### 6.1 Sites scoped out

6.1.2 Of these seven sites, four were scoped out as being too distant from the scheme for any significant effect, as they had no hydrological connection to the Scheme and no sufficiently mobile qualifying features. That is, none of the qualifying features of these scoped out Natura 2000 sites would be using the area within the zone of influence of the Scheme as habitat to support or maintain them, or because the Scheme would have no significant effect on the habitat within the site due to the distance of the Scheme from such habitat (over 20km). Of these scoped out sites the only potentially mobile qualifying feature is stag beetle and they are not sufficiently mobile to be affected.

6.1.3 Two Natura 2000 sites were identified within a 10km radius. Figure 6-1 shows the Natura 2000 sites within 10km of the Order Limits.

**Figure 6-1 Designated sites map (10km)**



6.1.4 Table 6-1 provides the key information regarding the identified sites.

**Table 6-1 Nature 2000 Sites within 30km of the Scheme**

Site	Designation	Approximate Distance from the Site	Key Qualifying features	Scoped In/Out
Lee Valley	Ramsar and SPA	8km north	Wetland birds and habitats	In
Epping	SAC	7km north	Woodlands, Heathlands and	In

Site	Designation	Approximate Distance from the Site	Key Qualifying features	Scoped In/Out
Forest			Stag beetle	
Thames Estuary and Marshes	Ramsar and SPA	30 km east	Wetland birds and habitats	In
Wimbledon Common	SAC	Over 20km west	Heathlands and Stag beetle	Out
Richmond Park	SAC	Over 21km west	Stag beetle	Out
Wormley-Hoddesdon Park Woods	SAC	Over 27km west	Hornbeam and Oak Woodlands	Out
North Downs Woodlands	SAC	30km south-west	Beech and Yew Forests and Calcareous Grasslands	Out

## 6.2 Sites scoped in for further assessment

6.2.1 Of the original seven, three sites were scoped in for further assessment and are as follows:

- The Lee Valley SPA and Ramsar site which is approximately 8km north of the Order Limits;
- The Thames Estuary and Marshes SPA and Ramsar site located approximately 30km east of the Order Limits; and
- Epping Forest SAC is located approximately 7km north of the Order Limits.

## 6.3 The Lee Valley SPA and Ramsar (and SSSI)

6.3.1 The Lee Valley SPA and Ramsar comprises four SSSIs spaced along the valley from just downstream of Ware in Hertfordshire to Finsbury Park in London, a total distance of about 24km. The whole site is contained within the Lee Valley Regional Park. The Lee Valley includes a series of embanked water supply reservoirs, sewage treatment lagoons and former gravel pits

along approximately 24km of the valley. These waterbodies support internationally important numbers of wintering gadwall (*Anas strepera*) and shoveler (*Anas clypeata*) and nationally important numbers of several other bird species. The site also contains a range of wetland and valley bottom habitats, both man-made and semi-natural, which support a diverse range of wetland fauna and flora.

#### **6.4 The Thames Estuary and Marshes SPA and Ramsar**

6.4.1 The Thames Estuary and Marshes SPA and Ramsar is located on the south side of the River Thames and supports a complex of brackish, floodplain grazing marsh ditches, saline lagoons and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterbirds. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.

#### **6.5 The Epping Forest SAC**

6.5.1 The Epping Forest SAC is a large ancient wood-pasture with habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains, wet and dry heathland and scattered wetland. The semi-natural woodland is particularly extensive but the forest plains are also a major feature and contain a variety of unimproved acid grasslands. The semi-natural woodlands of Epping Forest include important beech forests on acid soils, which are important for a range of rare epiphytic species. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and invertebrates associated with decaying timber. Stag beetle is also a qualifying feature for this site.

## 7. ASSESSMENT OF POTENTIAL EFFECTS

### 7.1 Effects scoped in for consideration

7.1.1 Fuller consideration is given below of the likelihood of significant effects (direct and/or indirect; in isolation and/or in combination with other plans/projects) on the European Sites in the context of their conservation objectives. Table 7-1 in Section 7.4 presents the existing features, conservation objectives and vulnerabilities with the potential effects and final assessment. Annex 1 presents these results in the PINS format as per Advice Note 10. Only those potential effects with potential relevance to the Scheme and the qualifying features of the Natura 2000 Sites have been presented below for further consideration.

7.1.2 The following potential effects were considered:

- Air Quality;
- Water Regime/Quality; and
- Functional Habitat Loss/Damage and/or Disturbance.

### 7.2 Air quality

#### SPAs and Ramsar

7.2.1 The ES Chapter 6: Air Quality (Document Reference: 6.1.6) provides full details of the predicted Scheme effects on air quality, these data are summarised and applied for assessment within this chapter.

7.2.2 Air quality is not a particularly sensitive parameter for these SPAs or Ramsar Sites, where sensitive vegetation Nitrogen deposition is often the most potentially damaging adverse effect from air quality. Threshold criteria for air quality assessment are a change of +/- 1000 vehicles per day, +/- 200 Heavy Duty Vehicles (HDV), 10kph change in daily average speed or 20kph change in peak hour speeds<sup>5</sup>. The impacts of the Scheme on traffic links within 200m of the SPAs and Ramsar Sites do not meet these criteria (see ES Chapter 6:

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<sup>5</sup> DMRB Volume 11 Section 3, Part 1 (Highways Agency, 1993)



Air Quality (Document Reference: 6.1.6) and Drawing 6.1: *Study Area* (Document Reference: 6.2), therefore no further assessment is required as there would be no perceptible change.

- 7.2.3 In conclusion, no likely significant effects upon the SPAs or Ramsar Sites have been identified resulting from the Scheme.

### **SAC**

- 7.2.4 Air quality at Epping Forest SAC has been identified as a potential particular sensitivity specifically associated with any increase in traffic potentially associated with the development which could result in a decrease in air quality (associated in particular with an increase in nitrogen compounds (N)), which could adversely affect the vegetation at Epping Forest SAC. NE's site condition record for the SAC identifies air pollution as potentially affecting the health of trees, heath and grassland.
- 7.2.5 The designated habitat types are lowland broadleaved, mixed and yew woodland and wet and dry heath. In terms of sensitivity to air pollution the critical load for nitrogen deposition for these types of habitat is 10–20 kg N/ha/yr.
- 7.2.6 The air quality objective for nitrogen oxides (NO<sub>x</sub>) which are levels of one form of airborne nitrogen for the protection of vegetation and ecosystems is 30 µg/m<sup>3</sup> as an annual mean (World Health Organisation estimates). Epping Forest annual mean has declined over the last 5 years and is now at an annual average of actual NO<sub>x</sub> concentration at 33.7 µgm<sup>3</sup>) APIS<sup>6</sup>.
- 7.2.7 The Conservators of Epping Forest recently co-sponsored a 3 year PhD research project by Imperial College examining the levels of car exhaust pollutants (NO<sub>2</sub> and ammonia) across a wide area of the Forest. An excess input of nitrogen can alter plant nutrition and biology, soil chemistry and encourage pests and pathogens. Concentrations in the air at most roadside locations were found to exceed, sometimes up to 3 times higher, the

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<sup>6</sup> Air Pollution Information system; [www.apis.ac.uk](http://www.apis.ac.uk); Accessed 01 September 2015

internationally-recommended limits above which plant health is threatened. These elevated levels extended as far as 20m from the main roads<sup>7</sup>.

- 7.2.8 Epping Forest is predicted by APIS to be in exceedance of its critical nitrogen (N) load (which is 10 to 20kgN/ha/yr by 15 kgN/ha/yr (i.e. N deposition: 35 kgN/ha/yr). Although the Epping Forest research study noted that modelled air pollution levels, from models such as APIS could not accurately predict levels of gaseous pollutants at roadside sites and significantly underestimated pollution levels. One of the reasons for this is the very significant contribution to nitrogen pollution from ammonia generated by car traffic, including cars with catalytic converters. Congestion and queuing may be other factors.
- 7.2.9 The traffic modelling data for the Scheme has showed that the N contribution from the Scheme, within 200m of Epping Forest, would not significantly increase the exceedances already present. The Scheme will therefore not meet the threshold criteria for air quality assessment (as stated in 7.2.2.) and that no further assessment is required as there would be no perceptible change. This has been confirmed upon receipt of the final traffic data.
- 7.2.10 In conclusion no likely significant effects upon the Epping Forest SAC site have been identified resulting from the Scheme.

### **7.3 Water regime and quality**

- 7.3.1 The Volume 1, Chapter 16 - Water Environment (Document Reference: 6.1.16) and Chapter 10 - Marine Ecology (Document Reference: 6.1.10) of the ES (6.1.9) have full details of the predicted background and predicted Scheme effects on these sites, these data are summarised and applied for assessment within this chapter.
- 7.3.2 Potential impacts considered in this section are indirect effects on water quality or changes to flow. However, the River Lee is located upstream of the Scheme and therefore proposals are therefore not anticipated to result in altered water regime of this Site.

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<sup>7</sup> Essex County Council and the City of London Corporation; Epping Forest Transport Strategy 2012-2016.

7.3.3 The Thames Estuary and Marshes is sufficiently far removed at 30km east of the Scheme not to be within the zone of influence of water quality effects.

7.3.4 Epping Forest SAC is not hydrologically linked.

7.3.5 In conclusion, no likely significant effects upon the Natura 2000 sites from water quality or flow have been identified resulting from the Scheme, either alone or in combination with other known plans and projects.

#### **7.4 Functional habitat loss/damage and/or disturbance**

7.4.1 The Volume 1, Chapter 9 - Terrestrial Ecology (Document Reference: 6.1.9 of the ES has full details of the habitats potentially suitable for wetland birds, these data are summarised and applied for assessment within this chapter. The potential effects considered are those of habitat loss, a degradation of habitat quality or disturbance to qualifying features.

7.4.2 Epping Forest has no functional habitat within the zone of influence of qualifying mobile species (i.e. stag beetle from Epping Forest will not be using any habitat that could be affected by the Scheme).

7.4.3 Although the SPAs and Ramsar Sites are distant (7km and 30km) from the Scheme there is potential for qualifying birds to use areas of functional habitat bordering the Thames within that distance. However, no significant areas of open water and/or marginal habitats will be lost/damaged or disturbed as a result of the Scheme. Habitat loss through clearance for construction is restricted to small areas of woodland, scattered trees and scrub and species poor or amenity grassland. Some localised disturbance of the River Thames is anticipated during the temporary jetty construction but none of the habitats affected by the Scheme represent important feeding, breeding, wintering or sheltering habitats to the bird species (Gadwall, Shoveler or Bittern) that contribute to the Qualifying Interest of Lee Valley SPA. Therefore, loss of these habitats to the project does not represent a significant effect on the SPA.

7.4.4 In conclusion, no likely significant effects upon the Natura 2000 sites due to habitat loss, degradation or disturbance have been identified resulting from the Scheme.

**Table 7-1 Summary of Potential Effects**

Site	Key Features	Conservation Objectives	Vulnerabilities	Potential Effect	Residual Effect
Lee Valley SPA and Ramsar (8km north)	<p>Comprises a series of embanked water supply reservoirs, sewage treatment lagoons and former gravel pits along approximately 24km of the valley. These waterbodies support internationally important numbers of wintering gadwall (<i>Anas strepera</i>) and shoveler (<i>Anas clypetea</i>) and nationally important numbers of several other bird species. The site also contains a range of wetland and valley bottom habitats, both man-made and semi-natural, which support a diverse range of wetland fauna and flora.</p> <p>Assemblages of the following birds of international importance</p> <p>Bittern (<i>Botaurus stellaris</i>) Shoveler (<i>Anas clypetea</i>) Gadwell (<i>Anas strepera</i>)</p>	<p>Maintain or restore the following:</p> <ul style="list-style-type: none"> <li>the extent and distribution of the habitats of the qualifying features;</li> <li>the structure and function of the habitats of the qualifying features;</li> <li>the supporting processes on which the habitats of the qualifying features rely;</li> <li>the population of each of the qualifying features, and;</li> <li>the distribution of the qualifying features within the site.</li> </ul>	<ul style="list-style-type: none"> <li>Water pollution;</li> <li>hydrological changes;</li> <li>disturbance via public recreation;</li> <li>inappropriate scrub control;</li> <li>inappropriate fish stocking;</li> <li>invasive species;</li> <li>inappropriate cutting/mowing, and;</li> <li>air pollution (e.g. atmospheric nitrogen deposition).</li> </ul>	<p>Should there be sufficient functionally linked land (wetlands) affected by the Scheme (habitat loss and disturbance), this may indirectly have an adverse effect on the qualifying features of the SPA, i.e. wintering birds.</p> <p>Should there be any hydrological connectivity and therefore the potential to affect the water quality associated with the SPA.</p>	<p>No Effect</p> <p>There isn't sufficiently functionally linked wetland within the zone of influence of the Scheme.</p> <p>There is no hydrological connectivity between the Scheme and the site.</p>

Site	Key Features	Conservation Objectives	Vulnerabilities	Potential Effect	Residual Effect
<p>Thames Estuary and Marshes</p> <p>SPA and Ramsar</p> <p>30km east (scoped in due to potential for functional land issues)</p>	<p>Supports a complex of brackish, floodplain grazing marsh ditches, saline lagoons and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterbirds. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.</p> <p>Assemblages of the following birds of international importance</p> <p>Avocet (<i>Recurvirostra avosetta</i>)</p> <p>Hen harrier (<i>Circus cyaneus</i>)</p> <p>Knot (<i>Calidris canutus</i>)</p> <p>Black-tailed godwit (<i>Limosa limosa</i>)</p> <p>Grey plover (<i>Pluvialis squatarola</i>)</p> <p>Redshank (<i>Tringa totanus</i>)</p> <p>Ringed plover (<i>Charadrius hiaticula</i>)</p> <p>Dunlin (<i>Calidris alpina</i>)</p>	<p>Maintain or restore the following:</p> <ul style="list-style-type: none"> <li>• the extent and distribution of the habitats of the qualifying features;</li> <li>• the structure and function of the habitats of the qualifying features;</li> <li>• the supporting processes on which the habitats of the qualifying features rely;</li> <li>• the population of each of the qualifying features, and;</li> <li>• the distribution of the qualifying features within the site.</li> </ul>	<ul style="list-style-type: none"> <li>• Coastal squeeze and erosion resulting in loss of intertidal and grazing marsh habitat;</li> <li>• dredging within intertidal habitat;</li> <li>• disturbance from waterborne recreation;</li> <li>• appropriate grazing and management of water in terrestrial part of SPA/ Ramsar;</li> <li>• development pressure (including direct land-take and indirect disturbance</li> </ul>	<p>Should there be sufficient functionally linked land (wetlands) affected by the Scheme (habitat loss and disturbance), this may indirectly have an adverse effect on the qualifying features of the SPA, i.e. wintering birds.</p> <p>Should there be any hydrological connectivity and therefore the potential to affect the water quality associated with the SPA.</p>	<p>No Effect</p> <p>There isn't sufficiently functionally linked wetland within the zone of influence of the Scheme.</p> <p>There is no hydrological connectivity between the Scheme and the site.</p>

Site	Key Features	Conservation Objectives	Vulnerabilities	Potential Effect	Residual Effect
			and hydrological effects); <ul style="list-style-type: none"> <li>• nitrogen and phosphorous input into Thames estuary;</li> <li>• invasive species;</li> <li>• change in distributions of Annex II qualifying species;</li> <li>• commercial fishing;</li> <li>• Illicit vehicles, and;</li> <li>• air pollution (atmospheric nitrogen deposition).</li> </ul>		
Epping Forest SAC	A large ancient wood-pasture with habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains, wet and dry heathland and scattered	Maintain or restore the following: <ul style="list-style-type: none"> <li>• the extent and distribution of</li> </ul>	<ul style="list-style-type: none"> <li>• Air pollution (e.g. atmospheric nitrogen</li> </ul>	Epping SAC has been identified as a potential particular sensitivity specifically associated with	No Effect  The traffic modelling data for the Scheme

Site	Key Features	Conservation Objectives	Vulnerabilities	Potential Effect	Residual Effect
7km north	<p>wetland. The semi-natural woodland is particularly extensive but the forest plains are also a major feature and contain a variety of unimproved acid grasslands. The semi-natural woodlands of Epping Forest include important beech forests on acid soils, which are important for a range of rare epiphytic species. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and invertebrates associated with decaying timber.</p> <p>The following qualifying habitats and species</p> <ul style="list-style-type: none"> <li>• Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer (<i>Quercion robur-petraeae</i> or <i>Ilici-Fagenion</i>)</li> <li>• Northern Atlantic wet heaths with <i>Erica tetralix</i></li> <li>• European dry heaths</li> <li>• Stag beetle (<i>Lucanus cervus</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• qualifying natural habitats and habitats of qualifying species;</li> <li>• the structure and function (including typical species) of qualifying natural habitats;</li> <li>• the structure and function of the habitats of qualifying species</li> <li>• the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;</li> <li>• the populations of</li> </ul>	<p>deposition);</p> <ul style="list-style-type: none"> <li>• undergrazing of wet heathland with Cross-leaved Heath (<i>Erica tetralix</i>) habitat;</li> <li>• public access/disturbance;</li> <li>• changes in distribution of Beech forest on acid soils;</li> <li>• inappropriate water levels on wet heathland with Cross-leaved Heath habitat, and;</li> <li>• water pollution via runoff from roads of heathland habitat with Cross-leaved Heath.</li> </ul>	<p>any increase in traffic potentially associated with the Scheme which could result in a decrease in air quality (associated in particular with an increase in nitrogen compounds), which could adversely affect the vegetation at Epping Forest SAC.</p>	<p>has showed that the Nitrogen contribution from the Scheme, within 200m of Epping Forest, would not significantly increase the exceedances already present.</p>

Site	Key Features	Conservation Objectives	Vulnerabilities	Potential Effect	Residual Effect
		qualifying species, and; <ul style="list-style-type: none"><li>the distribution of qualifying species within the site.</li></ul>			



## 7.5 Cumulative Effects

- 7.5.1 The potential effects of the Scheme have also been assessed in combination with other developments. In line with the ES Chapter 9: Terrestrial Ecology (Document Reference: 6.1.9), nine proposed developments located within or adjacent to the Scheme have been considered with regards to cumulative assessment. Table 7-2 below summarises these.
- 7.5.2 Any developments not adjacent to the Scheme, including the Thames Tideway Tunnel (TTT), which runs under the Thames, but not in the vicinity of the Scheme, have been scoped out, as impacts on terrestrial ecological features or hydrologically related features are unlikely within the distances involved and indeed TTT have their own No Significant Effects Report for Natura 2000 sites<sup>8</sup>.
- 7.5.3 In line with legislative requirements the Greenwich Local Plan and Core Strategy<sup>9</sup> has undergone a Habitats Screening Assessment for the Greenwich Local Plan which included Epping Forest SAC and the Lee Valley SPA. The assessment concluded no significant effect.
- 7.5.4 Newham also assessed Epping Forest SAC as part of its Local Plan<sup>10</sup> Habitats Regulations Screening Assessment Screening Plan and determined no significant effect.
- 7.5.5 Additionally Policy DH1 SC4 of the Greenwich Core Strategy, states that “all developments are expected to enhance biodiversity consistent with the Greenwich Biodiversity Action Plan” and “biodiversity will be protected and enhanced and development will contribute to a net gain in the quantity and quality of Newham’s natural environment” respectively. For Newham Policy SC4 Biodiversity Objective is to “Protect, enhance and create habitats for biodiversity across Newham, ensuring a net gain in BAP habitats, and secure

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<sup>8</sup> Thames Water (2013). *Thames Tideway Tunnel: Habitats Regulations Assessment: No Significant Effects Report: Doc Ref: 6.3: APFP Regulations 2009: Regulation 5(2)(g)*. Thames Water.

<sup>9</sup> Royal Borough of Greenwich (2014). *Royal Greenwich Local Plan: Core Strategy with Detailed Policies*. Royal Borough of Greenwich

<sup>10</sup> London Borough of Newham (2012). *Newham 2027: Newham’s Local Plan – The Core Strategy*. London Borough of Newham

their positive management; reduce deficiencies in access to nature for Newham’s existing and future residents; and undertake awareness-raising to promote appreciation of the Borough’s wildlife by all.” The Policies to ensure this objective is achieved includes INF7 “Expecting that all major developments make a contribution to achieving the targets and actions for biodiversity, as set out in the Newham Biodiversity Action Plan, and in conjunction with provision of green infrastructure.”

7.5.6 By following the HRA of the Local Plans and the subsequent biodiversity policies in the Core Strategies there will be no significant cumulative effect on Natura 2000 sites from the schemes presented in Table 7-2 in combination with the Silvertown Tunnel Scheme.

7.5.7 Both Greenwich and Newham are subject to the Duty to Cooperate under the Localism Act 2011 in preparing their Local Plans, and thus must consider the local plans of other boroughs.

7.5.8 In combination likely effects identified by Greenwich for Schemes outside their boundaries were increased visitor/adjacent recreational pressure resulting in disturbance to bird populations and supporting habitat; and increased recreational pressure and potential for pollution effects downstream.

7.5.9 The Greenwich Core Strategy seeks to mitigate against such effects by a variety of ways including for example, providing sufficient recreational space within the Borough, and on-site surface water management. It is considered unlikely that redevelopment of Charlton Riverside, Greenwich Riverside and Greenwich Peninsula alone or in combination with development of other boroughs will cause significant adverse impact.

**Table 7-2 Schemes Considered for Cumulative Effects Assessment**

<b>Planning application reference</b>	<b>Development summary</b>	<b>Potential cumulative effects</b>
<b>North (Newham)</b>		
Newham Strategic Site S8	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	<b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.

Planning application reference	Development summary	Potential cumulative effects
	<p>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.</p>	
<p><b>South (Greenwich) – all within Greenwich Masterplan 2015 (Planning Reference 15/0716/O)</b></p>		
<p>Greenwich (N/A)</p>	<p>Parking</p>	<p><b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.</p>
<p>Greenwich (N/A)</p>	<p>Film studio</p>	<p><b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.</p>
<p>Greenwich (N/A)</p>	<p>Transport interchange (planned)</p>	<p><b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise</p>

<b>Planning application reference</b>	<b>Development summary</b>	<b>Potential cumulative effects</b>
		disturbance.
Greenwich (N/A)	Dwelling houses/ serviced apartments (planned) x4	<b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.
Greenwich (N/A)	Design district comprising A, B, C and D classes	<b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.
Greenwich (N/A)	Shops/food//financial services	<b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.
Greenwich (N/A)	Parking/Design District comprising A, B, C and D classes	<b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.
<b>South (Greenwich) – Within Greenwich Peninsula West Masterplan</b>		
Greenwich (N/A)	Greenwich Peninsula West is designated as a Strategic Industrial Location within Greater London. Proposed land uses are: entertainment/sports, residential, education, public open space, wharf uses.	<b>Mixed use development</b> The proposed development could cause minor additional disturbance to breeding birds and commuting/foraging bats through visual and noise disturbance.

<b>Planning application reference</b>	<b>Development summary</b>	<b>Potential cumulative effects</b>
	<p>A multi-use facility is to be centrally positioned within the masterplan. A key role for it would be to provide outdoor entertainment linking with and implementing the offer at the O2 Arena. The complex could also be integrated with an elite sports</p>	

## 8. CONSULTATION

8.1.1 Statutory consultation (S.41) on the PEIR, including the HRA, was undertaken in October 2015. Responses were received from NE. Their response is provided below:

8.1.2 *“With relation to the findings of the HRA Screening Report (Stage 1 Habitats Regulations Assessment (HRA) Report (Document Reference: 6.3.9.7), there wouldn’t be any disagreement over the conclusion at this stage, given the distances involved to the nearest Natura 2000 (N2k) sites, such as Epping Forest SAC.*

8.1.3 *[We agree that] the impact of air pollution upon Epping Forest SAC would also be unlikely to be direct given the distance and the overall finding in the air quality assessment that broadly no adverse impacts were likely. As mentioned during the meeting the hydrological linkages between any of the N2k sites and the Scheme are not going to be direct and as such would not be likely to affect the designated sites.*

8.1.4 *As for functional habitat and mobile species findings, this again would be something which Natural England can concur with in respect of there not being any birds or bats from the nearest N2k sites that would be likely to venture far enough to be affected by the proposed scheme”.*

8.1.5 The HRA screening assessment has not changed materially since the consultation, and therefore, based on the comments above, no further assessment is required.

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## 9. CONCLUSIONS

9.1.1 Following consideration of all Natura 2000 sites within 30km it is concluded that there are no likely significant effects upon any Natura 2000 sites or their qualifying features resulting from the Scheme, either alone or in combination with other known plans and projects. It is therefore not necessary to carry out an 'Appropriate Assessment' / Stage 2 HRA. The method, findings and conclusion of the HRA Stage 1 Screening Assessment have been agreed as appropriate by NE. Annex 1 presents the conclusion of this report in the PINS matrices format<sup>11</sup>.

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<sup>11</sup> The Planning Inspectorate (2012). *Habitat Regulation Assessment: Advice Note 10: Habitat Regulations Assessment relevant to nationally significant infrastructure projects*. The Planning Inspectorate.





The Planning  
Inspectorate

## **Advice Note 10**

Habitat Regulations Assessment for nationally significant infrastructure projects

## **Annex 1: Template for Screening Matrices**



## Potential Impacts

Potential impacts upon the European site(s)§§§ which are considered within the submitted Appendix 9.G: Stage 1 Habitats Regulations Assessment (HRA) Report (Document Reference: 6.3.9.7) are provided in the table below. Impacts have been grouped where appropriate for ease of presentation.

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§§§ As defined in Advice Note 10.

### Impacts considered within the screening matrices

<b>Designation</b>	<b>Impacts in submission information</b>	<b>Presented in screening matrices as</b>
<b>Epping Forest Special Area of Conservation (SAC)</b>	<ul style="list-style-type: none"> <li>• Air quality change</li> <li>• Functional habitat loss/damage and/or disturbance</li> <li>• Water regime/quality change</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality change</li> <li>• Functional habitat loss/damage and/or disturbance</li> <li>• Water regime/quality change</li> </ul>
<b>Lee Valley Special Protection Area (SPA) and Ramsar</b>	<ul style="list-style-type: none"> <li>• Air quality change</li> <li>• Functional habitat loss/damage and/or disturbance</li> <li>• Water regime/quality change</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality change</li> <li>• Functional habitat loss/damage and/or disturbance</li> <li>• Water regime/quality change</li> </ul>
<b>Thames Estuary and Marshes SPA and Ramsar</b>	<ul style="list-style-type: none"> <li>• Air quality change</li> <li>• Functional habitat loss/damage and/or disturbance</li> <li>• Water regime/quality change</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality change</li> <li>• Functional habitat loss/damage and/or disturbance</li> <li>• Water regime/quality change</li> </ul>

## STAGE 1: SCREENING MATRICES

The European Sites included within the Applicant's assessment are:

- Epping Forest SAC;
- Lee Valley SPA and Ramsar; and
- Thames Estuary and Marshes SPA and Ramsar

Evidence for likely significant effects on their qualifying features is detailed within the footnotes to the screening matrices below.

### Matrix Key:

- ✓ = Likely significant effect **cannot** be excluded
- ✗ = Likely significant effect **can** be excluded

C = construction

O = operation

D = decommissioning

Where effects are not applicable to a particular feature they are greyed out.

## Stage 1 Matrix A: Epping Forest SAC

<b>Name of European site:</b> Epping Forest SAC												
<b>Distance to NSIP</b> 7km												
<b>European site features</b>	<b>Likely Effects of NSIP</b>											
	Habitat loss/damage and/or disturbance			Air quality change			Hydrological change			<i>In-combination effects</i>		
	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Annex I: H4010. Northern Atlantic wet heaths with Erica tetralix; Wet heathland with cross-leaved heath - (Ref: i)</i>	X a,e	X a,e	n/a	X a, d,h,j	X a, d,h,j	n/a	X a,c,f	X a,c,g	n/a	X a,k	X a,k	n/a
<i>Annex I: H4030. European dry heaths- (Ref: i)</i>	X a,e	X a,e	n/a	X a, d,h,j	X a, d,h,j	n/a	X a,c,f	X a,c,g	n/a	X a,k	X a,k	n/a
<i>Annex I: H9120. Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robur-petraeae or Ilici-</i>	X a,e	X a,e	n/a	X a, d,h,j	X a, d,h,j	n/a	X a,c,f	X a,c,g	n/a	X a,k	X a,k	n/a

<b>Name of European site:</b> Epping Forest SAC												
<i>Fagenion); Beech forests on acid soils - (Ref: i)</i>												
<i>Annex II: S1083. Lucanus cervus; Stag beetle- (Ref: i)</i>	X a, b,e	X a, b,e	n/a	X a,d, h,j	X a,d,h, j	n/a	X a,b,c,f	X a,b,c, g	n/a	X a	X a	n/a

**Evidence supporting conclusions**

- a) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-24 and 9-25). This section of the report describes the findings of the consultation with Natural England, who agree that there will be no impact upon the N2k sites.
- b) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-25). Consultation with Natural England concurs that functional habitat and mobile species associated with Epping Forest SAC would not be affected by the Scheme.
- c) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-25). Consultation with Natural England concurs that *“hydrological linkages between any of the N2k sites and the Scheme are not going to be direct and as such would not be likely to affect the designated sites.”*
- d) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-25) *“[We agree that] the impact of air pollution upon Epping Forest SAC would also be unlikely to be direct given the distance and the overall finding in the air quality assessment that broadly no adverse impacts were likely“.*
- e) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Paragraph 9.4.2, page 9-40) concludes that the Zone of Influence on Terrestrial Ecology for the Scheme with regards to the Natura 2000 sites is 5km, therefore Epping Forest falls outside of this area.
- f) Chapter 16 - Surface Water Quality and Flood Risk of the Environmental Statement, which has been updated and submitted at Deadline 1. Section 16.6 identifies that the hydrological impacts of the Scheme (construction) will be focussed on the River Thames and the immediate vicinity of the works, over 5km from Epping Forest SAC. Paragraph 16.6.15 and 16.6.16 state: *“There are some elevated concentrations of polycyclic aromatic hydrocarbons (PAH) when compared to stringent Canadian Effect Levels (CELs) but these are generally at lower*

*concentrations than found elsewhere in the river, based on the data reviewed outside the Order Limits. The potential for PAH compounds to be dissolved into the water column is discussed in Section 16.4 and indicates that there is minimal potential for the concentrations in the sediment to have any detrimental effect on the water quality. There could be a short term local reduction in water quality but the tidal action and the rapid river flow will quickly return concentrations to background levels. Hydrodynamic sediment plume modelling, described above and in Appendix 16.B, has quantified that the effects of the dredging works on the existing sediment transport and deposition regime would be Neutral. Therefore, the relatively small quantity of contaminated sediment which may be released into the water column would be rapidly diluted and dispersed and the resulting magnitude of impact on water quality would be Negligible.”*

- g) Chapter 16 – Surface Water Quality and Flood Risk of the Environmental Statement, updated and submitted Deadline 1. Section 16.6 identifies that the hydrological impacts of the Scheme (operation) will be focussed on the River Thames and the immediate vicinity of the works, over 5km from Epping Forest SAC. It is also assessed in the ES that there is likely to be a neutral impact upon water quality at the location of The Scheme. Paragraphs 16.6.28 and 16.6.29 state: *“Once the construction phase is complete, the risks of a pollution incident arising from heavily silted runoff and fuels, oils and other chemicals would be reduced to significantly less than the risks associated with the construction phase. The Scheme itself would be designed to ensure pollution control during operation and Class 1 bypass petrol interceptors and spill tanks will be used to fully treat flows. The new temporary jetty will only be operational during construction. Therefore, the magnitude of the residual impact on the water quality attributes of surface water resources (ranging from High to Low sensitivity) is classified as Negligible, with an overall residual significance of effect that is Neutral.”*
- h) Chapter 6 – Air Quality of the Environmental Statement (AS-022). Section 6.6, Paragraphs 6.6.55 states there are no ecological sites within 50m that have the potential to be affected by the construction works. Furthermore, the only ecologically designated site sensitive to nitrogen deposition located within 200m of the affected road network is West Thurrock Tidal Lagoon SSSI, which despite being within 200m of the affected road network will have effects which are *“considered to be imperceptible and unlikely to be significant”*. Considering there are no impacts to a site <200m from the affected road, it is assessed that there will be no impacts to a site >5km from the site.
- i) European Site Conservation Objectives for Epping Forest SAC Site Code: UK0012720 (Natural England, June 2014). Essex County Council and the City of London Corporation; Epping Forest Transport Strategy 2012-2016.
- j) Air Pollution Information system; [www.apis.ac.uk](http://www.apis.ac.uk); Accessed 01 September 2015.
- k) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Paragraph 9.8.9 Page 9-77 and 9-88). This section of the ES assesses that as the area is already highly developed there are unlikely to be any cumulative impacts. *“Other proposed developments in the surrounding area were researched in order to evaluate whether there would be any likely cumulative effects on the Scheme’s important ecological features as a result their development in combination with the Scheme. There are proposed developments adjacent to the Scheme around most of its boundary, which could result in an additional long-term minor operational impact on breeding birds through noise and visual disturbance. However, the area is already highly developed and therefore any additional cumulative [sic] impact on the local ecological resource is unlikely to be significant.”*



## Stage 1 Matrix B: Lee Valley SPA and Ramsar

Name of European site: Lee Valley SPA and Ramsar												
Distance to NSIP 8km												
European site features	Likely Effects of NSIP											
	Habitat loss/damage and/or disturbance			Air quality change			Hydrological change			<i>In-combination effects</i>		
	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
A021 <i>Botaurus stellaris</i> ; Great bittern (Non-breeding) –(Ref: <i>i, j</i> )	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a,b,d	X a,b,e	n/a	X a,h	X a,h	n/a
A051 <i>Anas strepera</i> ; Gadwall (Non-breeding) –(Ref: <i>i, j</i> )	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a,b,d	X a,b,e	n/a	X a,h	X a,h	n/a
A056 <i>Anas clypeata</i> ; Northern shoveler (Non-breeding) –(Ref: <i>i, j</i> )	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a,b,d	X a,b,e	n/a	X a,h	X a,h	n/a

Ramsar criterion 2: The site supports the nationally scarce plant species whorled water milfoil <i>Myriophyllum verticillatum</i> and the rare or vulnerable invertebrate <i>Micronecta minutissima</i> (a water-boatman) - <b>i, (Ref: j)</b>	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d	X a, b,e	n/a	X a,h	X a,h	n/a
Ramsar criterion 6: Internationally important populations of two wintering or passage bird species - <b>(Ref: i, j)</b>	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d	X a, b,e	n/a	X a,h	X a,h	n/a

**Evidence supporting conclusions**

- a) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-24 and 9-25). This section of the report describes the findings of the consultation with Natural England, who agree that there will be no impact upon the N2k sites.
- b) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-25). Consultation with Natural England concurs that “*hydrological linkages between any of the N2k sites and the Scheme are not going to be direct and as such would not be likely to affect the designated sites*”.

- c) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Paragraph 9.4.2, page 9-40) concludes that the Zone of Influence on Terrestrial Ecology for the Scheme with regards to the Natura 2000 sites is 5km, therefore the Lee Valley SPA and Ramsar is outside of the Zone of Influence for the Scheme.
- d) Chapter 16 - Surface Water Quality and Flood Risk of the Environmental Statement, which has been updated and submitted at Deadline 1. Section 16.6 identifies that the hydrological impacts of the Scheme (construction) will be focussed on the River Thames and the immediate vicinity of the works, over 5km from Epping Forest SAC. Paragraph 16.6.15 and 16.6.16 state: “There are some elevated concentrations of polycyclic aromatic hydrocarbons (PAH) when compared to stringent Canadian Effect Levels (CELs) but these are generally at lower concentrations than found elsewhere in the river, based on the data reviewed outside the Order Limits. The potential for PAH compounds to be dissolved into the water column is discussed in Section 16.4 and indicates that there is minimal potential for the concentrations in the sediment to have any detrimental effect on the water quality. There could be a short term local reduction in water quality but the tidal action and the rapid river flow will quickly return concentrations to background levels. Hydrodynamic sediment plume modelling, described above and in Appendix 16.B, has quantified that the effects of the dredging works on the existing sediment transport and deposition regime would be Neutral. Therefore, the relatively small quantity of contaminated sediment which may be released into the water column would be rapidly diluted and dispersed and the resulting magnitude of impact on water quality would be Negligible.”
- e) Chapter 16 - Surface Water Quality and Flood Risk of the Environmental Statement, updated and submitted Deadline 1. Section 16.6 identifies that the hydrological impacts of the Scheme (operation) will be focussed on the River Thames and the immediate vicinity of the works, over 5km from Epping Forest SAC. It is also assessed in the ES that there is likely to be a neutral impact upon water quality at the location of The Scheme. Paragraphs 16.6.28 and 16.6.29 state: “Once the construction phase is complete, the risks of a pollution incident arising from heavily silted runoff and fuels, oils and other chemicals would be reduced to significantly less than the risks associated with the construction phase. The Scheme itself would be designed to ensure pollution control during operation and Class 1 bypass petrol interceptors and spill tanks will be used to fully treat flows. The new temporary jetty will only be operational during construction. Therefore, the magnitude of the residual impact on the water quality attributes of surface water resources (ranging from High to Low sensitivity) is classified as Negligible, with an overall residual significance of effect that is Neutral.”
- f) Chapter 6 – Air Quality of the Environmental Statement (AS-022). Section 6.6, Paragraphs 6.6.55 states there are no ecological sites within 50m that have the potential to be affected by the construction works. Furthermore, the only ecologically designated site sensitive to nitrogen deposition located within 200m of the affected road network is West Thurrock Tidal Lagoon SSSI, which despite being within 200m of the affected road network will have effects which are “considered to be imperceptible and unlikely to be significant”. Considering there are no impacts to a site <200m from the affected road, it is assessed that there will be no impacts to a site >5km from the site.
- g) Air Pollution Information system; [www.apis.ac.uk](http://www.apis.ac.uk); Accessed 01 September 2015.

- h) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Paragraph 9.8.9 Page 9-77 and 9-88). This section of the ES assesses that as the area is already highly developed, there are unlikely to be any cumulative impacts. *“Other proposed developments in the surrounding area were researched in order to evaluate whether there would be any likely cumulative effects on the Scheme’s important ecological features as a result their development in combination with the Scheme. There are proposed developments adjacent to the Scheme around most of its boundary, which could result in an additional long-term minor operational impact on breeding birds through noise and visual disturbance. However, the area is already highly developed and therefore any additional cumulative [sic] impact on the local ecological resource is unlikely to be significant.”*
- i) European Site Conservation Objectives for Lee Valley SPA Site Code: UK9012111 (Natural England, June 2014)
- j) Ramsar Information Sheet: UK11034 (JNCC, June 2008)

Stage 1 Matrix C: Thames Estuary and Marshes SPA and Ramsar

Name of European site: Thames Estuary and Marshes SPA and Ramsar												
Distance to NSIP 30km												
European site features	Likely Effects of NSIP											
	Habitat loss/damage and/or disturbance			Air quality change			Hydrological change			<i>In-combination effects</i>		
	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
A149 <i>Calidris alpina alpina</i> ; Dunlin – (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a,b,d,i	X a,b,e,i	n/a	X a,h	X a,h	n/a
A143 <i>Calidris canutus</i> ; Knot. (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a,b,d,i	X a,b,e,i	n/a	X a,h	X a,h	n/a
A137 <i>Charadrius hiaticula</i> ; Ringed plover - (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a,b,d,i	X a,b,e,i	n/a	X a,h	X a,h	n/a
A082 <i>Circus cyaneus</i> ; Hen harrier - (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a,b,d,i	X a,b,e,i	n/a	X a,h	X a,h	n/a
A156 <i>Limosa</i>	X a,c	X a,c	n/a	X	X	n/a	X a,	X a,	n/a	X a,h	X a,h	n/a

Name of European site: Thames Estuary and Marshes SPA and Ramsar												
<i>limosa islandica</i> ; Black-tailed godwit - (Ref: j, k.)				a,f,g	a,f,g		b,d,i	b,e,i				
A141 <i>Pluvialis squatarola</i> ; Grey plover - (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d,i	X a, b,e,i	n/a	X a,h	X a,h	n/a
A132 <i>Recurvirostra avosetta</i> ; Avocet - (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d,i	X a, b,e,i	n/a	X a,h	X a,h	n/a
A162 <i>Tringa titanus</i> ; Redshank - (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d,i	X a, b,e,i	n/a	X a,h	X a,h	n/a
Ramsar criterion 2: The site supports one endangered plant species and at least 14 nationally scarce plants of wetland habitats. The site also supports more than 20 British Red Data Book invertebrates - (Ref: j, k.)	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d,i	X a, b,e,i	n/a	X a,h	X a,h	n/a

Name of European site: Thames Estuary and Marshes SPA and Ramsar												
<i>Ramsar criterion 5: Internationally important assemblages of wintering waterfowl - (Ref: j, k.)</i>	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d,i	X a, b,e,i	n/a	X a,h	X a,h	n/a
<i>Ramsar criterion 6: Internationally important populations of six wintering or passage bird species (Ref: j, k.)</i>	X a,c	X a,c	n/a	X a,f,g	X a,f,g	n/a	X a, b,d,i	X a, b,e,i	n/a	X a,h	X a,h	n/a

**Evidence supporting conclusions**

- a) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-24 and 9-25). This section of the report describes the findings of the consultation with Natural England, who agree that there will be no impact upon the N2k sites.
- b) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Table 9.2, page 9-25). Consultation with Natural England concurs that “hydrological linkages between any of the N2k sites and the Scheme are not going to be direct and as such would not be likely to affect the designated sites.
- c) Chapter 9 – ‘Terrestrial Ecology’ of the Environmental Statement (Document Reference: 6.1.9, Paragraph 9.4.2, page 9-40) concludes that the Zone of Influence on Terrestrial Ecology for the Scheme with regards to the Natura 2000 sites is 5km, therefore the Thames Estuary and Marshes SPA and Ramsar is not within the Zone of Influence.

- d) Chapter 16 - Surface Water Quality and Flood Risk of the Environmental Statement, which has been updated and submitted at Deadline 1. Section 16.6 identifies that the hydrological impacts of the Scheme (construction) will be focussed on the River Thames and the immediate vicinity of the works, over 5km from Epping Forest SAC. Paragraph 16.6.15 and 16.6.16 state: "There are some elevated concentrations of polycyclic aromatic hydrocarbons (PAH) when compared to stringent Canadian Effect Levels (CELs) but these are generally at lower concentrations than found elsewhere in the river, based on the data reviewed outside the Order Limits. The potential for PAH compounds to be dissolved into the water column is discussed in Section 16.4 and indicates that there is minimal potential for the concentrations in the sediment to have any detrimental effect on the water quality. There could be a short term local reduction in water quality but the tidal action and the rapid river flow will quickly return concentrations to background levels. Hydrodynamic sediment plume modelling, described above and in Appendix 16.B, has quantified that the effects of the dredging works on the existing sediment transport and deposition regime would be Neutral. Therefore, the relatively small quantity of contaminated sediment which may be released into the water column would be rapidly diluted and dispersed and the resulting magnitude of impact on water quality would be Negligible."
- e) Chapter 16 - Surface Water Quality and Flood Risk of the Environmental Statement, updated and submitted Deadline 1. Section 16.6 identifies that the hydrological impacts of the Scheme (operation) will be focussed on the River Thames and the immediate vicinity of the works, over 5km from Epping Forest SAC. It is also assessed in the ES that there is likely to be a neutral impact upon water quality at the location of The Scheme. Paragraphs 16.6.28 and 16.6.29 state: "Once the construction phase is complete, the risks of a pollution incident arising from heavily silted runoff and fuels, oils and other chemicals would be reduced to significantly less than the risks associated with the construction phase. The Scheme itself would be designed to ensure pollution control during operation and Class 1 bypass petrol interceptors and spill tanks will be used to fully treat flows. The new temporary jetty will only be operational during construction. Therefore, the magnitude of the residual impact on the water quality attributes of surface water resources (ranging from High to Low sensitivity) is classified as Negligible, with an overall residual significance of effect that is Neutral."
- f) Chapter 6 – Air Quality of the Environmental Statement (AS-022). Section 6.6, Paragraphs 6.6.55 states there are no ecological sites within 50m that have the potential to be affected by the construction works. Furthermore, the only ecologically designated site sensitive to nitrogen deposition located within 200m of the affected road network is West Thurrock Tidal Lagoon SSSI, which despite being within 200m of the affected road network will have effects which are "considered to be imperceptible and unlikely to be significant". Considering there are no impacts to a site <200m from the affected road, it is assessed that there will be no impacts to a site >5km from the site.
- g) Air Pollution Information system; [www.apis.ac.uk](http://www.apis.ac.uk); Accessed 01 September 2015.
- h) Chapter 9 – 'Terrestrial Ecology' of the Environmental Statement (Document Reference: 6.1.9, Paragraph 9.8.9 Page 9-77 and 9-88). This section of the ES assesses that as the area is already highly developed, there are unlikely to be any cumulative impacts. "*Other proposed developments in the surrounding area were researched in order to evaluate whether there would be any likely cumulative effects on the Scheme's important ecological features as a result their development in combination with the Scheme. There are proposed developments adjacent to the Scheme around most of its boundary, which could result in an additional long-term minor operational impact on breeding birds through noise and visual disturbance. However, the area is already highly developed and therefore any additional cumulative [sic] impact on the local ecological resource is unlikely to be significant.*"



- i) Chapter 10 - Marine Ecology of the Environmental Statement (Document Reference:6.1.10, Section 10.4, Paragraph 10.4.4 page 10-36). Section 10.4 states that the closest internationally designated sites that support marine features (the Thames Estuary and Marshes Special Protection Area (SPA) and Ramsar site) is located approximately 30km from the proposed Order limits and is outside of the zone of influence "*as such fall well outside of the assessment study area*".
- j) Thames Estuary: European Marine Site – English Nature’s advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994 (English Nature, May 2001)
- k) Ramsar Information Sheet: UK11069 (JNCC, June 2008).

## REFERENCES

Chapter 4 – Scheme Description (of the Environmental Statement)

Chapter 6 – Air Quality (of the Environmental Statement)

Chapter 9 - Terrestrial Ecology (of the Environmental Statement)

Chapter 10 - Marine Ecology (of the Environmental Statement)

Chapter 16 - Water Environment (of the Environmental Statement)

Silvertown Tunnel Appendix 9.C: Stage 1 Habitat Regulation Assessment (HRA) Screening Report (of the Environmental Statement)

European Site Conservation Objectives for Epping Forest SAC Site Code: UK0012720 (Natural England, June 2014)

European Site Conservation Objectives for Lee Valley SPA Site Code: UK9012111 (Natural England, June 2014)

Ramsar Information Sheet: UK11034 (JNCC, June 2008)

Thames Estuary: European Marine Site – English Nature’s advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994 (English Nature, May 2001)

Ramsar Information Sheet: UK11069 (JNCC, June 2008)

Essex County Council and the City of London Corporation; Epping Forest Transport Strategy 2012-2016

Air Pollution Information system; [www.apis.ac.uk](http://www.apis.ac.uk); Accessed 01 September 2015

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