

# Lower Thames Crossing

## 6.3 Environmental Statement Appendices

### Appendix 8.7 – Ornithology

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# Lower Thames Crossing

## 6.3 Environmental Statement Appendices

### Appendix 8.7 – Ornithology

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# 1 Introduction

- 1.1.1 This document presents the methodology and results of the ornithology desk study and field surveys carried out between 2017 and 2022 to inform the Environmental Impact Assessment and Habitat Regulations Assessment of the A122 Lower Thames Crossing Project (the Project). It forms an appendix to Chapter 8: Terrestrial Biodiversity of the Environmental Statement (Application Document 6.1).
- 1.1.2 The Project is referred to in three sections: south of the River Thames, the River Thames and north of the River Thames. For the purpose of this appendix, the second of these (the River Thames) includes the tunnel area, the intertidal zone and associated transect areas of functionally linked land as shown in Figure 8.10: Ornithology Survey Areas (Application Document 6.2).

## 2 Legislation and conservation status

- 2.1.1 The relevant legislation applicable to the ornithology assessment of the Project is presented below.
- 2.1.2 In the UK, all wild bird species, their eggs and nests are protected by law. In addition, there are several pieces of legislation or policy that give certain species extra legal protection, or emphasise their conservation importance, as outlined below:
- a. Species that are specially protected when breeding under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).
  - b. Species of Principal Importance (SoPIs) listed under Section 41 of the Natural Environment and Rural Communities Act 2006.
  - c. Species that are of high nature conservation concern, listed as ‘Red List’ and ‘Amber List’ on the Royal Society for the Protection of Birds (RSPB) list of Birds of Conservation Concern (BoCC) (Eaton *et al.*, 2015).
- 2.1.3 In addition, there are several bird species that are included as a Priority Species on the Biodiversity Action Plans (BAPs) for Kent (Kent Biodiversity Action Plan Steering Group, 1997) and Essex (Essex Biodiversity Action Plan Steering Group, 1999).
- 2.1.4 Special Protection Areas (SPAs) are strictly protected sites classified in accordance with Article 4 of the European Birds Directive, which came into force in April 1979 (European Commission, 2009). They are of international importance and are classified for Rare and Vulnerable birds (as listed in Annex I of the Directive), and for regularly occurring migratory species.
- 2.1.5 Ramsar sites are wetlands of international importance designated under the Ramsar Convention (United Nations Educational, Scientific and Cultural Organization (UNESCO), 1994). Ramsar sites can also incorporate riparian (wetlands near rivers and streams) and coastal zones adjacent to the wetlands and islands or bodies of marine water deeper than 6m at low tide lying within the wetlands.
- 2.1.6 SPAs and Ramsar sites that are relevant to the Project, for which birds form qualifying features, are summarised in Appendix 8.1: Designated Sites (Application Document 6.3).
- 2.1.7 There are two statutory designated sites of international importance that are of particular ornithological significance to the Project, these are:
- a. Thames Estuary and Marshes SPA.
  - b. Thames Estuary and Marshes Ramsar site.

- 2.1.8 Sites of Special Scientific Interest (SSSIs) are areas that are notified by statutory nature conservation agencies under the Wildlife and Countryside Act 1981 (as amended) as being areas of land that, in their opinion, are '*of special interest by reason of any of its flora, fauna, or geological or physiographical features*'. SSSIs that are relevant to the Project, for which birds form notifying features, are summarised in Appendix 8.1: Designated Sites (Application Document 6.3).
- 2.1.9 The proximity of the statutory designated sites to the Project is shown in Table 1.1 of Appendix 8.1: Designated Sites (Application Document 6.3).

## 3 Methodology

- 3.1.1 The area where ornithological information for the Project has been gathered, and the approach taken to gathering this information, is outlined below.

### 3.2 Zone of Influence

- 3.2.1 To determine the survey boundary for the Project, consideration has been given to the likely Zone of Influence (Zol) of the construction and operational activities of the Project.
- 3.2.2 The Zol of an ecological feature is defined as '*the area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities*' (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018).
- 3.2.3 As works near nest sites of particularly sensitive bird species could feasibly, as a reasonable worst-case scenario, cause disturbance up to 500m from the source of the disturbance, the Zol for breeding birds is the Order Limits plus 500m.
- 3.2.4 For non-breeding birds, the maximum area where disturbance is considered likely is 500m from the Order Limits. However, where internationally designated sites (SPA and Ramsar) and their functionally linked land fall within this area, the Zol is extended to include these sites, as well as all connected functionally linked land up to a maximum of the Order Limits plus 2km.

### 3.3 Survey boundary

- 3.3.1 The survey boundary for ornithology (the limits of the survey area where field surveys were carried out) is the Order Limits plus 500m, except for functionally linked land associated with SPA and Ramsar sites (this is the Order Limits plus 1km).
- 3.3.2 Targeted surveys of specific areas were carried out where significant loss of potentially important bird habitat is predicted, within the Order Limits plus 200m.
- 3.3.3 Viewsheds for vantage point surveys extended up to 1km from the Order Limits, although in some instances birds were recorded further away.
- 3.3.4 The areas defined above have been agreed with stakeholders as outlined in the Scoping Report (Highways England, 2017).
- 3.3.5 Three survey areas were determined within the survey boundary: south of the River Thames, River Thames (and functionally linked land) and north of the River Thames.

### 3.4 Wider Study Area

- 3.4.1 The term Wider Study Area refers to the area where a desk-based assessment has been carried out. For both breeding and non-breeding birds, the Wider Study Area is the Order Limits plus 2km. This includes a search for any European Sites (including SPAs and Ramsar sites) that are designated for their ornithological interests. This is discussed further in Appendix 8.1: Designated Sites (Application Document 6.3).

### 3.5 Desk study

- 3.5.1 A high-level desk study was carried out in 2017 that included a review of aerial photographs, Ordnance Survey maps and other freely available information. The aim was to identify likely bird habitats within 2km of the Order Limits.
- 3.5.2 The locations of designated sites of international, national and local importance for biodiversity within 2km Order Limits were also obtained. Citations for these sites, which provide information on the reasons for their designation, were reviewed to determine whether birds are cited as qualifying/notifying features.
- 3.5.3 As part of a desk study carried out in 2020, and updated in 2022, records of all bird species within a radius of 2km of the Order Limits were requested from the sources summarised in Table 3.1.

**Table 3.1 Terrestrial ornithology desk study data sources**

Data source	Information requested
Data was collated for UK BAP priority habitats using the Multi-Agency Geographic Information for the Countryside (MAGIC) website (Natural England, 2022)	Priority habitats listed on Section 41 of the Natural Environment and Rural Communities Act 2006.
MAGIC website (Natural England, 2022)	Data pertaining to SSSIs.
Kent and Medway Biological Records Centre (KMBRC, 2022) Essex Wildlife Trust Biological Records Centre (EWTBRC) (2020) Essex Field Club (2022) Greenspace Information for Greater London (GiGL) (2022)	Data on Local (county) Wildlife Sites (LWS), and legally protected and notable species.
Local BAPs Essex Biodiversity Partnership (2011) Kent Biodiversity Partnership (2009) and Biodiversity Audits (for example The Thames Estuary Partnership Habitat Action Plan) and Thurrock Council Biodiversity Audit	Reviewed to identify habitats and species of local importance, including LWS and Local Nature Reserves (LNRs).
Map data from the RSPB	Identifies all RSPB reserves within the Thames Estuary area.
Natural England publications relating to the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site, including the SPA and Special Area of Conservation Natura 2000 forms, and Ramsar site Data Sheet. A report by Natural England entitled 'What do we know about the birds and habitats of the North Kent Marshes?' (Liley, 2011)	Information relating to European designated sites, including the conservation objectives for the Thames Estuary and Marshes SPA, and the current condition status of the South Thames Marshes SSSI (encompassed by the SPA and Ramsar site designations).
Natural England's ancient woodland inventory, using the MAGIC website (Natural England, 2020) and the Woodland Trust's ancient tree hunt (Woodland Trust, 2020)	Used to identify areas of ancient woodland and individual veteran and ancient trees within the Project survey area.
British Trust for Ornithology (BTO) – Wetland Bird Survey data (WeBS) (BTO, 2022)	Results from 18 count areas located within 2km of the Order Limits over a period of five years.



## 3.6 Field surveys

- 3.6.1 The primary purpose of the ornithological surveys for the Project were to identify any notable populations or assemblages of breeding and non-breeding bird species that could be significantly impacted by the Project. Surveys focused on carefully selected areas where target species activity was likely to be located. Different survey methodologies were therefore employed in different locations within the survey boundary, depending on the target species/species group. Survey locations were ascertained by consultations with relevant nature conservation organisations such as Natural England and the RSPB (Highways England, 2017) and informed by the high-level desk study.
- 3.6.2 Notable populations of birds include those that form qualifying features of any statutory designated sites and species that are given special protection through legislation. This is because elements of the Project have the potential to result in loss of breeding habitat for species of conservation concern, or loss of 'functionally linked land'. Functionally linked land can be defined as an area of land that, while falling outside of a SPA or Ramsar site boundary, provides a resource such as foraging habitat for bird species that are cited as interest features of these sites. Therefore, the land provides a supporting function to the SPA or Ramsar site interest features and the area of land is said to be functionally linked.
- 3.6.3 This approach allowed the identification of baseline conditions to focus on the Important Ecological Features for the Project and enable the subsequent assessment to be suitably proportionate and appropriate. For the purpose of this Environmental Impact Assessment, Important Ecological Features are defined as:
- a. ecological features that are of local or greater importance for biodiversity
  - b. ecological features that should be considered due to their legal status
- 3.6.4 This was agreed during a meeting with Natural England and the RSPB, as reported in the Scoping Report (Highways England, 2017). The survey areas were reviewed on a continuous basis during the Project's design review process and adapted where necessary to ensure any additional areas were surveyed as required.
- 3.6.5 A suite of ornithological field survey work was carried out as part of the Project, including the following:
- a. Intertidal Vantage Point surveys
  - b. Functionally Linked Land Transect surveys
  - c. Designated Woodland Transect surveys
  - d. Main Route Transect surveys
  - e. Additional Transect surveys (formerly referred to as 2019 Transect surveys)
  - f. Barn Owl *Tyto alba* surveys
  - g. Targeted Marsh Harrier *Circus aeruginosus* Vantage Point surveys

3.6.6 Table 3.2 outlines the species that were targeted during all survey activities and the rationale for their inclusion. Figure 8.10: Ornithology Survey Areas (Application Document 6.2) shows the transect areas, routes and vantage points for all survey types. A brief summary of the methodologies for each of these field survey activities is provided in Table 3.3. The abbreviated species codes used during surveys and shown on all ornithology figures are shown in Annex E.

**Table 3.2 Target species recorded during each field survey method and rationale for their inclusion**

Survey type	Target species	Rationale for inclusion
Intertidal Vantage Point	<ul style="list-style-type: none"> <li>All 'waterbird' species as defined by the WeBS methodology (BTO, 2019) – static and foraging only.</li> <li>Wildfowl</li> <li>Waders</li> <li>Rails</li> <li>Divers</li> <li>Grebes</li> <li>Cormorants</li> <li>Hérons</li> <li>All owl and raptor species (excluding sparrowhawk <i>Accipiter nisus</i>) – in flight only</li> </ul>	<p>Many waterbird species form qualifying features of the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site, and sites of national importance, including Mucking Flats and Marshes SSSI and the South Thames Estuary and Marshes SSSI.</p> <p>All raptor and owl species (except sparrowhawk) included due to their notable conservation status.</p> <p>Other species of conservation concern were excluded as target species during the vantage point surveys due to the perceived low risk of them being affected by underground works in the River Thames area.</p>
Functionally Linked Land Transect (diurnal)	<ul style="list-style-type: none"> <li>All Red List and Amber List BoCC species (Eaton <i>et al.</i>, 2015, see assumptions and limitations for more details)</li> <li>All species listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)</li> <li>All bird species listed in the Essex BAP (Essex Biodiversity Action Plan Steering Group, 1999)</li> <li>All bird species listed in the Kent BAP (Kent Biodiversity Action Plan Steering Group, 1997)</li> <li>All bird species listed as SoPI under Section 41 of the Natural</li> </ul>	<p>The target species recorded during the Functionally Linked Land Transect surveys included species that are of conservation concern and/or qualifying features of the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site.</p> <p>All raptor and owl species (except sparrowhawk) included due to their notable conservation status.</p> <p>Other target species included due to a combination of their conservation status and the potential risk of being affected by the construction phase of the Project.</p>

Survey type	Target species	Rationale for inclusion
	<p>Environment and Rural Communities Act 2006</p> <ul style="list-style-type: none"> <li>• All bird species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site</li> <li>• All waterbird (WeBS) species (BTO, 2019)</li> <li>• All owl and raptor species (excluding sparrowhawk)</li> </ul>	
Functionally Linked Land Transect (nocturnal)	<ul style="list-style-type: none"> <li>• All waterbird (WeBS) species (BTO, 2019)</li> <li>• All owl and raptor species (excluding sparrowhawk)</li> </ul>	<p>The target species recorded during the nocturnal Functionally Linked Land Transect surveys were primarily those associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site. All waterbirds were recorded due to the potential for misidentification of species at night.</p> <p>All raptor and owl species (except sparrowhawk) included due to their notable conservation status, with emphasis on nocturnal species (i.e. owls) that would likely be under-recorded during diurnal surveys.</p> <p>Other species of conservation concern were not targeted due to their general nocturnal inactivity and to allow the surveyors to focus on the priority species.</p>
Designated Woodland and Main Route Transects	<ul style="list-style-type: none"> <li>• All Red List and Amber List BoCC species (Eaton <i>et al.</i>, 2015, see assumptions and limitations for more details).</li> <li>• All species listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).</li> <li>• All bird species listed in the Essex BAP (Essex Biodiversity Action Plan Steering Group, 1999).</li> <li>• All bird species listed in the Kent BAP (Kent Biodiversity Action Plan Steering Group, 1997).</li> <li>• All bird species listed as SoPI under Section 41 of the Natural</li> </ul>	<p>The target species recorded during the non-breeding bird transect surveys comprised species that are of conservation concern and that could potentially be affected by the Project.</p>

Survey type	Target species	Rationale for inclusion
	Environment and Rural Communities Act 2006	
Barn Owl survey	<ul style="list-style-type: none"> <li>Barn owl</li> </ul>	Barn owl are afforded extra protection from disturbance (while breeding) under Schedule 1 of the Wildlife and Countryside Act (as amended).
Marsh Harrier Vantage Point	<ul style="list-style-type: none"> <li>Marsh harrier</li> </ul>	Marsh harrier were targeted for additional surveys following anecdotal evidence suggesting the potential presence of a winter roost site in a specified reedbed. A confirmed winter roost would suggest the potential for a breeding site, and the species is afforded extra protection from disturbance (while breeding) under Schedule 1 of the Wildlife and Countryside Act (as amended).

**Table 3.3 Summary of survey methodologies undertaken**

Survey activity	Survey areas	Survey time period	Purpose
Intertidal Vantage Points	Four locations, two either side of the River Thames, covering the area where the Order Limits cross the River Thames.	All year, covering winter, passage and breeding periods.	To understand the distribution and status of SPA bird species using the River Thames intertidal area.
Marsh Harrier Vantage Points	At a single reedbed location.	During winter.	To understand whether marsh harrier (or other raptor species) use that particular reedbed area as a winter roost site.
Functionally Linked Land Transect	Potential areas of functionally linked habitat adjacent to the River Thames.	All year, covering winter, passage and breeding periods. Including winter nocturnal survey.	To understand the distribution and status of SPA bird species using the adjacent habitats.
Designated Woodland Transect	Areas of woodland designated as SSSI, primarily along the A2 corridor in Kent.	All year, covering winter, passage and breeding periods.	To understand the status and distribution of the bird assemblage within the woodland SSSI.
Main Route Transect	Areas of potentially important bird habitat within the main Project route plus 500m.	During the breeding and winter periods only.	To understand the status and distribution of the breeding and wintering bird assemblage within main Project route.
Additional Transects	Additional areas required as a result of Project design evolution and subsequent amendments to the Order Limits.	During the breeding period only, except for East Tilbury Battery (that is hereafter included with Functionally Linked Land Transects) and surveyed in winter.	To understand the status and distribution of the breeding and wintering bird assemblage within the additional areas.

Survey activity	Survey areas	Survey time period	Purpose
Barn Owl	Potentially suitable breeding sites within the Order Limits plus 500m.	Timed to avoid the main breeding season (i.e. excluding March to June).	To understand the status and distribution of barn owl along the route alignment.

### Intertidal Vantage Point surveys

3.6.7 Intertidal Vantage Point surveys (VPs) were carried out overlooking the Thames Estuary north and south of the proposed crossing location, to understand the extent and distribution of species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site.

3.6.8 The surveys were carried out twice in each month from April 2017 to March 2019 (inclusive). Counts of all other target species (not in flight) were undertaken, at hourly intervals, from high to low tide (and vice versa) for a total of six counts to encompass the whole tidal cycle. Flights made by raptors and owls were also recorded throughout. The peak count of each species during this time was taken as the maximum number of birds that could be affected by the Project.

#### Seasonal peak counts

3.6.9 The seasonal peak count, as presented for each species and each season in the results tables in Section 413, is the maximum number of individuals observed simultaneously (during a single hour) across all VP locations on a single date, within the given season.

#### Distribution of peak counts

3.6.10 For each day within the given season, the hour with the greatest number of recorded individuals of each species (as a total count between all five VP locations) was selected as the peak count hour. These are presented in Figures 8.11 and 8.12 (Application Document 6.2) for each species and season. Each frame displays all data points from the selected peak count hours, for every survey date in one season, for each species (i.e. the results from multiple survey dates are collated into a single frame).

### Functionally Linked Land Transect surveys

3.6.11 Diurnal and nocturnal transect surveys were carried out within areas of habitat defined as being functionally linked to the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site. The aim was to understand usage by associated species and to determine the breeding and wintering bird assemblages.

3.6.12 The diurnal surveys were carried out twice per month over a period of two years from April 2017 to March 2019 (inclusive; refer to paragraph 5.3.3 for East Tilbury Battery Transect). These were timed to take place throughout all parts of the day and tidal states (including one high-tide survey per month). Surveyors walked at a constant pace following predefined transect routes, established on the first visit, so that each part of the survey area was approached to within approximately 200m in the wintering and passage seasons (August to March, inclusive) and 100m in the breeding season (April to July, inclusive). The

change in detail was to ensure that singing birds were recorded during the breeding season.

- 3.6.13 The nocturnal surveys were carried out once per month over a period of two years from November 2017 to March 2019 (inclusive, but excluding April to October 2018; refer to paragraph 5.3.3 for East Tilbury Battery Transect). These were timed to take place at high tide and a variety of times throughout the night. The survey involved a pair of surveyors moving between vantage points across the transect and viewing the area using a night-vision binocular and infrared light source. Surveyors used a 4x4 vehicle where access was feasible/permitted to gain extra height for a greater visible range and reduce the disturbance to birds in the area (McLeod *et al.*, 2013).

### Designated Woodland Transect surveys

- 3.6.14 Walked transect surveys were carried out within designated areas of woodland (SSSIs) to understand the breeding and wintering bird assemblages.
- 3.6.15 The surveys were carried out once per month over a period of two years from April 2017 to March 2019 (inclusive). They were timed to take place at approximately one hour after sunrise (Marchant, 1983) in the breeding season (April to July, inclusive) and throughout all parts of the day in all other months. Surveyors walked at a constant pace following predefined transect routes, established on the first visit, so that each part of the survey area was approached to within approximately 200m in the wintering and passage seasons (August to March, inclusive) and 100m in the breeding season (April to July, inclusive). The change in detail was to ensure that singing birds were recorded during the breeding season.

### Main Route Transect surveys

- 3.6.16 Walked transect surveys were carried out within areas of suitable bird habitat along the main Project route to understand the breeding and wintering bird assemblages.
- 3.6.17 The surveys were carried out once per month over a period of one year from April 2018 to March 2019, and timed to take place at approximately one hour after sunrise (Marchant, 1983) in the breeding season (April to July, inclusive) and throughout all parts of the day in all other months (excluding July to October). Surveyors walked at a constant pace following predefined transect routes, established on the first visit, so that each part of the survey area was approached to within approximately 200m in the wintering and season (November to March, inclusive) and 100m in the breeding season (April to July, inclusive). The change in detail was to ensure that singing birds were recorded during the breeding season.

### Barn owl surveys

- 3.6.18 Targeted barn owl surveys of suitable buildings and trees were carried out to identify breeding and roosting sites. These included an assessment of potential foraging habitat to identify potential traffic accident blackspots.
- 3.6.19 The surveys, in 2018 and 2019, were timed to avoid the main breeding season (March to June, inclusive) to reduce potential disturbance. Buildings and trees were initially selected for detailed inspection based on data from the Phase 1



Habitat, Bat Building and Tree Inspection surveys, plus a combination of aerial images and walk-by assessment from adjacent land.

- 3.6.20 Detailed inspections began with a targeted conversation with the occupier of the land to gain anecdotal evidence (where available). The building or tree was then assessed externally to identify any points of access large enough for a barn owl to enter (minimum 80mm diameter for a breeding-weight female (Shawyer, 2011)). Provided that the structure was safe to enter (or tree safe to climb), an internal inspection was carried out (with access to height using a ladder) to classify potential breeding or roosting features and identify evidence of use by barn owl. See Annex C for the detailed structure assessment categories.
- 3.6.21 Foraging habitat was categorised according to guidance described by Shawyer (2011), first by using aerial imagery and then reviewed in the field (where feasible) either by close inspection or from a distance (in order of preference).

### Marsh Harrier Vantage Point surveys

- 3.6.22 Targeted Marsh Harrier Vantage Point surveys were carried out to understand whether marsh harrier (or other raptor species) use a particular reedbed area as a winter roost site. This was prompted by an anecdotal report of marsh harrier roosting at the site.
- 3.6.23 The surveys were carried out once per month in November and December 2018, from 1.5 hours before sunset to 0.5 hours after sunset. The methods were adapted from the hen harrier *Circus cyaneus* methodology in Gilbert *et al.* (1998).

## 4 Results

4.1.1 This section summarises the results of the ornithological survey activities outlined in Section 1.3.

### 4.2 Designated and non-designated sites

4.2.1 Designated and non-designated sites that are relevant to the Project designated, in part, for their ornithological interests are listed in Table 4.1. A complete description of these and other designated sites that may be impacted by the Project is presented in Appendix 8.1 Designated Sites (Application Document 6.3).

**Table 4.1 Designated sites that include ornithological features in their citations**

Geographic section	Site name	Ornithological interests
South of the River Thames	South Thames Estuary and Marshes SSSI (Natural England, 1991a)	<ul style="list-style-type: none"> <li>• Waterfowl counts regularly exceed 20,000</li> <li>• Year-round</li> <li>• Redshank <i>Tringa totanus</i> (&gt;1% of north-west European population)</li> <li>• Winter (low tide)</li> <li>• Knot <i>Calidris canutus</i> and dunlin <i>Calidris alpina</i> (&gt;1% of north-west European population)</li> <li>• Avocet <i>Recurvirostra avosetta</i>, and ringed plover <i>Charadrius hiaticula</i> (&gt;1% of British population)</li> <li>• Winter (high tide)</li> <li>• European white-fronted goose <i>Anser albifrons</i>, shelduck <i>Tadorna tadorna</i>, gadwall <i>Mareca strepera</i>, teal <i>Anas crecca</i>, pintail <i>Anas acuta</i>, shoveler <i>Anas clypeata</i>, grey plover <i>Pluvialis squatarola</i>, curlew <i>Numenius arquata</i> and black-tailed godwit <i>Limosa limosa</i> (&gt;1% of British population)</li> <li>• Autumn passage</li> <li>• Grey plover, curlew, black-tailed godwit, redshank and greenshank <i>Tringa nebularia</i> (&gt;1% of British population)</li> <li>• Spring passage</li> <li>• Redshank (&gt;1% of British population)</li> <li>• Breeding</li> <li>• Outstanding assemblage including garganey <i>Anas querquedula</i>, pintail, avocet and bearded tit <i>Panurus biarmicus</i></li> <li>• Specially protected birds</li> <li>• Hen harrier, short-eared owl <i>Asio flammeus</i>, ruff <i>Philomachus pugnax</i>, common tern <i>Sterna</i></li> </ul>



Geographic section	Site name	Ornithological interests
		<i>hirundo</i> , avocet and golden plover <i>Pluvialis apricaria</i> .
	Cobham Woods SSSI (Natural England, 1984)	<ul style="list-style-type: none"> <li>• Breeding</li> <li>• Supports a good variety of typical woodland species including three species of woodpecker, nuthatch <i>Sitta europaea</i>, treecreeper <i>Certhia familiaris</i>, hawfinch <i>Coccothraustes coccothraustes</i> and marsh tit <i>Poecile palustris</i>. Some of these species are present in relatively high densities.</li> </ul>
	Holborough to Burham Marshes SSSI (Natural England, 1990)	<ul style="list-style-type: none"> <li>• The many different habitats support a wide variety of breeding birds and the site is also important for wintering wildfowl and waders.</li> <li>• Breeding</li> <li>• Reed warbler <i>Acrocephalus scirpaceus</i>, water rail <i>Rallus aquaticus</i>, bearded tit, lapwing <i>Vanellus vanellus</i>, redshank, treecreeper, great spotted woodpecker <i>Dendrocopos major</i>, nightingale <i>Luscinia megarhynchos</i>, cetti's warbler <i>Cettia cetti</i>, lesser whitethroat <i>Curruca curruca</i>, grasshopper warbler <i>Locustella naevia</i>, sedge warbler <i>Acrocephalus schoenobaenus</i>.</li> <li>• Passage</li> <li>• Swallow <i>Hirundo rustica</i>, sand martin <i>Riparia riparia</i>, wagtail species.</li> <li>• Wintering</li> <li>• Teal, shelduck, snipe <i>Gallinago gallinago</i>, tufted duck <i>Aythya fuligula</i>, pochard <i>Aythya ferina</i>, gadwall, wigeon <i>Anas penelope</i>.</li> </ul>
	Swanscombe Peninsula SSSI (Natural England 2021)	<ul style="list-style-type: none"> <li>• Breeding</li> <li>• Wetland</li> <li>• Bearded tit, marsh harrier, water rail, reed bunting <i>Emberiza schoeniclus</i>, sedge warbler, reed warbler, Cetti's warbler.</li> <li>• Grazing marsh</li> <li>• Lapwing, little egret <i>Egretta garzetta</i>, grey heron <i>Ardea cinerea</i>, pochard, mute swan <i>Cygnus olor</i> and little grebe <i>Tachybaptus ruficollis</i>.</li> <li>• Chalk pits and scrub</li> <li>• Grasshopper warbler, nightingale, linnets <i>Linaria cannabina</i> and lesser whitethroats.</li> </ul>
	Ranscombe Farm Reserve LWS (Plantlife, 2019)	<ul style="list-style-type: none"> <li>• Fifty bird species noted. Of these, nine species are included on the 2016 Red List of Birds of Conservation Concern, including turtle dove <i>Streptopelia turtur</i>, marsh tit, skylark <i>Alauda</i></li> </ul>

Geographic section	Site name	Ornithological interests
		<p><i>arvensis</i>, song thrush <i>Turdus philomelos</i>, mistle thrush <i>Turdus viscivorus</i>, house sparrow <i>Passer domesticus</i>, linnets, lesser redpoll <i>Acanthis cabaret</i> (probably winter only) and yellowhammer <i>Emberiza citrinella</i>.</p>
	Ebbsfleet Marshes LWS (Kent Wildlife Trust, 2018)	<ul style="list-style-type: none"> <li>• 'A good bird fauna.'</li> </ul>
	Canal and Grazing Marsh Higham LWS (Kent Wildlife Trust, 2009)	<ul style="list-style-type: none"> <li>• 'Supports nesting birds.'</li> </ul>
	Walderslade Woods, Chatham LWS	<ul style="list-style-type: none"> <li>• A variety of woodland birds including common warblers, tits and finches were observed during the botanical survey. The site was known in the recent past to support a winter roost of hawfinches.... There are records of whitethroat <i>Sylvia communis</i> and willow warbler <i>Phylloscopus trochilus</i>.</li> </ul>
The River Thames and functionally linked land	South Thames Estuary and Marshes SSSI (Natural England, 1991a)	<ul style="list-style-type: none"> <li>• See above</li> </ul>
	Thames Estuary and Marshes SPA (Natural England, 2018a)	<ul style="list-style-type: none"> <li>• Qualifying features – non-breeding (peak mean count of individuals 1993/4 to 1997/8; percentage of given wintering population)</li> <li>• Avocet (283; 28.3% British)</li> <li>• Black-tailed godwit (1,699; 2.4% Icelandic)</li> <li>• Dunlin (29,646; 2.1% North Siberian/European/West African)</li> <li>• Grey plover (2,593; 1.7% Eastern Atlantic)</li> <li>• Hen harrier (7; 1% British)</li> <li>• Knot (4,848; 1.4% north-east Canada/Greenland/Iceland/north-west Europe)</li> <li>• Redshank (3,251; 2.2% Eastern Atlantic)</li> <li>• Ringed plover (1,324; 2.6% European/North African)</li> <li>• Waterbird assemblage – non-breeding (1993/4 to 1998/9 wintering population of 75,019)</li> <li>• Passage and wintering Bewick's swan <i>Cygnus columbianus bewickii</i>, golden plover and ruff.</li> <li>• Nationally important populations of shelduck, teal, pintail, gadwall, shoveler, tufted duck and pochard.</li> </ul>
	Thames Estuary and Marshes Ramsar site (Joint Nature Conservation Committee, 2005)	<ul style="list-style-type: none"> <li>• Assemblage of international importance – species with peak counts in winter</li> <li>• 45,118 waterfowl (five-year peak mean 1998/99 to 2002/03).</li> </ul>

Geographic section	Site name	Ornithological interests
		<ul style="list-style-type: none"> <li>• Qualifying species/populations occurring at levels of international importance (individuals; five-year peak mean 1998/89 to 2002/03 as percentage of population)</li> <li>• Species with peak counts in spring/autumn:</li> <li>• Black-tailed godwit (1,640; 4.5% Iceland/West Europe)</li> <li>• Species with peak counts in winter:</li> <li>• Dunlin (15,171; 1.1% West Siberia/West Europe)</li> <li>• Knot (7,279; 1.6% West &amp; Southern Africa)</li> </ul>
	Mucking Flats and Marshes SSSI (Natural England, 1991b)	<ul style="list-style-type: none"> <li>• Nationally and internationally important numbers of wintering wildfowl and waders. Saltmarshes provide high-tide roosts. Interchange of roosting and feeding birds with Cliffs and Cooling Marshes SSSI and Higham Marshes SSSI.</li> <li>• Internationally important numbers</li> <li>• Ringed plover</li> <li>• Nationally important numbers</li> <li>• Shelduck, grey plover, dunlin, black-tailed godwit and redshank</li> <li>• Other species occur in good (sometimes nationally important) numbers</li> <li>• Avocet</li> <li>• Passage migrants (mudflats and saltmarsh)</li> <li>• Curlew sandpiper <i>Calidris ferruginea</i> and yellow-legged gull <i>Larus michahellis</i></li> </ul>
North of the River Thames	Mucking Flats and Marshes SSSI (Natural England, 1991b)	<ul style="list-style-type: none"> <li>• See above</li> </ul>
	Linford Wood LNR (Natural England, 2018b)	<ul style="list-style-type: none"> <li>• Birds include tawny owls <i>Strix aluco</i>, great spotted woodpeckers and green woodpeckers <i>Picus viridis</i>, as well as migrant birds in spring and autumn.'</li> </ul>
	Blackshots Nature Area LWS (EWTBRC, 2015a)	<ul style="list-style-type: none"> <li>• Nesting habitat for ground nesting birds such as skylark.</li> </ul>
	Belhus Lakes/Belhus Wood Country Park LWS (EWTBRC, 2015b)	<ul style="list-style-type: none"> <li>• Breeding birds including little ringed plover <i>Charadrius hiaticula</i>.</li> </ul>
	Cranham Hall Shaws and Pasture SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>• This is a mosaic of habitats, consisting of a sizeable horse field with rich hedges and a pond, and two small areas of woodland. Together, these habits are of value to a variety of birds.</li> </ul>

Geographic section	Site name	Ornithological interests
	Puddle Dock Angling Centre SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>The abundance of young fish attracts herons and kingfishers <i>Alcedo atthis</i>.</li> </ul>
	Tylers Common SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>The site supports a range of breeding birds including skylark and meadow pipit <i>Anthus pratensis</i>.</li> </ul>
	Jermains Wood SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>Breeding birds include hobby <i>Falco subbuteo</i> and sparrowhawk.</li> </ul>
	Fairplay Farm SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>Arable fauna is also well represented and includes skylark.</li> </ul>
	Stubbers Adventure Centre SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>These (grassland) areas support breeding skylarks and meadow pipits. The lakes are important for wintering wildfowl, and tufted duck, mute swan and little grebe breed.</li> </ul>
	North Ockendon Pit SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>The site is moderately rich in plant species despite the dominance of couch, and provides undisturbed habitat for a wide variety of birds.</li> </ul>
	Pot Kiln Wood and Sickle Wood SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>The site as a whole provides suitable habitat for foraging and breeding birds.</li> </ul>
	Ingrebourne Valley SINC (GiGL 2020)	<ul style="list-style-type: none"> <li>A very diverse breeding avifauna includes redshank, lapwing, hobby, water rail, kingfisher, common snipe, reed bunting, cuckoo <i>Cuculus canorus</i>, long-eared owl <i>Asio otus</i>, reed and sedge warblers, gadwall, teal and pochard, and irregular marsh warblers <i>Acrocephalus palustris</i>, Cetti's warblers and bearded tit (London's only recent breeding records for the latter two). Large numbers of teal and tufted duck occur on Berwick Ponds in winter, while a long list of species visit on passage in spring and autumn.</li> </ul>

## 4.3 Species baseline conditions

4.3.1 This section presents the results of the desk study and ornithological field surveys conducted between April 2017 and March 2020. Table A.1 in Annex A provides a summary of all the target species recorded, their distribution (i.e. the geographic section they were recorded) and the survey methodologies they were recorded during.

4.3.2 The bird species that will be discussed specifically are as follows:

- a. Birds with legal protection under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended). This protects certain species from disturbance while breeding in addition to the usual protection against destruction of active nests, which applies to all wild bird species.

- b. Birds listed as interest features of designated sites included in Table 4.1, specifically qualifying species of the internationally (SPA and Ramsar site) and nationally (SSSI) important sites.
- c. Species listed in BoCC (Eaton *et al.*, 2015) as Red or Amber. BoCC Red Listed species have undergone severe population declines and Amber Listed species have undergone a moderate population decline over the last 25 years. The assessment criteria for the categorisation include conservation status, globally, at a European level and within the UK, historical decline, population trends, rarity, localised distribution and international importance.
- d. Certain bird species are listed as Species of Principal Importance for the conservation of biodiversity under Section 41 of the Natural Environment and Rural Communities Act 2006. As the majority of these species recorded are also listed under either Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended) and/or as either Red or Amber BoCC species (Eaton *et al.*, 2015), the approach within this baseline has been to focus on categorising species as Schedule 1, Red or Amber Listed rather than Section 41 listed.
- e. Species listed on the Rare Breeding Bird Panel (RBBP) report (Holling *et al.*, 2018).
- f. Green list species, those of least conservation concern, will not be discussed unless otherwise notable.

4.3.3 Summary tables of all recorded Schedule 1 bird species are included in Annex D.

4.3.4 The desk study was initially conducted in September 2017 and updated in April 2022. The results are divided into geographical sections alongside the field survey results.

4.3.5 In addition, two further sources were reviewed for data relating to ornithology as part of the desk study:

- a. Tilbury Power Station: Ecology survey and mitigation plan (WYG, 2018), including the results from breeding and wintering ornithological surveys carried out between March 2015 and October 2017.
- b. Unpublished results from ornithological surveys carried out by the RSPB at Shorne Marshes between 2015 and 2018.

## South of the River Thames

4.3.6 This section refers to the survey area (field survey) and Wider Study Area (desk study) south of the River Thames, excluding the areas of land classified as functionally linked to the European Sites that are associated with the River Thames, which are discussed separately later in this section.

### Waterbirds

- 4.3.7 The desk study identified 87 waterbird species as being reported within the Wider Study Area south of the River Thames (KMBRC, 2022). Nineteen of these species are listed on the BoCC Red List (Stanbury *et al.*, 2021), including woodcock *Scolopax rusticola*. Forty-eight of these species are listed on the BoCC Amber List (Stanbury *et al.*, 2021), including common gull *Larus canus* and greylag goose *Anser anser*.
- 4.3.8 All BTO WeBs data (BTO, 2022) south of the River Thames was associated with the Thames Estuary and Marshes SPA, Ramsar, or with the functionally linked land, and this data is shown in the River Thames section below.
- 4.3.9 Six target waterbird species were recorded during surveys within the survey area south of the River Thames, including transect surveys along the main route of the Project and within designated woodland areas. Table 4.2 provides a summary of the peak counts (the maximum number of individuals recorded during a single survey) of those recorded targeted waterbird species. Figures 8.13 to 8.17 and 8.22 (Application Document: 6.2) show the distribution and abundance of those species.

**Table 4.2 Peak counts of waterbird species recorded during Main Route and Designated Woodland Transects south of the River Thames**

Species	Main Route Transects					Designated Woodland Transects					
	T23	T24	T25	T26	T28	Ashenbank Wood	Cobham Woods – West	Cobham Woods – East	Great Crabbles Wood	Randall Wood and Brewers Wood	Shorne Wood
Black-headed gull <i>Chroicocephalus ridibundus</i>	15	58	90	130	55	0	0	0	0	0	0
Common gull	67	0	1	24	0	0	0	0	0	0	0
Herring gull <i>Larus argentatus</i>	74	0	0	20	0	0	0	0	0	0	0
Mallard <i>Anas platyrhynchos</i>	0	16	0	0	0	0	0	0	0	2	8
Moorhen <i>Gallinula chloropus</i>	0	0	0	0	1	0	0	0	0	4	6
Lesser black-backed gull <i>Larus fuscus</i>	1	0	0	0	0	0	0	0	0	0	0
Woodcock	0	0	0	0	0	0	1	1	1	0	0



4.3.10 Of the Main Route Transects, T23 and T26 supported the greatest abundance of waterbirds with up to four and three gull species respectively – namely black-headed, common, herring and lesser black-backed gulls. The waterbird assemblage is typical of the primarily arable habitats within the transects. The Designated Woodland Transects also supported typical waterbird species for the habitats present, such as woodcock.

### Songbirds and allies

4.3.11 The desk study identified 92 songbirds and allies as being reported within the Wider Study Area south of the River Thames (KMBRC, 2022). Twenty-eight of these species are listed on the BoCC Red List (Stanbury *et al.*, 2021), including corn bunting *Emberiza calandra* and house martin *Delichon urbica*. Seventeen species listed on the BoCC Amber List (Stanbury *et al.*, 2021) were reported, including dunnock *Prunella modularis*. Twelve of these species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).

4.3.12 Twenty-three targeted species of songbirds and allies were recorded during surveys conducted within the survey area south of the River Thames. Table 4.3 provides a summary of the peak counts of those species. Figures 8.13 to 8.17 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.

**Table 4.3 Peak counts of songbirds and allies recorded during Main Route and Designated Woodland Transects south of the River Thames**

Species	Main Route Transects					Designated Woodland Transects					
	T23	T24	T25	T26	T28	Ashenbank Wood	Cobham Woods – West	Cobham Woods – East	Great Crabbles Wood	Randall Wood and Brewers Wood	Shorne Wood
Bullfinch <i>Pyrrhula pyrrhula</i>	0	1	1	0	1	2	1	8	3	2	5
Corn bunting	2	2	0	0	0	0	0	0	0	0	0
Dunnock	9	4	7	16	3	9	9	4	1	6	9
Fieldfare <i>Turdus pilaris</i>	8	2	14	1	21	0	10	1	0	0	0
Greenfinch <i>Chloris chloris</i>	4	26	3	4	2	5	11	0	2	0	1
Hawfinch	0	0	0	0	0	0	3	0	0	0	1
House martin	2	0	0	0	0	0	0	0	0	0	0
House sparrow	58	10	28	24	0	0	0	0	0	0	0
Kingfisher	0	0	0	0	0	0	0	0	0	0	1

Species	Main Route Transects					Designated Woodland Transects					
	T23	T24	T25	T26	T28	Ashenbank Wood	Cobham Woods – West	Cobham Woods – East	Great Crabbles Wood	Randall Wood and Brewers Wood	Shorne Wood
Lesser redpoll	0	0	0	0	1	1	6	0	0	11	14
Linnet	17	75	26	7	0	0	2	2	0	0	1
Marsh tit	0	0	0	0	1	2	3	0	0	3	2
Meadow pipit	20	67	2	5	0	0	0	1	0	0	0
Mistle thrush	0	0	0	6	8	3	5	2	4	2	2
Redwing <i>Turdus iliacus</i>	30	4	25	5	10 4	30	350	28	160	37	14
Rook <i>Corvus frugilegus</i>	0	0	0	0	0	6	2	3	0	1	7
Skylark	24	22	11	9	0	0	0	1	0	0	0
Song thrush	9	12	1	6	5	13	7	12	14	13	13
Spotted flycatcher	0	0	0	0	0	2	0	0	0	0	0
Starling <i>Sturnus vulgaris</i>	53	27	5	23	2	1	10	0	10	1	13
Stock dove <i>Columba oenas</i>	3	48	1	7	4	11	11	5	1	5	11
Swift <i>Apus apus</i>	6	0	0	0	0	9	0	0	0	0	0
Wheatear <i>Oenanthe oenanthe</i>	0	0	1	0	0	0	0	0	0	0	0
Whitethroat	4	10	7	7	0	14	8	52	3	0	6
Willow warbler <i>Phylloscopus trochilus</i>	0	0	0	0	0	5	3	1	0	5	4
Woodpigeon <i>Columba palumbus</i>	35 0	16 9	31	94	52	69	61	51	45	58	83
Wood warbler	0	0	0	0	0	0	0	1	0	0	0
Wren <i>Troglodytes troglodytes</i>	22	10	3	20	18	37	41	28	19	24	35
Yellowhammer	0	1	0	0	0	0	0	0	0	0	0



4.3.13 Transects T23, T24, T25 and T26 supported a similar assemblage of species typical of arable habitats. This included good numbers of passerines including house sparrow, linnet, meadow pipit and skylark. Hawfinch were recorded during the winter season on one occasion each in Cobham Woods – West and Shorne Wood. Cobham Woods – West also supported the highest numbers of wintering redwing.

### Raptors and owls

4.3.14 The desk study identified 18 species of raptors and owls as being reported within the Wider Study Area south of the River Thames (KMBRC, 2022). Two species listed on the BoCC Red List (Stanbury *et al.*, 2021) were reported, including Merlin *Falco columbarius*. Seven species listed on the BoCC Amber List (Stanbury *et al.*, 2021) species were identified, including kestrel *Falco tinnunculus* and tawny owl. Ten species recorded were listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended) included red kite *Milvus milvus*, hobby and peregrine *Falco peregrinus*.

4.3.15 Three species of raptors and owls were recorded during surveys conducted within the survey area south of the River Thames. Table 4.4 provides a summary of the peak counts of those species. Figures 8.13 to 8.22 (Application Document: 6.2) show the distribution and abundance of those species.

**Table 4.4 Peak counts of raptors and owls species recorded during Main route and Designated Woodland Transects south of the River Thames**

Species	Main Route Transects					Designated Woodland Transects					
	T23	T24	T25	T26	T28	Ashenbank Wood	Cobham Woods – West	Cobham Woods – East	Great Crabbles Wood	Randall Wood and Brewers Wood	Shorne Wood
Kestrel	1	1	1	1	0	3	3	6	0	0	2
Peregrine	0	0	2	0	0	0	0	0	0	0	0
Sparrowhawk	0	0	0	1	0	1	2	1	0	1	1
Tawny owl	0	0	0	0	1	0	1	3	0	0	0

4.3.16 A single pair of peregrine (Schedule 1) was confirmed to be breeding on a pylon within T25.

### Barn owl

4.3.17 The desk study returned barn owl records within the Wider Study Area south of the River Thames. No evidence of barn owl breeding was recorded as part of these desk study records (KMBRC, 2022).

4.3.18 No evidence was recorded at any structures (buildings, trees and/or nest boxes) during targeted inspection surveys within the survey area to the south of the River Thames that would indicate barn owls may use the site for breeding.

- 4.3.19 Figure 8.18: Ornithology Main Route Transects – Wintering (Application Document 6.2) shows all barn owl records from other ornithological surveys and any incidental records recorded during other ecological surveys.
- 4.3.20 Figure 8.19: Ornithology Main Route Transects – Breeding (Application Document 6.2) presents the results of the barn owl foraging habitat assessments. One area was found to be particularly valuable as foraging habitat for barn owl south of the River Thames (excluding functionally linked land); this was around the village of Thong and Southern Valley Golf Course.

### **The River Thames (and functionally linked land)**

- 4.3.21 This section refers to the survey area (field survey) and Wider Study Area (desk study), both within the River Thames and the adjacent areas of land that have been identified as functionally linked to the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site. Therefore, the waterbird species have been separated into groups according to their relevance to these designated sites.

### **SPA/Ramsar site qualifying features and associated species**

- 4.3.22 Bird species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site were specifically targeted within the geographical area described as the River Thames as part of the Intertidal Vantage Point surveys and Functionally Linked Land Transect (diurnal and nocturnal) surveys.
- 4.3.23 No geographical information was provided for the desk study data, so please see the waterbird sections for both south and north of the river.
- 4.3.24 BTO WeBs data (BTO, 2022) identified the presence of 28 wetland bird species within the River Thames and functionally linked land. In particular, the mudflats to the south and east of Coalhouse fort contained large numbers of SPA designated birds. The Mid Thames (Tilbury to Mucking) WeBS count site was particularly notable for its aggregation of waterbirds, with avocet (peak count 5,705), dunlin (peak count 21,404) and black tailed godwit (peak count 6,910), grey plover (peak count 1,194) and ringed plover (peak count 243) all being found in significant numbers. For full details, please refer to Annex B for full details of WeBS data.
- 4.3.25 Breeding bird survey data from the RSPB for Shorne Marshes recorded seven species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site. These results indicate that notable numbers of lapwing and redshank breed within the Shorne Marshes RSPB reserve, with an average of 49 and 66 breeding pairs per year, respectively.
- 4.3.26 Five species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site were reported in the Tilbury Power Station Ecology Survey and Mitigation Plan (RWE Generation UK PLC, 2015). These included species such as shelduck and redshank.

### **Intertidal Vantage Point surveys**

- 4.3.27 Table 4.5 provides a summary of the results of the Intertidal Vantage Point surveys that were carried out to inform the Project. This includes the peak count for each species per season, taken as the highest total number of individuals

from a single count-hour across all five VP locations. The results also present the overall peak count and the number of separate surveys each species was recorded during (out of a possible maximum of 47).

**Table 4.5 Seasonal peak counts of SPA/Ramsar species recorded during the Intertidal Vantage Point surveys**

Species	Peak count per season*						Overall peak count	No. surveys recorded during
	Br. 2017	Pa. 2017	Wi. 2017/ 18	Br. 2018	Pa. 2018	Wi. 2018/ 19		
<b>SPA/Ramsar listed qualifying feature species</b>								
Avocet	59	1	141	44	300	830	830	36
Black-tailed godwit	306	40	286	594	1372	408	1372	36
Dunlin	1	120	807	2	450	1575	1575	26
Grey plover	0	12	56	0	14	35	56	22
Knot	0	15	21	0	1	0	21	5
Redshank	75	7	59	30	13	122	122	40
Ringed plover	15	162	75	10	98	52	162	38
<b>SPA/Ramsar specifically listed assemblage/non-qualifying/noteworthy species</b>								
Common tern	2	35	0	7	42	13	42	15
Gadwall	0	0	0	3	0	0	3	2
Golden plover	0	0	2	0	0	0	2	1
Lapwing	3	5	130	3	0	70	130	18
Little egret	5	3	2	2	8	3	8	30
Little grebe	0	0	1	0	1	0	1	2
Pochard	0	0	0	1	0	0	1	1
Ruff	2	0	0	0	0	0	2	1
Shelduck	27	15	49	82	20	129	129	43
Shoveler	0	0	3	2	0	11	11	6
Teal	16	18	277	143	75	641	641	26
Whimbrel <i>Numenius phaeopus</i>	5	5	10	3	3	0	10	16

\* Br. – breeding season (April to July, inclusive) Pa. – passage season (August to October, inclusive) Wi. – wintering season (November to March, inclusive)

4.3.28 Seven species that form qualifying features of the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site were recorded within the survey boundary. Twelve additional species that are specifically listed as forming part of the assemblage qualification, as non-qualifying interest

features and/or as noteworthy species of Thames Estuary and Marshes SPA and/or Ramsar site, were also recorded.

- 4.3.29 Figures 8.11 and 8.12 (Application Document 6.2) show the distribution and abundance of individual species and assemblages listed on the designations for the Thames Estuary and Marshes SPA and/or Ramsar site recorded during Intertidal Vantage Point surveys.

**Functionally Linked Land Transect survey (diurnal)**

- 4.3.30 Table 4.6 presents a summary of the results of diurnal transect surveys conducted within the River Thames (and functionally linked land) area. The results present the peak count for each species at each transect area, taken as the maximum number of individuals recorded during a single survey.

**Table 4.6 Peak counts for SPA/Ramsar species recorded at each of the Functionally Linked Land Transects (diurnal)**

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
<b>SPA/Ramsar qualifying species</b>												
Avocet	0	0	0	0	0	0	0	6	0	0	0	0
Black-tailed godwit	0	0	0	0	0	0	0	36	1	0	0	7
Dunlin	0	0	0	0	0	0	1	10	0	0	0	0
Knot	0	0	0	0	0	0	0	0	0	0	0	1
Redshank	0	0	0	0	0	0	0	51	0	0	0	118
Ringed plover	0	0	0	0	0	0	21	27	16	0	0	0
<b>SPA/Ramsar assemblage/non-qualifying/noteworthy species</b>												
Common tern	0	0	2	0	0	0	0	0	0	0	0	0
Gadwall	0	2	0	0	0	2	2	101	2	10	2	17
Golden plover	7	0	0	0	0	0	0	0	20	0	0	0
Kingfisher	2	2	0	0	0	0	1	1	1	2	1	3
Lapwing	192	60	323	3	304	0	43	111	51	291	12	922
Little egret	2	3	2	2	0	2	1	16	1	5	1	3
Little grebe	0	3	16	1	0	0	0	26	5	8	2	11
Pintail	0	0	0	0	0	0	0	0	0	0	0	13

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Pochard	0	0	0	0	0	0	0	53	3	0	0	9
Ruff	0	0	0	0	0	0	0	0	0	0	0	1
Shelduck	4	0	0	8	0	0	4	22	18	9	0	101
Short-eared owl	0	0	0	0	0	0	1	0	0	0	0	0
Shoveler	0	0	2	0	0	0	2	10	8	2	0	104
Teal	0	21	0	0	0	0	34	153	50	80	13	237
Tufted duck	0	1	2	0	0	0	0	12	2	2	0	30
Water rail	0	1	0	0	0	0	0	1	0	1	0	2
Whimbrel	0	0	3	0	0	0	1	0	0	0	0	0

- 4.3.32 Six species that form qualifying features of the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site were recorded within the survey boundary. Seventeen species that are specifically listed as forming part of the assemblage qualification, as non-qualifying interest features and/or as noteworthy species of Thames Estuary and Marshes SPA and/or Ramsar site, were also recorded.
- 4.3.33 Figures 8.13 to 8.19 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.

**Functionally Linked Land Transect survey (nocturnal)**

- 4.3.34 Table 4.7 presents a summary of the results of nocturnal Functionally Linked Land Transect surveys conducted within the River Thames (and functionally linked land) area. The results present the peak count for each species at each transect area.

**Table 4.7 Peak counts for SPA/Ramsar species recorded at each of the Functionally Linked Land Transects (nocturnal)**

Species	Essex							Kent	
	Cole Farm and scrapheap	Bowaters Farm	East Tilbury Battery	Ingrebourne Valley	Jetty VP	Motts Farm	Tilbury Fort	Chalk	Eastcourt Marshes
<b>SPA/Ramsar qualifying species</b>									
Avocet	0	0	0	0	14	0	12	0	0
Black-tailed godwit	0	0	0	0	0	0	20	0	0
Dunlin	0	1	0	0	800	0	810	0	0
Grey plover	0	0	0	0	2	0	1	0	0
Redshank	0	1	0	0	5	0	84	0	1
Ringed plover	0	0	0	2	1	0	0	0	0
<b>Non-qualifying or noteworthy interest features</b>									
Gadwall	0	0	0	0	0	0	0	0	3
Lapwing	127	28	48	7	0	37	44	89	11
Little grebe	0	0	0	0	0	0	16	0	13
Pochard	0	0	0	3	0	0	12	0	3
Shelduck	0	0	0	0	10	0	14	0	0
Shoveler	0	0	0	7	0	0	3	0	34
Teal	0	4	4	6	2	0	147	4	10
Short-eared owl	0	0	0	2	0	0	0	0	0
Tufted duck	0	0	0	0	0	0	2	0	3
Water rail	0	0	0	0	0	0	0	0	1

- 4.3.35 Six species that form qualifying features of the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site were recorded within the survey boundary. Ten species that are specifically listed as forming part of the assemblage qualification, as non-qualifying interest features and/or as noteworthy species of Thames Estuary and Marshes SPA and/or Ramsar site, were also recorded.
- 4.3.36 Five groups of bird types (see Table 4.10 below) could not be identified to species level due to the limitations of nocturnal surveys (see assumptions and limitations section below). These groups may have included species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site.
- 4.3.37 Figures 8.13 to 8.19 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.

#### Other waterbirds

- 4.3.38 The desk study identified 61 other waterbird species as being reported within the functionally linked land area. Eight records of BoCC Red List (Eaton *et al.*, 2015) species were reported, including arctic skua *Stercorarius parasiticus* and curlew sandpiper. Thirty-two records of BoCC Amber List (Eaton *et al.*, 2015) species were reported, including brent goose *Branta bernicla*, and turnstone *Arenaria interpres*. Twenty species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended). Five records of great white egret *Ardea alba* were identified. This species is not currently classified on the BoCC report (Eaton *et al.*, 2015) as it is not widely distributed in the UK. However, the great white egret is classified as 'very rare' by the RBBP report, so remains a notable record (Holling *et al.*, 2018).
- 4.3.39 Breeding bird survey data from the RSPB identified four species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site. These were greylag goose, mallard, mute swan and oystercatcher *Haematopus ostralegus*.
- 4.3.40 Five other waterbird species were reported in the Tilbury Power Station Ecology Survey and Mitigation Plan (RWE Generation UK PLC, 2015). Four records were listed on the BoCC Amber List (Eaton *et al.*, 2015) including mallard, snipe, oystercatcher and black-headed gull. The remaining record was of Schedule 1 species (Wildlife and Countryside Act 1981 (as amended)) greenshank.



### Intertidal Vantage Point survey

4.3.41 Table 4.8 provides a summary of the Intertidal Vantage Point survey results for other waterbird species. This includes the peak count for each species per season, taken as the highest total number of individuals from a single count-hour across all five VP locations. The results also present the overall peak count and the number of surveys recorded during for each species.

**Table 4.8 Seasonal peak counts of other waterbird species recorded during the Intertidal Vantage Point surveys**

Species	Peak count per season						Overall peak count	No. surveys recorded during
	Br. 2017	Pa. 2017	Wi. 2017/18	Br. 2018	Pa. 2018	Wi. 2018/19		
Arctic tern <i>Sterna paradisaea</i>	0	0	0	0	1	0	1	1
Bar-tailed godwit	0	9	8	0	10	408	408	9
Black tern <i>Chlidonias niger</i>	0	0	0	3	0	0	3	1
Black-headed gull	1067	1005	1157	626	1191	1843	1843	47
Brent goose	0	0	1	0	0	0	1	1
Canada goose <i>Branta canadensis</i>	17	185	2	0	30	207	207	6
Caspian gull <i>Larus cachinnans</i>	0	0	0	0	1	0	1	1
Common gull	1	3	65	9	44	53	65	32
Common Sandpiper <i>Actitis hypoleucos</i>	4	6	0	1	9	1	9	11
Cormorant <i>Phalacrocorax carbo</i>	3	3	5	4	4	4	5	44
Curlew	18	61	30	8	58	70	70	43
Egyptian goose <i>Alopochen aegyptiaca</i>	0	0	2	0	0	0	2	1
Great black-backed gull <i>Larus marinus</i>	2	52	30	3	30	58	58	44
Great crested grebe <i>Podiceps cristatus</i>	2	0	4	2	0	3	4	7
Grey heron	0	2	1	0	0	0	2	5
Greylag goose	1	2	0	0	200	67	200	5
Herring gull	262	171	51	101	389	207	389	46

Species	Peak count per season						Overall peak count	No. surveys recorded during
	Br. 2017	Pa. 2017	Wi. 2017/18	Br. 2018	Pa. 2018	Wi. 2018/19		
Lesser black-backed gull	9	29	47	2	27	20	47	38
Little gull <i>Hydrocoloeus minutus</i>	0	0	0	0	0	69	69	1
Mallard	15	4	20	6	7	28	28	32
Mediterranean gull <i>Larus melanocephalus</i>	1	1	0	11	3	1	11	8
Mute swan	0	0	4	1	0	2	4	6
Oystercatcher	8	16	5	7	6	9	16	33
Red-breasted merganser <i>Mergus serrator</i>	0	0	1	0	0	0	1	1
Sanderling <i>Calidris alba</i>	0	0	0	4	0	0	4	1
Sandwich tern <i>Sterna sandvicensis</i>	0	2	0	0	1	0	2	3
Shag <i>Phalacrocorax aristotelis</i>	0	0	0	1	0	0	1	1
Turnstone	8	7	16	1	1	7	16	19
Wigeon	0	8	483	8	22	623	623	23
Yellow-legged gull	7	0	0	2	80	3	80	9

Br. – breeding season (April to July, inclusive) Pa. – passage season (August to October, inclusive) Wi. – wintering season (November to March, inclusive)

4.3.42 Thirty other waterbird species were recorded that are considered to form part of the waterbird assemblage qualification. Notable species recorded include up to 80 yellow-legged gull (relevant to Mucking Flats and Marshes SSSI (Natural England, 1991b)), 69 little gull (foraging on a single occasion) and consistently high wintering numbers of wigeon (frequently associated with the saltmarsh to the east of Shornemead Fort).

#### Functionally Linked Land Transect survey (diurnal)

4.3.43 Table 4.9 presents a summary of the results of transect surveys conducted within the River Thames (and Functionally Linked Land) area. The results present the peak count for each species at each transect area.

**Table 4.9 Peak counts for other waterbird species recorded at each of the Functionally Linked Land Transects (diurnal)**

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Black-headed gull	230	215	600	5	25	25	7	294	8	800	18	71
Canada goose	0	0	70	0	0	0	0	21	74	9	0	235
Caspian gull	0	1	0	0	0	0	0	0	0	0	0	0
Common gull	55	8	7	0	1	0	350	4	0	33	4	0
Common sandpiper	0	0	0	0	0	0	0	4	2	1	0	3
Coot <i>Fulica atra</i>	0	9	21	0	0	0	1	1	2	20	3	285
Cormorant	0	0	0	0	0	0	0	3	0	1	0	7
Curlew	1	1	0	0	0	0	0	2	0	0	0	77
Garganey	0	0	0	0	0	0	0	0	0	0	0	1
Egyptian goose	0	0	0	0	0	0	2	2	0	11	0	50
Great black-backed gull	0	1	0	5	0	0	40	2	0	0	0	0
Great crested grebe	0	0	0	0	0	0	0	9	0	0	0	0
Great white egret	0	0	0	0	0	0	0	0	1	0	0	0
Green sandpiper <i>Tringa ochropus</i>	0	2	0	1	0	0	2	1	5	2	0	1
Grey heron	3	6	1	1	1	0	1	3	1	7	3	12
Greylag goose	0	0	76	0	0	6	9	2	2	20	0	160

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Herring gull	85	400	70	120	0	0	760	4	0	60	1	2
Jack snipe <i>Lymnocyptes minimus</i>	0	0	0	0	0	0	0	0	0	0	0	1
Lesser black-backed gull	2	3	2	5	0	0	30	0	0	4	1	0
Little ringed plover	1	1	0	0	0	0	1	0	2	0	0	3
Mallard	9	48	19	8	5	4	9	84	30	37	11	162
Mediterranean gull	0	0	0	0	0	0	0	1	0	2	0	0
Moorhen	9	16	3	1	0	5	2	3	4	18	11	16
Mute swan	0	0	0	0	0	0	0	4	5	15	2	18
Oystercatcher	0	0	2	0	0	0	2	10	0	0	0	5
Pectoral sandpiper <i>Calidris melanotos</i>	0	0	0	0	0	0	0	0	0	0	0	1
Snipe	3	17	4	3	1	0	11	45	3	12	11	44
Wigeon	0	0	0	0	0	0	0	82	0	45	0	40
Woodcock	0	0	0	0	0	0	2	0	0	0	0	0
Yellow-legged gull	0	0	2	0	0	0	0	0	0	0	0	0

- 4.3.44 Thirty other waterbird species were recorded, which are considered to form part of the waterbird assemblage qualification. Figures 8.13 to 8.19 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.
- 4.3.45 Functionally Linked Land Transect survey (nocturnal) Table 4.10 presents a summary of the results of Functionally Linked Land Transect surveys (nocturnal) conducted within transect areas north of the River Thames and south of the River Thames, respectively. The results present the peak count for each species at each transect area.

**Table 4.10 Peak counts for other waterbird species recorded at each of the Functionally Linked Land Transects (nocturnal)**

Species	Essex							Kent	
	Cole Farm and scrapheap	Bowaters Farm	East Tilbury Battery	Ingrebourne Valley	Jetty VP	Mott Farm	Tilbury Fort	Chalk	Eastcourt Marshes
Black-headed gull	0	0	0	1	1	0	0	0	0
Canada goose	0	0	0	13	0	0	23	5	6
Coot	0	0	0	1	0	0	6	4	22
Curlew	0	0	0	0	3	0	1	0	0
Great crested grebe	0	0	0	2	0	0	0	0	0
Green sandpiper	0	0	0	0	0	0	2	0	0
Grey heron	0	0	0	0	0	0	1	3	0
Greylag goose	0	0	0	0	0	0	0	0	10
Mallard	1	8	4	20	2	0	57	8	7
Moorhen	0	2	0	1	0	4	1	2	5
Mute swan	0	0	0	0	0	0	2	10	2
Oystercatcher	0	0	0	0	0	0	1	0	0
Snipe	2	19	0	3	0	1	4	9	5
Wigeon	0	0	0	9	0	0	45	0	35
Woodcock	3	2	2	2	0	1	0	1	5
Unidentified duck	0	0	0	3	0	0	7	1	45
Unidentified medium wader	0	0	0	0	8	0	72	0	2
Unidentified small wader/small grebe	1	0	1	1	8	0	0	0	0
Unidentified large wader	0	0	0	0	2	0	0	0	0
Unidentified swan/goose	0	2	0	0	0	0	0	0	2

- 4.3.46 Fifteen other waterbird species were recorded, which are considered to form part of the waterbird assemblage qualification. Five groups of bird types (Table 4.10) could not be identified to species level due to the limitations of nocturnal surveys (see assumptions and limitations section below). These groups may have included species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site.

#### Songbirds and allies

- 4.3.47 The desk study identified 46 songbirds and allies as being reported within the functionally linked land area. Twenty-seven species listed on the BoCC (Eaton *et al.*, 2015) Red List were reported, including cuckoo and house sparrow. Twelve species listed on the BoCC (Eaton *et al.*, 2015) Amber List were reported, including bullfinch and common redpoll *Acanthis flammea*. The remaining seven species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).
- 4.3.48 Breeding bird survey data from the RSPB identified seven species associated with the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar site.
- 4.3.49 Twenty songbirds and allies were reported in the Tilbury Power Station Ecology Survey and Mitigation Plan (RWE Generation UK PLC, 2015). Nine records of BoCC (Eaton *et al.*, 2015) Red List were identified, including corn bunting, nightingale and house sparrow. Eight records of BoCC (Eaton *et al.*, 2015) Amber List were identified, including meadow pipit, reed bunting and song thrush. The remaining three species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).
- 4.3.50 Thirty-three targeted species of songbirds and allies were recorded during surveys conducted within the River Thames (and Functionally Linked Land) survey area. Table 4.11 provides a summary of the peak counts of those species. Figures 8.13 to 8.17 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.

**Table 4.11 Peak counts for songbird and other non-waterbird species recorded at each of the Functionally Linked Land Transects (diurnal)**

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Black redstart <i>Phoenicurus ochruros</i>	0	0	0	0	0	0	0	1	0	0	0	0
Brambling <i>Fringilla montifringilla</i>	0	0	1	0	0	0	0	0	0	0	1	0
Bullfinch	0	0	2	0	0	0	0	0	0	1	2	0
Cetti's warbler	1	2	3	4	2	0	15	2	3	9	2	9
Corn bunting	2	1	60	13	1	0	7	0	4	1	0	0
Cuckoo	1	0	1	1	1	0	4	0	1	2	2	5
Dunnock	4	8	16	13	8	2	8	16	9	12	5	6
Fieldfare	11	80	368	72	20	0	82	37	46	84	240	200
Grasshopper warbler	0	2	0	0	0	0	1	0	1	2	0	1
Greenfinch	4	1	5	10	6	0	2	3	3	32	13	25
Grey partridge <i>Perdix perdix</i>	0	4	0	0	0	0	5	0	0	0	0	0
Grey wagtail <i>Motacilla cinerea</i>	0	2	4	0	0	0	0	2	0	0	0	0
House martin	3	1	106	12	0	0	24	0	30	12	20	25
House sparrow	250	140	147	22	30	3	12	18	1	62	200	0
Linnet	11	54	15	147	31	7	52	98	104	52	60	258

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Marsh tit	0	0	0	0	0	0	0	0	0	0	0	1
Meadow pipit	12	42	34	31	14	0	80	32	32	80	10	178
Mistle thrush	2	2	2	5	5	0	1	0	3	4	1	4
Nightingale	0	0	4	1	0	0	6	0	2	0	0	0
Redstart <i>Phoenicurus phoenicurus</i>	0	0	0	0	0	0	0	0	0	1	0	0
Redwing	23	24	380	40	20	0	55	4	40	30	60	64
Reed bunting	14	18	10	26	16	0	7	4	6	7	3	6
Rook	30	40	5	54	9	0	12	22	11	20	15	9
Sedge warbler	4	7	7	2	5	0	6	0	4	10	1	11
Skylark	63	89	49	45	80	2	79	2	75	32	5	54
Song thrush	11	8	9	19	9	1	10	4	13	12	6	3
Starling	136	250	515	143	95	80	405	556	162	1200	225	698
Stock dove	10	193	30	384	100	0	16	11	61	52	5	4
Swift	11	14	15	2	0	1	200	2	4	72	14	42
Tree sparrow <i>Passer montanus</i>	0	0	1	0	0	0	1	0	0	0	0	0
Turtle dove	0	0	0	0	0	0	1	0	0	0	0	0
Water pipit <i>Anthus spinoletta</i>	0	0	0	0	0	0	0	0	0	0	0	2



Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Wheatear	1	6	0	1	0	0	1	0	4	5	0	3
Whinchat <i>Saxicola torquata</i>	0	1	1	1	0	0	3	1	3	2	0	0
Whitethroat	12	12	25	39	11	7	25	4	38	10	1	17
Willow warbler	2	0	2	3	0	0	1	1	3	0	0	2
Woodpigeon	284	400	440	540	285	16	162	880	37	220	186	83
Wren	10	18	20	26	15	6	28	5	17	16	11	27
Yellow wagtail <i>Motacilla flava</i>	2	2	4	2	0	0	1	0	0	1	0	8
Yellowhammer	1	9	0	6	2	0	1	0	1	1	0	1

4.3.51 Of the Functionally Linked Land Transects in Essex, East Tilbury Marshes and Coalhouse Fort supported the greatest total peak counts of individuals as well as the greatest diversity of species in this group. In Kent, both Filborough Marshes and Shorne Marshes were similarly diverse and abundant. Notable species recorded include cuckoo, corn bunting and nightingale. Cetti’s warbler (Schedule 1) were recorded as confirmed or probable breeders on most transects (11 out of 12).

**Raptors and owls**

- 4.3.52 The desk study identified 13 raptor and owl records as being reported within the River Thames (and Functionally Linked Land) Survey Area. Two records of BoCC Amber List species (Eaton *et al.*, 2015) were identified, including kestrel and tawny owl. One record of long-eared owl was identified. This species is classified as a green list species on the BoCC report (Eaton *et al.*, 2015). However, this is largely due to the species being under reported. The long-eared owl is classified as ‘scarce/less scarce’ by the RBBP report, so remains a notable record (Holling *et al.*, 2018). Ten species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).
- 4.3.53 The Tilbury Power Station Ecology Survey and Mitigation Plan (RWE Generation UK PLC, 2015) reported three records of raptor and owl species. Two records were of Schedule 1 (Wildlife and Countryside Act 1981 (as amended)) species were identified, including barn owl and peregrine. One record kestrel was identified, a BoCC (Eaton *et al.*, 2015) Amber List species.
- 4.3.54 Four species of raptors and owls were recorded during Intertidal Vantage Point surveys conducted within the River Thames (and Functionally Linked Land) Survey Area. Table 4.12 provides a summary of those species. Figures 8.11 to 8.19 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.

**Table 4.12 Seasonal peak counts of raptors and owls recorded during the Intertidal Vantage Point surveys**

Species	Peak count per season						Overall peak count	No. surveys recorded during (maximum possible: 47*)
	Br. 2017	Pa. 2017	Wi. 2017/18	Br. 2018	Pa. 2018	Wi. 2018/19		
Barn owl	0	0	0	1	0	1	1	2
Kestrel	4	4	2	1	2	2	4	23
Marsh harrier	1	1	6	2	2	1	6	18
Peregrine	1	2	1	0	1	1	2	7

*Br. – breeding season (April to July, inclusive) Pa. – passage season (August to October, inclusive) Wi. – wintering season (November to March, inclusive)*

\* A total of 47 surveys were carried out between the breeding season 2017 and wintering 2018/19

- 4.3.55 Kestrels were regularly observed foraging along the banks of the River Thames.
- 4.3.56 Eight species of raptors and owls were recorded during diurnal Functionally Linked Land Transect surveys. Table 4.13 presents a summary of those results.

Confirmed or probable Schedule 1 breeders included barn owl, hobby and marsh harrier.

4.3.57 Four species of raptors and owls were recorded during nocturnal Functionally Linked Land Transect surveys. Table 4.14 presents a summary of those results.

**Table 4.13 Peak counts for raptors and owls recorded at each of the Functionally Linked Land Transects (diurnal).**

Species	Essex						Kent					
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Barn owl	0	0	1	1	0	0	2	0	1	1	0	1
Hobby	0	0	0	0	0	0	1	0	1	2	0	2
Kestrel	1	3	2	2	2	0	2	1	2	5	2	13
Marsh harrier	1	1	1	1	0	0	2	0	1	2	0	9
Merlin <i>Falco columbarius</i>	0	0	0	0	0	0	0	0	0	1	0	0
Peregrine	0	1	1	0	1	0	1	0	2	0	0	1
Red kite	0	0	0	0	0	0	0	0	1	0	0	0
Short-eared owl	0	0	0	0	0	0	1	0	0	0	0	0
Sparrowhawk	2	2	1	1	1		3	0	1	3	1	2

**Table 4.14 Peak counts for raptors and owls recorded at each of the Functionally Linked Land Transects (nocturnal).**

Species	Essex							Kent	
	Cole farm and scrapheap	Bowaters Farm	East Tilbury Battery	Ingrebourne Valley	Jetty VP	Mott Farm	Tilbury Fort	Chalk	Eastcourt Marshes
Barn owl	0	1	0	1	1	2	0	0	0
Merlin	0	0	0	1	0	0	0	0	0
Short-eared owl	0	0	0	2	0	0	0	0	0
Tawny owl	0	1	0	1	1	2	0	0	0

### Barn owl

4.3.58 Table 4.15 provides a summary of structures (buildings, trees and/or nest boxes) within the River Thames (and Functionally Linked Land) Survey Area where evidence recorded during targeted inspection surveys indicated that barn owls may use the site for the purpose of breeding. This includes signs of both current (at the time of survey) and historical breeding activity.

**Table 4.15 Summary of the results from targeted barn owl surveys (breeding significance only)**

Location reference*	Survey date	Structure type	Breeding category	Evidence
BOBS_1	29 August 2018	<i>Building (historic fort)</i>	<i>Occupied breeding site</i>	<i>Anecdotal: conversation with Coalhouse Fort Ranger (Ray Reeves) – breeding barn owls have delayed the restoration work onsite, adult and juvenile observed emerging from fort.</i>
BOBS_2	28 August 2018	<i>Barn owl nest box (within barn)</i>	<i>Old breeding site</i>	<i>Droppings and layer of old (&gt; one year) pellets in box. No recent signs.</i>
BOBS_3	28 August 2018	<i>Building (small barn)</i>	<i>Occupied breeding site</i>	<i>Chicks confirmed as present (hissing calls heard) within roof lining cavity.</i>

\* Locations of barn owl nest sites are considered sensitive information and as such are only shown on a confidential figure.

- 4.3.59 Three sites with evidence of breeding were recorded. Two of these sites were occupied by breeding barn owls at the time of the survey; one site showed only historical signs of breeding but remained suitable for breeding in the future.
- 4.3.60 Figure 8.18: Ornithology Main Route Transects Results – Wintering (Application Document 6.2) shows the locations of these results, as well as all barn owl records from other ornithological surveys and any incidental records recorded during other ecological surveys.
- 4.3.61 Figure 8.19: Ornithology Main Route Transects Results – Breeding (Application Document 6.2) presents the results of the barn owl foraging habitat assessments. The functionally linked land contained the highest concentration of valuable foraging habitat across the whole survey area, on both sides of the River Thames. This was primarily associated with the land adjacent to the River Thames, between Tilbury Fort and Coalhouse Fort to the north, as well as within the Metropolitan Police Firing Range and adjacent Shorne and Filborough Marshes to the south.

### Marsh harrier

- 4.3.62 Figure 8.21: Ornithology Marsh Harrier Distribution (Application Document 6.2) presents all records of marsh harrier recorded between April 2017 and March 2020, including results from:
- Marsh Harrier Vantage Point surveys conducted during November and December 2018
  - All other ornithological surveys conducted between April 2017 and March 2020 (inclusive)
  - Incidental records generated during other species surveys
- 4.3.63 One marsh harrier breeding site was identified within Shorne Marshes and a total of 104 other observations were recorded. These included regular foraging over functionally linked land (both north and south of the River Thames) and multiple observations of marsh harrier crossing the River Thames during Intertidal Vantage Point surveys.

### North of the River Thames

- 4.3.64 This section refers to the survey area (field survey) and Wider Study Area (desk study) north of the River Thames, excluding the areas classified as functionally linked land.
- 4.3.65 The results from both Main Route Transects and Additional Transects are combined in this section, as although the Main Route Transects were carried out for two seasons and Additional Transects only one season, the methodology was comparable. The East Tilbury Battery Transect is presented with the Functionally Linked Land Transects in the River Thames and functionally linked land section.

### Waterbirds

- 4.3.66 The desk study identified 104 waterbird species as being reported within the Wider Study Area north of the River Thames (EWTBRC, 2020, GiGL, 2022, EFC, 2022). Twenty-four of these species are listed on the BoCC Red List (Stanbury *et al.*, 2021), including white-fronted goose and pochard. Fifty-three species listed on the BoCC Amber List (Stanbury *et al.*, 2021) were reported, including mallard and jack snipe. Twenty-five of these species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended)..
- 4.3.67 BTO WeBs data (BTO, 2022) identified the presence of 11 wetland bird species north of the River Thames, in areas not associated with the River Thames SPA or the functionally linked land. Belhus Woods Country Park was notable for its aggregation of wintering ducks, with gadwall (peak count 147), pochard (peak count 123), shoveler (peak count 118), teal (peak count 119) and tufted duck (peak count 344) all being found in good numbers. For full details, please refer to Annex B for full details of WeBS data.
- 4.3.68 Eighteen targeted species of waterbird were recorded during surveys within the survey area north of the River Thames, including transect surveys along the Project route and within designated woodland areas. Table 4.16 provides a summary of the peak counts (the maximum number of individuals recorded during a single survey) of species. Figures 8.11 to 8.17 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.

**Table 4.16 Peak counts of waterbird species recorded during Main Route, Designated Woodland and Additional Transects north of the River Thames**

Species	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T16	T19	T20	T21	T22	Hangman's Wood	Bird Lane	Puddledock Farm Fishery	Top Meadow	Walton Hall
Black-headed gull	0	0	0	180	60	40	0	200	2	0	23	1	502	10	84	72	30	104	75	0	0	0	2	0
Common gull	0	0	0	4	1	23	0	0	8	0	1	0	50	27	51	10	8	6	0	0	0	0	0	0
Gadwall	0	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green sandpiper	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Great black-backed gull	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Greylag goose	0	0	0	0	0	2	2	2	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	4
Herring gull	0	0	0	0	0	1	250	750	200 0	2	30	0	3	0	0	0	0	7	0	0	0	0	115	0
Lapwing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	142	691	0	0	0	0	0
Mallard	0	0	2	4	0	4	1	5	2	4	2	0	200	0	0	0	0	23	6	0	2	34	4	2
Lesser black-backed gull	0	0	0	8	0	2	100	450	25	1	90	0	0	0	0	0	0	0	0	0	0	0	10	0
Pochard	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
Shelduck	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Species	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T16	T19	T20	T21	T22	Hangman's Wood	Bird Lane	Puddledock Farm Fishery	Top Meadow	Walton Hall
Shoveler	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
Mute swan	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teal	0	0	0	0	0	0	0	3	0	7	0	0	0	0	0	0	0	3	1	0	0	0	0	0
Common tern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Snipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Woodcock	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0

- 4.3.69 T6 and T21 supported the greatest diversity of waterbird species. Significant numbers of wintering lapwing were recorded on T21 and T22 on a single occasion each (both in late January 2019).

#### **Songbirds and allies**

- 4.3.70 The desk study identified 103 songbird species as being reported within the Wider Study Area north of the River Thames (EWTBRC, 2020, GiGL, 2022, EFC, 2022). Thirty of these species are listed on the BoCC Red List (Stanbury *et al.*, 2021), including grey partridge, spotted flycatcher *Muscicapa striata* and yellowhammer. Twenty-one species listed on the BoCC Amber List (Stanbury *et al.*, 2021) were reported, including stock dove. Fifteen species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).
- 4.3.71 Twenty-seven targeted species of songbirds and allies were recorded during surveys conducted within the survey area north of the River Thames. Table 4.17 provides a summary of the peak counts of those species. Additionally, ring-necked parakeets *Psittacula krameri* were recorded during four out of seven surveys within Transect 8, associated with the area of woodland known as The Wilderness. Although this is not a target species, it is included for relevance to bats. Figures 8.11 to 8.17 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.



**Table 4.17 Peak counts of songbirds and allies recorded during Main Route, Designated Woodland and Additional Transects north of the River Thames**

Species	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T16	T19	T20	T21	T22	Hangmans Wood	Bird Lane	Puddledock Farm Fishery	Top Meadow	Walton Hall
Brambling	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bullfinch	0	2	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Cetti's warbler	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	3	0	0	0	0	0	1
Common crossbill <i>Loxia curvirostra</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corn bunting	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	1	0	3	0	0	0	0	0
Cuckoo	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	0	0
Dunnock	4	7	5	11	7	13	13	10	4	15	7	5	6	3	7	6	6	6	5	4	3	2	5	1
Fieldfare	68	30	91	28	0	27	119	20	86	52	51	40	150	18	23	43	10	14	45	0	0	0	0	0
Greenfinch	6	0	2	5	2	3	1	1	0	5	5	0	4	6	2	0	0	8	0		5	2	6	2
Grey wagtail	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House martin	0	0	0	2	0	1	1	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
House sparrow	1	0	6	7	1	6	0	23	0	4	5	25	5	21	15	10	21	40	10	16	5	1	30	10
Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Lesser redpoll	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Linnet	4	14	1	1	2	4	93	15	2	8	12	6	6	4	10	109	77	60	2	0	0	0	6	15
Meadow pipit	2	2	9	0	2	50	6	25	3	3	30	0	2	1	0	2	2	1	0	0	0	2	0	0
Mistle thrush	3	1	0	2	1	1	1	0	0	2	0	1	2	1	0	0	1	0	0	1	1	0	0	0
Moorhen	0	0	0	0	3	0	2	6	0	4	1	0	2	0	0	1	0	2	7		0	3	4	2

Species	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T16	T19	T20	T21	T22	Hangmans Wood	Bird Lane	Puddledock Farm Fishery	Top Meadow	Walton Hall
Nightingale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0
Redwing	69	20	3	57	18	20	21	8	50	6	7	80	33	0	10	0	0	10	15	6	0	0	0	0
Reed bunting	3	0	10	0	0	0	1	3	1	4	5	2	3	0	0	0	0	2	0	0	0	0	0	0
Rook	5	0	5	0	0	20	35	40	0	30	165	11	20	0	20	16	10	200	9	0	0	3	2	13
Sedge warbler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Skylark	1	1	44	4	7	5	16	37	30	20	43	4	15	19	31	40	17	102	40	0	5	0	39	2
Song thrush	21	7	4	5	11	3	4	11	10	7	2	8	9	1	4	1	2	5	1	2	4	0	4	0
Sparrowhawk	0	1	1	1	0	1	1	0	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0
Starling	0	0	40	10	115	180	0	80	290	10	24	320	19	30	47	100	18	40	49	13	17	0	150	10
Stock dove	7	3	100	1	3	5	1	5	9	15	4	20	16	0	20	167	29	86	0	0	8	12	162	0
Wheatear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Whitethroat	8	2	10	7	3	5	9	2	18	3	0	2	13	3	0	7	5	14	4	0	4	5	12	2
Willow warbler	0	2	0	2	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1
Woodlark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Woodpigeon	205	300	609	85	45	295	215	1016	480	722	252	350	306	37	135	400	18	237	155	45	49	22	60	25
Wren	26	23	11	33	10	15	18	11	13	15	18	11	17	5	5	5	8	14	12	9	17	6	8	6
Yellow wagtail	0	0	1	1	1	1	1	3	0	1	8	0	1	0	0	4	1	1	4	0	0	0	0	2
Yellowhammer	1	0	22	0	0	0	3	5	9	14	6	0	8	0	0	0	0	0	1	0	0	0	9	0

- 4.3.72 T21 supported the greatest diversity of songbird and allied species. Notable species recorded include linnet, nightingale and yellow wagtail. Cetti's warbler were recorded as probable Schedule 1 breeders on four transects.

#### Raptors and owls

- 4.3.73 The desk study identified 18 species of raptors and owls as being reported within the Wider Study Area north of the River Thames (EWTBRC, 2020, GiGL, 2022, EFC, 2022). One of these species are listed on the BoCC Red List (Stanbury *et al.*, 2021); Merlin *Falco columbarius*. Seven of these species are listed on the BoCC Amber List (Stanbury *et al.*, 2021), including kestrel and tawny owl. Additionally, long-eared owl were identified. The long-eared owl is classified as 'scarce/less scarce' by the RBBP report, so remains a notable record (Holling *et al.*, 2018). Nine species reported are listed under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (as amended).
- 4.3.74 Five targeted species of raptor and owl were recorded during surveys conducted within the survey area north of the River Thames. Table 4.18 provides a summary of the peak counts of those species. Figures 8.12 to 8.19 and 8.22 (Application Document 6.2) show the distribution and abundance of those species.
- 4.3.75 The incidental results included a single sighting of a marsh harrier, which was recorded foraging over Ockendon Landfill on 29 September 2018. This was the only observation of this species outside of the functionally linked land area.

**Table 4.18 Peak counts of raptors and owls recorded during Main Route, Designated Woodland and Additional Transects north of the River Thames**

Species	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T16	T19	T20	T21	T22	Hangman' s Wood	Bird Lane	Puddledock Farm Fishery	Top Meadow	Walton Hall
Barn owl	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hobby	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Kestrel	1	0	1	2	1	2	0	1	1	2	1	0	3	1	1	0	1	0	1	1	1	1	1	0
Long-eared owl	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peregrine	0	0	0	0	1	0	0	0	0	0	1	0	2	0	0	0	0	1	0	0	0	0	0	0
Sparrowhawk																								

4.3.76 Confirmed or probable Schedule 1 breeders included barn owl, hobby and peregrine.

**Barn owl**

4.3.77 The desk study returned barn owl records within the Wider Study Area south of the River Thames. Records of breeding barn owl were reported as part of the desk study, however no geographical information was provided for these records (EWTBRC, 2020, GiGL, 2022, EFC, 2022).

4.3.78 Table 4.19 provides a summary of structures (buildings, trees and/or nest boxes) where evidence recorded during targeted inspection surveys indicates that barn owls may use the site for the purpose of breeding. This includes signs of both current (at the time of survey) and historical breeding activity.

**Table 4.19 Summary of the results from targeted barn owl surveys (breeding significance only)**

Location reference *	Survey date	Structure type	Breeding category	Evidence
BOBS_4	3 September 2018	Barn owl nest box (within barn)	Occupied breeding site	Pair of adults observed roosting in nest box. Fresh layer of pellets in box. Two moulted female primary feathers below box.
BOBS_5	18 July 2018	Tree (pedunculate oak)	Occupied breeding site	Chicks confirmed as present in cavity (visual observation by tree-climber). Adult female flushed from nest, second adult flushed from nearby tree.
BOBS_6	17 September 2019	Barn owl nest box (within a small derelict building); also, near a barn to the north-west	Unconfirmed breeding site	Two adults flushed from building (one inside, next to nest box); one outside from ivy Hedera helix growing on wall. Small layer of pellets in box. One feather (not primary). One nearby barn was suitable for breeding, but the survey was incomplete due to unsafe access. Anecdotal evidence of breeding in this barn.
BOBS_7	19 July 2018	Barn owl nest box (within barn)	Occupied breeding site	Female adult observed sitting on four eggs (live camera installed in box).
BOBS_8	26 February 2020	Stacked hay bales within a barn	Former breeding site	>20 pellets found (at least ten were <one week old); convincing anecdotal evidence from the landowner reporting that a pair of barn owls had used the site for over three years, and they had previously found dead nestlings within the bales.

Location reference *	Survey date	Structure type	Breeding category	Evidence
BOBS_9	2018	Assumed within barn (desk study record does not specify)	Unconfirmed breeding site, desk study record from EWTBRC	Desk study report of a 'pair with three fledged juveniles'.
BOBS_10	9 September 2021	Tree (pedunculate oak)	Occupied breeding site	Chicks confirmed as present in cavity (visual observation by tree-climber).

*\*Locations of barn owl nest sites are considered sensitive information and so are only shown on a confidential figure.*

- 4.3.79 Six sites with evidence of breeding were recorded. Four of these sites were occupied by breeding barn owls at the time of the survey. One site (BOBS\_6) comprised two separate features: a derelict building (where two barn owls were flushed from) with no signs of breeding activity; and a separate nearby barn, which contained tall machinery that was likely to provide a potential nest site. It was not possible to survey the machinery as there was no safe means of access. However, anecdotal reports of breeding barn owls in this building and significant evidence of roosting within the surrounding farm mean that this site was precautionarily categorised as a breeding site, albeit unconfirmed. One site (BOBS\_8) was categorised as old (no longer used), though this is primarily due to the time of year the survey took place.
- 4.3.80 One desk study record (BOBS\_9) was reported for a breeding site in a building where access was not possible for field surveys. This has been categorised as an unconfirmed breeding site.
- 4.3.81 Figure 8.18: Ornithology Main Route Transects Results – Wintering (Application Document 6.2) shows the locations of these results, as well as all barn owl records from other ornithological surveys and any incidental records recorded during other ecological surveys.
- 4.3.82 Figure 8.19: Ornithology Main Route Transects Results – Breeding (Application Document 6.2) presents the results of the barn owl foraging habitat assessments. The main concentrations of valuable foraging habitat were surrounding the village of Orsett and the areas around the Ockendon Landfill site.

## 5 Assumptions and limitations

### 5.1 Land access

- 5.1.1 All surveys were subject to permission being gained to access parcels of land. Some transects had no access during particular months and/or restricted access to some small parts of the transect area on a regular basis, due to permission and health and safety restrictions.

### 5.2 Birds of conservation concern update

- 5.2.1 All surveys were undertaken between 2017 and 2020 with red and amber list species included as target species based on the Birds of Conservation Concern 4, published in 2015 (Eaton *et al.*, 2015). An updated Birds of Conservation Concern, version 5 (Stanbury *et al.*, 2021) was published with a number of updates to species concern. This includes a number of species that were moved from green list to red/amber. As part of the surveys, any green list species records had no geographical information, each transect recorded a tally of the total number of individuals recorded. This data is included in the results section above, however none of these species will be presented on the figures as there is no geographical information available to map the location of these records.
- 5.2.2 Where surveys occurred in the proximity of the SPA, all waterbird species were recorded regardless of whether they were green list species. These surveys were the Intertidal Vantage Point Surveys and the Functionally Linked Land Surveys. As such, these green list species are mapped on the figures for each of these surveys.
- 5.2.3 Two species moved from amber list to green list as part of the update of the Birds of Conservation Concern 5 update. These were mute swan and kingfisher. Mute Swan has been removed from the results section and figures for the main route transect surveys and the designated woodland transect surveys. Although kingfisher is now a green list species, it is still listed as a species listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and has therefore been retained in the results section.

### 5.3 Transect surveys (functionally linked land, designated woodland and main route)

- 5.3.1 Nocturnal Functionally Linked Land Transect surveys were limited by the range of vision available when using night-vision equipment, estimated to be effective at an extreme range of 200m, but most effective up to 150m. This limitation was exacerbated in some areas where vehicular access was not available (the use of a 4x4 vehicle gave surveyors extra height).
- 5.3.2 The area of reedbed within the Shorne Marshes contained an active Schedule 1 breeding bird site. Surveyors avoided working close to the area to avoid disturbing the nesting birds, so the area was likely under-surveyed during the breeding season.

5.3.3 The East Tilbury Battery Transect was added due to an amendment to the Order Limits in 2019 (the area was proposed for habitat mitigation work). As a result of this and restricted land access, it was not surveyed entirely according to the Functionally Linked Land Transect methodology, despite being categorised as such. A total of three breeding bird surveys were carried out in 2019 covering a variety of tidal states, as well as one diurnal and one nocturnal survey in each month between November 2019 and March 2020, otherwise adhering to the methodologies in Section 1.3. Only one year of surveys has been carried out, instead of two years of surveys at other transect areas. However, the area would be improved as part of mitigation works and is distant from other works, so would be at a low risk of an adverse impact.

## 5.4 Intertidal Vantage Point surveys

5.4.1 There was a risk of double-counting records between adjacent vantage point locations where viewsheds overlapped. This risk was controlled as follows.

5.4.2 Between all VPs, because data was inputted and viewed ‘live’ on the digital recording app (Collector for ArcGIS), surveyors could actively review data input by other teams. Surveyors also communicated with each other by mobile phone when uncertain. Additionally:

- a. Between the north and south VPs, surveyors only recorded up to the centre of the river.
- b. Between the north-west and north-east VPs, an informal boundary was set approximately 350m east of the north-west VP, where the viewshed of both VPs naturally reached a limit and a line of rocks on the shore could be used as a reference point.
- c. Between the south-west and south-east VPs, there was very little overlap of viewsheds, with the exception of birds at greater range towards the centre of the river. In these cases, surveyors relied on communication.

5.4.3 It is held that the residual risk of double counting is sufficiently low that it would not have a material effect on the survey results.

5.4.4 A single survey (28 February 2018) was not carried out due to an extreme weather event (heavy snow – *Anticyclone Hartmut*/ ‘Beast from the East’) and concerns for surveyors’ safety.

5.4.5 When calculating the seasonal peak counts, in some instances, two or more vantage points contained equal peak counts within a single hour. Where this was the case, the point(s) selected to represent the peak count was that closest to the Order Limits, as this would represent the worst-case scenario. This relates to parts of the Order Limits representing above-ground works only. The underground works were, at this stage in the assessment process, presumed to present a lower risk of disturbance than above-ground works.



## 5.5 Marsh Harrier Vantage Point survey

- 5.5.1 This survey was not continued beyond two visits as it was deemed unnecessary to do so. This decision was informed by the professional judgement of the ornithology survey leader.
- 5.5.2 The location of the potential roost site was close (approximately 30m) to an active haul road used by large trucks and plant. This activity was not taking place when the roost was anecdotally reported and was deemed likely to be a significant disturbance to roosting marsh harrier, making it unlikely to support them for roosting.

## 5.6 Barn owl activity results

- 5.6.1 Figure 8.19: Ornithology Main Route Transects Results – Breeding (Application Document 6.2) presents observations of barn owl activity recorded on all survey types (including incidental sightings from non-ornithological surveys). It is recognised that this figure shows some activity bias to the areas of functionally linked land because of the higher density of all surveys (including nocturnal) in this area.

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## Annex A Distribution of Targeted Bird Species Recorded During Field Surveys

### A.1 Auto ID and Verification

#### A.1.1 Key to abbreviations in Table A.1:

- a. FLLn: Functionally Linked Land Transect survey (nocturnal)
- b. FLLd: Functionally Linked Land Transect survey (diurnal)
- c. DW: Designated Woodland Transect survey
- d. MR: Main Route Transects (combined with Additional Transects)
- e. VP: Intertidal Vantage Point
- f. N/A: indicates that the species was not a targeted for that survey type

**Table A.1 The distribution of targeted bird species observed, sorted by geographic section and survey type**

Species	South of the River Thames		The River Thames and functionally linked land					North of the River Thames	
	DW	MR	FLLn	FLLd	VP	FLLd	FLLn	MR	DW
<b>Qualifying features of the Thames Estuary and Marshes SPA and/or Ramsar site</b>									
Avocet					Y	Y	Y		
Black-tailed godwit				Y	Y	Y	Y		
Dunlin					Y	Y	Y		
Grey plover					Y		Y		
Knot				Y	Y				
Redshank			Y	Y	Y	Y	Y		
Ringed plover					Y	Y	Y		
<b>Specifically named assemblage, non-qualifying interest and/or noteworthy species of the Thames Estuary and Marshes SPA and/or Ramsar site</b>									
Common tern					Y	Y			
Gadwall			Y	Y	Y	Y		Y	
Golden plover					Y	Y			
Kingfisher	Y		N/A	Y	N/A	Y	N/A	Y	
Lapwing			Y	Y	Y	Y	Y	Y	
Little egret	N/A	N/A		Y	Y	Y		N/A	N/A
Little grebe	N/A	N/A	Y	Y	Y	Y	Y	N/A	N/A

Species	South of the River Thames		The River Thames and functionally linked land					North of the River Thames	
	DW	MR	FLLn	FLLd	VP	FLLd	FLLn	MR	DW
Pintail				Y					
Pochard			Y	Y	Y	Y	Y	Y	
Ruff				Y	Y				
Shelduck				Y	Y	Y	Y	Y	
Short-eared owl						Y	Y	Y	
Shoveler			Y	Y	Y	Y	Y	Y	
Teal			Y	Y	Y	Y	Y	Y	
Tufted duck	N/A	N/A	Y	Y		Y	Y	N/A	N/A
Water rail	N/A	N/A	Y	Y		Y		N/A	N/A
Whimbrel					Y	Y			
<b>Species considered to form part of the waterfowl and wader assemblage qualification for the Thames Estuary and Marshes SPA and/or Ramsar site</b>									
Arctic tern					Y				
Bar-tailed godwit					Y				
Black tern					Y				
Black-headed gull		Y		Y	Y	Y	Y	Y	Y
Brent goose					Y				
Canada goose	N/A	N/A	Y	Y	Y	Y	Y	N/A	N/A
Caspian gull					Y	Y			
Common gull		Y		Y	Y	Y		Y	
Common sandpiper				Y	Y	Y			
Coot	N/A	N/A	Y	Y		Y	Y	N/A	N/A
Cormorant	N/A	N/A		Y	Y	Y		N/A	N/A
Curlew				Y	Y	Y	Y		
Egyptian goose	N/A	N/A		Y	Y	Y		N/A	N/A
Garganey				Y					
Great black-backed gull					Y	Y		Y	
Great crested grebe	N/A	N/A			Y	Y	Y	N/A	N/A
Great white egret						Y			
Green sandpiper				Y		Y	Y	Y	
Grey heron	N/A	N/A	Y	Y	Y	Y	Y	N/A	N/A
Greylag goose			Y	Y	Y	Y		Y	Y

Species	South of the River Thames		The River Thames and functionally linked land					North of the River Thames	
	DW	MR	FLLn	FLLd	VP	FLLd	FLLn	MR	DW
Herring gull		Y		Y	Y	Y		Y	Y
Jack snipe	N/A	N/A		Y				N/A	N/A
Lesser black-backed gull		Y		Y	Y	Y		Y	Y
Little ringed plover				Y		Y			
Mallard	Y	Y	Y	Y	Y	Y	Y	Y	Y
Mediterranean gull				Y	Y	Y			
Moorhen	N/A	N/A	Y	Y		Y	Y	N/A	N/A
Mute swan			Y	Y	Y	Y	Y	Y	
Oystercatcher				Y	Y	Y	Y		
Red-breasted merganser	N/A	N/A			Y			N/A	N/A
Sanderling					Y				
Sandwich tern					Y				
Shag					Y				
Snipe			Y	Y		Y	Y	Y	
Turnstone					Y				
Wigeon			Y	Y	Y	Y	Y		
Woodcock	Y		Y			Y	Y	Y	
Yellow-legged gull					Y	Y			
<b>Schedule 1 listed species</b>									
Barn owl				Y	Y	Y	Y	Y	
Black redstart			N/A		N/A	Y	N/A		
Brambling			N/A	Y	N/A	Y	N/A	Y	
Common crossbill			N/A		N/A		N/A	Y	
Cetti's warbler			N/A	Y	N/A	Y	N/A	Y	Y
Fieldfare	Y	Y	N/A	Y	N/A	Y	N/A	Y	
Firecrest			N/A		N/A		N/A	Y	
Hobby				Y		Y		Y	
Marsh harrier				Y	Y	Y			
Merlin				Y			Y		
Peregrine		Y		Y	Y	Y		Y	
Red kite						Y			
Redwing	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y

Species	South of the River Thames		The River Thames and functionally linked land					North of the River Thames	
	DW	MR	FLLn	FLLd	VP	FLLd	FLLn	MR	DW
Woodlark								Y	
<b>BoCC Red List species (Eaton et al., 2015)</b>									
Corn bunting		Y	N/A	Y	N/A	Y	N/A	Y	
Cuckoo			N/A	Y	N/A	Y	N/A	Y	Y
Grasshopper warbler			N/A	Y	N/A	Y	N/A		
Grey partridge			N/A		N/A	Y	N/A		
Grey wagtail			N/A		N/A	Y	N/A	Y	
Hawfinch	Y		N/A		N/A		N/A		
House sparrow		Y	N/A	Y	N/A	Y	N/A	Y	Y
Lesser redpoll	Y	Y	N/A		N/A		N/A	Y	
Linnet	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
Marsh tit	Y	Y	N/A	Y	N/A		N/A		
Mistle thrush	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
Nightingale			N/A	Y	N/A	Y	N/A	Y	
Skylark	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
Song thrush	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
Spotted flycatcher	Y		N/A		N/A		N/A		
Starling	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
Tree sparrow			N/A		N/A	Y	N/A		
Turtle dove			N/A		N/A	Y	N/A		
Whinchat			N/A	Y	N/A	Y	N/A		
Wood warbler	Y		N/A		N/A		N/A		
Yellow wagtail			N/A	Y	N/A	Y	N/A	Y	Y
Yellowhammer		Y	N/A	Y	N/A	Y	N/A	Y	Y
<b>BoCC Amber List species (Eaton et al., 2015)</b>									
Bullfinch	Y	Y	N/A	Y	N/A	Y	N/A	Y	
Dunnock	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
House martin		Y	N/A	Y	N/A	Y	N/A	Y	
Kestrel	Y	Y		Y	Y	Y		Y	Y
Meadow pipit	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
Redstart			N/A	Y	N/A		N/A		
Reed bunting			N/A	Y	N/A	Y	N/A	Y	
Stock dove	Y	Y	N/A	Y	N/A	Y	N/A	Y	Y
Swift	Y	Y	N/A	Y	N/A	Y	N/A		



Species	South of the River Thames		The River Thames and functionally linked land					North of the River Thames	
	DW	MR	FLLn	FLLd	VP	FLLd	FLLn	MR	DW
Tawny owl	Y	Y					Y		
Water pipit			N/A	Y	N/A		N/A		
Willow warbler	Y		N/A	Y	N/A	Y	N/A	Y	Y

## Annex B BTO WeBS Count Data Within 2km of the Order Limits

**Table B.1 Five-year annual peak means for qualifying bird species within the Thames Estuary and Marshes SPA, Ramsar Site and Functionally Linked land from WeBS count areas within 2km of the Order Limits**

WeBS survey area	Alpha Pool	Coastguards Pool	Higham Bight	Higham Marsh	Redham to Mead	Shorne Marshes	Gravesend Promenade Offshore	Shorne Marshes Offshore	Cliffe Creek and Offshore	Lower Hope Point Offshore	Mid Thames (Tilbury to Mucking)	Purfleet To Grays	Stanford Wharf Fisheries	Stanford Wharf (realigned)	Thameside Nature Park Mucking
Years included within Five-year annual mean peak	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2017/18	2016/17 to 2020/21	2016/17 to 2020/21	2015/16 to 2019/20	2014/15 and 2017/18	2017/18	2016/17 to 2020/21	2011/12 to 2015/16	2013/14 to 2015/16	2013/14 to 2015/16 and 2017/18	2013/14 to 2015/16 and 2017/18
Avocet	1	0	107	0	0	0	8	0	0	0	5705	33	0	28	0
Black-tailed godwit	<1	0	143	33	0	18	201	0	0	0	6910	62	0	124	0
Dunlin	2	0	1072	<1	0	<1	41	220	0	104	21409	1014	0	76	0
Grey plover	0	0	36	0	0	0	1	7	0	15	1194	4	0	24	0
Knot	0	0	3	0	0	0	0	0	0	0	65	<1	0	0	0

WeBS survey area	Alpha Pool	Coastguards Pool	Higham Bight	Higham Marsh	Redham to Mead	Shorne Marshes	Gravesend Promenade Offshore	Shorne Marshes Offshore	Cliffe Creek and Offshore	Lower Hope Point Offshore	Mid Thames (Tilbury to Mucking)	Purfleet To Grays	Stanford Wharf Fisheries	Stanford Wharf (realigned)	Thameside Nature Park Mucking
Years included within Five-year annual mean peak	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2017/18	2016/17 to 2020/21	2016/17 to 2020/21	2015/16 to 2019/20	2014/15 and 2017/18	2017/18	2016/17 to 2020/21	2011/12 to 2015/16	2013/14 to 2015/16	2013/14 to 2015/16 and 2017/18	2013/14 to 2015/16 and 2017/18
Redshank	45	3	42	13	0	18	163	48	1	2	132	339	0	241	0
Ringed plover	0	1	3	0	0	0	87	0	0	0	243	6	0	67	0
Bewick's swan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common tern	110	0	0	0	0	0	104	0	1	0	40	13	0	2	<1
Gadwall	11	0	0	8	0	7	21	0	0	40	54	4	0	0	71
Golden plover	0	2	2	0	0	<1	0	0	0	0	1	3	0	0	0
Greenshank	<1	0	0	0	0	0	0	0	0	0	2	2	0	2	1

WeBS survey area	Alpha Pool	Coastguards Pool	Higham Bight	Higham Marsh	Redham to Mead	Shorne Marshes	Gravesend Promenade Offshore	Shorne Marshes Offshore	Cliffe Creek and Offshore	Lower Hope Point Offshore	Mid Thames (Tilbury to Mucking)	Purfleet To Grays	Stanford Wharf Fisheries	Stanford Wharf (realigned)	Thameside Nature Park Mucking
Years included within Five-year annual mean peak	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2017/18	2016/17 to 2020/21	2016/17 to 2020/21	2015/16 to 2019/20	2014/15 and 2017/18	2017/18	2016/17 to 2020/21	2011/12 to 2015/16	2013/14 to 2015/16	2013/14 to 2015/16 and 2017/18	2013/14 to 2015/16 and 2017/18
Kingfisher	2	0	0	<1	0	0	<1	0	0	0	2	<1	<1	0	5
Lapwing	33	86	85	221	0	440	63	27	0	0	1241	194	0	17	126
Little egret	27	0	2	3	0	4	3	0	0	0	38	3	0	0	5
Little grebe	819	0	0	2	0	2	0	0	0	0	138	<1	1	7	27
Pintail	0	1	<1	1	0	1	0	2	0	0	2	0	0	1	0
Pochard	452	0	0	0	0	5	0	0	0	0	71	0	0	0	70
Ruff	0	0	0	0	0	<1	0	0	0	0	0	0	0	0	0
Shelduck	21	11	11	52	0	22	24	1	0	0	2120	43	0	156	1
Shoveler	<1	11	0	18	0	36	3	0	1	0	34	2	0	0	44

WeBS survey area	Alpha Pool	Coastguards Pool	Higham Bight	Higham Marsh	Redham to Mead	Shorne Marshes	Gravesend Promenade Offshore	Shorne Marshes Offshore	Cliffe Creek and Offshore	Lower Hope Point Offshore	Mid Thames (Tilbury to Mucking)	Purfleet To Grays	Stanford Wharf Fisheries	Stanford Wharf (realigned)	Thameside Nature Park Mucking
Years included within Five-year annual mean peak	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2017/18	2016/17 to 2020/21	2016/17 to 2020/21	2015/16 to 2019/20	2014/15 and 2017/18	2017/18	2016/17 to 2020/21	2011/12 to 2015/16	2013/14 to 2015/16	2013/14 to 2015/16 and 2017/18	2013/14 to 2015/16 and 2017/18
Spotted redshank <i>Tringa erythropus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teal	117	19	377	19	0	30	74	82	20	30	1806	202	0	575	30
Tufted duck	397	0	<1	<1	0	4	0	0	0	0	69	<1	5	0	303
Water rail	<1	0	0	0	0	<1	0	0	0	0	<1	0	2	0	5
Whimbrel	0	0	0	0	0	0	<1	0	0	0	11	1	0	6	0
White-fronted goose (European)	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0

WeBS survey area	Alpha Pool	Coastguards Pool	Higham Bight	Higham Marsh	Redham to Mead	Shorne Marshes	Gravesend Promenade Offshore	Shorne Marshes Offshore	Cliffe Creek and Offshore	Lower Hope Point Offshore	Mid Thames (Tilbury to Mucking)	Purfleet To Grays	Stanford Wharf Fisheries	Stanford Wharf (realigned)	Thameside Nature Park Mucking
Years included within Five-year annual mean peak	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2016/17 to 2020/21	2017/18	2016/17 to 2020/21	2016/17 to 2020/21	2015/16 to 2019/20	2014/15 and 2017/18	2017/18	2016/17 to 2020/21	2011/12 to 2015/16	2013/14 to 2015/16	2013/14 to 2015/16 and 2017/18	2013/14 to 2015/16 and 2017/18
Curlew	0	0	81	105	0	94	13	3	1	0	665	15	0	209	0
Curlew sandpiper	0	0	0	0	0	0	<1	0	0	0	1	0	0	0	0
Garganey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-legged gull	0	0	0	0	0	0	2	0	0	0	57	18	0	2	1

**Table B.2 Five-year annual peak means for qualifying bird species north of the Thames Estuary and Marshes SPA and Ramsar Site from WeBS count areas within 2km of the Order Limits**

WeBS survey area	Belhus Woods Country Park	Warren and Lion Gorges
Years included within five-year annual peak mean	2016/17 to 2020/21	2020/21
Avocet	0	0
Black-tailed godwit	0	0
Dunlin	0	0
Grey plover	0	0
Knot	0	0
Redshank	0	0
Ringed plover	0	0
Bewick's swan	0	0
Common tern	0	0
Gadwall	147	0
Golden plover	0	0
Greenshank	0	0
Kingfisher	2	0
Lapwing	159	0
Little egret	6	10
Little grebe	46	0
Pintail	0	0
Pochard	123	3
Ruff	0	0
Shelduck	<1	0
Shoveler	118	41
Spotted redshank	0	0
Teal	119	0
Tufted duck	344	11
Water rail	13	0
Whimbrel	0	0
White-fronted goose (European)	0	0
Curlew	0	0
Curlew sandpiper	0	0
Garganey	0	0
Yellow-legged gull	0	0

**Table B.3 BTO WeBS count areas within the Thames Estuary and Marshes SPA, Ramsar Site and Functionally Linked land within 2km of the Order Limits**

WeBS count area	Records included within five-year annual peak mean in Table B.1
Alpha Pool	2016/17 to 2020/21
Cliffe Creek and Offshore	2014/15 to 2017/18
Coastguards Pool	2016/17 to 2020/21
Gravesend Promenade	2016/17 to 2020/21
Higham Bight	2016/17 to 2020/21
Higham Marshes	2016/17 to 2020/21
Lower Hope Point Offshore	2017/18
Redham to Mead	2017/18
Shorne Marshes (offshore)	2015/16 to 2019/20
Shorne Marshes	2016/17 to 2020/21
Filborough Marshes	Not included. Last counted 2005/06
Mid Thames (Tilbury to Mucking)	2016/17 to 2020/21
Purfleet to Grays	2011/12 to 2015/16
Stanford Wharf Fisheries	2013/14 to 2015/16
Stanford Wharf (Realigned)	2013/14 to 2015/16 and 2017/18
Thameside Nature Park, Mucking	2013/14 to 2015/16 and 2017/18
North Mucking excl fishery	Not included. No submissions for this site.

**Table B.4 BTO WeBS count areas south of the River Thames within 2km of the Order Limits**

WeBS count area	Records included within five-year annual peak mean in Table B.1
Belhus Woods Country Park	2016/17 to 2020/21
Warrens and Lions Gorge	2020/21
Grays Chalk Pits	Not included. Last counted 2009/10
Stubbers Complex	Not included. Last counted 2005/06
Little Mollands Farm Pits	Not included. Last counted 2004/05
South Ockendon GPs	Not included. Last counted 1984/85
South Stifford GPs	Not included. Last counted 1984/85
Tilbury Docks	Not included. Last counted 1984/85
Hall Farm Ockendon	Not included. Last counted 2001/02
Bramble and Bush's Farm Lakes	Not included. Last counted 2004/05
Corbetts Tey Park	Not included. Last counted 2009/10
Hall Farm South Ockendon	Not included. Last counted 2003/04



## Annex C Barn Owl Structure Suitability Assessment Categories

**Table C.1 Barn owl structure suitability assessment categories**

Suitability category	Suitability sub-category	Description
Temporary Rest Site (TRS)	No	No evidence of the site having been used by barn owls.
	Old	An old sign of barn owl use, such as droppings and the occasional pellet or body feather is present.
	Recent	A recent sign of barn owl use, such as droppings and the occasional pellet or body feather is present.
Roost Site (RS)	No potential	The structure has no suitable access points (>80mm) for barn owl and/or no feature that might be used as a perch.
	Potential	At least one access point (>80mm) and perch are present, but no signs of recent or old use by barn owl is present.
	Old (>12 months)	At least one access point (>80mm) and perch are present. There is no evidence of breeding and no recent observations of barn owl have been reported (last 12 months). Its presence can be recognised by signs such as pellets, droppings or moulted feathers but none of these can be identified as <12 months old.
	Recent (<12 months)	At least one access point (>80mm) and perch are present. There is no evidence of breeding, but a barn owl is reported to have been seen or heard regularly, or its recent presence (last 12 months) can be recognised by signs such as pellets, droppings or moulted feathers that are <12 months old.
	Current single barn owl	Same as Recent RS, plus a single barn owl is observed roosting during the survey.
	Current pair of barn owls	Same as Recent RS, plus a pair of barn owls is observed roosting during the survey.
Breeding Site (BS)	No potential	No suitable cavity or platform is present that might be used by nesting barn owls.
	Potential	Same as Potential/Recent/Old RS, plus a suitable cavity or platform that might be used by nesting barn owls, but no signs of previous or current breeding observed.

<b>Suitability category</b>	<b>Suitability sub-category</b>	<b>Description</b>
	Old	Same as Potential BS, plus evidence of breeding activity such as eggshells, nesting material juvenile down, but no signs of current breeding observed.
	Occupied	Same as Old BS, but signs of current breeding are observed, such as blowflies around a cavity entrance or chicks observed to be present.

## Annex D Summary of Species Records Listed Under Schedule 1 Part 1 of the Wildlife and Countryside Act 1981 (As Amended) Split by Geographical Region

### A.1 South of the River Thames

**Table D.1 Peak counts of Schedule 1 species recorded during Main Route, Designated Woodland and Additional Transects south of the River Thames**

Species	T 23	T 24	T 25	T 26	T 28	Ashenbank Woods	Cobham Woods – West	Cobham Woods – East	Great Crabbles Wood	Randall Wood and Brewers Wood	Shorne Woods
<b>Possible, probable or confirmed breeding</b>											
Barn owl	0	0	0	0	0	0	0	0	0	0	0
Cetti's warbler	0	0	0	0	0	0	0	0	0	0	0
Hobby	0	0	0	0	0	0	0	0	0	0	0
Peregrine	0	0	2	0	0	0	0	0	0	0	0
<b>Non-breeding (relating to habitat, season and/or national distribution season)</b>											
Brambling	0	0	0	0	0	0	0	0	0	0	0
Common crossbill	0	0	0	0	0	0	0	0	0	0	0
Fieldfare	8	2	14	1	21	0	10	1	0	0	0
Green sandpiper	0	0	0	0	0	0	0	0	0	0	0
Kingfisher	0	0	0	0	0	0	0	0	0	0	1
Redwing	13	4	25	5	104	30	350	28	160	37	14

## A.2 The River Thames and functionally linked land

**Table D.2 Peak counts of Schedule 1 species recorded during Main Route, Designated Woodland and Additional Transects within the River Thames and functionally linked land**

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
<b>Schedule 1 Possible, probable or confirmed breeding</b>												
Barn owl	0	0	1	1	0	0	2	0	1	1	0	1
Cetti's warbler	1	2	3	4	2	0	15	2	3	9	2	9
Hobby	0	0	0	0	0	0	1	0	1	2	0	2
Kingfisher	2	2	0	0	0	0	1	1	1	2	1	3
Little ringed plover	1	1	0	0	0	0	1	0	2	0	0	3
Marsh harrier	1	1	1	1	0	0	2	0	1	2	0	5
Peregrine	0	1	1	2	1	0	1	0	2	0	0	1
<b>Schedule 1 Non-breeding</b>												
Avocet	0	0	0	0	0	0	0	6	0	0	0	0
Barn owl	0	0	1	1	0	0	2	0	1	1	0	1
Black-tailed godwit	0	0	0	0	0	0	0	36	1	0	0	7
Black redstart	0	0	0	0	0	0	0	1	0	0	0	0
Brambling	0	0	1	0	0	0	0	0	0	0	1	0

Species	Essex									Kent		
	Biggins Farm	Bretts Farm	Coalhouse Fort	Coles Farm	Parsonage Farm	East Tilbury Battery	East Tilbury Marshes	Tilbury Fort	Tilbury Power Station	Filborough Marshes	Rochester Bridge	Shorne Marshes
Fieldfare	11	80	368	95	20	0	86	37	46	84	240	200
Green sandpiper	0	2	0	1	0	0	2	1	5	2	0	1
Kingfisher	2	2	0	0	0	0	1	1	1	2	1	3
Little ringed plover	1	1	0	0	0	0	1	0	2	0	0	3
Marsh harrier	1	1	1	1	0	0	2	0	1	2	0	5
Mediterranean gull	0	0	0	0	0	0	0	2	0	2	0	0
Peregrine	0	1	1	2	1	0	1	0	2	0	0	1
Ruff	0	0	0	0	0	0	0	0	0	0	0	1
Whimbrel	0	0	3	0	0	0	1	0	0	0	0	0

## A.3 North of the River Thames

**Table D.3 Peak counts of Schedule 1 species recorded during Main Route, Designated Woodland and Additional Transects north of the River Thames**

Species	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T16	T19	T20	T21	T22	Hangman' s Wood	Bird Lane	Puddledock Farm Fishery	Top Meadow	Walton Hall	
<b>Possible, probable or confirmed breeding</b>																									
Barn owl	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cetti's warbler	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	3	0	0	0	0	0	0	1
Firecrest <i>Regulus ignicapilla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Hobby	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Peregrine	0	0	0	0	1	0	0	0	0	0	1	0	2	0	0	0	0	1	0	0	0	0	0	0	0
<b>Non-breeding (relating to habitat, season and/or national distribution season)</b>																									
Brambling	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common crossbill	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fieldfare	68	30	91	28	0	27	119	20	86	52	51	40	150	18	23	43	10	14	45	0	0	0	0	0	0
Green sandpiper	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Redwing	69	20	3	57	18	20	21	8	50	6	7	80	33	0	10	0	0	10	15	6	0	0	0	0	0

## Annex E Abbreviated BTO Species Codes (BTO, 2020)

**Table E.1 Abbreviated two-letter BTO species codes as used on all ornithology figures**

Arctic tern	AE	Curlew	CU	House martin	HM	Nightingale	N.	Spotted flycatcher	SF
Avocet	AV	Dunlin	DN	House sparrow	HS	Oystercatcher	OC	Starling	SG
Barn owl	BO	Dunnock	D.	Jack snipe	JS	Peregrine	PE	Stock dove	SD
Bar-tailed godwit	BA	Egyptian goose	EG	Kestrel	K.	Pintail	PT	Swift	SI
Black redstart	BX	Fieldfare	FF	Kingfisher	KF	Pochard	PO	Tawny owl	TO
Black tern	BJ	Firecrest	FC	Knot	KN	Red kite	KT	Teal	T.
Black-headed gull	BH	Gadwall	GA	Lapwing	L.	Red-breasted merganser	RM	Tree sparrow	TS
Black-tailed godwit	BW	Garganey	GY	Lesser black-backed gull	LB	Redshank	RK	Tufted duck	TU
Brambling	BL	Golden plover	GP	Lesser redpoll	LR	Redstart	RT	Turnstone	TT
Brent goose	BG	Grasshopper warbler	GH	Linnet	LI	Redwing	RE	Turtle dove	TD
Bullfinch	BF	Great black-backed gull	GB	Little egret	ET	Reed bunting	RB	Water pipit	WI
Canada goose	CG	Great crested grebe	GG	Little grebe	LG	Ringed plover	RP	Water rail	WA
Caspian gull	YC	Great white egret	HW	Little ringed plover	LP	Ruff	RU	Whimbrel	W M
Cetti's warbler	CW	Green sandpiper	GE	Mallard	MA	Sanderling	SS	Whinchat	WC
Common crossbill	CR	Grey heron	H.	Marsh harrier	MR	Sandwich tern	TE	Wigeon	WN

Common gull	CM		Grey partridge	P.		Marsh tit	MT		Shag	SA		Willow warbler	W W
Common sandpiper	CS		Grey plover	GV		Meadow pipit	MP		Shelduck	SU		Wood warbler	WO
Common tern	CN		Grey wagtail	GL		Mediterranean gull	MU		Short-eared owl	SE		Woodcock	WK
Coot	CO		Greylag goose	GJ		Merlin	ML		Shoveler	SV		Woodlark	WL
Cormorant	CA		Hawfinch	HF		Mistle thrush	M.		Skylark	S.		Yellow wagtail	YW
Corn bunting	CB		Herring gull	HG		Moorhen	MH		Snipe	SN		Yellowhammer	Y.
Cuckoo	CK		Hobby	HY		Mute swan	MS		Song thrush	ST		Yellow-legged gull	YG



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