RiverOak Strategic Partners Limited

Manston Airport

Report to Inform the Appropriate Assessment

Report for

RiverOak Strategic Partners

Main contributors

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Contents

1. Introduction

1.1 Background to and Purpose of this Report

1.1.1.1 This Report forms one of a suite of documents, which together support and explain in detail the content and nature of RiverOak Strategic Partners (hereafter referred to as 'RiverOak') Development Consent Order (DCO) application in respect of the Manston Airport Project (the 'Proposed Development'); the proposals and their policy context are more fully described in the Planning Statement (Environment Statement [ES] **Chapter 4: Planning Policy Context**) and related supporting documentation accompanying the DCO application. The description for the Proposed Development is provided in **ES Chapter 3: Description of the Proposed Development.** This report is an appendix **(Appendix 7.1)** to **ES Chapter 7: Biodiversity.**

1.1.1.2 RiverOak is seeking a DCO (incorporating powers of compulsory acquisition of interests and rights in land) to acquire, re-develop and re-open Manston Airport in Ramsgate, Kent. The proposal focuses on the provision of air cargo services. The proposal also includes the provision of passenger services and enable aircraft maintenance, repair, overhaul and end-of-life recycling amongst other things.

1.1.1.3 The project is a Nationally Significant Infrastructure Project (NSIP) under section14 (1)(i) and section23 of the *Planning Act 2008 (as amended)* (hereafter referred to as the 2008 Act). Development consent under the 2008 Act is required if a development is an NSIP. An application for a DCO will be examined by the Planning Inspectorate (PINS) who will make a recommendation to the Secretary of State for Transport as to whether the DCO is granted. The Secretary of State will then decide whether the DCO is made.

1.1.1.4 When considering the merits of the application, the Secretary of State and PINS must consider potential effects on European sites (Natura 2000 sites[1]). European sites are defined as Special Areas of Conservation (SACs), candidate SACs, Sites of Community Importance (SCI), Special Protection Areas (SPA) and European Marine Sites, which are marine areas designated as SACs and SPAs. UK policy extends the requirements pertaining to European sites to include Ramsar sites and potential SPAs, which would include proposed extensions or alterations to existing SPAs.

1.1.1.5 SPAs are sites classified in accordance with *Article 4 of Directive 2009/147/EC on the conservation of wild birds*, the codified version of *Directive 79/409/EEC as amended*. This is known as the Birds Directive.

1.1.1.6 SACs are designated under *Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*, as amended. This is known as the Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II respectively of the Habitats Directive.

1.1.1.7 The term 'European Marine Site' (EMS) (as defined by the *Conservation of Habitats and Species Regulations 2017, as amended* (SI 2017 No. 1012) and also known as the 'Habitats Regulations') refers to those marine areas of both SACs and SPAs, which are protected under the EC Habitats and Birds Directives. These areas range from entirely subtidal to exclusively intertidal. An EMS can be an entire SAC or SPA, or only part of one (the SAC/SPA may also include terrestrial areas). However, 'European Marine Site' is not a statutory site designation: these areas are essentially management units for those parts of Natura 2000 sites which extend beyond the SSSI designations in the UK.

1.1.1.8 SCIs are sites that have been adopted by the European Commission but not yet formally designated by the government of each country. Article 13(1) of the Habitats Regulations state that:

[1] Natura 2000 is a network of nature protection areas in the territory of the European Union.

"*Once a site of Community importance in England or Wales has been adopted in accordance with the procedure laid down in Article 4(2) of the Habitats Directive (list of sites of Community importance), the appropriate authority must designate that site as a special area of conservation as soon as possible and no later than six years from the date of adoption of that site.*"

1.1.1.9 Ramsar sites are wetlands of international importance, listed under the *Ramsar Convention*, which the UK ratified in 1976. The vast majority of Ramsar sites are also designated as a SPA. Though Ramsar sites are international / global sites, because of the UK national policy requirement to treat them as Natura 2000 sites, they are also referred to as 'European sites' within this document.

1.1.1.10 If a project is likely to have an effect on a European site, the applicant must provide a Habitats Regulations Assessment (HRA) report as part of the application documentation. The HRA report must show the European site(s) potentially affected, alongside sufficient information to enable the Secretary of State to make an appropriate assessment[2] if required.

1.2 Habitats Regulations Assessment

1.2.1.1 The Habitats Directive provides, *inter alia*, a framework for the protection of European sites. The Habitats Directive is transposed into the law of England and Wales by The *Conservation of Habitats and Species Regulations 2017, as amended* (SI 2017 No. 1012) and also known as the 'Habitats Regulations'.

1.2.1.2 Amongst other things, the Habitats Regulations define the process for the assessment of the implications of plans or projects on European sites. This process is termed the Habitats Regulations Assessment (HRA) and, in relation to Nationally Significant Infrastructure Projects (NSIPs), is specified by the Planning Inspectorate in its advice note entitled '*Habitats Regulations Assessment relevant to National Infrastructure Projects (Advice Note 10)*' (Version 8, November 2017). Further guidance on the HRA process is available at both the national[3] and European level[4].

1.2.1.3 In exercising its duty as Competent Authority, the Secretary of State must comply with Regulation 63 of the Habitats Regulations, as set out below:

- "*63(1) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which:*
  - *a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and*
  - *b) is not directly connected with or necessary to the management of that site,*
- *must make an appropriate assessment of the implications for that site in view of that site's conservation objectives*."

1.2.1.4 In undertaking the assessment under Regulation 63(1)(a) and, if required the appropriate assessment under Regulation 63(1)(b), the Secretary of State must consult Natural England and have regard to any representations that Natural England makes. The HRA is a staged process that is described in Advice Note 10 as:

- **Stage 1** – HRA Screening: Screening for Likely Significant Effects (LSEs or an LSE). If there are no LSE(s) identified for all the European sites considered, then the report should take the form of a No Significant Effects Report (NSER) and HRA Stages 2-4 will not be required.

[2] Regulation 5 of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.
[3] ODPM Circular 06/2005: Biodiversity and Geological Conservation – statutory obligations and their impact within the planning system
[4] European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC; European Commission (2000) Managing Natura 2000 Sites – the Provisions of Article 6 of Article 6 of the "Habitats" Directive 92/43/EEC.

- **Stage 2** - Appropriate Assessment: If there are LSEs, it is necessary to assess the implications of those LSEs on the affected site's or sites' conservation objectives.
- **Stage 3** - Assessment of Alternatives: A consideration of alternatives is required if it cannot be concluded that there will be no adverse effect on the integrity of the affected European site(s).
- **Stage 4** - Consideration of Imperative Reasons of Over-riding Public Important (IROPI): If there are no alternatives, an IROPI assessment is required.

1.2.1.5 Stages 1 and 2 are covered by Regulation 63 (as stated above), and Stages 3 and 4 are covered by Regulation 64 of the Habitats Regulations.

1.2.1.6 This document has been produced because the Proposed Development is located in close proximity to several European sites, notably the Thanet Coast and Sandwich Bay Special Protection Area (SPA) and Ramsar, and the Sandwich Bay Special Area of Conservation (SAC). It describes the methods employed (in **Section 2**) and results (in **Section 3**) of the HRA screening process (i.e. Stage 1), undertaken in connection with the Proposed Development, which has been informed through the consultation process. A number of LSEs are identified from the screening process, and taken forward for more detailed consideration in this report to inform an Appropriate Assessment (Stage 2), the details of which are also provided within this report (in **Section 4**), and concluded in **Section 5**.

1.3 Consultation

1.3.1.1 A consultation exercise has been undertaken with Natural England prior to the ES being issued to PINS for determination, to inform the HRA screening exercise (Stage 1) and provide input to inform the Appropriate Assessment (Stage 2). **Table 1.1** provides an overview of the meetings undertaken with Natural England.

Table 1.1 HRA Consultation

Date	Type / Participants	Meeting Scope
26/04/2016	Meeting - Natural England and Amec Foster Wheeler Environment & Infrastructure UK Limited (Amec Foster Wheeler)	Project outline; general overview of biodiversity issues including European sites; potential scope of the Evidence Plan process.
03/11/2016	Meeting - Natural England and Amec Foster Wheeler	Project update; use of third party data; HRA Screening Methodology; ornithological survey; assessment parameters.
05/09/2017	Meeting - Natural England and Amec Foster Wheeler	Project update, baseline survey programme, HRA (air quality, Water, noise issues) and European Protected Species; ornithological survey (bird flight line survey).
06/03/2018	Meeting - Natural England and Wood (previously Amec Foster Wheeler)	Project update, bat survey and European Protected Species licencing, HRA (noise in relation to effects on birds, air quality and water).

2. Methodology

2.1 HRA Screening (Stage 1)

2.1.1 Process Outline

2.1.1.1 It is the purpose of the HRA screening stage (Stage 1) to determine whether or not a plan or project is capable of resulting in LSEs on one or more European sites. If a LSE is identified, an Appropriate Assessment is required (Stage 2) to determine whether it can be concluded that the plan or project will not result in an adverse effect on the integrity of one or more European sites.

2.1.1.2 The HRA screening stage has been characterised by the European Commission in the guidance document '*Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*' as a four-step process. These steps are:

- **Step 1***: "determining whether the project or plan is directly connected with or necessary to the management of the* European *site";*
- **Step 2***: "describing the project or plan and the description and characterisation of other projects or plans that in combination have the potential for having significant effects on the Natura 2000 site";*
- **Step 3***: "identifying the potential adverse effects on the European site";* and
- **Step 4:** "*assessing the significance of any adverse effects on the European site".*

2.1.1.3 The originator of the plan or project must provide sufficient information to the Competent Authority to enable LSEs to be identified, and if they are, to inform an Appropriate Assessment. The Appropriate Assessment is then carried out by the Competent Authority.

2.1.1.4 In order to determine whether a plan or project is capable of resulting in one or more LSEs on a European site, it is necessary to understand the activities associated with the construction, operation or decommissioning (if relevant) of the project (e.g. the take-off / landing of aircraft), the potential changes that may occur in the environment as a result (e.g. the production of aircraft noise and pollution) and the effects that this may have on designated features of European sites (e.g. disturbance of fauna resulting in increased energy expenditure and reduced energy intake resulting in lower survival and productivity rates). Through the use of this 'activity – change – effect' concept, it is possible to identify potential European sites (and their designated features) that may be subject to LSEs through the determination of a series of geographic parameters (see **Section 2.3**).

2.1.1.5 When each of the four steps has been worked through, there are two potential outcomes:

- One or more LSEs on designated features of European sites are identified and the project requires an Appropriate Assessment (Stage 2); or
- No LSEs on designated features of European sites are identified, either because there is no pathway by which such effects could occur or the potential effect can be discounted due to project design (see **Section 2.4**) and therefore, there is no requirement for an Appropriate Assessment.

2.1.2 Identifying In-Combination Effects, and Other Plans or Projects for Inclusion (Step 2, Stage 1)

2.1.2.1 Effects on European sites may result from a proposed development alone and/or in-conjunction with other plans or projects; these potential effects are described as 'in-combination effects' in the Habitats Regulations. Within the published literature, the main reference that provides relevant and current guidance is:

- *Planning Inspectorate [PINS] (2015). Advice Note 17 Cumulative Effects Assessment relevant to nationally significant infrastructure projects*.

2.1.2.2 This source informed the methods used for the separate in-combination assessment.

2.1.2.3 The identification of plans and projects to include within the in-combination assessment of effects, forms part of **Step 2** of the HRA screening process, and follows the same methodology as that outlined in **Section 2.1.3** for the identification of European sites relevant to the Proposed Development. Key to the inclusion of other plans and projects within the in-combination assessment are the spatial and temporal overlaps that may occur due to the scale of potential changes (e.g. overlaps in the zones of disturbance caused by simultaneous construction activity) or the areas over which potential receptors may travel (e.g. a bird may pass through several areas where development is proposed when moving between roosting and feeding grounds).

2.1.2.4 The same process for undertaking an Environmental Impact Assessment (EIA) Cumulative Effects Assessment (CEA) for a Nationally Significant Infrastructure Project (NSIP) as outlined in PINS Advice Note 17 (PINS, 2017) has been used for the HRA in-combination assessment.

2.1.2.5 Details of the approach taken in assessing in-combination effects, referred to as the cumulative impacts within the ES, is provided in **ES Chapter 5: Approach to the Environmental Statement** and in **Chapter 18: Cumulative Effects**. The outcome of this process, is a short-list of other developments and plans to include within the in-combination assessment.

2.1.3 Identification of the European Sites that Could Be Affected by the Proposed Development and Other Plans/Projects (Step 3, Stage 1)

2.1.3.1 Part of **Step 3** of the HRA screening stage is to identify the European sites that could potentially be affected by the Proposed Development, either alone and/or in-conjunction with other plans or projects. The European sites that should be considered within the HRA screening process are those where there is the potential for an effect to be realised. Key to determining which European sites are included is an understanding of the activities associated with the Proposed Development, the geographical scale over which changes due to the different activities may be detectable and the types of receptors (i.e. designated features) susceptible to them. An efficient way to determine these relationships in a structured and transparent way is through the use of the activity – change – effect model, which has been employed within this screening process.

2.1.3.2 Central to the identification of European sites for consideration within the HRA process is the ability to define evidence based geographic parameters. In order to achieve this, the following steps are followed (see **Table 3.1** for further detail):

- Identification of the activities of the Proposed Development and other plans/projects associated with the construction, operation or (if applicable) decommissioning phases that have the potential to result in changes to background environmental parameters (e.g. air quality, land take);
- Determination of the changes that could occur as a result of the activities identified;
- Determination of the scale over which these changes may occur, based on published literature, outputs from the ecological assessment process and/or professional judgement; and
- Identification of the potential receptors[5] (e.g. based on Annex 1 habitats and Annex II species in the Habitats Directive and Annex I birds listed in the Birds Directive, including any functionally linked habitat outside the boundaries of the SPA) that may be affected by the identified changes.

2.1.3.3 Functionally linked habitat in this context is defined as: Areas of land or sea outside of the boundary of a European site that may be important ecologically in supporting the populations for which the European site has been designated or classified. Occasionally impacts to such habitats

[5] Based on baseline environmental survey and desk-study information.

can have a significant effect upon the species interest of such sites, where these habitats are considered to be functionally linked to the site (Natural England, 2016).

2.1.3.4 The outcome of these steps is a series of geographic parameters based on potential pathways of effect that can then be used to determine both the European sites for inclusion within the HRA process due to their physical proximity to the Proposed Development, and those linked by way of mobile fauna and associated functionally linked habitat.

2.1.3.5 Information on European sites within the UK was gathered using the Joint Nature Conservation Committee (JNCC) website (www.jncc.gov.uk)[6] and the Defra GIS[7] mapping tool MAGIC (http://magic.defra.gov.uk/). Data on designations elsewhere within the European Union was available from the European Environment Agency's Natura 2000 network viewer (http://natura2000.eea.europa.eu/), in order to determine any potential transboundary impacts.

2.1.4 Determining LSEs (Step 4, Stage 1)

2.1.4.1 Step 4 of the HRA screening process is to assess the significance of any adverse effects on the European sites identified in **Step 3**. The HRA screening process uses the LSE threshold to determine whether effects on European sites should be the subject of further assessment. The Habitats Regulations do not define the term LSE. However, in the Waddenzee case (Case C-127/02), the European Court of Justice found that an LSE exists if it cannot be excluded on the basis of objective information that the plan or project will have significant effects on the conservation objectives of the site concerned, whether alone or in-combination with any other project. The Advocate General's opinion in relation to the Sweetman case (Case C-258/11) further clarifies the position by noting that, for a conclusion that an LSE exists to be made "*there is no need to **establish** such an effect, it is merely necessary to determine that there **may** be such an effect*" (bold font indicates original emphasis).

2.1.4.2 For the purposes of the screening stage, an LSE is defined as any identified effect that is capable of resulting in a change in the conservation status of one or more qualification features of a European site after all aspects of the plan or project have been considered alone and in-combination with other plans and projects.

2.1.4.3 In line with guidance and case law, a precautionary approach has been taken to the screening process. Only those qualification features and European sites where it can be demonstrated that there is no likelihood of a significant effect occurring have been screened out.

2.1.4.4 Within this screening assessment, each potential effect is considered using information from surveys undertaken as part of:

- The EIA process;
- Published literature (where available); and
- Other available baseline data, modelling outputs and professional judgement (informed by CIEEM, 2016).

2.1.4.5 Where a potential effect has been identified but no LSE is predicted, the reason for that finding is provided.

2.1.4.6 If the screening exercise (**Stage 1**) concludes that no LSEs are predicted, then a 'Non-Significant Effects Report' is produced and no further assessment is undertaken.

[6] Designated features described within the results sections are those outlined in the SPA Review (Stroud *et al.* 2001) as per JNCC guidance (http://jncc.defra.gov.uk/page-5485)
[7] Geographic Information System

2.2 Appropriate Assessment (Stage 2)

2.2.1.1 For those European sites and their features for which LSE(s) has been identified in the Stage 1 screening process, further study is undertaken to permit an Appropriate Assessment (Stage 2) to be undertaken by the Competent Authority, using information provided by the applicant and its consultants and NE. This study includes a detailed assessment of the potential adverse effects on each feature identified, and concludes whether this would result in an adverse effect on the integrity of the European site.

2.2.1.2 The study to provide information for Appropriate Assessment is informed by results from the desk study (to provide contextual information) and baseline surveys undertaken for the Proposed Development, and through consultation with NE. The Favourable Conservation Status (FCS) of the qualifying features of the European sites, the current site conditions and any threats or vulnerabilities are also taken into consideration when assessing the effects as well as any mitigation and avoidance measures aimed at reducing/ avoiding the effects.

2.2.1.3 This follows the approach endorsed in the case of Peter Sweetman v Coillte Teoranta. (Judgement of 12 April 2018, C-323/17). The Judgement concerns the stage at which mitigation measures should be taken into account when undertaking an assessment under the Habitats Regulations. The High Court held that mitigation and avoidance measures should not be considered during Stage 1 (the screening stage during which LSEs are identified) and instead be considered during Stage 2 (Appropriate Assessment).

2.2.1.4 The Habitats Directive defines when the conservation status of the habitats and species it lists is to be considered as favourable. The definitions it uses for this are specific to the Directive; in summary, they require that the range and areas of the listed habitats, and the range and population of the listed species, should be at least maintained at their status when the Directive came into force in 1994 or, where the 1994 status was not viable in the long term, to be restored to a position where it would be viable (http://jncc.defra.gov.uk/page-4096, accessed 6 March 2018).

2.2.1.5 When assessing the conservation status of habitats, four parameters are considered. These are: range, area, structure and function (referred to as habitat condition) and future prospects. For species, the parameters are: range, population, habitat (extent and condition) and future prospects. Each of these parameters is assessed as being in one of the following conditions: Favourable, Unfavourable-inadequate, Unfavourable-Bad, or Unknown.

2.2.1.6 Details of the conservation status (including any pressures and threats) of each qualifying feature is reported in JNCC (2007) and can be obtained from the JNCC website: for habitats (http://jncc.defra.gov.uk/page-4064) and species (http://jncc.defra.gov.uk/page-4063).

2.2.1.7 If it cannot be concluded that there will be no adverse effect on the integrity of the affected European site(s), then **Stage 3** (Assessment of Alternatives) and **Stage 4** (Consideration of Imperative Reasons of Over-riding Public Important) are carried out.

3. HRA Screening (Stage 1)

3.1 Step 1: Relationship Between the Proposed Development and the Conservation Management of European Sites

3.1.1.1 **Step 1** seeks to determine whether or not the plan or project is directly connected or necessary for the management of a European site.

3.1.1.2 The European Commission guidance states that in order to conclude that a plan or project is directly connected or necessary for the management of a European site, it must relate solely to conservation actions and not be a direct or indirect consequence of other actions.

3.1.1.3 The Proposed Development is not connected to, or necessary for, the management of any European site, therefore it is necessary to proceed to **Step 2** (see **Section 3.2**).

3.2 Step 2: Description of the Proposed Development

3.2.1 Description of the Site and the Surrounding Area

The application site

3.2.1.1 The application site (referred to in this document as the Order Limits) is located on the existing site of the former Manston Airport, west of the village of Manston and north east of the village of Minster, in Kent. The town of Margate lies approximately 5km to the north of the Order Limits and Ramsgate approximately 1km to the east/ north-east. Pegwell Bay is located approximately 1km from the operational part of the airport, though the outfall (which, together with the outfall corridor, forms part of the Order Limits) discharges into Pegwell Bay. The northern part of the Order Limits is bisected by the B2050 (Manston Road), and the Order Limits is bounded by the A299 dual carriageway to the south and the B2190 (Spitfire Way) to the west. The existing access to the Order Limits is from the junction of the B2050 with the B2190.

3.2.1.2 The Order Limits covers an area of approximately 303.2 ha (749.2 acres) and comprises a combination of existing buildings and hardstanding, large expanses of grassland, and some limited areas of scrub and/or landscaping and the route of the existing outfall which flows into Pegwell Bay. This includes the 2,748m long, 60m wide runway, which is orientated in an east-west direction across the southern part of the Order Limits. The existing buildings are clustered along the east and northwest boundaries of the Order Limits

3.2.1.3 A network of hard surfacing, used for taxiways, aprons, passenger car parking, and roads connects the buildings to the runway and to the two main airport entrance points that are located to the east and west of the Order Limits. The buildings and facilities are generally surrounded by grassland; during the previous operation of the airport this was kept closely mown. Landscape planting is limited to lines of ornamental trees and shrubs along some sections of the boundary of the Order Limits such as the B2190, around some buildings and in car parking areas on the eastern edge. Post and wire security fencing of varying heights runs alongside most of the Order Limits' perimeter.

3.2.1.4 The part of the Order Limits to the north of Manston Road (B2050), which bisects the centre of the Order Limits in a roughly east to west direction, is referred to as the 'Northern Grass'. This part of the Order Limits is predominantly grassland, with some areas of hard standing, including a stretch of taxiway that formerly linked across to the main taxiway network. The two museums, the Spitfire and Hurricane Memorial Museum, and the RAF Manston Museum, are located in the southwestern corner of the 'Northern Grass'. A small number of other redundant buildings, such as the former RAF air traffic control tower, are also located on the 'Northern Grass'.

Site history

3.2.1.5 The Order Limits provided a variety of airport-related services from 1916 until it ceased operation in May 2014. It operated as RAF Manston until 1998, and was also a base for the United States Air Force for a period in the 1950s. From 1998 it operated as a private commercial airport with a range of services including scheduled passenger flights, charter flights, air freight and cargo, a flight training school, flight crew training and aircraft testing. More recently it operated as a specialist air freight and cargo hub. Much of the airport infrastructure, including the runway, taxiways, aprons, cargo facilities, and a passenger terminal still remains, with a number of the buildings still in use, including a helicopter pilot training centre, and the Spitfire and Hurricane and RAF Manston museums.

3.2.2 Summary Description of the Proposed Development

3.2.2.1 The aims and purpose of the Proposed Development are to reopen and develop Manston Airport into a dedicated air freight facility, which also offers passenger, executive travel, and aircraft engineering services. The proposed DCO will, amongst other things, authorise:

- Upgrading the runway and improving the parallel taxiway;
- Constructing 19 new air cargo stands;
- Constructing four new passenger aircraft stands and a new passenger terminal;
- Completely re-fitting the airfield navigation aids;
- Refurbishing or replacing the existing fire station;
- Building new air cargo facilities;
- Developing a new air traffic control service, demolishing the current Air Traffic Control tower;
- An aircraft recycling facility;
- A flight training school;
- A fixed-base operation for executive travel;
- Building new aircraft maintenance hangars and developing areas of the 'Northern Grass' for airport related businesses; and
- Highway improvement works to ensure improved access to and around Manston Airport, including a new, permanent, dedicated access on Spitfire Way which will help to reduce airport related traffic on the local road network.

3.2.2.2 A detailed description of the Proposed Development is provided in the **Chapter 3: Description of the Proposed Development** within the ES.

3.2.3 DCO Programme and Project Delivery

3.2.3.1 The submission of the DCO application is scheduled for the beginning of the second quarter of 2018. Based on this programme and the anticipated determination period, the DCO may be granted in the third quarter of 2019 and this timescale has been assumed when developing the construction/operational programme for this assessment.

3.2.3.2 The forecasting of the air freight and passenger movements for the airport, as discussed further below, has been conducted for the 20-year period from the granting of the DCO. This section outlines the programme for construction and then operation of the Proposed Development during this 20-year period.

3.2.3.3 The main activities to be undertaken during year 1 would be the construction activities required to return the Order Limits to full operational use. There may be some limited airport services, for example helicopter and heli-charter services, flight school and training services, and fixed base of

operation services; however, these will be dependent on the level of work required to restore the runway and to construct other essential services and utilities.

3.2.3.4 The full reopening of the airport would therefore take place in year 2, which would also see the start of the air freight services. Passenger services are anticipated to start in year 5.

3.2.3.5 Three further phases of construction, as described in more detail below, would follow in years 2-5, 5-12 and 12-18. During these three phases of construction, the airport would remain operational (see **Section 3.3, Chapter 3: Description of the Proposed Development** of the ES).

3.2.4 Other Developments and Plans

3.2.4.1 The short list of other developments and plans that has identified for which in-combination effects with the Proposed Development could potentially occur is presented in **Table 18.2** in **Chapter 18: Cumulative Effects** of the ES. The reasons for inclusion and exclusion of 'other developments', are included in **Appendix 18.1, Chapter 18: Cumulative Effects**. The location of the short list of 'other developments' is included in **Figure 18.1**.

3.2.4.2 Of these, 13 developments and 9 plans are wholly or primarily associated with new residential property, with the remaining developments including an offshore wind farm, overhead electricity transmission, road improvement and other non-residential developments.

3.2.4.3 The developments and plans involving the construction of new residential housing have the potential to result in additional disturbance to features of European sites (in particular, golden plover and turnstone) due to increased human visitor pressure to areas that these species utilise for foraging and roosting (e.g. coastal habitats and farmland).

3.2.4.4 There is also the potential for onshore works (such as cable-laying) for the proposed offshore wind farm extension to disturb turnstone and golden plover foraging and roosting on Pegwell Bay.

3.2.4.5 Construction and operation of the developments and plans also have the potential to effect features of European sites due to increased nitrogen deposition from vehicles, pollution from surface water runoff from the sites, and increased disturbance due to the visual presence of operatives and noise from vehicles and machinery.

3.3 Step 3: Identification of Potential Effects on European Sites from the Proposed Development and Other Developments and Plans

3.3.1 Scope of Screening Principles

3.3.1.1 In **Step 3**, the European sites that could be affected by the construction and operation of the Proposed Development, either alone or in-combination with other developments and plans, are identified. The following sections of this report outline the discussions and consultation which took place with interested parties (including PINS, NE, Kent County Council (KCC) and Minster Parish Council) to identify the potential effects of the Proposed Development on sensitive qualifying features (see **Appendix C**). The outcome of this HRA Screening stage is a list of SPAs, SACs, and Ramsar sites and associated qualifying features for which the potential for LSEs to arise (as a result of works associated with the Proposed Development) cannot be excluded.

3.3.1.2 In line with the ruling of the European Court of Justice in Waddenzee (c-127/02), an LSE is one which cannot be excluded on the basis of objective information, either individually or in-combination with other developments and plans.

3.3.1.3 In order to undertake a robust assessment, it has been essential to determine the functional linkages between qualification species, the Proposed Development, and relevant European sites. For wintering birds, for example, these linkages were determined based on dispersal from roost sites, an understanding of foraging range and movement between inland foraging sites and low tide roost sites.

3.3.2 European Sites Included for Assessment

3.3.2.1 Each European site is designated as a SAC, classified as an SPA, or listed as a Ramsar site in respect of specific 'qualifying features'. These 'qualifying features' (habitats, mosaics of habitats, species or assemblage of species, and combinations of these) are the reasons for which the site is to be protected and managed for conservation purposes. All receptors that are qualifying features of European sites or support such features, and which may potentially be affected by the Proposed Development and other developments and plans have been considered within this Screening process, as follows:

3.3.2.2 For SPAs, the qualifying features are the birds for which the SPA is classified, under either:

- *Article 4(1) of the Birds Directive* as rare and vulnerable species, species in danger of extinction or requiring particular attention because of their habitat needs, listed in Annex 1; or
- *Article 4(2) of the Birds Directive* as regularly occurring migratory species (e.g. on passage or over-wintering or an internationally important assemblage of birds) not listed in Annex 1.

3.3.2.3 All UK SPAs were reviewed in 2001 and 2016 by the UK government and numerous changes were made to their designated species. These are detailed on the JNCC website (http://jncc.defra.gov.uk/page-2545) and in published literature (Stroud *et al*. 2001, 2016). As a result of the 2001 review, golden plover and little tern no longer appear as qualifying features of the Thanet Coast and Sandwich Bay SPA. However, these changes have yet to be ratified and therefore, this is understood to mean that until such ratification, the old qualifying features as detailed in the most recent 2012 SPA Conservation Objectives, should be referenced until these SPAs are formally (re) designated.

3.3.2.4 For Ramsar sites, nine ‘Criteria’ are used to identify wetlands of international importance, these being based on the site supporting rare wetland habitat types (Criteria 1) or specific species or ecological communities (Criteria 2-9 inclusive).

3.3.2.5 For SACs, the qualifying features are the habitats listed in *Annex I of the Habitats Directive* and the species listed in *Annex II of the Habitats Directive*. The JNCC provides citations of SACs, indicating qualifying features (habitats and/or species) that are a primary reason for selection of the site, and those which are present as a qualifying feature, but not a primary reason for site selection. However, for the purposes of this assessment, and as indicated on the JNCC site selection webpage for each SAC, all the qualifying features (both primary and non-primary) need to be treated equally.

3.3.2.6 A 15km radius (from the perimeter of the Order Limits) was used as the initial search area and potential Zone of Influence (ZoI) for the Proposed Development. This initial search area took into consideration the potential aircraft flight paths and the environmental changes and effects (such as air quality) by which the European sites could be affected, such as disturbance from construction and operations on-site, and pollution derived from aircraft entering and leaving the airfield. It was considered that over 15km, these effects would be negligible, including the emissions due to aircraft moving to or from the airport.

3.3.2.7 Ten European protected sites are located within the initial search radius of 15km (see **Figure 5.1** within this report), the details of which (including their qualifying interest features) are presented in **Table B.1** in **Appendix B** (in order of their distance from the Order Limits). The sites are as follows:

- Thanet Coast and Sandwich Bay SPA;
- Thanet Coast and Sandwich Bay Ramsar;
- Thanet Coast SAC;
- Sandwich Bay SAC;
- Outer Thames Estuary SPA;
- Margate and Long Sands SAC;

- Stodmarsh SPA;
- Stodmarsh SAC;
- Stodmarsh Ramsar; and
- Blean Complex SAC.

3.3.2.8 As recommended by PINS Advice Note 10 (PINS, 2017), a full summary of the HRA screening process upon all the European sites potentially affected by the Proposed Development is provided in **Appendix A**: Screening Matrices.

3.3.3 Identification of Potential Impacts

3.3.3.1 To determine which of the qualifying features of the ten European sites require consideration within the HRA, it is necessary to understand:

- What types of activities may be associated with the Proposed Development;
- The receptor groups[8] that may be affected by the potential adverse effects identified (based on Annex I habitats and Annex II species[9] listed on the *Habitats Directive* and Annex I birds listed in the *Birds Directive*[10]); and
- The geographic extent over which the potential effects could manifest themselves.

3.3.3.2 A number of habitats and species' receptor groups are likely to be sensitive to activities undertaken during the construction and operational phases of the Proposed Development; the potential for adverse effects to arise on individual species will depend on that species' use of the area potentially impacted. It is necessary to consider the effects on both the qualifying species and the habitats they depend upon, both within the boundaries of European sites, but also on adjacent habitats, which qualifying bird species (such as golden plover) might use for foraging and resting. This habitat would then be considered functionally linked to the SPA, and could be located several kilometres from the SPA.

3.3.3.3 In view of this, a number of potential impacts have been identified which may arise as a result of each phase of the Proposed Development (it should be noted, that there is an overlap in the timing of parts of the construction and operational phases of the development), and which have the capacity to adversely affect habitats and species that are the qualifying interest of European sites, as described below.

Construction phase

- Removal of habitats (such as grassland) within the Proposed Development area to facilitate construction works. These habitats might be used for foraging/ nesting by qualifying species of birds (e.g. golden plover), and thus be considered 'functionally linked' to the SPA;
- Effects of aural and visual disturbance on qualifying species due to noise and vibration and movement of construction vehicles and site operatives;
- Loss of pollutants or fine material from the construction site due to surface water flows during rainfall events. This pollution may then find its way into European sites via watercourses or the outfall which discharges into Pegwell Bay;

[8] Note that all Annex II species that could be affected if they were present are included. At this stage, no determination of likelihood of presence based on distribution, habitat type etc. is made to avoid bias in the definition of geographic extent used to identify which European sites could potentially be adversely affected by the Proposed Development;
[9] Annex II species features of SACs in the UK are described at http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC_species.asp. Annex I habitat features of SACs in the UK are described at http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC_habitats.asp
[10] Annex I bird features of SPAs in the UK are described at http://jncc.defra.gov.uk/page-1418

- Deposition of oxides of nitrogen (NOx) from engine exhausts from construction vehicles and generators (on-Site) on habitats within European sites, or functionally linked habitats;
- Deposition of NOx and NOx concentrations in air from engine exhausts from construction vehicles travelling to and from the Order Limits (off-Site) on habitats within European sites, or habitats functionally linked to the European site; and
- Deposition of dust from the construction site onto functionally linked habitats and habitats within European sites.

Operational phase

- Disturbance to qualifying species (e.g. golden plover foraging on farmland adjacent to the Order Limits) due to noise and vibration and movement during ground activities, such as cargo loading, plane maintenance and airfield management;
- Disturbance to qualifying species due to the activities associated with bird-strike hazard management through use of bird scaring devices (e.g. pyrotechnics, distress call broadcast etc.);
- Disturbance to qualifying species (including the airport forming a barrier to the movement of birds between their foraging and roost sites) during aircraft take-off and landing, caused by noise and the visual presence of aircraft;
- Deposition of NOx from aircraft engines on habitats within European sites, or functionally linked habitats. Results from air quality modelling conclude that the effects of particulates and sulphur on vulnerable habitats are predicted to be negligible and have therefore not been considered further within this assessment (see **Chapter 6: Air Quality** of the ES);
- Deposition of NOx and NOx concentrations in air from engine exhausts from vehicles travelling to and from the Order Limits (off-Site) on qualifying habitats within European sites, or habitats functionally linked to the European site;
- Disturbance to qualifying species by ground vehicle usage outside the Order Limits (e.g. along roads used by vehicles accessing and leaving the Order Limits); and
- Effects on qualifying habitats due to pollutants held within surface water runoff from the Order Limits, entering European sites via the outfall or natural watercourses.

Decommissioning phase

- The potential effects during the decommissioning phase are considered to be similar to those identified during the construction of the Proposed Development.

3.3.4 Screening Opinion and Consultation

3.3.4.1 Since 2015 and throughout the undertaking of the survey and assessment work, RiverOak has engaged with consultees with an interest in the potential effects of the Proposed Development on biodiversity. An EIA scoping report (see **Appendix 1.1, ES Chapter 1: Introduction**), including a chapter covering biodiversity, was produced and submitted to PINS who provided a Scoping Opinion (see **Appendix 1.2, Chapter 1: Introduction**).

3.3.4.2 Organisations that were consulted include:

- PINS;
- NE;
- Environment Agency (EA);
- KCC;
- Thanet District Council (TDC);

- The Royal Society for the Protection of Birds (RSPB); and
- The Kent Wildlife Trust (KWT).

3.3.4.3 Meetings have been held with NE and KWT[11]. RSPB confirmed (by email[12]) that they did not wish to meet or participate in the HRA screening process for this project other than responding (or not) to the public consultation materials and/or application documents as these are released. KWT indicated that, although they would still like to be consulted, they would not participate in meetings due to resource constraints. Information and an opportunity to engage in the HRA screening process has been provided to KCC and TDC. Consultation was also undertaken with the Kent Downs Area of Outstanding Natural Beauty Unit[13].

3.3.4.4 A summary of the consultee comments and responses received on the Scoping Report and the 2017 Preliminary Environmental Information Report (PEIR), with regard to the HRA is provided in **Table C.1** in **Appendix C**, and for the 2018 PEIR provided in **Table C.2** in **Appendix C.**

3.3.5 Evidence Base

Desk study and literature review

3.3.5.1 A Desk Study was carried out in order to obtain contextual data and to gain further information on European sites within 15km of the Order Limits and their qualifying interests that are likely to be affected by the Proposed Development, the results of which are provided in the **Appendix 7.2 of ES Chapter 7: Biodiversity**. Primary sources of contextual data identified included:

- The Government's Multi-Agency Geographic Information for the Countryside (MAGIC) website (http://magic.defra.gov.uk/) and the JNCC website (www.jncc.defra.gov.uk): details of the locations and reasons for designation of European sites;
- The Kent and Medway Biological Records Centre (KMBRC): priority habitats, and records of legally protected and priority species;
- Studies commissioned by NE into the numbers and distribution of golden plover in the Sandwich Bay and Thanet area, the results of which are reported in Griffiths (2003) and Henderson & Sutherland (2017);
- Kent Ornithological Society (KOS): bird records were extracted from their online database, for all species within 5km of the Order Limits (http://birdgroups.co.uk/kos/default.asp, accessed in August 2016);
- Kent Bird Reports 2013 and 2014: annual reports published by KOS, containing notable bird records in Kent (Privett [ed.] 2015, 2016);
- Kent Breeding Bird Atlas 2008-13 (Clements *et al*., 2015): results from a county-wide survey, mapping the distribution of all breeding bird species at a tetrad (2x2km National Grid Reference square) resolution;
- British Trust for Ornithology (BTO): Wetland Bird Survey (WeBS) core count data for 1995/96-2014/15 inclusive, and low tide data for 2002/03 and 2008/09 (the most recent winters for which data was available) were purchased from the BTO, for their Pegwell Bay count sector. In addition, further core count and low tide data for Pegwell Bay was from obtained from the BTO website (www.bto.org);
- Civil Aviation Authority (CAA) bird strike data for Kent International Airport (the previously operational airport at Manston) and CAA documents and guidance (e.g. CAP 772); and

[11] The contact at KWT was Vanessa Evans.
[12] Dated 09/11/2016, from Dora Querido, Conservation Officer, South-east Regional Office.
[13] The Kent Downs AONB Unit is based in Ashford, Kent. http://www.kentdowns.org.uk/

- Data derived from ESs for other proposed and consented developments for which information is publicly available, including:
  - Stone Hill Park (OL/TH/0550), a proposed residential development that shares a common boundary with the Order Limits over much of its area;
  - Land East of Haine Road (OL/TH/14/0050), adjacent to the east of the Order Limits;
  - Land south of Great West Autos (F/TH/12/0722), a now built solar farm, adjacent to the north of the Order Limits;
  - Land east of Worlds Wonder (F/TH/14/0645), a proposed solar farm adjacent to the north of the Order Limits; and
  - Land North of Thorne Farm (F/TH/13/0596): a now built solar farm adjacent to the south of the Order Limits.

3.3.5.2 A literature review was undertaken into studies related to the reaction of birds to visual and aural disturbance caused by aircraft, the results of which are provided in **Appendix 7.4, Chapter 7: Biodiversity** of the ES. This information was used to identify the lateral distance at ground level and the altitude beyond which birds are unlikely to be disturbed by over-flying aircraft. This review focussed on the qualifying species (or closely related species / species-groups) potentially affected by the Proposed Development.

Field surveys

3.3.5.3 Wintering bird surveys were undertaken due to the proximity of the Thanet Coast and Sandwich Bay SPA and Ramsar site, and the Sandwich Bay to Hacklinge Marshes SSSI, all of which are important or designated for their wader and waterfowl interest. Two stand-alone survey methodologies were employed, the results of which are provided in **Appendix 7.5 in Chapter 7: Biodiversity** of the ES as follows:

- Functional habitat surveys, involving the survey of farmland up to 2km from the boundary of the Order Limits (at the time of survey commencement in September 2016). The functional habitat surveys targeted golden plover (as well as other farmland/ notable bird species) and were carried out once per month from September 2016 to March 2017; and
- Pegwell Bay distribution bird surveys were undertaken one day per month, from October 2016 to March 2017, over a six-hour diurnal period capturing a partial tidal cycle within each visit. When possible, survey dates coincided with daytime high tides.

3.3.6 Identification of Geographical Parameters to Screen European Sites

3.3.6.1 A set of geographic distance criteria and rules (geographic parameters) have been used to define the ZoI within which to identify those European sites within 15km of the Order Limits that might be adversely affected by the Proposed Development. The parameters provide a filter for the identification of European sites using the JNCC website (www.jncc.gov.uk) and the Defra GIS mapping tool MAGIC (http://magic.defra.gov.uk/)[14]. These geographic parameters have been derived from guidance, best practice, modelling and studies for that particular effect and activity (i.e. air quality from road traffic, noise from aircraft etc). The activities, changes, receptors and potential adverse effects that have been identified are outlined in **Table 3.1**, alongside the geographic parameters. It should be noted that from Year 2 of the Proposed Development, the construction and operational phases are planned to occur coincidentally.

3.3.6.2 In-combination effects for the activities identified in **Table 3.1** will include developments and plans (listed in **Table 18.2, Chapter 18: Cumulative Effects** of the ES) that, if the same search area was

[14] The geographic extent of the parameters described in **Table 3.1** excludes the potential for transboundary effects (i.e. effects that might impact European sites located outside of the UK).

imposed upon their site boundaries, would overlap with any European Site(s) that could be affected by the Proposed Development alone.

Table 3.1 Identification of Geographic Parameters for HRA Screening of the Proposed Development

Activity	Potential Change	Potential Effect	Geographic Extent
CONSTRUCTION PHASE			
Construction activity including use of plant and presence of workforce	Production of aural and visual stimuli due to noise and vibration and movement of construction vehicles and engineers	Disturbance / displacement of birds (designated features of SPA) resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	European sites (designated for ornithological features) and functionally linked habitats (for European sites supporting designated features such as golden plover that may rely on the functionally linked habitats) within **750m** of the construction site. This is a precautionary distance based on information reported on disturbance in the literature (e.g. Cutts, Phelps & Burdon 2009, Ruddock & Whitfield 2007).
Use of chemicals (e.g. fuels, solvents etc.) and the liberation of fine material (e.g. through excavation).	Loss of pollutants or fine material from the construction site due to surface water flows during rainfall events.	The introduction of toxic pollutants or sediments resulting in loss of, or damage to terrestrial or freshwater environments leading to effects on habitats, flora, invertebrates, amphibians, bats, otters (as designated features of SACs) and birds (as designated features of SPAs).	European sites supporting terrestrial habitats or species within **100m** of the construction site, including the outfall. This geographic parameter is based on professional judgement following a review of the Environment Agency Pollution Prevention Guidance 5 (which suggests control of impacts can be managed within a distance of 50 m), alongside experience of the extent of sediment deposition and pollutant escapes from construction projects. European sites supporting aquatic habitats or species downstream (and within the catchment area) of any watercourse or drainage channel within 100m of the construction site or at any greater distance where a direct drainage outfall is located. This geographic parameter, for pollutants entering watercourses / drainage systems is based on the justification outlined immediately above and the potential for mobile pollutants to then disperse downstream.
Use of construction vehicles and generator sets.	Deposition of oxides of nitrogen and NOx in air from engine exhausts.	Deposition of oxides of nitrogen and concentrations of NOx in air from vehicle emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant community through changes in baseline conditions resulting in effects on habitats, flora, invertebrates, amphibians, bats, otters (as designated features of SACs) and birds (as designated	European sites within **200m** of the construction site and/ or wider road network. This geographic parameter is based on Department for Transport (2005) Interim Advice Note 61/04: Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs.

Activity	Potential Change	Potential Effect	Geographic Extent
		features of SPAs)	
Dust creation during construction activity	Deposition of dust in areas neighbouring the construction site.	Deposition of dust resulting in loss of or damage to terrestrial or freshwater environments from smothering or enrichment resulting in effects on flora vegetation, invertebrates, amphibians, bats, otters (as designated features of SACs) and birds (as designated features of SPAs)	European sites within **200m** of the construction area, and **500**m of the Order Limits entrance. IAQM guidance (http://iaqm.co.uk/guidance) is to assess ecological receptors which are within 50m of the construction site and within 500m of the Order Limits entrance. Natural England have requested that the 50m parameter be increased to 200m for designated sites.
OPERATION PHASE			
Operation (ground based activities including presence of workforce)	Production of aural and visual stimuli due to noise and vibration and movement during ground activities such as cargo loading, plane maintenance, airfield management (not including bird scaring devices).	Disturbance / displacement of birds (designated features of SPA) resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	European sites (designated for ornithological features) and functionally linked habitats (for European sites supporting designated features such as golden plover that may rely on the functionally linked habitats) within **750m** of the construction site. This is a precautionary distance based on information reported on disturbance in the literature (e.g. Cutts, Phelps & Burdon 2009, Ruddock & Whitfield 2007).
Operation (aircraft take-off and landing)	Production of aural and visual stimuli due to noise, aircraft presence and shadow cast.	Disturbance / displacement of birds (designated features of SPA), including the barrier effects (the airport may form a barrier to the movement of birds between foraging and roost sites), resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	Results from the literature review (**Appendix 7.4 in Chapter 7**) indicate a precautionary Lateral Disturbance Distance of **1km** from flight paths at altitudes up to **500m**. This review also indicates that above altitude of **500m**, there would be negligible levels of visual disturbance to birds on the ground due to the visual presence and shadow cast from the overflying aircraft. The review also indicates that at ground level, noise levels below 70 dB LAmax (see **Table 12.1 in Chapter 12**) are unlikely to result in disturbance to birds (see **Figures 4.1a and 4.1b**).

Activity	Potential Change	Potential Effect	Geographic Extent
Operation (aircraft take-off and landing, and ground-based activities)	Deposition of oxides of nitrogen and NOx in air from aircraft engines; road traffic within the Order Limits, and along roads used by vehicles entering and leaving the Order Limits.	Deposition of oxides of nitrogen and concentrations of NOx in air from vehicle emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant community through changes in baseline conditions resulting in effects on habitats, flora, and invertebrates (as designated features of SACs) and birds (designated feature of SPAs).	The EA guidance note "*Air emissions risk assessment for your environmental permit*" (EA, 2016)[15] indicates that the impact of the installation should be evaluated at protected conservation areas that meet the following criteria: SPAs, SACs or Ramsar sites within **10km** of the installation (or within 15km of coal or oil-fired power stations). The geographic extent for the potential effects of nitrogen deposition from aircraft and ground-based traffic has been determined from the results of air quality modelling, the details of which are provided in **Chapter 6**. European sites within **200m** of the construction site and/ or wider road network should also be included for consideration for ground-based activities. This geographic parameter is based on Department for Transport (2005) Interim Advice Note 61/04: Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs.
Management of bird strike risk	Use of bird scaring devices (e.g. pyrotechnics, distress call broadcast etc.).	Disturbance / displacement of birds (designated features of SPA) resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	A precautionary distance of **1km** from the runway area has been used, beyond which the effects of disturbance to birds is considered negligible. This distance has been based on trials undertaken at London Ashford Airport at Lydd in Kent[16] and reference to CAA (2014)[17].
Management of surface water run-off and mobile pollutants (e.g. fuels and lubricants)	Loss of pollutants from road surface due to surface water flows during rainfall events.	The introduction of toxic pollutants (and the effects of scouring by fluid emitted from the outfall) resulting in loss of or damage to terrestrial or freshwater environments leading to effects on habitats, flora, invertebrates, amphibians, bats, otters (as designated features of SACs) and birds (designated feature of SPAs).	European sites supporting terrestrial habitats or species within **100m** of the operational site, including the outfall. This geographic parameter is based on professional judgement following a review of the Environment Agency Pollution Prevention Guidance 5* (which suggests control of impacts can be managed within a distance of 50 m), alongside experience of the extent of sediment deposition and pollutant escapes from construction projects. European sites supporting aquatic habitats or species downstream (and within the catchment area) of any watercourse or drainage channel within **100m** of the construction site or at any greater distance where a direct drainage outfall is located. This geographic parameter, for pollutants entering watercourses / drainage systems is based on the justification outlined immediately above and the potential for mobile pollutants to then disperse downstream.

[15] EA (2016) 'Air emissions risk assessment for your environmental permit'. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit, dated 2 August 2016.
[16] www.39essex.com/docs/cases/lydd_final_judgment_15_may_14.pdf.
[17] Provides details of a range of portable systems developed specifically for bird control extending beyond 1.5 km from the airport runway. The measures to be employed at the Proposed Development are unlikely to disturb golden plover foraging in fields beyond 1km.

Activity	Potential Change	Potential Effect	Geographic Extent
Ground vehicle usage (including on major routes accessing the airport)	Deposition of oxides of nitrogen from engine exhausts.	Deposition of oxides of nitrogen from vehicle emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant community through changes in baseline conditions resulting in effects on habitats, flora, invertebrates, amphibians, bats, otters (as designated features of SACs) and birds (designated feature of SPAs)	European sites within **200m** of the airport boundary and/or major road links with Manston Airport (the wider road network). This geographic parameter is based on Department for Transport (2005) Interim Advice Note 61/04: Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs.

3.3.7 Screening Summary

3.3.7.1 By applying the geographic parameters for the potential effects identified in **Table 3.1** to the initial search list of European sites within 10km of the Order Limits (provided in **Appendix B)**, a total of four European sites have been identified as being potentially affected by the Proposed Development, and other developments and plans for which in-combination effects could occur, as follows (full designation information and their conservation objectives is provided in **Appendix D**):

- Thanet Coast and Sandwich Bay Ramsar Site;
- Thanet Coast and Sandwich Bay SPA;
- Thanet Coast SAC; and
- Sandwich Bay SAC.

3.3.7.2 By applying the geographic parameters identified in **Table 3.1**, together with consideration to the conservation objectives of the site's qualifying features (see **Appendix D**) and the lack of connectivity and the likely impacts pathways resulting from the Proposed Development, none of the qualifying features for the following European sites have been considered for further assessment:

- Stodmarsh SPA;
- Stodmarsh Ramsar Site;
- Stodmarsh SAC;
- Outer Thames Estuary SPA;
- Margate and Long Sands SAC; and
- Blean Complex SAC.

3.4 Step 4: Screening Assessment of Likely Significant Effects

3.4.1.1 The following screening of potential impacts presented in **Table 3.2** identifies each of the (potentially affected/ screened in) qualifying interest features of the four European sites listed previously. Each qualifying feature is listed with the potential adverse effects associated with that feature, together with the relevant conservation objectives. Each qualifying feature is then screened in or out, based on whether it is concluded that they are likely to be significantly affected or not by the Proposed Development (and other developments and plans in combination). The rationale for these conclusions are outlined in the table, based on the geographic parameters provided in **Table 3.1**, and taking into consideration the conservation objectives of the qualifying features and their condition status. Results from the ornithological desk study (**Appendix 7.2, Chapter 7: Biodiversity** of the ES) and field survey (**Appendix 7.5, Chapter 7: Biodiversity** of the ES) also inform the rationale, as well as the assessment of effects included within the separate ES chapters for:

- **Chapter 6: Air Quality;**
- **Chapter 8: Freshwater Environment;**
- **Chapter 12: Noise and Vibration;**
- **Chapter 16: Climate Change; and**
- **Chapter 18: Cumulative Effects.**

3.4.1.2 If no LSE is identified from this screening exercise, the effect is 'screened out' and the conclusion is reached that the proposed re-opening of Manston Airport will have a negligible effect both alone and in-combination with other developments and plans. For those effects that cannot be 'screened out' at this stage, further detailed consideration into LSEs is provided within the information to permit Appropriate Assessment in **Section 4**.

3.4.1.3 As recommended by PINS Advice Note 10 (PINS, 2017), a full summary of the HRA screening process upon all the European sites potentially affected by the Proposed Development is provided in **Appendix A**: Stage 1, Screening Matrices.

Climate change

3.4.1.4 The release of greenhouse gases from vehicles, machinery and aircraft (in particular) has the potential to contribute to climate change which could affect all of the designated features of European sites considered in this report. For example: climate change may lead to crop management changes resulting in the loss of foraging habitat for golden plover. Climate change may also lead to changes in the distribution of wintering golden plover and turnstone due to other areas within the UK and abroad becoming more suitable for the species, leading to decline in the SPA/ Ramsar populations. Climate change has the potential to affect the habitats that red data book invertebrates depend upon (i.e. for the Thanet Coast and Sandwich Bay Ramsar), and to result in changes to the vegetation/ species compositions of the qualifying (sand dune) habitats of the Sandwich Bay SAC.

3.4.1.5 An in-combination climate change impacts assessment is provided in **Chapter 16: Climate Change** of the ES. One of the primary aims of the assessment in terms of potential effects on biodiversity is to determine where climate change increases the exposure of environmental receptors to an extent that a new significant effect is found. The assessment of likely significant effects associated with the Proposed Development considers the construction and operational phases of the Proposed Development. The significance level attributed to each effect will be assessed based on the magnitude of the climate change impact and the sensitivity of the affected receptor to resulting changes.

3.4.1.6 Results from the climate change assessment (provided in **Chapter 16: Climate Change** of the ES) concludes that the Proposed Development is likely to provide a very small input/ contribution to overall global climate change. In view of this, the effects of climate change on the qualifying features listed in **Table 3.1** can effectively be scope out for further, more detailed assessment**.**

Table 3.2 Screening Assessment

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
Thanet Coast and Sandwich Bay Ramsar site[19] (0m)	Turnstone (non-breeding) (Criterion 6)	Maintain and restore the extent, distribution, structure and function of habitats turnstone reply upon, and their supporting processes. Maintain and restore the population and distribution of turnstone[20]	**Construction phase (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) intertidal habitats that turnstone depend upon, due to run-off entering the Ramsar site from the currently operational outfall.	Results from the desk study and field survey indicate that turnstone regularly use the northern shores of Pegwell Bay (within the Ramsar/SPA) for roosting and foraging.	There is the potential for adverse effects to the habitat utilised by foraging and roosting turnstone (mudflats and rocky shoreline) from the discharge of treated water to Pegwell Bay, through scour at the point of discharge during construction of the proposed development. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the Ramsar site.	**Screened in**
			Construction phase (noise): Noise, vibration and physical activity within the Order Limits from earthworks, fixed and mobile plant during the construction phase provides potential for foraging/ resting turnstone to be displaced from any suitable habitat close to the Order Limits. Increased noise and vibration may also occur due to an increase in construction road traffic.	Evidence from the desk study and survey indicate that turnstone do not utilise any habitats within the 750m of the Order Limits. This is a precautionary disturbance distance is based on information reported on disturbance in the literature (e.g. Cutts, Phelps & Burdon 2009, Ruddock & Whitfield 2007).	In view of the lack of presence of turnstone within 750m of the Order Limits: no adverse effects are predicted on the extent and structure of the habitats turnstone rely upon, or the numbers and distribution of this species due to the construction works. No LSE is predicted.	Screened out
			Operation Phase (noise/visual presence from aircraft):	Results from the desk study and field survey indicate that turnstone	Turnstone are known to utilise intertidal habitats close to the inward and outward flight paths of planes to the east of the Order Limits. Therefore, noise and visual	**Screened in**

[18] Full designation information is provided in **Appendix B.**
[19] Conservation objectives for all sites are listed in **Appendix D.**
[20] The conservation objectives for turnstone for the Ramsar site have been taken as being the same as for the SPA of the same name, with which it shares a common boundary over much of its area.

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
			Disturbance / displacement of turnstone resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing.	regularly use the northern shores of Pegwell Bay (within the Ramsar/SPA) for roosting and foraging.	presence of aircraft has the potential to adversely affect the population and distribution of turnstone. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the Ramsar site.	
			Operation Phase (air quality): Deposition of oxides of nitrogen from aircraft and vehicle emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant community and the invertebrates that turnstone forage upon.	Results from the desk study and field survey indicate that turnstone regularly forage on rocky shores and mudflats within the Ramsar/SPA in Pegwell Bay.	Turnstone primarily forage along shorelines and on rocky beaches, neither of which are identified as habitats vulnerable to nitrogen deposition (www.apis.ac.uk/indicative-critical-load-values). APIS have not assigned a critical load value for NOx deposition to these habitat types (see www.apis.ac.uk/indicative-critical-load-values, and **Chapter 6**). In addition, a critical load value >34 kg N ha^{-1} y^{-1} has been assigned to 'mudflats and sandbanks not covered by seawater at low tide' in an analysis of sensitive Natura 2000 habitats in the Netherland (van Dobben *et al*., 2012). This habitat was one of the least sensitive to nitrogen deposition in the analysis of 75 different habitat types. In view of this, no adverse effects on the habitats turnstone reply upon are predicted. No LSE is predicted.	Screened out
			Operation phase (bird scaring): Disturbance / displacement of turnstone resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise created by bird scaring activity.	No suitable habitat for foraging/roosting turnstone exists within the ZOI (within 1km of the Order Limits). The desk study and field survey also provided no evidence to indicate that turnstone utilise habitats within the ZOI (1km of the Order Limits).	The nearest point within the Ramsar site which provides suitable foraging/ resting habitat (rocky beaches/ intertidal sand and mud) for turnstone is approximately 1.4km south-east of the fringes of the airfield where bird scaring methods would be deployed. In view of this, no adverse effects on the population and distribution of turnstone are predicted. No LSE is predicted.	Screened out
			Operation phase (barrier effect):	Studies undertaken by Hodgson (Hodgson, 2016)	There is no evidence to indicate that the flight paths of turnstone cross or will cross the Order Limits. In	Screened out

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
			Disturbance / displacement of turnstone due to the Proposed Development forming a barrier to the movement of birds between foraging and roosting sites, resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	conclude that turnstone flight paths are likely to closely follow the coastline, and are therefore unlikely to be cross the Order Limits.	view of this, no adverse effects on the population and distribution of turnstone are predicted. No LSE is predicted.	
			Operation phase (outfall): The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) intertidal habitats that turnstone depend upon, due to run-off entering the Ramsar site from the currently operational outfall	Results from the desk study and field survey indicate that turnstone regularly forage and roost on rocky shoreline and mudflats within close vicinity of the outfall in Pegwell Bay.	There is the potential for adverse effects to the habitat utilised by foraging and roosting turnstone (mudflats and rocky shoreline) from the discharge of treated water to Pegwell Bay, through scour at the point of discharge during operation of the proposed development. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the Ramsar site.	**Screened in**
	15 British Red Data Book invertebrate species (Criterion 2)	Maintain and restore the extent, distribution, structure and function of habitats the qualifying feature invertebrate species reply upon, and their supporting processes. Maintain and restore the populations and distributions of the qualifying feature invertebrate species.	**Operation Phase (air quality):** Deposition of oxides of nitrogen from aircraft emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant community through changes in baseline conditions resulting in direct or indirect effects on listed invertebrates.	The wetland habitats support 15 British Red Data Book invertebrates.	Air quality modelling indicates that habitats upon which the invertebrate species are likely to depend are located within the ZOI in which adverse effects could occur due to NOx, and that these habitat types (including freshwater marshes and sand dunes) are sensitive to nitrogen deposition (see **Chapter 6**). In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the Ramsar site.	**Screened in**
			Construction phase (outfall): The introduction of toxic	The wetland habitats support 15 British Red Data Book invertebrate	None of the 15 British Red Data Book invertebrate species are known to be associated with the mudflat habitats that could be potentially adversely affected	Screened out

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
			pollutants or sediments resulting in loss of or damage (including scouring) to habitats that the invertebrates depend upon, due to run-off entering the Ramsar from the outfall.	species.	by discharge from the outfall (due to scour). All the habitats likely to support the invertebrate species (sand dunes, grassland and other freshwater wetland habitats) are located well beyond 100m of the outfall, beyond which, no LSE is predicted (see **Table 3.1**). In view of this, no adverse impacts on the invertebrate species are predicted.	
			Operation phase (outfall): The introduction of toxic pollutants or sediments resulting in loss of or damage (including scouring) to habitats that the invertebrates depend upon, due to run-off entering the Ramsar from the outfall.	The wetland habitats support 15 British Red Data Book invertebrates.	None of the 15 British Red Data Book invertebrate species are known to be associated with the mudflat habitats that could be potentially adversely affected by discharge from the outfall (due to scour). All the habitats likely to support the invertebrate species (sand dunes, grassland and other freshwater wetland habitats) are located well beyond 100m of the outfall, beyond which, no LSE is predicted (see **Table 3.1**). In view of this, no adverse impacts on the invertebrate species are predicted.	Screened out
Thanet Coast and Sandwich Bay SPA (0m)	Golden plover (non-breeding)	Maintain and restore the extent, distribution, structure and function of habitats golden plover reply upon. Maintain and restore the population and distribution of golden plover	**Construction phase (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage (including scouring) to intertidal habitats that golden plover depend upon, due to run-off entering the SPA from the currently operational outfall.	Evidence from the desk study and survey indicate that golden plover utilise the mudflats and adjacent saltmarsh within close proximity to the outfall for roosting.	There is the potential for adverse effects to the habitat utilised as a roosting site by golden plover from the discharge of treated water to Pegwell Bay, through scour at the point of discharge during construction of the proposed development. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**
			Construction phase (noise): Noise, vibration and physical activity within the Order Limits from earthworks, fixed and mobile plant during the construction phase provides potential for foraging/ resting golden plover to be displaced from any suitable farmland adjacent to the Order Limits.	Evidence from the desk study and survey indicate that golden plover utilise the arable farmland within 750m of the Order Limits albeit in low numbers. 750m is a precautionary disturbance distance is based on information reported on disturbance in the literature (e.g. Cutts,	Due to the presence of golden plover within 750m of the Order Limits, there is the potential for construction noise to adversely impact on the population and distribution of golden plover. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
			Increased noise and vibration may also occur due to an increase in construction road traffic.	Phelps & Burdon 2009, Ruddock & Whitfield 2007).		
			Operation Phase (air quality): Deposition of oxides of nitrogen from aircraft emissions resulting in enrichment and/or acidification of habitat and a reduction in the invertebrate prey that golden plover depend upon.	Evidence from the desk study and survey indicate that golden plover utilise the arable farmland adjacent to the Order Limits in low numbers. The intertidal habitat (saltmarsh and mudflats) in Pegwell Bay are used as a roost site by important numbers of golden plover.	The intensively managed, arable farmland utilised by golden plover for foraging, which would receive a high level of input from herbicides and pesticides, is unlikely to be vulnerable to the effects of acidification and/or enrichment due to nitrogen deposition. The saltmarsh and mudflats used by roosting birds in Pegwell Bay are washed by tidal seawater on a regular basis and therefore the structure of the vegetation and suitability as a roost site is unlikely to be changed to such a degree as to be rendered unsuitable, as a result of nitrogen deposition. These habitats have low levels of sensitivity to nitrogen deposition, with values of 21-23 kg N ha^{-1} y^{-1} for *Salicornia*/ *Spartina* covered saltmarsh and >34 kg N ha^{-1} y^{-1} for mudflats/ sandflats (van Dobben *et al*., 2012). In view of this, no adverse impacts to habitats golden plover rely upon are predicted, due to air quality during operation. No LSE is predicted.	Screened out
			Operation phase (outfall): The introduction of toxic pollutants or sediments resulting in loss of or damage (including scouring) to intertidal habitats that golden plover depend upon, due to run-off entering the SPA from the currently operational outfall.	Evidence from the desk study and survey indicate that golden plover utilise the mudflats and adjacent saltmarsh within close vicinity to the outfall for roosting.	There is the potential for adverse effects to the habitat utilised as a roosting site by golden plover from the discharge of treated water to Pegwell Bay, through scour at the point of discharge during operation of the proposed development. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**
			Operation Phase (noise/visual presence from aircraft):	Results from the desk study and field survey indicate that golden plover regularly use areas of	Golden plover are known to utilise intertidal and farmland habitats close to the inward and outward flight paths of planes. Therefore, noise and visual presence of aircraft have the potential to adversely	**Screened in**

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
			Disturbance / displacement of golden plover resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing.	saltmarsh and mudflats in Pegwell Bay (within the SPA) for roosting. Low numbers of golden plover also forage in farmland surrounding the Order Limits.	affect the population and distribution of golden plover. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	
			Operation phase (bird scaring): Disturbance / displacement of birds resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise created by bird scaring activity.	The desk study and surveys indicate very low levels of use by golden plover in farmland within the ZOI (within 1km of the Order Limits).	Potentially suitable habitat for golden plover is located within the ZIO. Therefore, the bird scaring activities have the potential to adversely affect the population and distribution of golden plover. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**
			Operation phase (barrier effect): Disturbance / displacement of golden plover due to the Proposed Development forming a barrier to the movement of birds between foraging and roosting sites, resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	Desk study and survey data indicate that golden plover roost primarily on Pegwell Bay and forage in the wider areas of farmland to the south-west.	Desk study and surveys indicate low level of use of farmland around the Order Limits, though it is not known what levels of flight activity by golden plover occur over the now disused airfield at Manston. Therefore, barrier effect has the potential to adversely affect the population and distribution of golden plover. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**
	Little tern (breeding)	Maintain and restore the extent, distribution, structure and function of habitats little tern reply upon.	**Operation Phase (noise from planes):** Little tern may be prevented from recolonising the SPA due to disturbance/ displacement due to noise and shadow	Little tern no longer breed within the Thanet Coast and Sandwich Bay SPA (Clements *et al*., 2015). Little terns previously bred in summer at Shell Ness (north of Sandwich Bay)	Given the absence of this qualifying interest species from the SPA, no LSEs are considered during either construction or operation of the Proposed Development. However, consideration is given to adverse effects on the SPA due to the potential of the Proposed Development preventing re-colonisation of the SPA by little tern.	**Screened in**

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
		Maintain and restore the population and distribution of little tern.	created by planes on take-off and landing.	and near Plumpudding on the North Thanet coast. When the tide is in the little tern colony at Shell Ness would feed in the shallow coastal waters of Pegwell/Sandwich Bay and in the lower part of the Stour River.		
	Turnstone (non-breeding)	Maintain and restore the extent, distribution, structure and function of habitats turnstone reply upon and their supporting processes. Maintain and restore the population and distribution of turnstone.	**Construction phase (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) intertidal habitats that turnstone depend upon, due to run-off entering the SPA site from the currently operational outfall.	Results from the desk study and field survey indicate that turnstone regularly use the northern shores of Pegwell Bay (within the Ramsar/SPA) for roosting and foraging.	There is the potential for adverse effects to the habitat utilised by foraging and roosting turnstone (mudflats and rocky shoreline) from the discharge of treated water to Pegwell Bay, through scour at the point of discharge during construction of the proposed development. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**
			Operation phase (outfall): The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) intertidal habitats that turnstone depend upon, due to run-off entering the SPA from the currently operational outfall.	Results from the desk study and field survey indicate that turnstone regularly forage and roost on rocky shoreline and mudflats within close vicinity of the outfall in Pegwell Bay.	There is the potential for adverse effects to the habitat utilised by foraging and roosting turnstone (mudflats and rocky shoreline) from the discharge of treated water to Pegwell Bay, through scour at the point of discharge during operation of the proposed development. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**
			Operation Phase (noise/visual presence from aircraft): Disturbance / displacement of turnstone resulting in a reduction of energy intake and/or an increase in energy	The SPA and Ramsar site largely share common boundaries.	Noise and the visual presence of aircraft in flight have the potential to adversely affect the population and distribution of turnstone. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SPA.	**Screened in**

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
			expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing.			
					All other effects identified for this SPA feature have been screened out (see rationale as for Ramsar site above).	Screened out
Sandwich Bay SAC (0m)	Annex I habitats	Maintain and restore the extent, distribution, structure and function of the qualifying habitats (and their typical flora), and the supporting processes they rely upon.	**Construction Phase (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage to terrestrial or freshwater environments leading to direct or indirect effects on designated features due to run-off entering the SAC site from the currently operational outfall.	Annex I (sand dune) habitats occur at their closest, 2.5km south of the Order Limits.	All the qualifying habitats (dunes) are located well beyond 100m of the outfall, beyond which, no LSE is predicted (see **Table 3.1**). In view of this, no adverse impacts on the qualifying habitats and their plant species are predicted. No LSE predicted.	Screened out
			Operation Phase (air quality): Deposition of oxides of nitrogen from road vehicles and aircraft emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant communities within the Annex I habitats.	Annex I (sand dune) habitats occur at their closest, 2.5km south of the Order Limits.	Air quality modelling indicates that sensitive (sand dune) habitats are located within the ZOI in which adverse effects could occur due to air-borne and deposition of nitrogen (see **Chapter 6**). There is therefore the potential for air pollution to adversely impact the extent, distribution and structure of these habitats. In view of this, further assessment has been provided in order to determine any adverse effects on the integrity of the SAC.	**Screened in**
			Operation phase (outfall): The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) terrestrial or freshwater environments leading to direct or indirect effects on designated features due to run-off entering the SAC from the	Annex I (sand dune) habitats occur at their closest, 2.5km south of the Order Limits.	All the qualifying habitats (dunes) are located well beyond 100m of the outfall, beyond which, no LSE is predicted (see **Table 3.1**). In view of this, no adverse impacts on the qualifying habitats and their plant species are predicted. No LSE predicted.	Screened out

Site Name (distance from Order Limits)	Designated Features[18]	Conservation objectives of qualifying feature	Potential Effects	Current Baseline	Screening rationale	Conclusion
			currently operational outfall.			
Thanet Coast SAC (330m SE)	Annex 1 habitats	Maintain and restore the extent, distribution, structure and function of the qualifying habitats (and the typical species they support), and the supporting processed they rely upon.	**Construction Phase (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage to terrestrial or freshwater environments leading to direct or indirect effects on designated features due to run-off entering the SAC site from the currently operational outfall.	The Annex I habitats (reefs and submerged or partially submerged sea caves) are located, at their closest, 330m from the Order Limits.	The qualifying habitats are located well beyond the ZOI (the 100m geographic parameter, see **Table 3.1**). In view of this, no adverse impacts on the qualifying habitats are predicted. No LSE predicted.	Screened out
			Operation Phase (air quality): Deposition of oxides of nitrogen from aircraft emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant and animal communities that form the designated features.	The Annex I habitats (reefs and submerged or partially submerged sea caves) are located at their closest, 330m from the Order Limits.	The Annex I habitat features are submerged by tidal sea water on a daily basis, and therefore unlikely to be adversely affected by pollution derived from aircraft emissions. APIS have not assigned a critical load value for NOx deposition to these habitat types (see www.apis.ac.uk/indicative-critical-load-values, and **Chapter 6**). In addition, a critical load value >34 kg N ha^{-1} y^{-1} has been assigned to 'reefs' in an analysis of sensitive Natura 2000 habitats in the Netherland (Van Dobben *et al*., 2013). This habitat was one of the least sensitive to nitrogen deposition in the analysis of 75 different habitat types. In view of this, no adverse impacts on the qualifying habitats are predicted. No LSE predicted.	Screened out
			Operation phase (outfall): The introduction of toxic pollutants or sediments resulting in loss of or damage to terrestrial or freshwater environments leading to direct or indirect effects on designated features due to run-off entering the SAC from the currently operational outfall.	The Annex I habitats (reefs and submerged or partially submerged sea caves) are located, at their closest, 330m from the Order Limits.	The qualifying habitats are located well beyond the ZOI (the 100m geographic parameter, see **Table 3.1**) within which there is potential for water emitted from the outfall to damage the habitats due to scour. Therefore, no adverse impacts on the extent, distribution, structure and function of these qualifying habitats is predicted. No LSE predicted.	Screened out

4. Appropriate Assessment (Stage 2)

4.1.1.1 For those effects and qualifying features that cannot be 'screened out' during the Stage 1, screening exercise, further detailed assessment into whether these effects will result in an adverse impact on the integrity of the European sites is provided this section (**Section 4)**. This information will be provided to the Competent Authority to enable them to undertake an Appropriate Assessment. The assessments in **Section 4** will draw upon the information obtained from the desk study (**Appendix 7.2, Chapter 7: Biodiversity** of the ES), literature review (**Appendix 7.4, Chapter 7: Biodiversity** of the ES) and surveys (**Appendix 7.5, Chapter 7: Biodiversity** of the ES), together with guidance and the consultation exercise. The conclusions reached will also take account of the conservation objectives and condition status of the qualifying features concerned.

4.1.1.2 The European sites and features 'screened in' for detailed assessment are provided in **Table 4.1**, together with the effect and its pathway.

4.1.1.3 As recommended by PINS Advice Note 10 (PINS, 2017), a summary of the assessments into the potential adverse effects on integrity, for all the European sites and their features taken through to Stage 2 is provided in **Appendix E**: Stage 2: Matrices.

Table 4.1 European Sites and their Qualifying Features, Taken Forward for Detailed Assessment

Site Name (distance from Order Limits)	Designated Features[21]	Conservation objectives of qualifying feature	Potential effects and pathway
Thanet Coast and Sandwich Bay SPA (0m)	Turnstone (non-breeding)	Maintain and restore the extent, distribution, structure and function of habitats turnstone reply upon. Maintain and restore the population and distribution of turnstone.	**Construction and Operational Phases (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) intertidal habitats that turnstone depend upon, due to run-off entering the SPA from the currently operational outfall. **Operation Phase (noise/visual presence from aircraft):** Disturbance / displacement of turnstone resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing.
	Golden plover (non-breeding)	Maintain and restore the extent, distribution, structure and function of habitats golden plover reply upon. Maintain and restore the population and distribution of golden plover.	**Construction and Operational Phases (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) intertidal habitats that golden plover depend upon, due to run-off entering the SPA from the currently operational outfall. **Construction phase (noise):** Noise, vibration and physical activity within the Order Limits from earthworks, fixed and mobile plant during the construction phase provides potential for foraging/ resting golden plover to be displaced from any suitable farmland adjacent to the Order Limits. Increased noise and vibration may also occur due to an increase in construction road traffic.
			Operation Phase (noise/visual presence from aircraft): Disturbance / displacement of golden plover resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing.
			Operation phase (bird scaring): Disturbance / displacement of birds resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise created by bird scaring activity.
			Operation phase (barrier effect): Disturbance / displacement of golden plover due

[21] Full designation information is provided in **Appendix B.**

Site Name (distance from Order Limits)	Designated Features[21]	Conservation objectives of qualifying feature	Potential effects and pathway
			to the Proposed Development forming a barrier to the movement of birds between foraging and roosting sites, resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.
	Little tern (breeding)	Maintain and restore the extent, distribution, structure and function of habitats little tern reply upon. Maintain and restore the population and distribution of little tern.	**Operation Phase (noise from planes):** Little tern may be prevented from recolonising the SPA due to disturbance/ displacement due to noise and shadow created by planes on take-off and landing.
Thanet Coast and Sandwich Bay Ramsar (0m)	Turnstone (non-breeding)	Maintain and restore the population and distribution of turnstone. Maintain and restore the extent, distribution, structure and function of habitats turnstone reply upon. Maintain or restore the supporting processes on which the habitats of turnstone rely.	**Construction and Operational Phases (outfall):** The introduction of toxic pollutants or sediments resulting in loss of or damage to (including scouring) intertidal habitats that turnstone depend upon, due to run-off entering the Ramsar site from the currently operational outfall. **Operation Phase (noise/visual presence from aircraft):** Disturbance / displacement of turnstone resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing.
	15 Red Data Book Invertebrate species (Criterion 2)	Maintain and restore the populations and distributions of the qualifying feature invertebrate species. Maintain and restore the extent, distribution, structure and function of habitats the qualifying invertebrate species rely. Maintain or restore the supporting processes on which the habitats rely.	**Operation Phase (air quality):** Deposition of oxides of nitrogen from aircraft emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant community through changes in baseline conditions resulting in direct or indirect effects on listed invertebrates.
Sandwich Bay SAC (0m)	Annex I habitats	Maintain and restore the extent, distribution, structure and function of the qualifying habitats (and their typical flora), the supporting processed they rely upon.	**Operation Phase (air quality):** Deposition of oxides of nitrogen from road vehicles and aircraft emissions resulting in enrichment and/or acidification of the environment leading to alteration of the plant communities within the Annex I habitats.

4.2 Thanet Coast and Sandwich Bay SPA - Golden Plover (non-breeding)

4.2.1.1 The Stage 1 screening exercise identified the potential for the Proposed Development alone and/or in-combination with other developments and plans, to have an adverse effect on the SPA population of golden plover, due to:

- adverse effects on habitats used by foraging and roosting golden plover in Pegwell Bay due to scouring from water emitted from the outfall during construction and operation;
- disturbance from construction;

- visual and auditory disturbance caused by aircraft flights;
- noise from bird-scaring activities; and
- the potential barrier effect of the Proposed Development to the movement of golden plover between roost and foraging areas.

4.2.1.2 A detailed assessment of these effects on the SPA population of golden plover is provided as follows.

4.2.2 Current Baseline

4.2.2.1 Golden plover is listed in Annex 1 of the Birds Directive[22] (see **Appendix B**). The Thanet Coast & Sandwich Bay SPA was originally designated (under Article 4.1 of the Birds Directive) in part, for the internationally important non-breeding population of golden plover that it supported (during the five-year period 1985/86 – 1989/90, an average peak count of 1,980 golden plover was recorded). Nationally important numbers of non-breeding golden plover are also a notified feature of the Sandwich Bay to Hacklinge Marshes SSSI (which forms one of the two constituent SSSIs of the SPA). However, as part of the third JNCC SPA review (Stroud *et al*., 2016), golden plover was removed as a designated species from the SPA (likely due to declining numbers), although this change is to date unratified.

4.2.2.2 The UK wintering population of golden plover was estimated to be 420,000 birds in winter 2006/07 of which 400,000 were in Britain (Musgrove *et al*., 2013). The wintering population of golden plover in Great Britain increased by 263% from 1984/54 to 2009/10, though has undergone a short-term decline of 41% in the last five years of this period (Cook *et al*., 2013). Numbers increased substantially from the 1980s until around 2005, after which there has been a steep decline.

4.2.2.3 Golden Plover is a qualifying feature of the Thanet Coast and Sandwich Bay SPA, as the SPA regularly supported 0.2% of the population of Great Britain over the five-year peak mean 1991/92-1995/96 (Article 4.1 qualification)[23]. For the purposes of understanding European and National context and in order to determine significance, with respect to effects on the SPA population[24], **Table 4.2** presents a breakdown of population sizes and selection/significance thresholds[25].

Table 4.2 Golden plover Populations and Selection Thresholds

Golden Plover		Population sizes (individuals)	1% Selection/ Significance thresholds
International population		930,000	9,300
GB population		400,000	4,000
Thanet Coast and Sandwich Bay SPA	1985/86-1989/90, an average peak count	1,980	N/A
	1998/99 to 2002/03 five-year mean peak Pegwell Bay 'roost' count	6,332	N/A

[22] *Directive 2009/147/EC (known as the Birds Directive) on the conservation of wild birds* (the codified version of Council Directive 79/409/EEC as amended provides for the identification and classification of Special Protection Areas (SPAs) for rare or vulnerable species listed in Annex I of the Directive, as well as for all regularly occurring migratory species

[23] Natura 2000 Standard Data Form: Thanet Coast and Sandwich Bay SPA. http://jncc.defra.gov.uk/

[24] The international and national thresholds of importance for golden plover have been obtained from https://www.bto.org/volunteer-surveys/webs/data/species-threshold-levels, accessed 4 December 2017

[25] There is no fundamental biological reason to take 1% of a population as the threshold level for establishing the level of importance of a site. Nevertheless, this percentage is widely considered to be of value in developing measures that give an appropriate level of protection to populations, and has gained acceptance on this basis throughout the world. The criterion was, for example, adopted by parties involved in the *Ramsar Convention 1971*. Thereafter, the 1% level of national species totals has been taken as the basis of assessment in various countries, including Britain (Stroud, Mudge & Pienkowski, 1990)

	An average of 1.6% of the GB population (5-year mean peak 1998/9-2002/3)	4,190	N/A
	2010/11 to 2014/15 five-year mean peak Pegwell Bay 'roost' count	**3,285**	**33**

4.2.2.4 The five-year mean peak count of golden plover of 3,285 birds for 2010/11-2014/15 (obtained from WeBS core count data for the Pegwell and Sandwich Bays WeBS count sector) has been used as the basis for this assessment. The numbers of golden plover over-wintering in the area has clearly, varied greatly over the period since the SPA was designated, and therefore, this figure represents the most up-to-date value for the likely population size of golden plover for the SPA.

4.2.2.5 The conservation objectives for the SPA golden plover population are provided in **Appendix D**, and are in summary: to maintain and restore the population and distribution of golden plover, and the habitats and supporting processes they depend upon.

4.2.2.6 Golden plover winter on coastal and inland habitats around Sandwich Bay and Pegwell Bay. Their main feeding habitat is on arable fields and grazing marsh located inland of the dunes of Sandwich Bay (to the south of the Order Limits) and roosting on intertidal areas of Pegwell Bay. The birds using the farmland adjacent to the Order Limits are considered part of the SPA population and thus, this habitat is considered to be a functionally linked to the SPA.

4.2.2.7 A peak count of 530 golden plover was recorded during the Functional Habitat Survey in 2016/17 (**Appendix 7.5** in **Chapter 7: Biodiversity** of the ES) in a field adjacent to the southwest of the Order Limits (see **Figure 4.3**). However, this peak count was exceptional during the survey, with the next largest flock being of 33 birds and the remaining records involving just 1-6 individuals.

4.2.2.8 During the Pegwell Bay Distribution Survey (**Appendix 7.5** in **Chapter 7: Biodiversity** of the ES), golden plover were primarily recorded in November and December 2016, and in February 2017, when 500-850 birds were counted. No foraging birds were observed, with all records relating to flocks of golden plover resting (roosting or loafing) on intertidal habitat close to the high-water mark along the northern and western fringes of Pegwell Bay during low, mid and the high tide periods (see **Figure 4.4**).

4.2.2.9 No golden plover were recorded within the Order Limits during bird surveys undertaken for the proposed Stone Hill Park development in winter 2015/16 (WSP PB, 2016), or during the Functional Habitat Surveys in 2016/17.

4.2.2.10 Henderson & Sutherland (2017) and Griffiths (2003) and data provided by the Sandwich Bay Bird Observatory (SBBO) and KOS show that golden plover occur on both intertidal and inland areas around Pegwell Bay in winter. A range of roost sites have been identified, including Pegwell Bay, but also inland on farmland.

4.2.2.11 Henderson & Sutherland (2017) divided their survey area into a number of Recording Areas, with the only records of golden plover within 2km of the Order Limits being those in their Recording Area 15 to the east of the Order Limits (see **Figure 4.5**). In that area (despite parts in the east being unsuitable for foraging due to the presence of tall Brassica[26] crops), fields of ploughed and fallow land close to Pegwell Bay were used for feeding and roosting in the first half of the winter, as follows:

- A flock of 402 birds was roosting and foraging in a field adjacent to the south-east of the Order Limits on 13 November 2016;
- This was followed by 53 birds roosting in a different field (1.3km west of the Order Limits) on 27 November 2016;

[26] A common brassica crop is oil-seed rape.

- An additional 43 birds were roosting in the same field as the early November record on 31 December 2016; and
- No golden plover were recorded in Recording Area 15 in January and February 2017 (a March survey was not undertaken in this Area). These birds also used Pegwell Bay.

4.2.2.12 Henderson & Sutherland (2017) identified a number of other localities frequently used by golden plover. The highest numbers of roosting and foraging golden plover were to the south of the Order Limits, approximately 3.5km from the Order Limits on arable farmland in the Ash Levels Recording Area 7 where a peak count of 1,030 birds was recorded in January 2017.

4.2.2.13 The mudflats at Pegwell Bay formed a roost site, used intermittently at low tide, with a peak count of 1,000 birds noted there in February 2017. Disturbance caused by bait-diggers and other sources was identified as a continued problem in this area and the likely reason for its intermittent use by golden plover.

4.2.2.14 Unit 3 of the Sandwich Bay to Hacklinge Marshes SSSI (the main location for the roosting golden plover) is in an 'Unfavourable – Recovering' condition. The bird disturbance undertaken at Pegwell Bay in winter 2010/11 (Swandale & Waite, 2012) provides strong evidence indicating that recreational and commercial activities (including dog walking, walking without dogs, bait digging and kite surfing) are having a detrimental impact on bird populations in Pegwell Bay. The report states that:

> "*The most disturbing activity, particularly in the north section of the bay, is dog walkers with dogs off leads. This is being addressed through a dog management strategy which aims to provide alternative open space for dogs off leads. The voluntary agreement over kite surfing also needs to be reviewed given disturbance levels associated with this recreational activity. Continued monitoring is required particularly with regard housing development within Dover and Thanet Districts. Mitigation measures are being sought with regard these development plans including monitoring and possible wardening if monitoring indicates increased disturbance activity*."

4.2.2.15 Other areas of farmland used by roosting and/or foraging birds included:

- Sandwich Marshes (Recording Area 4), with up to 610 birds roosting by the flood-relief pools for the River Stour (4-5km south of the Order Limits);
- Goshall Valley (Recording Area 8, 4-7km south, peak 810 birds); and
- Worth Marshes (Recording Area 1, 8-9km south, peak count 242 birds).

4.2.2.16 Results from the surveys in 2002/03 (Griffiths, 2003) and 2016/17 (Henderson & Sutherland, 2017) show similar patterns of golden plover distribution across the Thanet and Sandwich Bay areas, and indicate that numbers have declined during the intervening years, from a high tide peak count of 4,962 birds (in January 2003) to only 1,536 (in late January 2017).

4.2.2.17 BTO Wetland Bird Survey (WeBS) core count data[27] for Pegwell Bay also shows a general decline in the peak counts of golden plover in Pegwell Bay over the period 2000/01 to 2014/15. A summary of the WeBS data is provided in **Table 4.3** (the figures in parenthesis include additional data obtained for Pegwell Bay outside the standardised WeBS core count dates, obtained from https://app.bto.org/webs-reporting/).

Table 4.3 Peak Monthly Counts of Golden Plover in Pegwell Bay, from Winters 2000/01-2014/15

Winter	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Peak count	Month

[27] There are two types of WeBS count: Core Counts undertaken at high tide, involving a large number of sites (around 2,800), and Low Tide Counts involving a relatively much smaller number of counts of feeding birds at low tide.

Winter	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Peak count	Month
2000/01	196	414	41	950	3,160	4,000	1070	1,404	4,000	Feb
2001/02	0	840	2,680	6,000	7,000	2,000	3750	3,711	7,000	Jan
2002/03	0	1,350	2,450	190	5,800	4,710	150	2,441	5,800 (7,229)	Jan
2003/04	62	1,410	6,240	5,500	8,000	1,125	14	3,193	8,000	Jan
2004/05	95	0	3,830	5,200	5,330	4,500	920	3,312	5,330	Jan
2005/06	79	2,070	550	7,000	1,900	2,500	595	2,099	7,000	Dec
2006/07	11	663	3,730	945	2,900	4,170	80	1,785	4,170	Feb
2007/08	25	1,500	4,500	5,500	5,000	4,200	0	3,454	5,500	Dec
2008/09	0	0	2,000	3,500	3,230	3,150	5	2,377	3,500	Dec
2009/10	0	700	1,200	60	753	1,100	410	703	1,200 (3,150)	Nov
2010/11	132	160	3,400	51	2,000	0	0	1,148	3,400 (4,000)	Nov
2011/12	1	1100	1,350	3,000	3,500	0	0	2,237	3,500 (3,640)	Jan
2012/13	1	180	2,000	2,820	4,330	2,820	285	2,072	4,330	Jan
2013/14	16	530	820	1,050	1,093	0	0	701	1,093 (2,000)	Jan
2014/15	1	0	1,147	2,456	0	760	0	1,454	2,456	Dec

Current baseline (noise levels)

4.2.2.18 To characterise the baseline noise environment/ levels in the wider area around the Order Limits (which is dominated by noise from road traffic), measurements and observations were undertaken at 14 locations during both daytime and night-time periods as described in Table 12.2 in **Chapter 12: Noise and Vibration** (of the ES) and shown in Figure 12.1 in **Chapter 12: Noise and Vibration** (of the ES). An ambient noise level has also been identified to represent each location observed, based on the following:

- Site observation;
- Short-term measurements; and

- Sound propagation modelling of the major sources of sound, namely road traffic movements for locations where the short-term noise level is uncertain; and *Directive 2002/49/EC*[28] Round 2 noise mapping data where road traffic modelling is not possible or rail is the dominant noise source.

4.2.2.19 The baseline noise levels measured from Observation Point 13 (OBS13) located on the northern fringe of Pegwell Bay (the most relevant measurement point in terms of the SPA), showed daytime noise levels of 40-45 dB $L_{Aeq,5min}$[29] and night time noise levels of 40 dB $L_{Aeq,5min}$, primarily due to road traffic. The ambient day and night noise level for OBS13 is 42 dB $L_{Aeq, 16hr}$ (see **Table 12.2 in Appendix 12**).

Current baseline (drainage and discharge into Pegwell Bay)

4.2.2.20 The Proposed Development is on relatively high ground, mainly at an elevation between 45-50 mAOD (metres above ordnance datum). The southern portion is located at an elevation of approximately 50mAOD, along the length of the existing runway, but rises to approximately 55mAOD in the westernmost corner of the site. North of the runway the site level declines to approximately 40mAOD in the west, at the Spitfire Way Junction (crossroads of the Manston Road (B2050) and Spitfire Way (B2190) carriageways), forming the start of the headwater valley for the Brooksend Stream, while remaining at 45-50 mAOD in the northernmost part of the site. The Site red line boundary (RLB) also encompasses the line of the buried pipeline to Pegwell Bay, which extends from the southern portion of the site at about 50 mAOD to the outfall point in Pegwell Bay.

4.2.2.21 The average annual rainfall recorded at Manston between 1981 and 2010 was 592.5mm30.

4.2.2.22 There are no river watercourses on or adjacent to the Proposed Development, partly due to the high permeability of the underlying Chalk. A series of water channels and streams that form part of the Minster Marshes are located more than 1 km to the south of the main site. The buried pipeline lies in closer proximity to the north-western extent of this system, but aerial photography indicates that it does not cross any surface water features. Minster Marshes drain south into the River Stour, 3km south of the Proposed Development, which flows east into Sandwich and Pegwell Bays. Currently, runoff from the Proposed Development infiltrates locally and, due to the highly permeable nature of the underlying geology, is unlikely to reach these surface water systems via overland flow routes.

4.2.3 Future Baseline

4.2.3.1 In the absence of development, it is assumed that the Order Limits will remain principally as grassland and hard standing and its immediate vicinity will remain primarily as arable farmland. As a result, the management of this area would be unlikely to change in the foreseeable future and therefore the baseline with respect to the golden plover population of the Thanet Coast and Sandwich Bay SPA would not be altered significantly.

4.2.4 Predicted Adverse Effects

4.2.4.1 Distribution data from the locality of the Order Limits indicate that golden plover utilising farmland to the south, north and west are likely to be connected with the Pegwell Bay (Thanet Coast and Sandwich Bay SPA) wintering population i.e. they disperse from Pegwell Bay at high tide to forage

[28] *Directive 2002/49/EC* of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise [online] Available at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32002L0049 [Accessed 14/02/2018]

[29] L_{Aeq} indicates average exposure noise level over a measured period, in this case 5 minutes (BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures' BS7445-1:2003). BS 7445 provides guidance for describing and measuring noise from all sources. The standard recommends equivalent continuous A-weighted sound pressure level (L_{Aeq}) as the most appropriate basic noise indicator.

[30] Meteorological Office (Met. Office): http://www.metoffice.gov.uk/public/weather/climate

on farmland in the wider area. As a result of the likely movements of birds between high-tide foraging areas around the Order Limits and Pegwell Bay at low tide, and their use of the surrounding farmland for foraging and roosting, there is potential for adverse effects on the golden plover population, due to:

- Auditory, visual, and vibration stimuli caused by vehicles, machinery and their operatives during construction and operation of the Proposed Development;
- Auditory disturbance caused by any onsite pyrotechnical bird scaring methods during operation of the Proposed Development;
- Auditory and visual disturbance caused by over-flying aircraft, and aircraft departing from and arriving at the airport;
- The potential barrier effect of the airport to the movements of birds between foraging and roost sites; and
- Damage to habitats (primarily mudflats) used by roosting golden plover in Pegwell Bay due to scouring caused by water emitted from the outfall in Pegwell Bay, during construction and operation.

Construction displacement - habitat loss due to disturbance

4.2.4.2 Noise, vibration and physical activity within the Order Limits from earthworks, fixed and mobile plant, and the visual presence of operatives during the construction phase has the potential for foraging and resting golden plover to be displaced from any suitable farmland within 750m of the Order Limits (see **Table 3.1**). Increased noise and vibration may also occur due to an increase in construction road traffic. As construction noise, vibration and activity within the Order Limits is currently lacking and also likely to be unpredictable, it has a greater potential to cause disturbance than an increase in road traffic noise and vibration. This is because birds in the vicinity of the airport are likely to be habituated to current road traffic noise and vibration and its more predictable pattern.

4.2.4.3 Survey of golden plover in northeast Kent, including the area surrounding the Order Limits in winter 2003/04 (Griffiths, 2004) identified no concentrations of golden plover within 750m of the Order Limits; the data for this work was collected whilst Manston Airport was still operational.

4.2.4.4 Survey of farmland habitat around the Order Limits in 2016/17 has also shown limited use by foraging and roosting golden plover of these areas within 750m of the Order Limits (**Appendix 7.5, Chapter 7: Biodiversity** of the ES, Henderson & Sutherland 2017). Between September 2016 and February 2017 inclusive, few golden plover were recorded, with generally five or less birds noted within 1km of the Order Limits. An exception to this, was during the November survey, when a flock of 530 golden plover was recorded in an arable field immediately to the south of the Order Limits at its eastern end (**Appendix 7.5** in **Chapter 7: Biodiversity** of the ES). Soon after this record, the field was cultivated and no further records were obtained from that location. This flock was also recorded during the surveys reported in Henderson & Sutherland (2017).

4.2.4.5 The desk study and winter bird surveys indicate that golden plover do not make regular use of farmland within 750m of the Order Limits, although birds may use it opportunistically, depending upon suitability of crop type. Golden plover rarely remain faithful to a single site throughout the winter but tend to use a number of sites dependant on food availability and weather conditions (Percival, 2007). The Order Limits is located adjacent to an extensive area of arable farmland (to the west, north and south), and therefore any birds displaced by the Proposed Development are likely to find alternative foraging sites within their usual foraging ranges. This is supported by the desk study and survey results in that birds were generally recorded at any one location during only part of the non-breeding season period, suggesting that they were foraging widely, moving to alternative feeding sites in response to changing crop structure, food availability and weather conditions.

4.2.4.6 Golden plover are very much dependent upon the presence of suitable foraging areas during autumn and winter. Mason & MacDonald (1999), in their study of wintering populations of golden plover in north-east Essex, found that the former species showed a strong association for winter cereals. Much of the foraging activity of golden plover in their study was recorded in fields of cereal less than 100mm in height, with golden plover rarely recorded on other crop or habitat types such as cereal stubble and rape. Kirby (1997) identified many other factors that might influence the changing use of a site by golden plover. One of the main food sources are earthworms, which occur in much higher densities in the early stages of an arable crop rotation, with very few present in fields that have been under continuous arable cultivation for three or more years (Kirby, 1997). Large open fields are most favoured (Kirby 1997, Mason & MacDonald 1999) and during prolonged periods of hard weather, when the ground has been frozen for at least three days, lapwing and golden plover move from arable fields to grassland, where invertebrate prey remains more accessible. Where grassland is not present, the birds often leave the area for warmer climes such as in France and on the Iberian Peninsula (Kirby, 1997).

4.2.4.7 It should also be noted that these studies focus on the use of habitats during the day, and that golden plover are known to use different habitats to forage in during the night (Gillings *et al*., 2005). A study of plovers on Thanet during 2016 (M. Sutherland, unpublished data) involving eight paired visits by day and night, provided little evidence one way or the other as to whether the nocturnal distribution differed substantially from the diurnal. It was thought that, while locally, birds may be more dispersed at night, it is unlikely that the broad distribution patterns across the various survey areas would be substantially different from that recorded by day (Henderson & Sutherland, 2017).

4.2.4.8 To conclude, any presence of golden plover on farmland adjacent to the Order Limits is likely to be strongly influenced by crop management, in particular, the rotation and relative proportions of rape and winter cereal, the latter providing the bare ground habitat favoured for foraging birds in autumn and early winter. Results from the desk study and surveys indicate that the area within 750m of the Order Limits, which is the area identified within which any disturbance and displacement would occur, does not form an important part of the foraging grounds for the SPA population of golden plover.

4.2.4.9 Given that the functional habitat surveys and other desk study data (e.g. Henderson & Sutherland, 2017) indicate that farmland within 750m of the Order Limits is not used on a regular basis by important numbers of golden plover (with a count of 530 birds in a single month) and with the availability of extensive alternative inland feeding habitat within the vicinity, the effects of displacement on the SPA golden plover population during construction are considered negligible. The main roost site for the species (on Pegwell Bay) is located more than 1km from the Order Limits, and thus is predicted not to be adversely affected by construction works for the Proposed Development.

4.2.4.10 To conclude, there would be no adverse effect on the integrity of the SPA due to disturbance effects on the golden plover population during the construction phase of the Proposed Development.

Operational displacement - habitat loss due to bird scaring activities

4.2.4.11 Once the Proposed Development is operational, there is potential for foraging and roosting golden plover to be displaced from arable land, grazing marshes and intertidal habitats (used for roosting) due to disturbance caused by methods employed at the Proposed Development to reduce/ prevent collision risk by deterring hazardous birds from using the aerodrome and adjacent land. These bird scaring activities may deter golden plovers from using otherwise suitable habitat up to a distance of 1km from the Order Limits (see **Table 3.1**).

4.2.4.12 Trials undertaken to inform the now consented London Ashford Airport expansion concluded that bird scaring activities at the airport might have some disturbance effects up to 0.6-1km away, but

that there was no indication that there would be any impacts on the populations[31]. The recommended methods for bird scaring at London Ashford Airport included the use of audio and pyrotechnics, together with virtually continuous patrolling of the airport site.

4.2.4.13 Results from the desk study and surveys also indicate that golden plover do not utilise farmland or intertidal habitats within 1km of the Order Limits on a regular basis. In view of this, the effects of displacement to golden plover by bird scaring activities are considered negligible.

4.2.4.14 To conclude, there would be no adverse effect on the integrity of the SPA due to disturbance/ displacement of golden plover, as a result of bird scaring activities.

Operational displacement - habitat loss due to aircraft flights

4.2.4.15 Once the Proposed Development is operational, there is potential for foraging and roosting golden plover to be displaced from arable land, grazing marshes and intertidal habitats (used for roosting) below or near to the flight paths of planes. The altitude, lateral distance and noise of the aircraft are all factors involved in potential disturbance, although separating the effect of aircraft noise from that of visual disturbance is difficult.

4.2.4.16 There is limited documented evidence on the visual and auditory disturbance effects of aircraft on birds and much of this comes from studies that have focussed on geese, ducks, swans and seabirds. Those studies involving waders (such as golden plover) have looked at the effects of microlights and jets. Also, these studies have mainly been based upon effects associated with aircraft altitude rather than lateral distance.

4.2.4.17 A literature review was undertaken by Amec Foster Wheeler on bird disturbance by aircraft (**Appendix 7.4** in **Chapter 7: Biodiversity** of the ES). Results from this literature review and other studies indicate that beyond distances of 500m in altitude and 1km ground-level, lateral distance, golden plover are unlikely to be disturbed by the visual presence of flying aircraft.

4.2.4.18 An indicative figure of locations overflown by aircraft below 500m is shown in **Figure 4.6**. It should be noted that no aircraft (other than helicopters) are currently operating from the Order Limits and therefore the figure is based on indicative vertical climb profiles, operating procedures and flight paths. The actual procedures and flight paths will be consulted on after the DCO through the CAA's Airspace Change Process (ACP) and the ACP will provide opportunities for engagement with local communities and other stakeholders. The ACP will likely follow the process outlined in the draft ACP guidance CAP1520 (CAA, 2017). However, given the relatively close proximity of Pegwell Bay to the dis-used airfield at Manston, the options for the flight routes to the east of the airfield, just north of Pegwell Bay are very limited. In view of this, the proposed routes of the flights are very unlikely to deviate from those shown in **Figure 4.6,** once agreed with the CAA.

4.2.4.19 The roosting areas for golden plover in Pegwell Bay are located outside the area where aircraft are predicted to fly over at altitudes of less than 500m (see **Figures 4.4 and 4.6**) and are at their closest, 1.5km from the proposed routes for aircraft flights to the east of the airfield (beyond the 1km, lateral disturbance distance). Desk study and survey data also indicate that use of the farmland by golden plover in these areas is also low (see **Figure 4.3**).

4.2.4.20 Results from the literature review in **Appendix 7.4 in Chapter 7: Biodiversity** (of the ES) indicates that noise levels in excess of 80 dB[32] L_{Amax}[33] (peak noise levels) have been recorded as causing the more severe disturbance incidents in a number of studies, primarily in duck species. However, golden plover has been identified as a species of moderate sensitivity to noise disturbance, being

[31] London Ashford Airport, Lydd, Kent. File Refs: APP/L2250/V/10/2131934 and 2131936. Report to the Secretary of State for Communities and Local Government and the Secretary of State for Transport by K D Barton BA(Hons) (an Inspector appointed by the Secretary of State for Communities and Local Government and the Secretary of State for Transport). Date: 9 March 2012.

[32] The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Due to this wide range, a scale based on logarithms is used in noise level measurement. The scale used is the decibel (dB) scale which extends from 0 to 140 dB corresponding to the intensity of the sound pressure level.

[33] L_{Amax} is maximum recorded noise level during the measurement period.

tolerant of peak noise levels of up to 72 dB L_{Amax} (Cutts *et al*., 2013). Therefore, a more precautionary peak noise level of 70 dB L_{Amax} has been used for the purposes of this assessment, below which, noise from aircraft flights is very unlikely to elicit a more severe disturbance response (such as taking flight), and thus any effects of noise levels below 72 dB L_{Amax} would be negligible.

4.2.4.21 In addition to the relatively high levels of noise generated from nearby road traffic in the area (as indicated by the baseline noise measurements in **Chapter 12: Noise and Vibration** of the ES), golden plover using farmland adjacent to the Order Limits will also experience regular disturbance from agricultural activities including the high noise levels generated from gas guns[34] (used to scare wood pigeons from fields of oilseed rape, which is widely cultivated in the area), and from organised game shoots, and shooting for pest control purposes.

4.2.4.22 During operation of the Proposed Development, the average daytime noise levels across Pegwell Bay (during the period when peak numbers of aircraft flights will occur), are predicted to be between 50-63 dB L_{Aeq16}, (see **Figure 12.6 in Chapter 12: Noise and Vibration** of the ES), and at night, generally less than 40 dB $L_{Aeq, 8hr}$ (see **Figure 12.7 in Chapter 12: Noise and Vibration** of the ES).

4.2.4.23 In terms of disturbance to birds, the peak noise levels are likely to elicit more of a 'measurable' behavioural response by birds rather than the average noise levels over a period of time (e.g. over the course of a day)[35].

4.2.4.24 The area of land (at ground level) where noise levels in excess of 80 dB L_{Amax} are predicted (during peak periods of operation of the Proposed Development) during the day (07:00 to 23:00 hrs) and night (23:00 to 07:00 hrs) are shown in **Figures 4.1a and 4.1b** respectively, and where noise levels are in excess of 70 dB L_{Amax} shown on **Figures 4.2a and 4.2b** respectively. The different coloured shaded areas denote the mean number of events per day (due to aircraft movements), where peak noise levels of 80 and 70 dB L_{Amax} will be exceeded (respectively), taking into account the proposed flight paths, and combination of different aircraft types/ models that are planned to be in operation in Year 20 when the number of flights will have reached their anticipated peak (worst case scenario). For example, in Figure 4.2a, any birds foraging on land within the outermost shaded area (in light pink) are predicted to experience an average of 10-19 single noise events per day (due to aircraft flights) that exceed 70 dB L_{AMAX} during Year 20.

4.2.4.25 Results from the desk study (**Appendix 7.2** in **Chapter 7: Biodiversity** of the ES) and the Functional Habitat and Pegwell Bay Distribution surveys (**Appendix 7.5** in **Chapter 7: Biodiversity** of the ES) indicate infrequent use by golden plover of areas of farmland within the area where 70 dB L_{Amax} is exceeded (see **Figures 4.3 and 4.5**). In addition, the desk study and survey data also indicate that the main area of Pegwell Bay used by roosting golden plover is not located within the area where noise levels in excess of 70 dB L_{Amax} are predicted (see **Figures 4.2a, 4.2b and 4.4)**.

4.2.4.26 As stated previously, there is limited research and studies on the auditory disturbance effects of aircraft on birds in the UK and therefore, it is important that any case studies into effects on birds at currently operation airports in the UK are also considered in this assessment.

4.2.4.27 There are a number of operational airports in the UK that are located adjacent or close to SPAs designated for their congregations of non-breeding waterfowl and waders, including internationally important numbers of waders utilising mudflats for foraging. These include the civil airports at Belfast, Liverpool, Southampton, Bournemouth, Lydd (London Ashford Airport) and Blackpool (amongst others), and military aviation activities/ operations.

4.2.4.28 **Table 1.2** in **Appendix 7.2** of **Chapter 7 Biodiversity** (of this ES) presents a summary of results of a review of case studies related to the effects of aircraft flights from military and civil airports in the

[34] These are portable devices that are located at the edge of fields to disturb birds from feeding and damaging crops, in particular, rape seed oil. They are setup to typically emit, 3-4 short, loud bursts of noise (bangs) at intervals of c.15 seconds.

[35] NE have indicated their preference for the assessment to be determined on the basis of using the LAmax (peak noise level) metric

UK on nearby SPAs. This study was undertaken to inform the now consented expansion of London Ashford Airport, south of Lydd in Kent (Parsons Brinckerhoff, 2007).The case studies highlighted, show that despite the visual and noise disturbance from civil and military aircraft flights over the SPAs, there have been no recorded adverse effects on their qualifying populations of waders and wildfowl, including non-breeding populations of golden plover on the Ribble Estuary, Wash, North Norfolk Coast, Dungeness to Pett Levels and Lough Foyle SPAs.

4.2.4.29 In addition, there is no evidence to indicate that the numbers of golden plover have increased since airport operations ceased at Manston Airport in May 2014 (see **Table 4.3**), and conversely, numbers appear to have declined.

4.2.4.30 To conclude, evidence from the literature review and case studies indicates that golden plover using Pegwell Bay for roosting, and the farmland surrounding the Order Limits for foraging will very likely habituate to the visual presence and noise from regular aircraft flights from the Proposed Development. Existing levels of noise in these areas are relatively high, primarily due to road traffic but also agricultural activities. The predicted peak noise levels (due to aircraft flights) that would be experienced by golden plover using Pegwell Bay and the surrounding farmland are unlikely to result in high levels of disturbance to these birds. Any golden plover displaced from farmland surrounding the Order Limits would be able to locate other more extensive areas of suitable foraging habitat to the south and west. In view of this, the effects of disturbance to the SPA population of golden plover are predicted to be negligible, and there would be no adverse effect on the integrity of the SPA.

Operational - displacement (barrier effects)

4.2.4.31 Unlike turnstone (the other qualifying/notification wader species of the Thanet Coast and Sandwich Bay SPA and Ramsar Site), golden plover frequently move to inland farmland areas to forage. Movements to and from inland areas and the coast result in the Proposed Development forming a barrier to the movement of golden plover between these sites. If the birds have to undertake flights of greater distance due to the presence of the Proposed Development, this could result in increased energy expenditure and lost foraging time, leading to increased mortality. Therefore, it is important to know the distribution of golden plover surrounding the airport and their likely flight paths between roosting and foraging areas.

4.2.4.32 Results from the desk study (in particular, Henderson & Sutherland 2017) and surveys indicate that much of the golden plover population roosts at Pegwell Bay, and forages on farmland to the south and south-west (more than 3km to the south of the Order Limits). The likely flights of golden plover between their main roost site and foraging areas is thus unlikely to take them across the Order Limits, or the vicinity of flight paths of low flying aircraft. In addition, CAA data obtained during part of the previous operational period for Manston Airport (2007-13) revealed only one record of golden plover collision with aircraft, indicating that the airport did not form part of the regular flight paths for this species.

4.2.4.33 In view of the lack of CAA records of golden plover and the likely flight paths of birds, the levels of flight activity by this species over the Order Limits and adjacent areas are predicted to be low, and as a consequence, the impacts of barrier effect are considered negligible.

4.2.4.34 To conclude, there would be no adverse effect on the integrity of the SPA due to barrier effects on golden plover caused by the presence of the Proposed Development.

Construction displacement - habitat loss due to damage to roosting site caused by outfall

4.2.4.35 This assessment of effects takes into account the environmental measures provided in **Table 7.7 in Chapter 7**, and also **Section 8.5 and Table 8.6 in Chapter 8: Freshwater Environment**).

4.2.4.36 The existing drainage arrangements at the Site, divert rainfall to a sea outfall at Pegwell Bay. This outfall is of sufficient size to accept peak flows without surcharging.

4.2.4.37 The Site drainage network will be put in place during Construction Phase 1. During all phases, any discharges not entering the Site drainage network will be contained on-Site and discharged to the

Site sewer network, following treatment by silt-busters or similar, or taken off-Site. Additional measures, which are detailed in the Construction Environmental Management Plan (CEMP) and put in place to protect the groundwater environment during the construction phase, will also ensure that no potential pollutants reach Pegwell Bay (see **Section 8.5 in Chapter 8**).

4.2.4.38 Only when the Site drainage network is put in place, will discharges be allowed into Pegwell Bay via the outfall. All discharges will only take place once silt and any other potential pollutants (e.g. hydrocarbons) have been removed from Site discharge. The discharge is therefore of clean water.

4.2.4.39 Paragraphs 4.2.4.44 to 4.2.4.47 inclusive present the detailed design strategy for the Site drainage network to ensure that measures are put in place to protect the qualification/notification features of Pegwell Bay's designated sites. These measures will be confirmed with the EA and NE prior to the commencement of works.

4.2.4.40 The drainage strategy is based upon a 150l/s pump capacity. The outfall structure, with a series of four incomplete barriers that reduce the flow rate of the discharge to Pegwell Bay, is a robust structure designed with scour protection to prevent scour to intertidal habitat.

4.2.4.41 Following the incorporation of the environmental measures, it is concluded that all effects on Pegwell Bay will be negligible. Therefore, it is concluded that there will be no adverse effects on the habitats utilised by roosting golden plover in Pegwell Bay, and no adverse effect on the integrity of the SPA due to the outfall during construction.

Operational displacement - habitat loss due to damage to roosting site caused by outfall

4.2.4.42 The operational phase has the potential to have a significant effect on water quality at Pegwell Bay through the following mechanisms:

- The generation of sediment laden run-off entering the Site's drainage system in an uncontrolled manner; and
- Pollution from the spillages of concrete, oils, fuels or other chemicals entering the Site's drainage system or reaching Pegwell Bay through groundwater inflows.

4.2.4.43 Environmental measures incorporated into the Proposed Development (see **Table 7.7 and Section 7.5, Chapter 7**) will be included in the CEMP.

4.2.4.44 As described in **Section 3.4, Chapter 3**: Description of the Proposed Development, the Outline Drainage Strategy for the Site (Appendix A in **Appendix 8.2 of Chapter 8**) provides for positive drainage following the Site's natural contours, discharging into two adjacent attenuation ponds, one for 'dirty' water and one for 'clean' water. Prior to discharging into the ponds, the water will flow through interceptors (existing and new). The 'dirty' pond will treat de-icer contaminated runoff through the use of aerators, before discharging into the second pond. Flow into the 'clean' pond will be limited; the spillway will have a storage capacity of greater than a 1 in 30-year flood event. From the second pond, the clean water will be transported through the existing pumping system to be discharged from the Site. Discharge will only take place from the clean water pond once silt and any other potential pollutants (e.g. hydrocarbons, de-icer) have been removed from Site discharge.

4.2.4.45 A maximum discharge rate of 150 l/s has been assumed in designing the on-site attenuation ponds which been sized to attenuate site run off for the 1% Annual Exceedance Probability (AEP) storm plus a 40% climate change allowance. At the detailed design stage, the Site drainage network design will include consideration of the impact of the peak rate of discharge on the qualification/notification features of Pegwell Bay's designated sites in the construction phase. Further consultation on this point with NE and the EA is also expected to occur at the detailed design stage to ensure that appropriate scour protection is in place. The proposed pumping rate represents a maximum worst case scenario and lower rates could be achieved by using a variable rate pump or further attenuating water on-Site. If further attenuation is required this could be achieved by increasing the surface area of the ponds, by providing limited infiltration of clean run off (e.g. roof drainage), by providing addition attenuation tanks elsewhere on-Site, by providing additional storage capacity with the drainage network by oversizing pipes, by utilising any spare

capacity in the Southern Water drainage network or by using clean run-off water elsewhere on-Site. The work to refine and improve attenuation and therefore reduce peak discharge rates is expected to be investigated during the detailed design stage of the project which will come after the order is made.

4.2.4.46 The Fuel Farm site will have its own separate drainage system which will connect to the drainage outfall pipe at Pegwell Bay (see Appendix G of Appendix A in **Appendix 8.2 of Chapter 8**). This drainage system will be fitted with an oil separator and an anti-pollution non-return control valve to ensure that no hydrocarbons enter the drainage outfall to Pegwell Bay and any pollution incident does not leave the Fuel Drainage system.

4.2.4.47 The regulation of Site discharges has been discussed with the Environment Agency [EA] (see **Table 8.6 and Table 8.14 of Chapter 8**) and NE. The EA have indicated that they do not normally permit surface water drainage discharges to sea, however, it is acknowledged that the sensitivity of the features at Pegwell Bay does require appropriate mitigation. It is possible that a permitting approach could be used which combined the use of a Water Discharge Activity Permit to regulate discharges from the 'dirty' to 'clean pond, combined with the anti-pollution non-return valve on the Fuel Farm drainage system and appropriate monitoring of the clean pond outflow. The regulation of the quality of all discharges to Pegwell Bay will be discussed with the EA and NE prior to the commencement of works.

4.2.4.48 The appropriate design of the Site drainage system, the regulation of the Site discharge through an environmental permit and the design of the outfall discharge mean that all effects on Pegwell Bay from the Site discharge are concluded to be negligible during the operation phase. Therefore, it is envisaged that there will be no adverse effects on the habitats golden plover utilise for roosting in Pegwell Bay, and therefore no adverse effects on the integrity of the SPA due to the outfall during operation.

4.2.5 In-combination Effects

4.2.5.1 Other developments and plans within the local area also have the potential to adversely affect the SPA population of golden plover due to habitat loss through land-take and disturbance. None of the developments and plans identified in the shortlist in **Chapter 18: Cumulative Effects** of this ES are predicted to lead to the loss of potentially important areas of suitable foraging and roosting habitat (farmland) for golden plover that might be considered as functionally linked habitat to the SPA, due to land-take or disturbance to birds foraging/ resting adjacent farmland. These developments are not located in close vicinity to areas where important concentrations of golden plover are known to utilise farmland and therefore are not predicted to cause high levels of disturbance.

4.2.5.2 A number of developments and plans identified within the short list in **Chapter 18: Cumulative Effects** (of this ES) however, include new residential housing, in particular: Manston Green (OL/TH/14/0050) and Land off New Haines Road (OL/TH/11/0910) which each propose the construction of several hundred new homes. In addition, TDC have identified land for a further 4,875 dwellings in nine separate areas (IDs A-I, see **Figure 18.1** and **Table 18.2** in **Chapter 18: Cumulative Effects**). These developments and plans have the potential to have an adverse effect on the four European sites identified in **Table 4.1** due to increased disturbance from residents visiting these sites for recreational purposes. Disturbance to birds by dog walkers using Pegwell Bay has been highlighted as a major issue for the Thanet Coast and Sandwich Bay SPA. This increased human disturbance also has the potential to adversely impact on golden plover roosting in Pegwell Bay.

4.2.5.3 The Competent Authority must comply with Regulation 63 of the Habitats Regulations, as set out below:

> "63(5). *In the light of the conclusions of the assessment, and subject to regulation 64, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).*"

4.2.5.4 If a project is likely to have an adverse effect on a European site (for example, due to disturbance to qualifying bird species due to increased numbers of residents visiting the SPA from a proposed new housing development), to comply with the Habitats Regulations, the applicant must provide a HRA report as part of the application documentation (see **Sections 1.1 and 1.2**). The HRA report must show the European site(s) potentially affected, alongside sufficient information to enable the Secretary of State to make an appropriate assessment, if required. If applicable, this would need to include measures to mitigate against the effects of increased human disturbance to birds. Typically, such measures would include the provision of on-site green space (for dog walking etc) and/or contribution to management measures within the SPA to reduce disturbance or control access.

4.2.5.5 The Hacklinge Marshes to Sandwich Bay SSSI is also notified for its non-breeding population of golden plover and forms a constituent SSSI of the Thanet Coast and Sandwich Bay SPA. Paragraph 118 of the National Planning Policy Framework (NPPF)[36] states:

- "*When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:*
  - *if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
  - *Proposed Development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site's notified special interest features is likely, an exception should only be made where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;*"

4.2.5.6 In view of the requirements of the NPPF and Habitats Regulations, any planning applications for development, including those for new residential housing (such as those identified in the short list in **Chapter 18: Cumulative Effects** of this ES) would be required to provide suitable mitigation as detailed above. For example, the Manston Green development, includes a strategy to contribute towards SPA management and Monitoring; and provide additional natural green space / Suitable Alternative Natural Green Space (SANGS) within the site to mitigate against the effects of human disturbance to the Thanet Coast and Sandwich Bay SPA.

4.2.5.7 To conclude, no adverse effects on the integrity of the SPA is predicted due to the in-combination effects of other developments and plans on the SPA golden plover population.

4.3 Thanet Coast and Sandwich Bay SPA – Little Tern (Breeding)

4.3.1 Current Baseline

4.3.1.1 Little tern is a qualification feature of the Thanet Coast & Sandwich Bay SPA. It qualifies under Article 4.1 of the *Birds Directive* as during the breeding season, the area regularly supports 0.3% (five-year mean, 1992-1996) of the breeding population of Great Britain. Following the third JNCC review (Stroud *et al*. 2016) of the SPA designated species, it was suggested little tern be removed, due to recent absence from the SPA, although this change is as yet unratified.

4.3.1.2 The conservation objectives for the SPA little tern population are provided in **Appendix D**, and are in summary: to maintain and restore the population and distribution of little tern, and the habitats and supporting processes they depend upon.

[36] Communities and Local Government (CLG) (2012) *National Planning Policy Framework*, CLG, London.

4.3.1.3 Little tern almost exclusively occurs in coastal habitats, nesting and foraging along shorelines and beaches. The Order Limits and surrounding farmland provides no opportunities for foraging, resting or nesting little tern, and therefore the species is unlikely to occur in this area.

4.3.1.4 Little tern no longer breeds within the Thanet Coast & Sandwich Bay SPA. The species has also ceased to breed on a regular basis in Kent, with no records of nesting mentioned in the latest Kent bird report, in 2014 (Privett [ed.], 2016). Little tern previously bred at a number of locations along the Kent coast, including on the Swale Estuary and on Shellness (on the Isle of Sheppey), Dungeness (on the south coast), near Plumpudding Island on the North Thanet coast and on Shell Ness in Sandwich Bay (Taylor *et al*., 1984). During high tide, little terns from the colony at Shell Ness, in Sandwich Bay (at its closest 2.5km south of the airport runway) were known to forage in the shallow coastal waters of Pegwell/ Sandwich Bay and in the lower part of the River Stour.

4.3.2 Future Baseline

4.3.2.1 In the absence of development, it is assumed that the Order Limits will remain principally as grassland and hard standing and the land in the immediate vicinity will remain primarily as arable farmland. As a result, the management of this area would be unlikely to change in the foreseeable future and therefore the baseline with respect to the little tern population of the Thanet Coast and Sandwich Bay SPA and Ramsar site, and its potential recolonization, would not be altered significantly.

4.3.3 Predicted Adverse Effects

Operational disturbance - breeding failure due to the noise from aircraft flights

4.3.3.1 Although little tern no longer breeds around Pegwell Bay, assessment is made in order to determine whether the Proposed Development could prevent little tern from re-establishing itself as a breeding species within the SPA. Once the airport is operational, there is potential for any nesting little terns to be displaced from coastal habitats (used for nesting and foraging) below or near to the flight paths of planes. The altitude, lateral distance and noise of the aircraft are all factors involved in potential disturbance, although separating the effect of aircraft noise from that of visual disturbance is difficult.

4.3.3.2 Most of the documented evidence on the visual and auditory disturbance effects of aircraft on birds comes from studies that have focussed on geese, ducks, swans and seabirds. Also, these studies have mainly been based upon effects associated with aircraft altitude rather than lateral distance.

4.3.3.3 A literature review was undertaken by Amec Foster Wheeler on bird disturbance by aircraft (**Appendix 7.4** in **Chapter 7: Biodiversity** of this ES). Results from this literature review and other studies indicate that beyond distances of 500m in altitude and 1km ground-level, lateral distance, little tern is unlikely to be disturbed by the visual presence of flying aircraft other than helicopters (see **Table 3.1**).

4.3.3.4 An indicative figure of locations overflown by aircraft below 500m is shown in **Figure 4.6**. It should be noted that no aircraft are currently operating from the Order Limits and therefore the figure is based on indicative vertical climb profiles, operating procedures and flight paths. The actual procedures and flight paths will be consulted on after the DCO through the CAA's Airspace Change Process (ACP); the ACP will provide opportunities for engagement with local communities and other stakeholders. The ACP will likely follow the process outlined in the draft ACP guidance CAP1520 (CAA, 2017). Given, the very limited options for any change in the flight routes to the east of the airfield, north of Pegwell Bay, it is inconceivable that the routes would pass within 1km of potentially suitable nesting habitat for little tern.

4.3.3.5 Results from the literature review (**Appendix 7.4, Chapter 7: Biodiversity** of this ES) indicate that noise levels in excess of 80 dB[37] L_{Amax}[38] (peak noise levels) have been recorded as causing the more severe disturbance incidents in a number of studies, primarily in duck species. There is also evidence from the literature review to indicate that breeding terns are relatively tolerant of aircraft flights. The information provided for the application to expand London Ashford Airport, highlighted no evidence to indicate that the colony of Sandwich and common terns breeding on Burrowes Pits, close to the operational airport had been adversely affected by high noise levels from over-flying aircraft, of 90-95 dB LAmax (London Ashford Airport, 2012). The review of case studies presented in **Table 1.2 in Appendix 7.4**, shows that there has been no recorded adverse effects on the breeding populations of little tern on the Wash, North Norfolk Coast or Firth of Tay and Eden SPAs, despite the close proximity of airports, and regular over-flight by military aircraft.

4.3.3.6 The area of land (at ground level) where noise levels in excess of 80 dB L_{Amax} are predicted (during peak periods of operation of the Proposed Development) during the day (07:00 to 23:00 hrs) and night (23:00 to 07:00 hrs) are shown in **Figures 4.1a and 4.1b** respectively, and where noise levels are in excess of 70 dB L_{Amax} shown on **Figures 4.2a and 4.2b** respectively. The different coloured shaded areas denote the mean number of events per day (due to aircraft movements), where peak noise levels of 80 and 70 dB L_{Amax} will be exceeded (respectively), taking into account the proposed flight paths, and combination of different aircraft types/ models that are planned to be in operation in Year 20 when the number of flights will have reached their anticipated peak (worst case scenario). For example, in **Figure 4.2a**, any birds foraging on land within the outermost shaded area (in light pink) are predicted to experience an average of 10-19 single noise events per day (due to aircraft flights) that exceed 70 dB L_{AMAX} during Year 20.

4.3.3.7 Little tern is a coastal species and does not use farmland and as such, available nesting areas do not occur within the area where 70 dB L_{Amax} is exceeded. Potentially suitable habitat (shingle/stony beaches) available for nesting for little tern, the closest of which is on Shell Ness on the southern edge of Pegwell Bay are located outside the area where aircraft are predicted to fly over at altitudes of less than 500m (see **Figure 4.6**) and are at their closest, 2.5km from the airport runway (well beyond the 1km ground-level, lateral disturbance distance). In view of this, the effects of noise and visual presence from aircraft in deterring little tern from re-colonising the SPA are considered negligible and would not adversely affect the integrity of the SPA.

4.3.4 In-combination Effects

4.3.4.1 Other developments and plans within the local area also have the potential to adversely affect little tern to breed within the SPA due to disturbance from aircraft. None of the proposed or consented developments and plans identified and listed in **Table 18.2** in **Chapter 18: Cumulative Effects** of this ES are sufficiently close to potential little tern nesting sites to directly result in disturbance.

4.3.4.2 A number of developments and plans identified within the shortlist in **Chapter 18: Cumulative Effects** of this ES however, include new residential housing, in particular: Manston Green (OL/TH/14/0050) and Land off New Haines Road (OL/TH/11/0910) which each propose the construction of several hundred new homes. In addition, TDC have identified land for a further 4,875 dwellings in nine separate areas (IDs A-I, see **Figure 18.1** and **Table 18.2** in **Chapter 18: Cumulative Effects** of this ES). These developments and plans have the potential to have an adverse effect on the nearby European sites (and constituent SSSI) with bird interest due to increased disturbance from residents visiting these sites for recreational purposes. Disturbance to birds by dog walkers using Pegwell Bay has been highlighted as a major issue for the Thanet Coast and Sandwich Bay SPA. This increased human disturbance also has the potential to adversely impact on little tern should the species attempt to breed around Pegwell Bay.

[37] The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Due to this wide range, a scale based on logarithms is used in noise level measurement. The scale used is the decibel (dB) scale which extends from 0 to 140 dB corresponding to the intensity of the sound pressure level.
[38] L_{Amax} is maximum recorded noise level during the measurement period.

4.3.4.3 In view of the NPPF and Habitats Regulations (detailed in **Section 4.2.5**), no in-combination effects due to increased visitor disturbance preventing little tern from re-colonising the SPA are predicted. In view of this, no in-combination adverse effects on the integrity of the SPA due to effects on little tern are anticipated.

4.4 Thanet Coast and Sandwich Bay SPA/ Ramsar - Turnstone (Non-Breeding)

4.4.1 Current Baseline

4.4.1.1 The Thanet Coast and Sandwich Bay SPA and Ramsar site are designated for their internationally important non-breeding numbers of turnstone. The SPA qualifying population of turnstone (of 940 individuals, 5-year peak mean counts from 1991/2-1995/6) represent 1.4% of the Western Palearctic population.

4.4.1.2 The two constituent SSSIs for the SPA are: the Thanet Coast SSSI and the Sandwich Bay to Hacklinge Marshes SSSI. The Thanet Coast SSSI is partly notified for its nationally important non-breeding population of turnstone. Turnstone is not a notified feature of the Sandwich Bay to Hacklinge Marshes SSSI though the intertidal habitats in Units 1 and 4 of the SSSI are known to be used by roosting turnstone. Both units are described by Natural England as being in a 'Favourable' condition, with Unit 1 containing undisturbed littoral habitat (rocky beach) in good condition.

4.4.1.3 The conservation objectives for the SPA turnstone population are provided in **Appendix D** and are in summary: to maintain and restore the population and distribution of turnstone and the habitats and supporting processes they depend upon.

4.4.1.4 Turnstone occur almost exclusively in coastal habitats, foraging and resting on rocky shorelines and beaches, and will also forage along the tidelines on sandy beaches and on mudflats. The Order Limits and surrounding farmland provide no opportunities for foraging or resting turnstone, and therefore the species is unlikely to occur in these areas on a regular basis.

4.4.1.5 The Thanet Coast Turnstone Monitoring Report (Hodgson, 2016) concluded from six surveys undertaken between 2001 -2010 that the population of turnstone within the SPA varied from 1,087 to 1,335 birds, with a mean of 1,227. A coordinated count in 2013 showed a marked decline, with 620 turnstone counted. Further coordinated counts in winter 2013/14 (two counts) and latterly in 2016 (single count) confirmed this decline, with 583, 664 and 537 birds recorded respectively.

4.4.1.6 It was suggested in Hodgson (2016) that prior to high tide, the turnstones from the Thanet Coast and Sandwich Bay SPA flew to join a roost, 2.5km west of Whitstable Harbour on the north Kent coast, within the Swale SPA and some 18km north-west of the Order Limits. This suggestion was based on results from coastal survey plots. It would therefore appear that the birds, as would be expected for this species, are following the coastline around Thanet and not undertaking any overland movements.

4.4.1.7 WeBS Core Count Survey results indicate that turnstone concentrations within the Thanet Coast and Sandwich Bay SPA occur mainly across the northern extremities of the SPA, heading west toward Whitstable, with Pegwell Bay supporting only a small proportion of the numbers mentioned here. **Table 4.4** shows the peak counts of turnstone each winter, obtained from the WeBS core count data, including additional counts obtained outside the standardised WeBS visit dates. Data for the Thanet Coast WeBS count sectors is very incomplete for the two most recent seasons for which data is available (2013/14 and 2014/15) and has therefore not been included (Frost *et al*. 2017, and https://app.bto.org/webs-reporting/, accessed 4 December 2017).

Table 4.4 Peak Counts of Turnstone from 2008/09 – 2012/13 for Pegwell Bay and the Thanet Coast

	2008/09	2009/10	2010/11	2011/12	2012/13

Pegwell Bay	130	927	90	65	70
Thanet Coast	722	624	529	396	360

NB: Pegwell Bay includes the WeBS count sector 22412 (which also includes Sandwich Bay). Thanet Coast includes data for WeBS count sectors: 22417, 22418, 22420, 22431 and 22432[39].

4.4.1.8 During the Pegwell Bay Distribution Survey (**Appendix 7.5** in **Chapter 7: Biodiversity** of this ES), relatively low numbers of turnstone were recorded, with flocks of roosting and foraging birds primarily seen on intertidal habitat along the northern and north-western fringe of Pegwell Bay, near the high-water mark. The largest count of foraging turnstone was of 54 individuals on the northern fringe of Pegwell Bay on 13 October 2016, and of roosting birds, 28 on the western fringe on 14 March 2017. **Figure 4.7** shows the location of the peak counts of turnstone recorded in each 500m grid square.

4.4.2 Future Baseline

4.4.2.1 In the absence of development, it is assumed that the Order Limits will remain principally as grassland and hard standing and the land in the immediate vicinity will remain primarily as arable farmland. As a result, the management of this area would be unlikely to change in the foreseeable future and therefore the baseline with respect to the turnstone population of the Thanet Coast and Sandwich Bay SPA and Ramsar site would not be altered significantly.

4.4.3 Predicted Adverse Effects

Operational displacement - habitat loss due to aircraft flights

4.4.3.1 There is the potential for foraging and roosting turnstone in Pegwell Bay to be adversely affected by auditory and visual disturbance caused by over-flying aircraft, and aircraft departing from and arriving at the airport.

4.4.3.2 Results from the desk study (**Appendix 7.2** in **Chapter 7: Biodiversity** of this ES) and the Pegwell Bay Distribution Survey (**Appendix 7.5** in **Chapter 7: Biodiversity** of this ES) indicate that turnstone do not utilise intertidal habitats for foraging and roosting within the area where 70 dB $_{LAmax}$ is exceeded (see **Figures 4.2a and 4.2b**), or where aircraft fly over at altitudes of less than 500m (see **Figures 4.6 and 4.7**). In addition, the main foraging and roosting areas for turnstone in Pegwell Bay are located more than 1km from the airport runway. There is no historical evidence to suggest that turnstone were displaced from areas of Pegwell Bay close to the flight paths during the period when Manston airport was operational, and conversely, numbers of turnstone have declined since operation ceased (Hodgson, 2016).

4.4.3.3 It is acknowledged that there is very little information within the literature review (**Appendix 7.4 in Chapter 7: Biodiversity** of this ES) related specifically to the visual and auditory effects of aircraft flights on turnstone. In view of this, the assessment has drawn on information from case studies and from studies relating to the effects of human disturbance (for example, from dog walkers) on this species.

4.4.3.4 The review of case studies presented in **Table 1.2 in Appendix 7.4**, shows that there have been no recorded adverse effects on the non-breeding populations of turnstone on the Wash, North Norfolk Coast or Belfast Lough SPAs, despite the close proximity of civil airports, and/or regular over-flight by military aircraft. In addition, in the water bird disturbance mitigation toolkit in (Cutts *et al*., 2013), turnstone is described as a species with a low sensitivity to disturbance that is extremely tolerant to disturbance and that habituates rapidly. This study also cites, amongst others, turnstone not reacting to noise levels in excess of 90 dB L_{AMAX} due to piling during construction works, indicating a tolerance to high noise levels.

[39] Details of the locations and coverage of the WeBS count sectors can be found at https://app.bto.org/websonline/sites/vacant/vacant-sites.jsp?wide_region=3#wide_region=3

4.4.3.5 There is also evidence to indicate that turnstone will readily habituate to other types of disturbance, in particular, to the presence of humans (Cutts *et al*., 2009) and that this species does not flush (fly away) until approached at very close distance (Borgmann 2010, Smith & Visser 1993, Holloway 1997). Borgmann (2009) recorded an average distance at which wintering turnstone were flushed due to walkers of only 12m (the equal lowest value of all the species studied). Smit & Visser (1993) in their studies on the effects of human-related disturbance on waders and wildfowl in the Wadden Sea found that turnstone were flushed due to human presence at an average distance of 47m (compared to 211m for curlew), the lowest value of the nine species studied. Results from disturbance studies on waders in Findhorn Bay (Scotland) also found that turnstone reacted to human disturbance (such as the presence of dog-walkers) at much shorter distances (in this case an average of 14m) than most other wader species (Holloway, 1997).

4.4.3.6 To conclude, there is no evidence to suggest that turnstone will be disturbed by noise or the presence of aircraft in flight from the Order Limits; the effects of displacement on this species are considered negligible. In view of this, no adverse effect on the integrity of the Thanet Coast and Sandwich Bay SPA and Ramsar Site due to disturbance/ displacement of turnstone as a result of disturbance from aircraft flights is predicted.

Construction and Operational displacement - habitat loss due to damage to roosting site caused by outfall

4.4.3.7 There is the potential for direct effects to the foraging habitat and roosting sites of turnstone from the discharge of treated water to Pegwell Bay during the construction and operational phase of the Proposed Development. There is also potential for the discharge to adversely affect the habitats that turnstone rely upon, through scour at the point of discharge.

4.4.3.8 Following the incorporation of the environmental measures (as set out for golden plover, in Paragraphs 4.2.4.35 to 4.2.4.41 inclusive (during construction) and Paragraphs 4.2.4.42 to 4.2.4.48 inclusive (during operation), it is concluded that all effects on Pegwell Bay due to the outfall will be negligible. Therefore, it is concluded that there will be no adverse effects on the habitats utilised by turnstone in Pegwell Bay, and no adverse effect on the integrity of the SPA or Ramsar site due to the outfall during construction and operation of the Proposed Development.

4.4.4 In-combination Effects

4.4.4.1 None of the proposed or consented developments and plans identified and shortlisted in **Table 18.2** in **Chapter 18: Cumulative Effects** of this ES are predicted to lead to the loss of potentially important areas of suitable foraging and roosting habitat (intertidal mudflats and rocky shores) for turnstone. These developments and plans are either not located in close vicinity to areas where important concentrations of turnstone are known to occur, or are of a sufficiently small-scale (for example, ID127 in **Table 18.2, Chapter 18: Cumulative Effects** of this ES), and therefore are not predicted to cause high levels of disturbance.

4.4.4.2 In view of the NPPF and Habitats Regulations (detailed in **Section 4.2.5**), no in-combination effects due to increased visitor or other sources of disturbance to turnstone are predicted. To conclude, no adverse effects on the integrity of the SPA or Ramsar site are predicted due to the in-combination effects of other developments and plans on the turnstone population.

4.5 Sandwich Bay SAC – Annex I habitats

4.5.1 Current Baseline

4.5.1.1 The Sandwich Bay SAC is designated for the presence of five Annex I habitats (see **Appendix B**). The land coverage for each habitat within the SAC at its designation (in ha) has been obtained from the Natura 2000 data form (http://jncc.defra.gov.uk/ProtectedSites/SACselection/n2kforms/UK0013077.pdf), as follows:

- Embryonic shifting dunes (5.68ha);

- White dunes, shifting dunes along the shoreline (9.09ha);
- Grey dunes, fixed coastal dunes with herbaceous vegetation (223.93ha);
- Dunes with *Salix repens ssp. Argentea* (11.37ha); and
- Dune slacks (7.96ha).

4.5.1.2 The conservation objectives for the qualifying Annex I habitat features of the SAC are provided in **Appendix D**, and are in summary: to maintain and restore the extent, distribution, structure and function of these habitats (including the typical species of plant they comprise) and supporting processes they depend upon.

4.5.1.3 The precise locations of each of the five Annex I habitat types within the SAC is not known, though the description for the SAC indicates the presence of the embryonic and white dunes to be primarily along the seaward side within the northern half of the Order Limits. However, the overall extent of the 'sand dune' Habitat of Principal Importance [HPI]' (covering approximately 368ha) has been obtained from http://magic.defra.gov.uk/ and is shown on **Figure 4.8**. In view of this, the sand dune features of the SAC have been treated 'as a whole', rather than separately within the assessment. A worst-case scenario has been adopted in terms of the distance of each sand dune feature to the Order Limits (i.e. the distance of all the sand dune features has been taken to be the nearest point of the sand dune HPI to the Order Limits). Given the adoption of a worst-case scenario, the treatment of the different SAC sand dunes features (as a whole, rather than separately) does not affect the overall conclusions reached in this assessment.

4.5.1.4 The Sandwich Bay SAC is legally underpinned by the Sandwich Bay to Hacklinge Marshes SSSI which covers the entirety of the SAC, plus areas of adjacent and nearby land. The SSSI is notified for a total of 31 separate features, which include a range of vegetation types, species/ species groups and habitats, including nine coastal sand dune/ adjacent strandline vegetation communities, as follows:

- SD11 - *Carex arenaria - Cornicularia aculeata* dune community;
- SD12 - *Carex arenaria - Festuca ovina - Agrostis capillaris* dune grassland;
- SD14 - *Salix repens - Campylium stellatum* dune-slack community;
- SD2 - *Honkenya peploides - Cakile maritima* strandline community;
- SD4 - *Elymus farctus ssp. Boreali-atlanticus* foredune community;
- SD6 - *Ammophila arenaria* mobile dune community;
- SD7 - *Ammophila arenaria - Festuca rubra* semi-fixed dune community;
- SD8 - *Festuca rubra - Galium verum* fixed dune grassland; and
- SD9 - *Ammophila arenaria - arrhenatherum elatius* dune grassland.

4.5.1.5 Together with a further seven vegetation communities associated with wetland, intertidal and coastal habitats:

- S4 - *Phragmites australis* swamp and reed-beds;
- SM14 - *Atriplex portulacoides* saltmarsh;
- SM16a - *Festuca rubra saltmarsh Puccinellia maritima* sub-community;
- SM18 - *Juncus maritimus* saltmarsh;
- SM21 - *Suaeda vera - Limonium binervosum* saltmarsh;
- SM24 - *Elytrigia atherica* saltmarsh; and
- SM9 - *Suaeda maritima* saltmarsh.

4.5.1.6 The SSSI covers an area of 1,790ha, of which: 94% is in a 'Favourable' (50%) or 'Unfavourable - recovering' (46%) condition. The SSSI is divided into 62 units of which at least 12 Units (numbered 13-15, 17-19, 21-23, and 25-27 inclusive) contain sand dune habitat: ten in a 'Favourable' Condition, and two in an 'Unfavourable – Recovering' Condition (Units 18 and 22).

Current baseline (air quality)

4.5.1.7 The overall air quality baseline is detailed in **Chapter 6: Air Quality** of this ES**,** with a summary provided here.

4.5.1.8 Thanet's measured annual mean nitrogen dioxide (NO_2) monitoring programme between 2007 and 2016 showed that concentrations above 20 µg m^{-3} are confined to roadside and urban centre locations. There is a modest decreasing trend at most monitors, averaging roughly 1 µg m^{-3} per year, which is consistent with trends elsewhere in the UK.

4.5.1.9 For context, the legal limit for annual mean NO_2 concentrations is 40 µg m^{-3}. The monitoring shows that at rural and urban background locations, concentrations are well below the legal limit. There are some exceedances of the legal limit alongside busy roads. These results are typical of such locations in England.

4.5.1.10 Measured annual mean NO_x concentrations from Thanet's monitoring programme between 2007 and 2016 and monitor locations are detailed in **Appendix 6.2** in **Chapter 6: Air Quality** of this ES.

4.5.1.11 Measured annual mean PM_{10} concentrations from Thanet's monitoring programme between 2007 and 2016 are detailed in **Appendix 6.2** in **Chapter 6: Air Quality** of this ES. These are both roadside sites. The monitoring shows that at the monitoring locations, concentrations are well below the legal limit of 40 µg m^{-3}.

4.5.1.12 The Department for Environment, Food and Rural Affairs (Defra) maintains a nationwide model (the Pollution Climate Mapping (PCM) model) of existing and future background air quality concentrations at a 1km grid square resolution. The datasets include annual average concentration estimates for NO_x[40], NO_2, PM_{10} and $PM_{2.5}$[41], as well as other pollutants. The datasets were updated in 2016.

4.5.1.13 Measured NO_2 concentrations at non-roadside monitors are compared with the Defra concentrations (both for 2016) for the corresponding grid square (see **Chapter 6: Air Quality** of this ES). The measured concentrations are consistently higher than the Defra concentrations, by 3 to 9 µg m^{-3}. This is partly because the monitoring results for 2016 were unusually high, due to prevailing meteorological conditions, something which cannot be taken into account in the forecasting models. The magnitude of this difference is broadly consistent with comparisons in other parts of the country for similar air quality assessments, although the Margate urban background monitor (ZH2) shows an unusually large discrepancy.

APIS background mapped deposition rates

4.5.1.14 The Air Pollution Information System (APIS) website[42] provides information on background deposition of nitrogen and sulphur at sensitive ecological sites in the UK. APIS is widely recognised as the primary source of this information and will be used for the air quality assessment.

4.5.2 Future Baseline

4.5.2.1 There is a slight trend in the air quality monitoring data for concentrations to reduce over the years. This trend will be ignored for conservatism. The future baseline will therefore be assumed to be the

[40] Nitrogen oxides were taken to be nitrogen dioxide (NO_2) + nitrogen/nitric oxide (NO). NO and NO_2 are collectively known as NOx

[41] PM_{10} is particulate matter 10 micrometres or less in diameter, $PM_{2.5}$ is particulate matter 2.5 micrometres or less in diameter. $PM_{2.5}$ is generally described as fine particles.

[42] www.apis.ac.uk

same as the current baseline. For near-road locations, the projected Defra maps will be used for consistency across the roads methodology.

4.5.2.2 No information is available on future deposition rates, so these too will be assumed to be the same as the current baseline.

4.5.2.3 Committed developments have been reviewed to identify additional sources of emissions that are likely to arise in future. The main new developments of relevance are residential, which may generate additional road traffic. These have been included in the traffic model. No other developments have been identified which are likely to have an adverse effect on air concentrations at receptors close to the Proposed Development.

4.5.3 Predicted Adverse Effects

4.5.3.1 There is potential for direct effects resulting from a deterioration in air quality. Plant and equipment used during construction, as well as road traffic generated during the construction phase, will produce emissions. During operation, emissions will result from aircraft and airside plant and equipment; and road traffic generated during the operation phase.

4.5.3.2 The principal pollutant of concern associated with emissions that might affect sensitive habitats is nitrogen oxide[43] (NO_x). Road and air traffic emissions may increase the ambient NO_x concentrations in the air to which vegetation is exposed. The air quality standard measurement used for NO_x concentrations in air is the annual mean and the daily mean.

4.5.3.3 In addition to NO_x concentrations in air, NO_x emissions may also, following chemical conversion in the air, form NO_2, which is then deposited. This nitrogen deposition may affect plant communities (with the consequent potential to alter habitats) by causing:

i. Nutrient enrichment of soils; and

ii. Acidification of soils.

4.5.3.4 The strongest effect of NO_x emissions is through their contribution to nitrogen deposition (either through nutrient enrichment or acidification) rather than through the NO_x concentrations in air. Furthermore, there is substantial evidence to suggest that the effects of ambient nitrogen are much more likely to be negative in the presence of equivalent concentrations of SO_2, with the ratio of SO_2 to NO_2 having decreased greatly in the UK over the past 30 years[44]. Ozone (O_3) has a similar effect to SO_2. Ozone has also decreased and in 2016 for the UK "*all zones and agglomerations met the target values for health and for protection of vegetation*"[45]. There is also a long-term objective for the protection of vegetation from O_3. In 2016 the south-east of England was below this long-term objective for the protection of vegetation[46]. In terms of potential impacts upon ecological receptors this means that any elevated levels of NO_x concentrations in air are unlikely to have negative impacts when levels of SO_2 and O_3 are also low.

4.5.3.5 The EA and Institute of Air Quality Management (IAQM) has specific guidance for ecological receptors.

4.5.3.6 The EA[47] guidance gives criteria for screening outsource contributions at designated nature conservation sites. For SSSIs, SPAs, SACs and Ramsar sites, there is no need for further assessment if the screening calculation finds that:

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[43] Assessment of sulphur oxides (SO_2) has been scoped out as such emissions are expected to be negligible (see **Chapter 6, Section 6.4**).
[44] http://www.apis.ac.uk/overview/pollutants/overview_NOx.htm
[45] Defra, Air Pollution in the UK 2016. September 2017: https://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2016_issue_1.pdf
[46] Five zones (Yorkshire and Humberside, the West Midlands, the North-East, South Wales and North Wales) were above the long-term objective for vegetation in 2016 (Defra, Air Pollution in the UK 2016. September 2017).
[47] Environment Agency (2016). 'Air emissions risk assessment for your environmental permit'. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit, dated 2 August 2016.

- Both the following are met:
  - The short-term Process Contributions (PC)[48] is less than 10% of the short-term AQAL[49]; and
  - The long-term PC is less than 1% of the long-term AQAL;
- Or:
  - The long-term Predicted Environment Contributions (PEC) is less than 70% of the long-term AQAL.

4.5.3.7 Following detailed dispersion modelling, no further action is required if:

- The proposed emissions comply with Best Available Technique (BAT) associated emission levels (AELs) or the equivalent requirements where there is no BAT AEL; and
- The resulting PECs won't exceed AQALs.

4.5.3.8 The critical level for all vegetation types from the effects of NO_x has been set to 30 µg/m^3 [50].

4.5.3.9 The full scope of the air quality assessment, the air quality baseline, assessment methodology and assessments (covering both ecological and human receptors) are detailed in **Chapter 6: Air Quality** of this ES. The criteria for the spatial identification of ecological receptors is set out in **Section 6.4** of **Chapter 6: Air Quality** of this ES, with the receptors detailed in **Table 6** and their location shown in **Figure 6.5** (those near the Proposed Development) and **Figure 6.6** (those further away from the Order Limits).

4.5.3.10 The air quality assessment has been based upon three operational years, two of which also cover the construction phase, as follows:

- Year 2, representing the first year of aircraft operation;
- Year 6 (the point at which the airport exceeds 10,000 movements per year); and
- Year 20, representing the worst-case year in terms of likely emissions from aircraft and vehicular movements.

4.5.3.11 Construction activity will be spread over the first 18 years of the Proposed Development, but is conservatively assumed to be condensed into Years 2 and 6 (with construction completed before Year 20). This approach has ensured that the assessment has captured the peak construction years as well as the worst-case operational year.

4.5.3.12 Throughout the air quality modelling process, care has been taken not to risk under-predicting impacts. In fact, a number of conservative assumptions have been made (see **Appendix 6.3, Chapter 6: Air Quality** of this ES) for a summary list of conservative assumptions) which mean that impacts are very likely to be over-predicted, that is to say the air quality assessment is very much a worst-case assessment.

4.5.3.13 For daily mean NO_x concentrations in air and acid deposition no further assessment of any ecological receptors has been undertaken as the air quality assessment (see **Appendix 6, Chapter 6: Air Quality** of this ES) showed that effects were predicted to be not significant for each of the three assessment years (Years 2, 6 and 20) for all relevant ecological receptors.

[48] The predicted concentrations resulting from the process (i.e. the process contribution (PC)) are used along with background concentrations and the percentage contribution that the predicted environmental concentrations (PEC) would make towards the relevant standard, objective or guideline value (see **Chapter 6**).
[49] AQAL = Air quality assessment level. A generic term to embrace air quality standards, air quality objectives, targets, limit values, critical levels, critical loads, etc. This term is promulgated by IAQM/Environmental Protection UK.
[50] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. Transposed into UK law as the Air Quality Standards Regulations: Statutory Instrument 2010 No. 1001. Environmental Protection: The Air Quality Standards Regulations 2010.

4.5.3.14 **Chapter 6: Air Quality** of this ES also includes an assessment of air quality effects from roads away from the airport covering each of the three assessment years (see **Section 6.11, Chapter 6**). This concludes that any effects from the Proposed Development via NO_x concentrations in air, nutrient nitrogen deposition and acid deposition are not significant on valued ecological receptors in all years. Therefore, no further assessment is included in this chapter for any effects away from the airport in relation to emissions generated by road traffic.

Construction and operation phase effects (Year 2)

4.5.3.15 This is the second year of construction activity and the first year of aircraft operation. This section is based upon the results of the air quality modelling described in **Section 6.8, Chapter 6: Air Quality** of this ES.

4.5.3.16 Consideration is given to those ecological receptors identified in the air quality assessment that require further assessment for annual mean NO_x concentrations in air, as identified by the air quality assessment (**Chapter 6: Air Quality** of this ES).

4.5.3.17 For Year 2, the air quality assessment shows that further consideration is required for one receptor (located adjacent to the Sandwich Bay SAC) for annual mean NO_x concentrations in air. This receptor is E22[51] (see **Figure 6.5 in Chapter 6**). Receptor E22 is located approximately 2km north of the closest part of the qualifying sand dune features of the SAC (see **Figure 4.8**), though they are adjacent to the littoral habitats within the SAC, which are frequently and regularly covered by seawater through tidal action. Much of these habitats are unvegetated rock and sediment with no impact from elevated NO_x concentrations in air. Where vegetated, the habitats have low sensitivity to nitrogen (Van Dobben *et al*., 2012) and are covered by eutrophic tidal waters. In addition, for NO_x concentrations in air to have negative effects on vegetation, there has to be corresponding levels of SO^2 and O^3 and "*The level for NOx should only be applied where levels of SO_2 and O_3 are close to their critical levels*"[52] with levels of SO^2 and O^3 are below critical levels/threshold in Thanet[53].

4.5.3.18 The air quality assessment assumed background (existing) NO_x at rural locations in Thanet to be 25.9 µg m^{-3}, based on monitoring at two suburban/ edge-of-town sites. Therefore, actual concentrations at the SAC will probably be somewhat lower. At the nearest point of the SAC, the Proposed Development will add up to 0.9µg m^{-3} of NO_x, giving a total concentration of 26.8 µg m^{-3}. The increase here is 3% of the AQAL and therefore above the 1% EA screening threshold (see **Section 4.5.3.6)**. However, the total concentration is still below the 30 µg m^{-3} critical level (see **Section 4.5.3.8**) level for all vegetation types from the effects of NO_x.

4.5.3.19 Therefore, although the additional contribution of NO_x in Year 2 would be above the 1% EA screening threshold, the total concentration will remain below the critical level for these habitats and therefore there would be no adverse effect on the integrity of the Thanet Coast SAC.

Construction and operational effects (Year 6)

4.5.3.20 This is the sixth year of construction activity and the year when the airport exceeds 10,000 air traffic movements a year. This section addresses the results of the air quality modelling described in **Section 6.9** of **Chapter 6: Air Quality** (of this ES), which, as in Year 2, shows that any effects from nutrient nitrogen and acid deposition are not significant (see also **Appendix 6, Chapter 6: Air Quality** of this ES).

4.5.3.21 Consideration is therefore given to those ecological receptors that require further assessment for annual mean NO_x concentrations in air as identified by the air quality assessment (**Section 6.9**, **Chapter 6: Air Quality** of this ES).

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[51] The prefix 'E' denotes 'ecological' used in the air quality assessment to differentiate from human receptors.
[52] http://www.apis.ac.uk/
[53] Defra, Air Pollution in the UK 2016. September 2017: https://uk-air.defra.gov.uk/assets/documents/annualreport/air_pollution_uk_2016_issue_1.pdf

4.5.3.22 For Year 6, further assessment is required for receptors (that are located within or just outside the boundary of the SAC): E21 to E24 inclusive. Receptors E21-24 are located by residential and agricultural areas adjacent to the SAC but more 1.5km from the nearest sand dunes within the SAC (see **Figure 4.8** in this report, and **Figure 7.6** in **Chapter 7: Biodiversity** of this ES). No adverse effects from NO_x concentrations in air are predicted for the same reasons as stated for Year 2.

4.5.3.23 It should be emphasised that the modelled PECs are dominated by the background contribution, and it is assumed that the background concentrations are unchanged from current (2007–2016) monitored concentrations. This is a very conservative assumption, given that the monitoring data over that period shows a steady reduction in concentrations (about 1.4 µg m^{-3} per year at the ZH2 and ZH3 monitors, see **Section 6.5, Chapter 6: Air Quality** of this ES), and in fact, the assumed background concentration assumed here (25.9 µg m^{-3}, the 2007–2015 average at the two monitors) has not been exceeded since 2010. Moreover, the active measures are in place nationally and internationally to further reduce emissions from road vehicles and other sources which are expected to take effect over the next twenty years.

4.5.3.24 In addition, it should also be remembered that the modelling makes a number of worst-case assumptions about the emissions from the Proposed Development, so the PC is also likely to be overestimated.

Operational phase effects from aircraft in Year 20 (worst case)

4.5.3.25 This section presents results for Year 20, the year with the peak number of aircraft movements ('worst case') and with construction completed.

4.5.3.26 The air quality assessment (see **Section 6.10** and **Appendix 6** in **Chapter 6: Air Quality** of this ES) shows no significant effects from acid or nutrient nitrogen deposition for Year 20, therefore in this section, only the annual mean NO_x concentrations in air are considered.

4.5.3.27 The air quality assessment (see **Appendix 6, Chapter 6: Air Quality** of this ES) shows for annual mean NO_x concentrations in air, further assessment is required for the following ecological receptors (within or close to the SAC): E21 to E24 inclusive (see **Figure 6.6, Chapter 6: Air Quality** of this ES). The reasons given in the assessment in the preceding sections for Years 2 and 6 explaining no significant effect for those years are also applicable for Year 20. Therefore, no adverse effects from NO_x concentrations in air for Year 20 are predicted.

Conclusion

4.5.3.28 No adverse effects on the integrity of the Sandwich Bay SAC are predicted due to air quality changes caused by the Proposed Development, during construction or operation.

4.5.4 In-Combination Effects

4.5.4.1 There are no known other developments and plans (as identified in **Table 18.2** in **Chapter 18: Cumulative Effects** of this ES) that would combine with the minimal effects of air quality predicted (and as discussed above and in **Chapter 6: Air Quality** of this ES) from the Proposed Development in such a way as would result in adverse effects on the (sand dune) habitat features of the Sandwich Bay SAC. The developments and plans detailed in **Table 18.2** in **Chapter 18: Cumulative Effects** (of this ES) are all located more than 1km from the sand dune habitats within the SAC. Furthermore, as set out previously, DEFRA's Technical Guidance on Local Air Quality Management (Defra, 2009) states, in respect of NO_2, that:

> "*concentrations fall-off rapidly on moving away from the source, and that beyond a distance of 1km from the source, NO2 is unlikely to make a significant contribution to air quality*".

4.5.4.2 To conclude, no adverse in-combination effects of air quality (in the form of nitrogen deposition and acidification) on the qualifying habitat features of the Sandwich Bay SAC (and thus, the integrity of the SAC) are predicted due to the Proposed Development.

4.6 Thanet Coast and Sandwich Bay Ramsar – Invertebrates

4.6.1 Current Baseline

4.6.1.1 The Thanet Coast and Sandwich Bay Ramsar site qualifies under Ramsar Criterion 2 by supporting 15 Red Data Book invertebrate species. The Ramsar site also qualified under Ramsar Criterion 6 for supporting internationally important numbers of non-breeding turnstone. The assessment of effects on turnstone due to aircraft noise is dealt with in **Section 4.4**.

4.6.1.2 A total of 15 Red Data Book invertebrate species associated with freshwater and brackish wetland habitats and sand dune habitats have been recorded[54] (Bratton 1991, Shirt 1987). These comprise:

- Three species listed as endangered: the weevil *Lixus vilis*, the moth *Stigmella reprentiella*, and the beetle *Bagous nodulosus*;
- Two species listed as vulnerable: the silver barred moth *Deltote bankiana*, and the dance-fly *Poecilobothrus ducalis*; and
- Ten species listed as rare: the ground-bugs *Emblethis verbasci* and *Pionosomus varius*, the damsel bug *Nabis brevis*, the dung beetle *Euheptaulacus sus*, the click beetle *Melanotus punctolineatus*, the dotted footman moth *Pelosia muscerda*, two digger wasps *Ectemnius ruficornis* and *Alysson lunicornis*, the plantbug *Orthotylus rubidus*, and the only British population of the woodlouse *Eluma purpurescens*.

4.6.1.3 The interest features (both invertebrates and turnstone) of the Ramsar site are subject to relatively limited existing pressures as outlined below:

- Impact from water diversion or extraction;
- Unspecified disturbance from human activities; and
- Overgrazing by domestic livestock.

4.6.2 Future Baseline

4.6.2.1 In the absence of development, it is assumed that the Order Limits will remain principally as grassland and hard standing and the land in the immediate vicinity will remain primarily as arable farmland. As a result, the management of this area would be unlikely to change in the foreseeable future and therefore the baseline for the Ramsar site, including the habitats on which the Red Data Book invertebrate species depend would not be altered significantly.

4.6.3 Predicted Adverse Effects

4.6.3.1 There is potential for adverse effects on the Red Data Book invertebrate species, resulting from a deterioration in air quality. The principal pollutant of concern associated with ground-based traffic and aircraft emissions that might affect sensitive habitats is nitrogen oxide (NO_x[55]). Road traffic and aircraft emissions may increase the ambient NO_x concentrations to which vegetation that the invertebrates depend upon is exposed. NO_x emissions may also, following chemical conversion in the air, form NO_2, which is then deposited. This (nutrient) nitrogen deposition may affect plant communities by causing nutrient enrichment and by acidifying the soils.

[54] In the past, the Species Status Assessment project assigned conservation status to our flora and fauna using the internationally-approved IUCN Red Data Book criteria and categories. These reviews were published in a series entitled Species Status. Some reviews had detailed data sheets, giving biological and other information relevant for conserving each species (for example, the Diptera reviews, Species Status numbers 2 and 3), while others listed the new conservation status assigned to each species, with supporting reasons and evidence for these judgements (obtained from http://jncc.defra.gov.uk/page-3352).

[55] Nitrogen oxides were taken to be nitrogen dioxide (NO_2) + nitrogen/nitric oxide (NO).

4.6.3.2 Concentrations of NO_x in air are associated with adverse effects on plant growth, and are therefore included in this assessment. In addition, emissions of NO_x and SO_x to the air may result in deposition onto ecological sites, which may be sensitive to both nutrifying nitrogen and acid deposition. Emissions of SO_x are expected to be negligible (see **Section 6.4 in Chapter 6: Air Quality** of this ES), but the impact of NO_x on nutrifying and acid deposition are included in this assessment.

4.6.3.3 The precise locations of the populations of Red Data Book invertebrate species within the Ramsar site are not known, though the majority of these species are associated with habitats such as sand dunes, marshes and reedbeds, the locations of which are shown on **Figure 4.2, Appendix 7.2**. As discussed previously, though the Thanet Coast and Sandwich Bay Ramsar site is located adjacent to the Order Limits for the Proposed Development, the active part of the airport (i.e. the runways from which aircraft will be taking off and landing, and from where the source of much of the pollution will be derived) is further removed, being 1.2km from the Ramsar site boundary. The habitats on which the Red Data Book invertebrates are likely to depend upon (such as sand dunes, marshes and reedbeds) are located a considerable distance further from the run-way, with the nearest parts of the sand dune habitats being 2.8km to the south of the runway, and at least 1km from the nearest major roads.

4.6.3.4 In addition, the air quality assessment previously detailed for the sand dune habitat features of the Sandwich Bay SAC in **Section 4.5** concludes no adverse impact on the SAC, which covers broadly the same area as the Ramsar site in this location. The same conclusion can be applied to wetland habitats within the Ramsar site, which are primarily located more than 1km south of the airfield, and more than 200m from any major roads (see **Figure 4.2, Appendix 7.2**), beyond which the effects of air pollution would be negligible (see **Table 3.1**).

4.6.3.5 To conclude, the additional contribution of air-borne and deposited nitrogen (NO_x) from the Proposed Development in areas containing habitats on which the Red Data Book species of invertebrates depend (within the Ramsar site), is predicted to be negligible. In view of this, no adverse effects on the integrity of the Ramsar Site due to the effects of air quality pollution (during operation of the Proposed Development) on the qualifying invertebrate species is predicted.

4.6.4 In-Combination Effects

4.6.4.1 There are no known other developments and plans (as identified in **Table 18.2** in **Chapter 18: Cumulative Effects** of this ES) that would appear likely to combine with the minimal effects of air quality predicted from the Proposed Development in such a way as would result in an adverse effect on the habitats upon which the Red Data Book invertebrate species depend (primarily sand dunes and wetland habitats). The other developments and plans detailed are all either located more than 1km from the wetland and sand dune habitats within the Ramsar site (see **Figure 4.2** in **Appendix 7.2, Chapter 7: Biodiversity** of this ES), or whose contribution to air quality impacts are likely to be negligible due to their small-scale or proposed activity. No adverse in-combination effects on the integrity of the Ramsar site due to air quality pollution caused by the Proposed Development are predicted.

5. Conclusions

5.1.1.1 Based on the results of the above HRA screening exercise (Stage 1 in **Section 3**) and information provided to permit Appropriate Assessment (Stage 2, in **Section 4**), taking account of the nature, magnitude and scale of the Proposed Development, along with the stated conservation objectives and known sensitivities of the habitats and species associated with the European sites identified within this document, it is concluded that the Proposed Development will result in no adverse effects on the integrity of these sites. As such, it is considered that no further consideration of HRA Stage 3 (Assessment of Alternatives) and Stage 4 (Consideration of Imperative Reasons of Over-riding Public Important) for the Proposed Development by the Competent Authority are required under the Habitats Regulations.

6. References

Appendix 7.2 in ES Chapter 7: Biodiversity. *Manston Airport DCO EIA, Ecology Desk Study*. Report produced by Amec Foster Wheeler Environment & Infrastructure UK Limited for RSP, May 2017 (doc ref. cLon030i1r).

Appendix 7.4 in ES Chapter 7: Biodiversity. *Bird Disturbance by Aircraft, A Literature Review*. Technical Note produced by Amec Foster Wheeler Environment & Infrastructure UK Limited for RSP, January 2017 (doc ref. cBri021i1n).

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Appendix A
Screening Matrices (Stage 1)

Potential Impacts

Potential impacts upon the European sites, which are considered within this document during the Stage 1, screening exercise, are provided in **Table A.1** below. Impacts have been grouped (and a keyword provided in parenthesis) where appropriate for ease of presentation.

Table A.1 Impacts Considered within the Screening Matrices

Designation	Impacts in submission information	Presented in screening matrices as
Thanet Coast and Sandwich Bay SPA **Thanet Coast and Sandwich Bay Ramsar** **Thanet Coast SAC** **Sandwich Bay SAC** **Outer Thames Estuary SPA** **Margate & Long Sands SAC** **Stodmarsh SPA** **Stodmarsh SAC** **Stodmarsh Ramsar** **Blean Complex SAC**	The introduction of toxic pollutants or sediments resulting in loss of, or damage to terrestrial or freshwater environments leading to direct or indirect effects on designated features due to run-off entering the European sites from the currently operational outfall, during construction and operation.	**Effect 1 (outfall)**
	Disturbance / displacement of birds (that are qualifying features of the SPAs/Ramsar sites, located within either the SPAs/Ramsars or on functionally linked habitat outside these sites), resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing during operation.	**Effect 2 (aircraft)**
	Deposition of oxides of nitrogen from aircraft emissions and concentrations of NOx in air (during operation) and road vehicles (during construction and operation) resulting in enrichment and/or acidification of the environment leading to alteration of the plant community through changes in baseline conditions resulting in direct or indirect effects on designated features.	**Effect 3 (AQ)**
	Disturbance / displacement of birds (that are qualifying features of the SPAs/Ramsar sites, located within either the SPAs/Ramsars or on functionally linked habitat outside these sites), resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise created by bird scaring activity.	**Effect 4 (bird-scaring)**
	Disturbance / displacement of golden plover due to the Proposed Development forming a barrier to the movement of birds between foraging and roosting sites, resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	**Effect 5 (barrier)**
	Deposition of dust in areas neighbouring the construction site during the construction phase. Deposition of dust resulting in loss of or damage to terrestrial or freshwater environments from smothering or enrichment resulting in effects on flora vegetation, invertebrates, amphibians, bats, otters (as designated features of SACs) and birds (as designated features of SPAs).	**Effect 6 (dust)**
	Production of aural and visual stimuli due to noise and vibration and movement during	**Effect 7 (con. dist.)**

Designation	Impacts in submission information	Presented in screening matrices as
	ground activities during construction and operation, including construction works, cargo loading, plane maintenance, airfield management, but not including bird scaring devices.	
	In-combination effects of other developments and plans.	**Effect 8 (in-comb.)**

Stage 1: Screening Matrices

The European Sites included within the (Stage 1) screening assessment are:

- Thanet Coast and Sandwich Bay SPA;
- Thanet Coast and Sandwich Bay Ramsar;
- Thanet Coast SAC;
- Sandwich Bay SAC;
- Outer Thames Estuary SPA;
- Margate & Long Sands SAC;
- Stodmarsh SPA;
- Stodmarsh SAC;
- Stodmarsh Ramsar; and
- Blean Complex SAC.

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

Matrix Key:

✓ = Likely significant effect **cannot** be excluded at Stage 1

✖ = Likely significant effect **can** be excluded at Stage 1

C = construction

O = operation

D = decommissioning

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

Stage 1, Matrix A: Thanet Coast and Sandwich Bay SPA

Name of European site: Thanet Coast and Sandwich Bay SPA

Distance to Order Limits: 0m

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
A069 Turnstone (non-breeding)	✓b	✓b	✓b	n/a	✓b	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	✓b	✓b	✓b
A140 Golden plover (non-breeding)	✓b	✓b	✓b	n/a	✓b	n/a	Xa	Xa	Xa	n/a	✓b	n/a	n/a	✓b	n/a	Xa	n/a	Xa	✓b	n/a	✓b	✓b	✓b	✓b
A195 Little tern (breeding)	n/a	n/a	n/a	n/a	✓b	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Evidence supporting conclusions

a. Table 3.2 Screening Assessment
b. Section 4 Assessment of Adverse Effects

Stage 1, Matrix B: Thanet Coast and Sandwich Bay Ramsar

Name of European site: Thanet Coast and Sandwich Bay Ramsar Site

Distance to Order Limits: 0m

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Turnstone (non-breeding)	✓b	✓b	✓b	n/a	✓b	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	✓b	✓b	✓b
Red Data Book invertebrates	Xa	Xa	Xa	n/a	n/a	n/a	✓b	✓b	✓b	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	✓b	✓b	✓b

Evidence supporting conclusions

a. Table 3.2 Screening Assessment
b. Section 4 Assessment of Adverse Effects

Stage 1, Matrix C: Thanet Coast SAC

Name of European site: Thanet Coast SAC

Distance to Order Limits: 300m

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
H1170 Reefs	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa
H8330 Submerged or partially submerged sea caves	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa

Evidence supporting conclusions

a. Table 3.2 Screening Assessment

Stage 1, Matrix D: Sandwich Bay SAC

Name of European site: Sandwich Bay SAC

Distance to Order Limits: 0m

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
H2110 Embryonic shifting dunes	Xa	Xa	Xa	n/a	n/a	n/a	✓b	✓b	✓b	n/a	n/a	n/a	n/a	n/a	n/a	Xa	n/a	Xa	n/a	n/a	n/a	✓b	✓b	✓b
H2120 Shifting dunes along the shoreline	Xa	Xa	Xa	n/a	n/a	n/a	✓b	✓b	✓b	n/a	n/a	n/a	n/a	n/a	n/a	Xa	n/a	Xa	n/a	n/a	n/a	✓b	✓b	✓b
H2130 Fixed coastal dunes with herbaceous vegetation	Xa	Xa	Xa	n/a	n/a	n/a	✓b	✓b	✓b	n/a	n/a	n/a	n/a	n/a	n/a	Xa	n/a	Xa	n/a	n/a	n/a	✓b	✓b	✓b
H2170 Dunes with Salix repens ssp. argentea	Xa	Xa	Xa	n/a	n/a	n/a	✓b	✓b	✓b	n/a	n/a	n/a	n/a	n/a	n/a	Xa	n/a	Xa	n/a	n/a	n/a	✓b	✓b	✓b
H2190 Humid dune slacks	Xa	Xa	Xa	n/a	n/a	n/a	✓b	✓b	✓b	n/a	n/a	n/a	n/a	n/a	n/a	Xa	n/a	Xa	n/a	n/a	n/a	✓b	✓b	✓b

Evidence supporting conclusions

a. Table 3.2 Screening Assessment
b. Section 4 Assessment of Adverse Effects

Stage 1, Matrix E: Outer Thames Estuary SPA

Name of European site: Outer Thames Estuary SPA

Distance to Order Limits: 3.4km

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
A001 Red-throated diver (non-breeding)	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa
A195 Little tern (foraging areas during breeding season)	n/a	n/a	n/a	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa
A193 Common tern (foraging areas during breeding season)	n/a	n/a	n/a	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa

Evidence supporting conclusions

a. Table 3.2 Screening Assessment

Stage 1, Matrix F: Margate and Long Sands SAC

Name of European site: Margate and Long Sands SAC

Distance to Order Limits: 4.8km

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
H1110 Sandbanks slightly covered by seawater at all times	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa

Evidence supporting conclusions

a. Table 3.2 Screening Assessment

Stage 1, Matrix G: Stodmarsh SPA

Name of European site: Stodmarsh SPA

Distance to Order Limits: 8.4km

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
A021 Bittern (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
A082 Hen harrier (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
A051 Gadwall (Breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
A051 Gadwall (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
A056 Shoveler (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
Waterbird Assemblage (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
Breeding Bird Assemblage	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa

Evidence supporting conclusions

a. Table 3.2 Screening Assessment

Stage 1, Matrix H: Stodmarsh SAC

Name of European site: Stodmarsh SAC

Distance to Order Limits: 7.7km

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
A1016 Desmoulin`s whorl snail	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa

Evidence supporting conclusions

a. Table 3.2 Screening Assessment

Stage 1, Matrix I: Stodmarsh Ramsar

Name of European site: Stodmarsh Ramsar Site

Distance to Order Limits: 8.4km

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Six British Red Data Book wetland invertebrate species	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa
Two nationally rare and five nationally scarce plant species	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa
Bittern (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
Bittern (Breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
Hen harrier (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
Gadwall (Breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa

Gadwall (autumn/spring passage)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa
Shoveler (Non-breeding)	n/a	n/a	n/a	n/a	Xa	n/a	Xa	Xa	Xa	n/a	Xa	n/a	n/a	Xa	n/a	Xa	n/a	Xa	Xa	n/a	Xa	Xa	Xa	Xa

Evidence supporting conclusions

a. Table 3.2 Screening Assessment

Stage 1, Matrix J: Blean Complex SAC

Name of European site: Blean Complex SAC

Distance to Order Limits: 11.5km

European site features	Likely effects of the Proposed Development																							
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird scaring)			Effect 5 (barrier)			Effect 6 (dust)			Effect 7 (con. dist.)			Effect 8 (in-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
H9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Xa	Xa	Xa

Evidence supporting conclusions

a. Table 3.2 Screening Assessment

Appendix B
Designation Information

Table B.1 European Sites (and Qualifying Interest Features) within 15km of the Order Limits

Site name and designation	Site interest features	Distance and (direction) from Order Limits
Thanet Coast and Sandwich Bay Ramsar	The Ramsar site (covering 2,169ha) is designated for supporting internationally important numbers of non-breeding turnstone *Arenaria interpes* (under Ramsar Criterion 6), and 15 Red Data Book invertebrate species associated with wetlands (under Criterion 2).	Adjacent (0m) to Order Limits
Thanet Coast and Sandwich Bay SPA	The SPA (covering 1,838ha) is designated for populations of European importance of turnstone (non-breeding); golden plover *Pluvialis apricaria* (non-breeding) and little tern *Sternula albifrons* (breeding).	Adjacent (0m) to Order Limits
Sandwich Bay SAC	The SAC (covering 1,137ha) is designated for the following Annex I habitats that are a primary reason for selection of this site: • Embryonic shifting dunes; • Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); • Fixed coastal dunes with herbaceous vegetation ("grey dunes") * Priority feature; and • Dunes with *Salix repens ssp. argentea* (*Salicion arenariae*). Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Humid dune slacks.	Within Order Limits
Thanet Coast SAC (including inshore marine)	The SAC (covering 2,816ha) is designated for the following Annex I habitats that are a primary reason for selection of this site: • Reefs; and • Submerged or partially submerged sea caves.	330m South-east
Outer Thames Estuary SPA	This SPA (covering 379,824ha) is designated for supporting a population of European importance of the Annex 1 species: red-throated diver *Gavia stellata* (during winter) and the foraging areas for little tern and common tern *Sterna hirundo* during the breeding season.	~3.4km North
Margate and Long Sands SAC	Margate and Long Sands SAC starts to the north of the Thanet coast of Kent and proceeds in a north-easterly direction to the outer reaches of the Thames Estuary. It contains a number of Annex I Sandbanks slightly covered by seawater at all times, the largest of which is Long Sands itself.	~4.8km North
Stodmarsh SAC	The SAC (covering 563ha) is designated for the following Annex II species that is the primary reason for selection of this site: Desmoulin`s whorl snail (*Vertigo moulinsiana*).	~7.7km South-west
Stodmarsh Ramsar	The Ramsar site (covering 481ha) is designated under Ramsar Criterion 2 for supporting: • Six British Red Data Book wetland invertebrates; • Two nationally rare and five nationally scarce plant species; and • Its diverse assemblage of rare wetland birds which includes gadwall *Anas strepera* (during passage and the breeding season) and bittern *Botaurus stellaris*, shoveler *Anas clypeata* and hen harrier *Circus cyaneus* (in winter).	~8.4km South-west
Stodmarsh SPA	The SPA (covering 481ha) is designated for its populations of European importance of bittern, gadwall, shoveler and hen harrier (during winter), gadwall during the breeding season, assemblage of breeding birds and assemblage of non-breeding waterbirds.	~8.4km South-west

Site name and designation	Site interest features	Distance and (direction) from Order Limits
Blean Complex SAC	A complex of broad leaved deciduous woodland designated for the Annex I habitat "Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*".	~11.5km West

Appendix C
Scoping Opinion, Consultee Responses

Table C.1 Consultee Comments to Scoping Report and 2017 PEIR

Consultee	Comments and considerations	How addressed in the ES, and this HRA report
PINS	The Secretary of State notes that it is indicated in Section 3.5 that the Applicant intends to prepare an Evidence Plan in relation to HRA. It is recommended that preparation of this plan begins, and that NE is contacted, at the earliest opportunity during pre-application. Information on Evidence Plans is provided in Section 4 of this Opinion.	Consultation with NE is ongoing and additional consultations have occurred following publication of the PEI. Consultations to date have included discussions regarding physical scope, methods of survey and assessment, principles of mitigation and potential effects from noise and air quality on surrounding European sites.
PINS	It is suggested in paragraph 6.6.7, and also reflected in paragraph 6.6.12, that direct effects are those that affect receptors on a development site while indirect effects are those that affect offsite receptors. The Secretary of State considers that this approach does not properly reflect how effects should be assessed, e.g. construction works on the boundary of a site or construction and operational traffic movements to and from the Order Limits could disturb flora and fauna beyond and at some distance from the boundary, depending on the nature of the activity and the sensitivity of the receptor; and aircraft movements beyond the boundary could increase collision risk with birds. Consideration should be given by the Applicant to how direct and indirect effects are defined and assessed in the EIA.	Agreed and those effects beyond the Order Limits boundary which would occur as a direct result of proposal activities are considered as direct effects.
PINS	It is noted that the list of potential receptors scoped in for further assessment in Table 6.2 does not include over-wintering birds, although Section 6.6 identifies potential for wintering birds to be found on the Order Limits and a potential need for more detailed survey work. The Secretary of State recommends that potential effects on these species are considered in the EIA.	Potential effects on over-wintering birds have been considered within ES Chapter 7 and the HRA report (Appendix 7.1).
PINS	Paragraph 6.6.16 notes that the design of the Proposed Development will incorporate measures to avoid or reduce adverse effects or deliver enhancements. Very limited reference is made in this chapter to potential mitigation measures for effects which may not be avoided or reduced as a result of the design, and no reference is made to how potential residual effects will be considered and assessed in the EIA. The Secretary of State expects such matters to be covered in the ES.	Explanation and details of mitigation measures for effects which may not be avoided or reduced as a result of the design have now been included within ES Chapter 7 and the HRA report (Appendix 7.1).
PINS	The Secretary of State draws attention to the need to consider combined effects in addition to cumulative effects. The ecological assessment should take account of noise, vibration, and air quality (including dust) impacts, and include consideration of the interrelationship between effects on ground and surface water and on biodiversity features. The Applicant's attention is drawn to the comments of TDC, contained in Appendix 3 of this Opinion, in this regard. The Secretary of State notes and welcomes that the outcomes of the air quality assessment will be evaluated in the ES biodiversity chapter. Cross-reference should be made in the ES between the relevant topic chapters.	Noise, vibration and air quality outcomes have been included in the assessment in the ES biodiversity chapter, with cross-reference made in the ES between relevant topic chapters.
PINS	The Applicant's attention is drawn to the comments of KCC, contained in Appendix 3 of this Opinion, particularly in relation to the extent of the ecological study areas, and potential effects on nearby internationally designated sites.	Noted

Consultee	Comments and considerations	How addressed in the ES, and this HRA report
Kent County Council	KCC queries why there appears to be no intention to consider the potential effects of air quality and aircraft deposition on the SPA or Ramsar sites; the presence of the features is dependent on the quality of habitats and as such KCC considers there to be a need to consider habitat impacts.	The potential effects of changes to air quality and deposition as a result of the proposals have now been considered within ES Chapter 7 and the HRA report (Appendix 7.1).
Kent County Council	Depending on the expected levels of use of the Order Limits, KCC also queries whether there is a need to consider the impacts of traffic and freight travelling to and from the airport on designated sites further afield.	The potential effects of changes to air quality from aircraft and any additional traffic as a result of the proposals are have now been considered within ES Chapter 7 and the HRA report (Appendix 7.1).
Minster Parish Council	Topics to be covered assume a zone of influence of 5km or, in the case of the road network, the local impact. The potential for the impact of operational development to exceed this distance seems clear, particularly with regard to noise impact upon the resident population beneath and adjacent to flight paths and the impact upon the nearby SPA and Ramsar site in terms of ecology.	Potential noise impacts on the Thanet Coast and Sandwich Bay SPA are now considered within the ES Chapter 7 and the HRA report (Appendix 7.1).
Natural England	NE welcomes the recognition in this chapter [Air Quality] that there is the potential for air quality impacts on vegetation and ecosystems as well as human health. We are generally satisfied with the methodology proposed where it relates to the assessment of impacts on the natural environment and we would be happy to work with the applicant to identify and agree appropriate, sensitive non-human receptors as recommended in paragraph 3.46 of your Scoping Opinion. We are pleased to see that air quality impacts will be assessed not only from the aircraft themselves but also from the additional traffic that will be associated with the airport during both the construction and operational phases of the development. Paragraph 5.6.2 of the Scoping Report provides criteria from the Design Manual for Roads and Bridges (DMRB) guidance on when a formal air quality assessment of vehicular emissions is likely to be required. Such an assessment will need to be carried out for designated nature conservation sites sensitive to air quality impacts where they fall within 200m of a road meeting one or more of the criteria listed here.	Designated nature conservation sites sensitive to air quality effects that they fall within 200m of a road meeting one or more of the criteria listed in the chapter have been identified and air quality impacts subsequently assessed and included within the ES.
Natural England	As this is the chapter most closely aligned to NE's remit, it is worth making a more general point here about the early stage this project appears to be at, certainly in terms of the level of detail reflected in the Scoping Report, with most of the information in this chapter being extremely generic. We share your concerns around the 'limited detail and evidence' provided on key areas such as the gathering of baseline data, the approach to be taken to assessing environmental impacts and proposed mitigation measures (Scoping Opinion, paragraph 3.8). However, we can advise you that Amec Foster Wheeler have recently contacted us to seek more detailed advice on biodiversity issues and in particular in putting together an HRA Evidence Plan.	Noted

Consultee	Comments and considerations	How addressed in the ES, and this HRA report
Natural England	We note from Section 6.5 of the Scoping Report that a 10km search radius has been used to identify statutory sites which may be affected by the Proposed Development and we support your request (Scoping Opinion, paragraph 3.59) that the Environmental Statement (ES) provide justification for a zone of influence of this size. We consider that the designated sites listed below are those which are most likely to be affected by the development, all of which fall within the current 10km zone, but we will work with the applicant as more detailed information becomes available to assess whether or not there are any other relevant sites outside this: • Sandwich Bay to Hacklinge Marshes Site of Special Scientific Interest (SSSI) (0.9 km); • Sandwich Bay Special Area of Conservation SAC (0.9 km); • Thanet Coast SAC (0.9 km); • Thanet Coast and Sandwich Bay SPA (0.9 km); • Thanet Coast and Sandwich Bay Ramsar site (0.9 km); • Sandwich & Pegwell Bay National Nature Reserve (NNR) (0.9 km); • Thanet Coast SSSI (4.3 km); • Outer Thames Estuary SPA (4.7 km); • Margate and Long Sands SAC (6 km); • Stodmarsh SSSI / SAC / SPA / Ramsar site / NNR (7.6 km); and • Preston Marshes SSSI (8.9 km).	The designated sites listed have been considered in the assessment particularly with regard to changes in air quality/deposition and noise effects.
Natural England	We are generally happy with the broad summary of impacts scoped in for further assessment as outlined in paragraph 6.6.12 of the Scoping Report. We would add that when assessing the potential impact of management measures to reduce bird collision risk, the ES also covers any implications stemming from the resumption of the 13km bird strike safeguarding zone defined by the International Civil Aviation Organisation (ICAO) which would require all future planning applications within this zone to be assessed for their potential impacts on bird numbers and movements. When assessing all impacts on designated sites, a comparison should be made between what is proposed in the DCO and the previous airport operations.	Consideration has been given in the assessment to previous operations at Manston Airport in comparison with what is proposed in the DCO.
Natural England	We agree with your request that the potential for effects on relevant habitats and species resulting from pollution incidents during both the construction and operational phases of the airport should remain scoped in at this stage (Scoping Opinion, paragraph 3.34), particularly given the confirmed presence of contamination on-Site (Scoping Report, Chapter 9). We support Thanet District Council's request that a Construction Environmental Management Plan (CEMP) should form part of the ES.	Effects from pollution incidents during construction and operation of the airport have been considered, and a CEMP provided as part of the ES.
Natural England	We do not believe that Table 6.2 of the Scoping Report currently provides a comprehensive cross-reference of each designated site with the likely pathways of impact by which the Proposed Development could affect it. We would query why the potential for deterioration in water quality is not picked up for those sites with a hydrological link to the airport. We also support Kent County Council's query as to why it is not proposed to consider the potential effects of air quality and aircraft deposition on SPA and Ramsar sites.	More detail on likely pathways to designated sites has been provided. Potential effects of air quality changes/nutrient nitrogen deposition on any sensitive habitats within European sites has now been considered.

Consultee	Comments and considerations	How addressed in the ES, and this HRA report
Natural England	NE notes [Ground and Surface Water] the main site discharge point from the runway and apron areas is via a pipe running out to the designated sites at Pegwell Bay and that if the applicant wishes this discharge to continue under their operation of the Order Limits then they will need to apply to the Environment Agency (EA) for a new discharge permit. In our initial meeting with the applicant on 26 April 2016 we advised that we would not wish to see any reduction in the quality of this discharge from what was previously permitted. We are pleased to see that the ES will give further consideration to the effects on water quality targets at Pegwell Bay and associated designated sites (Scoping Report, paragraph 7.6.4) and we also support your Scoping Opinion request (paragraph 3.35) that the potential for accidental spillages to Pegwell Bay via the Order Limits drainage network during construction remains scoped in at this early stage.	Noted. The potential effects to water quality targets at Pegwell Bay and associated designated nature conservation sites have now been considered.

Table C.2 Consultee Comments to 2018 PEIR

Consultee	Comments and considerations	How addressed in the ES, and this HRA report
Natural England	**ES Chapter 6**. NE have checked the selection of the major ecological receptors and note that they all appear to fall at the nearest boundary point of the designated sites. We would query whether you have considered the possibility that there may be more sensitive habitats further within particular sites which may suffer a more significant impact even though emission or deposition levels are reduced by this point?	A tech. note explaining the rationale behind the location of the receptors has been provided to NE. The air quality assessment of European sites takes a precautionary approach, in that it is based on APIS data for the most sensitive habitats within the site, rather than on the less sensitive habitats close to the receptors. NE are in agreement with this approach.
Natural England	**ES Chapter 6**. NE would welcome the opportunity to discuss the derivation of the NOx target for protected conservation areas which this table gives as a daily mean of 200 µg m^{-3} as our internal guidance provides a 24-hr mean NOx level for all vegetation types of 75 µg m^{-3}.	An assessment level of 200 μgm^{-3} was agreed with NE during a meeting on 5 September 2017
Natural England	**ES Chapter 6**. NE notes that this table identifies a likely significant effect (PC >1% AND PEC >70%) on 6 major ecological receptors (E08, E09, E17, E24, E11, E22). Given that paragraph 6.8.26 states that results are only given for a 'selection' of receptors we would appreciate confirmation that all incidences of significant impact on major ecological receptors have been listed here. This concern should also be applied to all other relevant tables in this chapter.	Confirmed
Natural England	**ES Chapter 7, Section 7.1**. NE notes that road traffic generated through both the construction and operational phases of the development may also affect designated sites sensitive to changes in air quality and that modelling will inform the assessment of such effects and be reported within the ES. Natural England would welcome discussion with your consultants on this matter in advance of the publication of the ES as this is a key air quality issue.	The assessment of air quality effects of road traffic on and off-site on ecological receptors has now been included in the ES.
Natural England	**ES Chapter 7 (pages 6-8): Nitrogen deposition in Year 20**. NE note that where initial modelling indicates a likely significant effect at receptor E22 (Pegwell Bay), further work will be undertaken prior to publication of the ES to ascertain whether this would result in an adverse effect on site integrity.	The assessment for E22 has now been undertaken and included in the ES.

Consultee	Comments and considerations	How addressed in the ES, and this HRA report
Natural England	**ES Chapter 7, Section 7.10.27**. NE notes that the potential for combined air pollution impacts from both traffic and aircraft on designated sites has yet to be confirmed and that further air quality modelling data will feed into the ES. We would welcome further discussion with your ecological consultants on this as accurate assessment of any in-combination air quality impacts is a priority issue.	The assessment for the combined air pollution impacts from aircraft and road traffic have now been included in the ES.
Natural England	**ES Chapter 7, Appendix 7.1, Table 5.1: Operation (aircraft take-off and landing)**. NE does not agree with the conclusion that, at ground level, noise levels below 80 dB LAMax are unlikely to cause disturbance to birds and this is a key unresolved issue for us.	The assessment will now be based on 70dB LAmax for the more noise sensitive species (such as golden plover). This has been derived from an extensive review of literature, research and case studies, as presented in Chapter 7, Appendix 7.4.
Natural England	**ES Chapter 7, Appendix 7.1, Table 5.1: Operation (aircraft take-off and landing, and ground-based activities). Deposition of oxides of nitrogen from aircraft engines** – the only reference in the Geographic Extent column is to 'European sites within 200m of the construction site and/or wider road network – this surely cannot be a relevant geographic parameter for aircraft?	Table 5.1 has been amended to include reference to the likely zone of influence derived from the air quality modelling in Chapter 7.
Natural England	**Chapter 7, Appendix 7.1, Table 5.1: Management of bird strike risk**. NE note the use of a 1km buffer from the runway area and that this is based on trails at London Ashford Airport: we will confirm our view on this as soon as possible. In view of this, NE are not in a position to agree with conclusions of no likely significant effect through the pathways of noise and visual disturbance from aircraft and bird scaring	We are seeking to confirm the types of bird scaring methods to be used at Manston, and if they are similar and applicable to use in our assessment, to those used at London Ashford Airport.
Natural England	**Chapter 7, Appendix 7.1, Table 5.2. Turnstone & golden plover: Construction phase (outfall).** NE does not agree that a conclusion of no LSE can be reached for the Thanet & Sandwich Bay SPA/Ramsar in advance of a CEMP being produced and reviewed by relevant stakeholders including ourselves.	Noted
Natural England	**Chapter 7, Appendix 7.1, Table 5.2**: **Nationally rare wetland invertebrates – Operation phase (AQ)**. NE note that the potential for LSE is yet to be determined and will require further modelling and consultation with ourselves.	The assessment into the effects of air pollution on the habitats the Ramsar site invertebrate species depend has now been undertaken and included in the ES.
Natural England	Chapter 7, Appendix 7.1, Table 5.2. Annex 1 habitats and Sandwich Bay SAC – Operation phase (AQ) - we note that the potential for LSE is yet to be determined and will require further modelling and consultation with ourselves.	The assessment into the effects of air pollution on the qualifying Annex 1 habitats of the Sandwich Bay SAC has now been undertaken.
Natural England	**Chapter 7, Appendix 7.4**. NE has been working with your ecological consultant and providing informal review of this technical note as it has developed. We do not propose to provide detailed comments here, other than to state that while we are in agreement with the first two bullet points regarding altitude and lateral distance in the concluding section (2.2), NE do not accept 80 dB LAmax as a minimum threshold for noise disturbance and are still in discussion with your ecological consultants on this matter.	Noted

Appendix D
Conservation Objectives

Thanet Coast and Sandwich Bay SPA (Site Code: UK9012071)

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

Qualifying Features:

- A140 Golden plover: non-breeding;
- A169 Turnstone: non-breeding; and
- A195 Little tern: breeding.

Thanet Coast SAC (Site Code: UK0013107)

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats;
- The structure and function (including typical species) of qualifying natural habitats; and
- The supporting processes on which qualifying natural habitats rely.

Qualifying Features:

- H1170 Reefs; and
- H8330 Submerged or partially submerged sea caves.

Sandwich Bay SAC (Site Code: UK0013077)

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats;
- The structure and function (including typical species) of qualifying natural habitats; and
- The supporting processes on which qualifying natural habitats rely.

Qualifying Features:

- H2110 Embryonic shifting dunes;

- H2120 Shifting (white) dunes along the shoreline, with marram grass (*Ammophila arenaria*);
- H2130 Fixed dunes with herbaceous vegetation ("grey dunes") - dune grassland;
- H2170 Dunes with *Salix repens ssp. Argentea - d*unes with creeping willow; and
- H2190 Humid dune slacks.

Outer Thames Estuary SPA (Site Code: UK9020309)

With regard to the SPA and the individual species and/or assemblage of species for which the site has been or may be classified (the 'Qualifying Features' including the 'Additional Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

Qualifying Features:

- A001 Red-throated diver: Non-breeding.

Additional Qualifying Features*

- The foraging areas during the breeding season for A193 Common tern (*Sterna hirundo*):; and
- A195 Little tern.

*Government has initiated public consultation on the scientific case for the classification of these features as part of this Special Protection Area (SPA).

Margate and Long Sands SAC (Site Code: UK0030371)

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats;
- The structure and function (including typical species) of qualifying natural habitats; and
- The supporting processes on which the qualifying natural habitats rely.

Qualifying Features

- H1110 Sandbanks which are slightly covered by sea water all the time.

Stodmarsh SPA (Site Code: UK9012121)

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

Qualifying Features:

- A021 Bittern: Non-breeding;
- A051 Gadwall: Breeding;
- A051 Gadwall: Non-breeding;
- A056 Shoveler: Non-breeding;
- A082 Hen harrier: Non-breeding; and
- Waterbird assemblage: Non-breeding; and
- Breeding bird assemblage.

Stodmarsh SAC (Site Code: UK0030283)

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of the habitats of qualifying species;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which the habitats of qualifying species rely;
- The populations of the qualifying species; and
- The distribution of the qualifying species within the site.

Qualifying Features:

- A1016 Desmoulin`s whorl snail (*Vertigo moulinsiana*).

Blean Complex SAC (Site Code: UK0013697)

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats;
- The structure and function (including typical species) of qualifying natural habitats; and
- The supporting processes on which qualifying natural habitats rely.

Qualifying Features:

- H9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*; Oak-hornbeam forests.

Appendix E
Appropriate Assessment Matrices (Stage 2)

Potential Impacts

Potential impacts upon the European sites, which are considered within the Appropriate Assessment (Stage 2, see **Section 4**) part of this document, are provided in **Table F.1** below. Impacts have been grouped (and a keyword provided in parenthesis) where appropriate for ease of presentation.

Table E.1 Impacts considered within the Appropriate Assessment matrices

Designation	*Impacts in submission information*	*Presented in matrices as*
Thanet Coast and Sandwich Bay SPA **Thanet Coast and Sandwich Bay Ramsar** **Sandwich Bay SAC**	The introduction of toxic pollutants or sediments resulting in loss of, or damage to terrestrial or freshwater environments leading to direct or indirect effects on designated features due to run-off entering the European sites from the currently operational outfall, during construction and operation.	**Effect 1 (outfall)**
	Disturbance / displacement of birds (that are qualifying features of the SPAs/Ramsar sites, located within either the SPAs/Ramsars or on functionally linked habitat outside these sites), resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise and shadow created by planes on take-off and landing during operation.	**Effect 2 (aircraft)**
	Deposition of oxides of nitrogen from aircraft emissions (during operation) and road vehicles (during construction and operation) resulting in enrichment and/or acidification of the environment leading to alteration of the plant community through changes in baseline conditions resulting in direct or indirect effects on designated features.	**Effect 3 (Air quality)**
	Disturbance / displacement of birds (that are qualifying features of the SPAs/Ramsar sites, located within either the SPAs/Ramsars or on functionally linked habitat outside these sites), resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates due to noise created by bird scaring activity.	**Effect 4 (bird-scaring)**
	Disturbance / displacement of golden plover due to the Proposed Development forming a barrier to the movement of birds between foraging and roosting sites, resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	**Effect 5 (barrier)**
	Production of aural and visual stimuli due to noise and vibration and movement during	**Effect 6 (construction disturbance)**

	ground activities during construction and operation, including construction works, cargo loading, plane maintenance, airfield management, but not including bird scaring devices.	
	In-combination effects of other developments and plans	**Effect 7 (in-combination)**

Stage 2: Appropriate Assessment Matrices

The European Sites included within the (Stage 2) Appropriate Assessment are:

- Thanet Coast and Sandwich Bay SPA;
- Thanet Coast and Sandwich Bay Ramsar; and
- Sandwich Bay SAC.

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

Matrix Key:

✓ = Adverse effect **cannot** be excluded at Stage 2

✕ = Adverse effect **can** be excluded at Stage 2

C = construction

O = operation

D = decommissioning

Where effects are not applicable to a particular feature (or have been screened out in Stage 1), the cells are 'greyed out'.

Stage 2, Matrix A: Thanet Coast and Sandwich Bay SPA

Name of European site: Thanet Coast and Sandwich Bay SPA

Distance to Order Limits: adjacent																					
European site features	Adverse effects of the Proposed Development																				
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 4 (bird-scaring)			Effect 5 (barrier)			Effect 6 (con. dist.)			Effect 7 (In-comb.)				
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D		
A169 Turnstone (non-breeding)	Xa	Xa	Xa		Xb											Xf	Xf	Xf		
A140 Golden plover (non-breeding)	Xa	Xa	Xa		Xb			Xc			Xd			Xe		Xe	Xf	Xf	Xf		
A195 Little tern (breeding)					Xb												Xf				

Evidence supporting conclusions

a. Following the incorporation of the environmental measures (see Paragraphs 4.2.4.44 to 4.2.4.47 inclusive, it is concluded that all effects on Pegwell Bay due to the outfall will be negligible.

b. The habitats utilised by golden plover, little tern and turnstone are located outside the area where adverse effects due to the visual presence and noise from over-flying aircraft would occur (see **Sections 4.2, 4.3 and 4.4** respectively).

c. Results from the desk study and surveys indicate a very low level of usage by golden plover of areas of land (i.e. within 1km of the Order Limits) where adverse effects due to bird scaring devices would occur (see **Section 4.2**).

d. Results from the desk study and surveys indicate that golden plover primarily roost on Pegwell Bay and forage in areas of farmland to the south-west, and thus are unlikely to fly over the Order Limits on a regular basis and therefore the Proposed Development would not act as a barrier to their movements (see **Section 4.2**).

e. Results from the desk study and surveys indicate a very low level of usage by golden plover of areas of land (i.e. within 750m of the Order Limits) where adverse effects due to construction-related disturbance would occur (see **Section 4.2**).

f. There are no known other developments and plans (as identified in **Table 18.2, Chapter 18: Cumulative Effects**) that would combine with the predicted adverse effects on the SPA features (and as discussed above and in **Sections 4.2-4.4**) from the Proposed Development in such a way as would result in adverse in-combination effects.

Stage 2, Matrix B: Thanet Coast and Sandwich Bay Ramsar

Name of European site: Thanet Coast and Sandwich Bay Ramsar Site

Distance to Order Limits: 0m

European site features	Adverse effects of the Proposed Development														
	Effect 1 (outfall)			Effect 2 (aircraft)			Effect 3 (AQ)			Effect 5 (barrier)			Effect 7 (In-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Turnstone (non-breeding)	Xa	Xa	Xa		Xb								Xd	Xd	Xd
Red Data Book Invertebrates							Xc	Xc	Xc				Xd	Xd	Xd

Evidence supporting conclusions

a. Following the incorporation of the environmental measures (see Paragraphs 4.2.4.44 to 4.2.4.47 inclusive, it is concluded that all effects on Pegwell Bay due to the outfall will be negligible.

b. The habitats utilised by turnstone are located outside the area where adverse effects due to the visual presence and noise from over-flying aircraft would occur (see **Section 4.4**).

c. Results from the air quality assessment (see **ES Chapter 6: Air Quality**, and **Section 4.6** of this report) conclude no adverse effects on the Ramsar site due to air pollution in the form of nitrogen levels in the air (NO_x) or nitrogen deposition. In view of this, the habitats the Red Data Book invertebrate species depend upon would not be adversely affected by air quality, and thus, there would be no adverse effects on this qualifying feature of the Ramsar site.

d. There are no known other developments and plans (as identified in **Table 18.2, Chapter 18: Cumulative Effects**) that would combine with the predicted adverse effects on the Ramsar site features (and as discussed above and in **Sections 4.4 and 4.6**) from the Proposed Development in such a way as would result in adverse in-combination effects.

Stage 2, Matrix C: Sandwich Bay SAC

Name of European site: Sandwich Bay SAC

Distance to Order Limits: within																
European site features	Adverse effects of the Proposed Development															
	Effect 2 (aircraft)			Effect 3 (AQ)			Effect 4 (bird-scaring)			Effect 5 (barrier)			Effect 7 (In-comb.)		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
H2110 Embryonic shifting dunes				X a	X a	X a							X b	X b	X b
H2120 Shifting dunes along the shoreline				X a	X a	X a							X b	X b	X b
H2130 Fixed coastal dunes with herbaceous vegetation				X a	X a	X a							X b	X b	X b
H2170 Dunes with *Salix repens* ssp. *argentea*				X a	X a	X a							X b	X b	X b
H2190 Humid dune slacks				X a	X a	X a							X b	X b	X b

Evidence supporting conclusions

a. Results from the air quality assessment (see **ES Chapter 6: Air Quality**, and **Section 4.5** of this report) conclude no adverse effects on the SAC due to air pollution in the form of nitrogen levels in the air (NO_x) or nitrogen deposition.

b. There are no known other developments and plans (as identified in **Table 18.2, Chapter 18: Cumulative Effects**) that would combine with the predicted adverse effects on the SAC features (and as discussed above and in **Section 4.5**) from the Proposed Development in such a way as would result in adverse in-combination effects.

Figures