CLEVE HILL SOLAR PARK

ENVIRONMENTAL STATEMENT

VOLUME 1 - CHAPTERS

CHAPTER 9 - ORNITHOLOGY

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CLEVE HILL
SOLAR PARK

9 ORNITHOLOGY

9.1 Introduction

1. This chapter of the Environmental Statement (ES) evaluates the effects of the proposed Cleve Hill Solar Park (the Development) on birds at the Development site and in the surrounding area. The scope and extent of the assessment, as set out in section 2.1 of Chapter 2: Environmental Impact Assessment, has been determined by a combination of professional judgement, the scoping opinion collated by the Planning Inspectorate, Section 42 responses to Preliminary Environmental Information Report (PEIR) and ongoing consultations with Natural England, Kent Wildlife trust (KWT) and the Royal Society for the Protection of Birds (RSPB).

2. The chapter is structured as follows:

- Introduction;
- Assessment methodology and significance criteria;
- Baseline conditions;
- Development design mitigation;
- Assessment of likely effects;
- Habitats Regulations Assessment;
- Mitigation measures and residual effects;
- Cumulative effects assessment;
- Transboundary Effects;
- Summary of likely effects; and
- Statement of significance.

3. The assessment focuses on the potential effects arising from the construction, operation and decommissioning of the Development on breeding and non-breeding birds in general, as well as specifically on The Swale, which is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site. The Swale is also a Marine Conservation Zone (MCZ) and includes National Nature Reserves (NNR) and Local Nature Reserves (LNR).

4. The component parts of the Development, along with details of the different phases of the Development, are described in detail in Chapter 5: Development Description.

5. This chapter is supported by Figures 9.1 to 9.3, provided in Volume 2: Figures:

- Figure 9.1: Study / Survey Areas;
- Figure 9.2: Designated Sites with Avian Interest; and
- Figure 9.3: Habitat Management Areas.

6. This chapter is supported by the following technical appendices, provided in Volume IV: Technical Appendices:

- Technical Appendix A9.1: *Ornithology Technical Appendix,* which provides details of the methods and results of the baseline surveys and desk study undertaken for the assessment of effects;
- Technical Appendix A9.2: *Cleve Farm – Breeding Bird Survey Report 2014 & 2015 (AECOM),* which provides further details specific to the baseline breeding bird surveys carried out by AECOM in 2014 and 2015;
- Technical Appendix A9.3: *Cleve Farm – Passage Bird Survey Report 2015 (AECOM),* which provides further details specific to the baseline passage period bird surveys carried out by AECOM in 2015; and
- Technical Appendix A9.4: *Cleve Farm – Wintering Bird Survey Report 2013/14 & 2014/15 (AECOM),* which provides further details specific to the baseline non-

breeding season bird surveys carried out by AECOM in winters 2013/14 and 2014/15.

7. In addition, reference is made to:

- Technical Appendix A5.2: Outline Landscape and Biodiversity Management Plan (LBMP), which addresses recommendations set out in Chapter 7: Landscape and Visual, Chapter 8: Ecology and this assessment in Chapter 9: Ornithology, and as highlighted in the scoping response, to protect ecological resources and enhance biodiversity.
- Technical Appendix A5.4: Outline Construction Environmental Management Plan (CEMP), which sets out good practice measures to mitigate environmental effects during construction (and decommissioning).
- Technical Appendix A8.8: Natural England Discretionary Advice Service (DAS) letter, which provides initial advice following a consultation held under the DAS that was initiated in October 2016.

8. Section 9.6 of this chapter explains the Habitats Regulations Appraisal process. The Application is accompanied by a Report to Inform an Appropriate Assessment (RIAA) (DCO Document Reference 5.2).

9.1.1 Development Parameters Assessed

9. The Rochdale Envelope parameters for the Development have been considered with respect to the ecological impact assessment, and worst-case values/scenarios for this are captured by the candidate design, as set out in Chapter 5: Development Description. This chapter therefore reports the assessment of effects associated with the candidate design.

10. The northern access route option has been considered as the worst case option of the two access options included in the candidate design, as it is closest to areas of habitat management and parts of The Swale SPA/SSSI/Ramsar Site. The other alternatives set out in the candidate design will not affect the conclusions of this assessment.

9.1.2 Scope of the Assessment

11. The potential effects of the Development on birds were identified as:

- *Disturbance* to birds from construction/decommissioning activities or maintenance activity and the presence of the solar panels and other associated aspects of the Development during the operational phase;
- *Displacement* of breeding or wintering birds from the area occupied by the Development as a result of habitat loss or change or fragmentation, including land functionally linked to The Swale Special Protection Area (SPA);
- *Indirect effects* on birds through impacts on habitats as a result of changes in water quality or deposition of dust;
- *Collision* of birds with the solar panels;
- *Disturbance* to birds from changes in public access to the area around the Development during operation; and
- *Criminal offences* in relation to damage or harm to nesting birds and additionally, disturbance to specially protected bird species listed on Schedule 1 of the Wildlife and Countryside Act, even if significant adverse effects are unlikely.

12. Further details of the nature of the Development's impacts and likely effects on birds are set out in section 0.

9.1.3 Scoping Responses and Consultation

13. A Scoping Report was issued to the Planning Inspectorate in December 2017 (DCO Document Reference 6.4.3.1). The Inspectorate issued a Scoping Opinion on behalf of the Secretary of State (SoS) in January 2018 collating responses from consultees (DCO Document Reference 6.4.3.2). Those of relevance to the ornithological assessment are summarised in Table 9.1a.

14. A consultation was initiated with Natural England in October 2016 through their Discretionary Advice Service (DAS). A consultation report was issued prior to a meeting held with representatives from Natural England in December 2016. Following the meeting, Natural England provided a letter (Charged Advice) setting out their initial advice regarding the scope and results of the baseline ecological and ornithological surveys completed up to that date, the implications for the proposal, particularly in relation to The Swale SPA and responding to a number of detailed questions raised during the meeting. A copy of the initial advice letter is provided in Technical Appendix A8.8. A summary is provided in Table 9.1a.

15. In recognition of the importance of ecological and ornithological interests relating to the designated sites near the Development site and the opportunities to improve local habitats and biodiversity, a Habitat Management Steering Group (HMSG) was formed in February 2018, comprising representatives of the Applicant and their consultants (Arcus Consultancy Services Ltd), Kent Wildlife Trust (KWT), Natural England (NE) and the Royal Society for the Protection of Birds (RSPB). The HMSG is intended to convene at key junctures throughout the pre-application, pre-construction, construction and operational phases of the Development. During the pre-application process, consultations with the HMSG have guided the proposals for mitigation and enhancement in the assessment, particularly in relation to the quantification of baseline bird use of the site and the location, extent and management of the Arable Reversion Habitat Management Area (AR HMA).

16. A PEIR comprising a draft Environmental Statement was published for consultation in May 2018. Section 42 Responses from consultees were collated and actions taken to update the assessment in this ES and to guide the Report to Inform and Appropriate Assessment (RIAA). Full details of the S42 consultation are presented in the Consultation Report (DCO Document Reference 5.1), with those relevant to the ornithological assessment presented in Table 9.1b. Natural England's responses are also specifically addressed in a Statement of Common Ground (SoCG) (DCO Document Reference 7.6).

Table 9.1a: Consultation Summary

Consultee	**Response**	**Action**
Natural England DAS (Pre-Application) October 2016 to January 2018	NE DAS was initiated in October 2016 and a consultation meeting was held in December 2016 following submission of the first Ornithology Consultation Report. NE DAS initial advice was set out in a letter dated 26/01/2017 (ref: DAS/11342/198096) and copied in Technical Appendix A8.8.	The initial advice has been reviewed and used to guide the assessment of effects on birds.
	The Development has the potential to impact the designated features of The Swale SPA and Ramsar site through, for example, disturbance and loss of functionally linked land.	Potential effects on The Swale and its qualifying interest features are addressed in section 0. A Report to Inform and Appropriate Assessment (RIAA) has been submitted with the DCO application.

Consultee	Response	Action
	Sufficient survey data had been collected (as of December 2016) to enable a thorough assessment of the potential impacts on SPA/Ramsar birds, and other important bird species.	Following extension to the project timescales, further surveys were carried out in winter 2017/18 to supplement the baseline data and provide the most up-to-date information.
	Baseline results (up to December 2016) showed that important numbers of birds associated with The Swale SPA/Ramsar use adjacent intertidal habitats and could be disturbed during construction and operation. Advised that timing of construction might be scheduled outside the winter period to avoid disturbance to important wintering bird populations, or that less disturbing construction methods (no impact piling) are used.	Mitigation for potential disturbance effects is set out in sections 0 and 9.7, with reference to the Outline CEMP, SPA Construction Noise Management Plan (SPA CNMP) and Breeding Bird Protection Plan (BBPP).
	Baseline results show that dark-bellied brent goose, dunlin, golden plover, lapwing and curlew use the Development site and all should be included in the assessment of loss of functionally linked land for wintering birds.	Potential effects of the changes to functionally linked land for these species are set out in section 0. A RIAA has been submitted with the DCO application.
	Agreed that the use of 'bird-days' to quantify and assess use of the site by wintering birds was a sensible approach.	The approach to quantifying the use of the site is set out in sections 0 and Technical Appendix A9.1.
	Baseline results show that a number of breeding species characteristic of grazing marsh were recorded during the surveys. The assessment should consider whether or not the site is necessary to the ecological functioning of the species associated with the SPA, as opposed to supporting species that are typical of grazing marsh habitat but also widespread and common. Initial view was that the site may be important functioning habitat for foraging marsh harrier, but other typical grazing marsh species present within the site, for example reed bunting, are probably not dependent on the site for their ecological functioning, and therefore, are not functionally linked.	The assessment in section 0 sets out the consideration of effects on the breeding bird assemblage and provides an assessment of the potential effects of changes to functionally linked land for marsh harrier.
	Guidance on enhancements has been produced by the BRE Solar Centre[10]. Establishment of grassland to benefit invertebrates would be valuable in this location, as would enhancement of ditches.	A number of sources of guidance, including advice provided by the HMSG, have been drawn upon to propose prescriptions for the management of habitats (particularly grassland) for biodiversity within the site.
	Provided advice relating to the breeding and non-breeding assemblage species to consider in the assessment.	See paragraphs 67 to 69 in section 9.3.1.

Consultee	Response	Action
Planning Inspectorate (Scoping)	The ES should contain the timescales upon which the surveys which underpin the technical assessments have been based. For clarity, this information should be provided either in the introductory chapters of the ES (with confirmation that these timescales apply to all chapters), or in each aspect chapter.	Details of all surveys undertaken in support of the ornithological assessment are provided in this chapter and associated Technical Appendices A9.1 to A9.4.
	The Inspectorate considers that where Regulation 32 applies, this is likely to have implications for the examination of a DCO application. The Inspectorate recommends that the ES should identify whether the Proposed Development has the potential for significant transboundary impacts and if so, what these are and which EEA States would be affected.	The potential for transboundary effects in relation to protected sites for birds is addressed in section 9.9.
	Impacts to visual amenity resulting from the introduction of lighting during the construction, operation and decommissioning phases should be assessed in the ES. The assessment should cross refer to other relevant aspect assessments and sensitive receptors (such as ecology and ornithology).	The potential effects of disturbance caused by lighting have been assessed in section 0.
	Paragraphs 61 and 191 of the Scoping Report refer to a 'Biodiversity and Landscape Management Plan' and a 'landscape planting scheme', respectively. Drafts of these documents should be provided with the ES. The Applicant should discuss and make effort to agree the planting specification/species mix with the relevant local planning authorities. It should be clear how the proposed landscaping would mitigate the effects on landscape and visual receptors, and how these effects would change as the proposed planting matures. Interactions with other ES aspects, for example beneficial effects on local ecology, should be explained.	The Outline LBMP is included in Technical Appendix A5.2. The ornithological assessment has informed some of the prescriptions in the LBMP and this chapter cross-references the plan where it is relevant to mitigating effects on birds.
	The Scoping Report states that the desk based assessment will identify statutory designated sites with potential to be affected by the Proposed Development (directly and indirectly). The assessment should take into account impacts to designated sites and functionally linked land.	Section 0 of this chapter considers effects on designated sites, including those relating to land functionally linked to designated sites through their qualifying interests.
	The study area should be established relative to the extent of the likely impacts.	Section 9.2.2 describes the study area.

Consultee	Response	Action
	The Scoping Report identifies that the Proposed Development is likely to result in impacts during construction, operation and maintenance. However it does not give a breakdown of the type of activities which may cause impacts, how they will create an impact or explain the duration of the impact. The specific elements of the Proposed Development likely to impact ornithological receptors should be explained and assessed in the ES. Potential impacts on ornithology during decommissioning should also be explained and assessed.	Section 0 describes the Development's potential impacts, including the decommissioning phase, and assesses the likely effects on birds, including consideration of the character of the potential effects.
	The impact of disturbance to birds is likely to be most severe during construction and decommissioning of the Proposed Development. The ES should assess all types of impact which may result in disturbance to birds (such as noise, vibration, traffic), cross-referencing to the other ES aspect assessments as appropriate. Appropriate mitigation measures should be proposed to minimise disturbance and agreed with relevant consultees.	Section 0 describes the Development's potential impacts, including disturbance during the construction and decommissioning phases, and assesses the likely effects on birds. Mitigation measures have been subject to consultation with the HMSG and are embedded within the Outline CEMP and associated SPA CNMP, BBPP and the Outline LBMP.
	The ES should identify the locations where vantage points surveys have been undertaken and explain how the locations for the survey were selected, with reference to any agreement with relevant consultees. The locations of the vantage point surveys should be depicted on a supporting plan in the ES.	The Flight Activity Survey method employing vantage point watches is fully described in Technical Appendix A9.1. Vantage point locations are shown in Figure 9.1 and Figure A9.29. Natural England advised that sufficient survey data had been collected to enable a thorough assessment of the potential effects on birds (Technical Appendix A8.8).
	Other developments identified for inclusion in the cumulative effect assessment should be agreed with the relevant consultees and their locations shown on a plan in the ES.	The approach to the cumulative assessment is provided in section 9.2.8.
Natural England (Scoping)	The Development site is adjacent to The Swale SSSI, SPA and Ramsar site and The Swale Estuary MCZ. If there is a likely significant effect on a European site, the competent authority may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process. The use of functionally linked land used by birds associated with the European site must be included in the assessment.	Section 0 assesses the potential effects on European designated sites with avian interest, including consideration of use of functionally linked land within the Development site. A RIAA has been submitted with the DCO application.
	Natural England considers that the baseline bird surveys that have been carried out are sufficient to provide a good picture of the use of the development area, and adjacent habitats, by birds.	None required.
	The EIA should consider the potential for impacts on Local Wildlife Sites.	Section 0 assesses the potential effects on Local Wildlife Sites with avian interest.

Consultee	Response	Action
	The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information): a. existing completed projects; b. approved but uncompleted projects; c. ongoing activities; d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.	The approach to the cumulative effect assessment is set out in section 9.2.8, the results of which are set out in section 9.9. A RIAA has been submitted with the DCO application, which includes the in-combination assessment required under the terms of the Habitats Regulations.
RSPB (Scoping)	Primary area of concern is to ensure appropriate recognition is afforded to the internationally important coastal habitats, and the waders, wildfowl and seabirds these support within and adjacent to the development area. Overall, RSPB consider the Scoping report to be comprehensive and are content with the methodologies and surveys undertaken to study the development area. These will ensure that robust evidence is presented so that the potential environmental impacts can be properly understood and evaluated. Advised that the BRE Biodiversity Guidance for Solar Developments[10] will also be a relevant and helpful source of guidance for this project.	Section 0 addresses the assessment of effects on birds associated with the internationally important habitats and birds that they support. None required. The BRE guidance has been reviewed and used to guide the development of the habitat management prescriptions described in the Outline LBMP.
KWT (Scoping)	KWT have not identified any significant omissions in the baseline survey work and consider that the ornithological surveys have been covered well.	None required.

Consultee	Response	Action
	Need to consider the potential for additional hydrological impacts during the operational phase. Paragraph 322 of the Scoping Report states that one of the key issues will be "Potential transfer of sediment and pollutants to surface water resources during construction". The potential for increased run-off of sediment owing to impaired ground vegetation should be considered. As the designated area includes the sea wall and habitats on the landward side, the drainage of the development site will have a direct impact on it and associated species.	The hydrological assessment is provided in Chapter 10: Hydrology, Hydrogeology, Flood Risk & Ground Conditions of this ES. The potential effects of increased sediment in run-off causing changes to habitats that birds use is given consideration in section 0.
Kent County Council (Scoping)	A good understanding of the site's ecological interest has been demonstrated. The results of the surveys and detailed mitigation strategies will need to be submitted as part of the DCO application to enable the determining authority to fully assess the impact associated with the proposed development. KCC recommends that the 'mitigation hierarchy' described in British Standard BS 42020:2013 is followed when designing the mitigation strategies. The measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development (BS 42020:2013, section 5.5). The site has been identified as being a functionally linked habitat for the adjacent designated sites. As detailed within the Scoping Report, a Habitat Regulations Assessment (in line with The Conservation of Habitats and Species Regulations 2017) will have to be carried out to assess whether the proposed development will have a 'Likely Significant Effect' on the adjacent designated sites.	Details of the bird survey methods and results are presented in this chapter of the ES and its accompanying Technical Appendices. The principles of the mitigation hierarchy have been followed in the application of design and applied mitigation proposals to minimise adverse effects and habitat enhancement measures are set out in the Outline LBMP. The need for HRA is considered in section 9.6 of this chapter of the ES. A RIAA has been submitted with the DCO application (DCO Document Reference 5.2).
Graveney with Goodnestone Parish Council (Scoping)	…the parish council would expect to provide input on areas including but not limited to: 1. Suitability of the project as a whole for the local population - human, fauna and flora.	The potential effects and opportunities for birds are considered within this chapter of the ES and input from the Parish Council is encouraged.

Table 9.1b: Section 42 responses to PEIR

Respondent	Comment	Applicant Response
CPRE Kent	We note the recent CJEU judgment (C-323/17) which concluded that the Habitats Directive 'must be interpreted as meaning that…it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site'. PINS Note 05/2018 to inspectors further states: 'Inspectors should be aware that on 12 April 2018, the Court of Justice of the European Union (CJEU) issued a judgement which ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures (referred to in the judgment as measures which are intended to avoid or reduce effects) should be assessed within the framework of an appropriate assessment (AA) and that it is not permissible to take account of measures intended to avoid or reduce the harmful effects of the plan or project on a European site at the screening stage'. In light of the CJEU judgment and PINS Note we would like to know whether you will be updating your assessment accordingly and resubmitting a revised PEIR and HRA. In the light of the short time remaining in the consultation period we would be grateful for a prompt response.	The Planning Inspectorate drew attention to the C-323/17 judgement in April 2018 during the pre-application consultation process. The Applicant does not intend to make any changes to the PEIR in respect of this judgement. The RIAA is submitted with the DCO application, which takes account of the CJEU ruling with respect to the treatment of mitigation measures in the HRA process.

Respondent	Comment	Applicant Response
CPRE Kent	We are particularly concerned at the site's location, coterminous with areas designated for biodiversity protection (and now that we have received notification that the application boundary has been extended it includes designated sites, which is not reflected in the documents which inform the existing PEIR). It is clear that this area of the marshes is regularly used by SPA and Ramsar species. There will be particularly significant harm to species such as skylark and marsh harrier (the nearby SPA boasts a population of 24 pairs of the latter, representing at least 15% of the breeding population in Great Britain). Many of the technical reports informing the PEIR (such as those covering breeding birds, passage birds and the habitat survey) are now 4 years old, and were undertaken before the proposed site boundary was extended. They therefore give an inaccurate representation of the proposals as they currently stand.	The additional areas included in the Development since the PEIR, which comprise part of The Swale SPA/SSSI/Ramsar site, will not contain any new development structures; they are included to facilitate ongoing maintenance of the sea wall and to bring biodiversity benefits through more appropriate management of the freshwater grazing marsh in the east of the site. This ES chapter and the RIAA assess the effects of the full extent of the Development and provide a complete assessment of the potential effects birds, including the qualifying interest features of the designated sites. Surveys were undertaken over a period between January 2014 and April 2018, with reporting in 2018. The scope and timing of the baseline surveys are appropriate to inform the assessment, which has been agreed by Natural England. The geographical coverage of the surveys already included the areas into which the Development site boundary was extended.
Faversham Footpath Groups	7. Other bodies, such as Kent Wildlife Trust and the RSPB, will no doubt comment on the proposal's impact on the environment and wildlife. But, as walkers who derive great enjoyment from seeing the area's distinctive flora and fauna, we are concerned about the prospective loss of important habitat, in particular for nesting marsh harriers and for other raptors.	This ES chapter and the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.

Respondent	Comment	Applicant Response
Graveney with Goodnestone Parish Council	· Loss of 'functionally linked' habitat: While the development site itself is adjacent to, rather than included in, areas with international and national wildlife designations, at certain times it does support species for which the designated habitats are noted (for example, lapwing, golden plover, Brent geese and marsh harrier). As such, it is 'functionally linked' to these designated areas, and its loss will have an impact on these and other species. The arable farm land is used from point to point as there is connectivity and by putting up fences and panels the bird population will be adversely affected. We note that the area counts more than 50% of bat species in one small area. We assume that CHSP will have to undertake a 'Habitats Regulations Assessment' to determine the impacts on these species and other species, what mitigation may be necessary, and ultimately demonstrate that any impacts will not be significant.	This ES chapter and the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements. A HRA has been undertaken and submitted with the DCO application in the RIAA. A focus of the HRA is the loss of functionally linked land for lapwing, golden plover, brent goose and marsh harrier.
GREAT Graveney	· 10 references to the peregrine falcon which is a protected species	Peregrine was identified as an Important Ecological Feature (section 9.5.1) and an assessment of the potential effects on this species has been provided (section 9.5.3).
GREAT Graveney	· 2 references to kestrels which have a decreasing population trend	Kestrel did not qualify as an Important Ecological Feature and therefore detailed assessment is not provided. The habitat enhancements through provision of substantial extents of lowland meadow is expected to improve conditions for foraging kestrels, which are known to use solar panels to perch on when hunting for prey.
GREAT Graveney	Even though some of the Schedule 1 birds received attention in this section, for instance the Harriers (54 references), the report is skewed towards water birds. As the core of the proposed land for development is dry land, greater emphasis needs to be given to birds that live, nest and feed on that land, not waterfowl who will still have the foreshore of the SSSI to feed on.	Water birds and marsh harrier are given a large degree of attention in the assessment (section 0) because they are the species associated with the adjacent European designated site. The wintering and farmland bird communities are identified as Important Ecological Features (section 9.5.1) and an assessment of the potential effects on these species has been provided (section 9.5.3).

Respondent	Comment	Applicant Response
GREAT Graveney	The mitigation areas within the development will result in a loss of habitat for those species that rely on the open farmland. In addition, it is known that aquatic insects lay eggs on solar panels and this results in a reduction of these insects. This, combined with the loss of diving insects that will be killed following collision with the panels, has a significant effect on the insect population which, in turn, has a knock-on effect on the feeding opportunities for birds. Additionally, removal of the arable land and replacement with solar panels will significantly reduce the prey available for predators such as the marsh harrier and peregrine falcon, including small mammals and invertebrates.	The ecological assessment (ES chapter 8) concludes that there will be improvements in conditions for invertebrates through the embedded design including large areas of lowland meadow and improved water quality in the drainage ditches. There is therefore no predicted decrease in foraging opportunities for birds in this respect. The embedded design enhancements involving creation of large areas of lowland meadow around the solar panel arrays, as well as grassland between solar panel tables, are predicted to improve the abundance of lower trophic animals and improve conditions for foraging predators.
GREAT Graveney	While the development site itself is adjacent to, rather than included in, areas with international and national wildlife designations, at certain times it does support species for which the designated habitats are noted, for example, lapwing, golden plover, Brent geese and marsh harrier. As such, it is 'functionally linked' to these designated areas, and its loss will have an impact on these and other species.	This ES chapter and the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.
GREAT Graveney	The arable farm land is used from point to point as there is connectivity. By putting up fences and panels the bird population will be adversely affected. Additionally, the area provides an important foraging resource utilised by nine species of bats, including the grassland and ditches.	This ES chapter and the RIAA identify fragmentation of habitat as a potential impact on birds, which has been assessed as having no likely significant effects.

Respondent	Comment	Applicant Response
GREAT Graveney	Having looked at the FAS mappings it is quite clear that a large amount of activity was recorded using the Vantage Point Method (VPM), and clearly shows the importance of the area to the birds surveyed. It is reported that "the survey used two vantage points providing excellent visual coverage of the majority of the solar park site" · Why only two Vantage Points (VPs)? This is not sufficient and can you advise if these VPs are at ground level?	The Flight Activity Survey method accords with best practice guidance (Scottish Natural Heritage guidance on Vantage Point methodology for wind farm developments) and is described in section 9.7 of Technical Appendix A9.1 to the ES. Observations were carried out from the two VPs by two observers simultaneously viewing the landscape from approximately 1 m above ground level. VPs were chosen parsimoniously according to best practice guidance to provide suitable coverage of the survey area. GIS modelling of the visible area from the VPs is provided in Figure A9.29 and demonstrates over 90% theoretical coverage of the Development site. In practice, local topography is used advantageously to provide better coverage than predicted by the GIS model. The frequency and distribution of flight activity recorded attests to the suitability of the survey method.
GREAT Graveney	· Are the observers skilled and licensed? Are binoculars or telescopes used?	The surveyors are highly skilled ornithologists with many hundreds of hours of flight activity survey experience. Binoculars and telescopes were used during the surveys when appropriate.
GREAT Graveney	· Please comment on the duration, timing and number of hours involved in survey.	These are provided in section 9.7.1 of Technical Appendix A9.1; this now includes additional details regarding the timing and weather conditions during each survey.
GREAT Graveney	· Who chose the VPs and what was the criteria used for this choice? · From our knowledge of the area and awareness of VP1 and VP2, we conclude that the visual coverage is not exceptional. What is the basis for the developers stating that the coverage is excellent?	The Flight Activity Survey method accords with best practice guidance (Scottish Natural Heritage guidance on Vantage Point methodology for wind farm developments) and is described in section 9.7 of Technical Appendix A9.1. VPs were chosen parsimoniously by experienced ornithologists according to best practice guidance to provide suitable coverage of the survey area. GIS modelling of the visible area from the VPs is provided in Figure A9.29 and demonstrates over 90% theoretical coverage of the Development site. In practice, local topography is used advantageously to provide better coverage than predicted by the GIS model. The frequency and distribution of flight activity recorded attests to the suitability of the survey method.

Respondent	Comment	Applicant Response
GREAT Graveney	· When were the nocturnal winter bird surveys conducted, where were these carried out, and who was involved in this exercise?	ES Technical Appendix A9.1 now includes additional details regarding the timing and weather conditions during each survey. Surveys covered the core survey area and were carried out by the same experienced ornithologists that undertook the diurnal surveys in winter 2015/16.
GREAT Graveney	· The PEIR Ornithology section (Non-Technical Summary, 9.1 Baseline Bird Surveys) it states there were 5 winter surveys 2013/2014, 2014/2015, 2015/2016 and 2017/2018. Why was a survey not undertaken in 2016/2017?	Paragraph 36 of this chapter provides this information.
GREAT Graveney	· Below are examples of CHSP's ineffective mitigation and management: o "The HMA (Habitat Management/Mitigation Area) may not be able to replace entirely the loss of foraging provision for Brent Geese, therefore this would be a long term negative effect." (9.3.2)	The AR HMA has been extended since PEIR, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese in the long term, such that a precautionary average measure of use of the site based on highest recorded counts each month is provided for.
GREAT Graveney	o "Disturbance during construction is likely to cause displacement of foraging Marsh Harrier from areas near the construction works..", "Conditions may be enhanced" and " the AHMP could improve conditions for foraging Marsh Harrier" (9.3.4) · Throughout the document CHSP uses words like may 'be', 'could' or 'likely'. Nothing appears exact, just vague and inconclusive and without any solid guarantee of mitigation. Why are these statements fluid and not precise? · Other examples in relation to Cetti's Warbler and Bearded tit report that "construction works are likely to cause localised disturbance to breeding birds resulting in temporary displacement.....", followed by " the LBMP includes measures to improve the quality of the ditches...", and "Ditch enhancements and other measures set out in the Aquatic Habitat Management Plan or AHMP, may enhance conditions for Cetti's Warbler" (9.3.5) · 9.3.5 states that "One of the aims of the Development is to provide improved conditions where possible for breeding birds. This will be a positive effect on the breeding bird community, although due to a degree of uncertainty regarding how birds will react to the presence of the solar panels in the landscape, it is not certain to occur." Are there any guaranteed measures or is this merely a PR exercise? · The same applies for the wintering farmland bird community (9.3.6): "likely to cause localised disturbance to foraging birds resulting in temporary displacement", "likely to result in displacement of flocks of wintering foraging birds...", and "overall,	The concept of likelihood is inherent in ecological assessment and explained in section 9.2.5 and 9.2.6. At PEIR stage of the application process, the Development design was not fixed, therefore there was less certainty in relation to effects and effectiveness of mitigation and enhancement measures. In the ES, additional mitigation and enhancement measures have been included in the Development, such as wider lowland meadows between the arrays, to provide confidence in the effectiveness of the measures.

Respondent	Comment	Applicant Response
	it is considered that there will be a change in the wintering farmland bird community. The large numbers of flocking species that use the solar park site are not likely to be attracted because the temporarily rich resources they favour at and after harvest of crops will no longer be available. However, the habitat management measures set out in the LBMP might improve conditions for some other wintering seed-eating species that can forage in the grassland habitats." · GREAT are not convinced that there is any real commitment that many of the concerns regarding the birdlife will be mitigated. The language used and the constant repetition of vague phrases such as 'likely', 'might', 'may' and the observations above would support this assertion.	
GREAT Graveney	· It would appear from the commentary throughout the document that, ultimately, CHSP developers do not know how the construction/development will affect any birdlife although our belief is that this will be in a largely negative way.	The concept of likelihood is inherent in ecological assessment and explained in the assessment methodology, ES Chapter 9, section 9.2. At PEI stage of the application process, the Development design was not fixed, therefore there was less certainty in relation to effects and effectiveness of mitigation and enhancement measures. In the ES, additional mitigation and enhancement measures have been included in the Development, such as wider lowland meadows between the arrays to provide more confidence in the effectiveness of the measures.
Kent County Council	Chapter 9: Ornithology The PEIR illustrates a good understanding of bird interest in the site, and the surveys have confirmed that the site provides functionally linked habitats with the adjacent SPA/Ramsar/SSSI (e.g., birds associated with the designated site were recorded within the application site) and that the site is utilised by ground nesting birds. The surveys were carried out over several years and KCC notes that the results indicate that the numbers using the site fluctuated throughout the years. The applicant should take note that this may be linked to the management of the site or crops grown within the site during that time.	The assessment in the ES chapter 9 notes that fluctuations in numbers of brent geese, lapwing and golden plover are most likely to be related to the type and growth stage of crops.

Respondent	Comment	Applicant Response
Kent County Council	KCC would expect the Environmental Statement to acknowledge that the proposed development would result in a complete loss of habitat for ground nesting areas and birds associated with the SPA. These birds require open vistas to be able to feel secure when they are roosting/feeding/nesting, which will mean that the habitat directly adjacent to the solar panels is likely to be lost.	The assessment of loss of foraging resources for brent geese, lapwing and golden plover (section 9.5.3 of this chapter) is made on the basis that there is total loss of foraging opportunity in the area developed for solar panels and other infrastructure. The assessment of loss of foraging and nesting resources for other species (section 9.5.3 of this chapter) is made on the basis that there is total loss with respect to the built structures, with enhancement of the large areas around the arrays continuing to provide resources for some species.
Kent County Council	The application is proposing to carry out habitat enhancements and ongoing management within an area to the east of the solar panels. KCC agrees it is likely that this area will provide suitable habitat for breeding and wintering birds.	No response required.
Kent County Council	However, the PEIR indicates that the proposal would lead to a significant reduction in habitat areas and KCC suggests there is a need for a greater area of habitat to be actively managed. KCC recommends that the applicant should investigate whether there are opportunities to support the management of habitats within the wider area. This would improve the quality of the remaining farmland for the birds that will be displaced as a result of the proposed development.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of grazing marsh grassland between arrays, removal of development in Field Y/Z for the LGM HMA and extension of the AR HMA, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). In addition, there are proposals to improve the management of grazing marsh habitat in the part of the SSSI (the FGM HMA) immediately to the east of the AR HMA.
Kent County Council	Habitats Regulation Assessment (HRA) In line with the identification within the PEIR that development will result in a 'Likely Significant Effect' on the adjacent designated sites, KCC advises that the applicant will need to carry out a Habitats Regulation Assessment.	A HRA has been undertaken and submitted with the DCO application in the RIAA.

Respondent	Comment	Applicant Response
Kent Ornithology Society	Apologies for the late submission of these comments. As the PEIR document extends to some 500 pages, plus additional appendices, it took considerable time to assimilate the information and extract relevant issues and I was only able to action the task in the last few days. My comments are restricted to Chapter 9 - Ornithology, in keeping with the aims of our Society, to promote the recording and conservation of birds in Kent. Having read the document at length, I have kept my comments brief to cover the main areas of concern.	No response required.
Kent Ornithology Society	The KOS has great concern about the scale and siting of the development.	The ES sets out the reasons for selecting this site and the impacts of the Development.
Kent Ornithology Society	Whilst acknowledging the national need for green energy, the Society believes that coastal land in the Swale Estuary, given its SPA, Ramsar and SSSI status, is a most insensitive and inappropriate location for a solar farm of this magnitude.	The ES sets out the reasons for selecting this site and the impacts of the Development.
Kent Ornithology Society	Although the actual site plan does not occupy land of SSSI status, it lies within an area of high wildlife and ornithological importance. The construction of the solar farm will prevent the area from being managed sensitively for birds and other wildlife in the future.	The DCO application boundary includes land designated as SSSI/SPA/Ramsar Wetland, but that land will not be developed. The proposed management of the land for birds and other wildlife is set out in the ES, Technical Appendix A5.2, Outline Landscape and Biodiversity Management Plan (LBMP). The potential effects of the Development on birds are assessed in this chapter. Negative effects are mitigated where possible and the Development also offers opportunities for sensitive habitat enhancement for the benefit of birds.

Respondent	Comment	Applicant Response
Kent Ornithology Society	The Society acknowledges that Arcus/AECOM have produced a very thorough assessment of the breeding, passage and wintering birds of the development site. However, the Society disagrees or takes issue with some of the conclusions drawn concerning the impact of the solar farm. It is also noted that no report is provided in A9.2 for the breeding survey in 2016, although it is noted (Table 9.5) that this was performed and that 72 species were recorded of which 40 were confirmed breeding, the highest of the three breeding surveys.	The assessment in this chapter was carried out in accordance with the EIA Regulations and relevant guidance, including the process of drawing conclusions. Negative effects are mitigated where possible and the Development also offers opportunities for sensitive habitat enhancement for the benefit of birds. The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z (LGM HMA) and extension of the AR HMA, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). Section A9.4.2 of Technical Appendix A9.1 to the ES provides the methods and results of the breeding bird survey in 2016. The results are displayed in Figure A8.8.
Kent Ornithology Society	There is a general assumption in the PEIR that as species of conservation concern are present elsewhere in the Swale Estuary area, perhaps in greater numbers, that the impact of the development is therefore not significant. This approach is taken, for example, with Marsh Harrier. A problem with this line of assessment is that a piecemeal loss of important species and sites occurs over time, if repeated during further development land grabs, which leads to the fragmentation of habitat and erosion of important populations.	Section 9.2.5 and 9.2.6 of this chapter describes the assessment methodology with respect to the determination of significance. The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), which will provide enhanced foraging resources for marsh harriers.

Respondent	Comment	Applicant Response
Kent Ornithology Society	An important species breeding within the development site is the Yellow Wagtail which is Red Listed in the UK as it has suffered a significant population decline. This species has undergone a significant change in breeding habitat in the UK over the last 30-40 years and now predominantly nests in crops. In Kent, coastal cereal crops are now an important habitat. The bird surveys noted 6-10 territories in the arable fields during 2014, 2015 (no data given for 2016). It is stated that as part of the BBPP mitigation some 41 ha of arable land will be converted to grazing marsh to benefit this and other species as compensation for territories lost by construction of the solar farm. However, Yellow Wagtails now mostly breed in arable farmland, not grazing marsh, and would therefore not be mitigated.	Crops are the predominant nesting habitat for yellow wagtails in Kent probably because it is the predominant habitat, rather than the preferred nesting habitat. The RSPB provide advice regarding provision of habitats for yellow wagtails, which includes provision of grassland with an open sward for nesting, whilst grazing pasture provides insect-rich resources for them. The assessment in section 0 of this chapter therefore concludes that the substantive habitat enhancements made within the Development site will provide suitable habitat for nesting and foraging yellow wagtails.
Kent Ornithology Society	It is mentioned that as a result of the first consultation, greater public access will be provided across the development site with cycle routes, bridle ways and footpaths. As these will obviously be along gaps and ditches between the solar panels, any improvements to habitat made in areas between the panels, to provide benefit to bird species affected by the development such as Marsh Harrier and Barn Owl, will be undone by the increased public disturbance.	As a result of the S42 consultation process, the proposed new permissive access ways are now restricted to one route, which will be a footpath only as there is no public access for horses or cycles at either end of this path, running north-south predominantly along an existing farm track between two arrays of solar panels. The majority of habitat enhancements throughout the site will therefore not be subject to increased public disturbance.
Kent Ornithology Society	One of the most important habitats for breeding birds in the development site is the wide ditch with reeds extending along the landward side of the sea walls. The Society would like to see a wider buffer zone to protect this habitat, say 200m. This would allow for a reasonable buffer strip to keep solar panels away from the ditch.	Since PEIR, the offset distance from this boundary has been increased from a minimum of 5 m to a minimum of 15 m, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). Section 0 provides an assessment of the potential effects on breeding birds throughout the Development site.

Respondent	Comment	Applicant Response
Kent Wildlife Trust	We are unconvinced the mitigation proposed, most notably in the form of a 41 hectare Habitat Management Area, will be sufficient to offset the impacts on a number of species, and this shortfall is confirmed for Dark-bellied Brent Geese within the documents. Marsh Harrier is also of particular concern, as a possible outcome of the proposals is the loss of this site and adjacent nature reserve as a breeding and foraging area. The proposals will adversely affect the integrity of the Special Protection Area (SPA). Further detail on these and other issues is appended to this letter.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z for grassland management (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.
Kent Wildlife Trust	Basic and Precautionary Principles Wintering Birds Overwintering birds, particularly those associated with The Swale Special Protection Area (SPA), are a key issue with regard to the impacts of the proposals. It is essential that the proposals are able to demonstrate that there will not be an adverse impact on the SPA. The proposals in front of us have not done that. The key principle proposed with regard to mitigating the loss of habitat is the provision of a smaller but 'higher quality' area of equivalent 'carrying capacity' to that being lost (expressed as 'bird days' in the documents). The calculations presented are insufficiently robust, and the predicted outcomes overly optimistic. In seeking to shrink 387 hectares of 'extensive' habitat into 41 hectares of 'intensive' habitat differing requirements of species are likely to come into conflict. It is important that this is taken into account when considering the area required and its management.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z for grassland management (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The predicted capacity of the HMA to support lapwings, golden plovers and brent geese has been amended following consultation and the HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.

Respondent	Comment	Applicant Response
Kent Wildlife Trust	Dark-bellied Brent Goose It is clear from the survey results that the percentage of the SPA's Dark-bellied Brent Geese population that the development site supports varies from year to year. Anecdotally it has been suggested that this is a result of changes in crop and crop development, and this would be consistent with what we know of this species, though site crop information to compare to the results to verify this would be welcome. There are no doubt other factors involved that influence the day-today differences in survey results, though these may be less well understood.	Since PEIR, information on historical cropping patterns have been obtained and are presented in Technical Appendix A9.1 to the ES.

Respondent	Comment	Applicant Response
Kent Wildlife Trust	However, what is of little doubt is that at times the site supports a significant proportion of the SPA's population, occasionally over 100%1. There remains a question over how we attempt to quantify this in order to put in place adequate mitigation to ensure the integrity of the SPA is not adversely affected. At present, the Preliminary Environmental Impact Report (PEIR) appears to use the Wetland Bird Survey (WeBS) 5-year Mean of the Peak counts for the Swale Estuary as a proxy for the SPA population to calculate the percentage provision provided by the Habitat Management Area (HMA). If we use an equivalent figure (or as close as possible) from the development site survey results (mean of the peak counts) to calculate the provision the development site provides we get 64%. The PEIR also uses a 'mean of seasonal monthly peak means' and 'mean of seasonal means' of the development site survey results to quantify the value of the development site. Using the former figure we get 32%. While the true figure arguably falls somewhere between the lower and higher of these three figures, the validity of the approach taken, and other possible approaches, is clearly a subject that needs further discussion. This is of course as valid for other species as it is for brent geese. To enable further comment on the issues, we have worked with the approach taken in the PEIR and the figures provided therein.	In the PEIR, the comparison between the quantification of use of the Development site by birds (based on baseline survey counts) and the Swale Estuary population as a whole has caused confusion and did not fulfil the objective of its inclusion. Following consultation with the Habitat Management Steering Group, this aspect of the assessment has been modified in this chapter. Agreement has been reached with consultees that the average 'peak-mean' count from the baseline survey data (the inter-seasonal mean of the intra-seasonal monthly peak-mean) is an appropriate metric to measure the use of the site; the ES has updated the assessment accordingly.

Respondent	Comment	Applicant Response
Kent Wildlife Trust	Key to the calculations of the required area of mitigation for Dark-bellied Brent Geese is the paper by Vikery et al. (1994) 'The management of grass pastures for brent geese'. Presented are two potential carrying capacities based upon management prescriptions studied in this paper (1,562 and 2,097 bird-days/ha). However, we note that the study cited (and therefore the figures in question) was of grassland that had been established for several years prior to the study being undertaken – as the title suggests, it was of management of grass pastures, not arable reversion as is the case at Cleve Hill. The higher bird-day figure stated depends upon the inputs of fertilizers. However, many times in Chapter 8 (Ecology) the cessation of the input of fertilizers is stated as an outcome of the change from arable, leading to improvements in the water quality and habitats of the ditches, and indirect benefits for designated sites. The application of fertilizer to achieve more bird-days would contradict the assessments made for other ecological receptors. For the reasons set out above, we consider even the lower figure of 1,562 bird-days/ha for brent geese to be overly optimistic. The actual figure, taking into account both the less intensive management prescriptions consistent with ecological assessments in Chapter 8, and the fact the site is arable reversion that is likely to take a while to 'reach condition' under these prescriptions, the actual figure is likely to be lower than this. However, even using these figures (or rather a mid-point between the two) by admission "The HMA may not be able to replace entirely the loss of foraging provision for brent geese..." (Chapter 9, Paragraph 158). Based on the assumptions made (notwithstanding we consider these unsafe), it is stated that the HMA would have the capacity to support 22.7% of the foraging requirement of the SPA population (Chapter 9, Paragraph 157). While it is not stated, based upon the figures provided for development site bird-days and SPA bird-days, the development site has supported ~32% of the foraging requirements of the SPA's brent geese. Paragraph 158 of this Chapter seeks to argue that the consistency of the HMA will offset this shortfall, compared to the present situation where the arable habitat does not provide the same foraging resource every season. However, this has already been taken into account in using	A number of sources are quoted in section 9.6 of Technical Appendix A9.1 to the ES that inform the capacity value of the Habitat Management Area for brent geese. With the appropriate management focussed on provision of resources for brent geese, the capacity value used in this chapter has been agreed in principle with Natural England. This includes the application of organic fertiliser and/or inorganic fertiliser if necessary in the AR HMA to achieve the desired outcome for geese. Chapter 8: Ecology of the ES has been modified accordingly, noting that the quantity of fertiliser applied to the land will be significantly less than the baseline arable farm environment. Re-seeded grassland is capable of supporting the higher capacity values of geese, so time lag to reach condition is not necessary. The AR HMA has been extended since PEIR from 41 ha to 56 ha to achieve a suitable area of mitigation for loss of foraging resources for brent geese. The management prescription for the AR HMA includes fertiliser application to optimise foraging conditions for geese. The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.

Respondent	Comment	Applicant Response
	mean, rather than maximum, figures. I.E., the fact that the site does not always provide foraging for brent geese, as evidenced by the survey results, has been taken into account by the use of those survey results in the calculations of development site bird-days. The Ornithology Technical Appendix states that 66.3 hectares are required for Dark-bellied brent geese, based on these metrics (Table A9.24). Comparing the stated HMA provision (22.7%) to the current provision (~32%) we are left with a reduction of approximately 10% of the foraging availability for the SPA (comparing peak-means for the site and the SPA). As stated earlier, we consider the calculations for the HMA to be overly optimistic, so this shortfall is likely to be higher, at least in the short term.	
Kent Wildlife Trust	In addition, there will be impacts from disturbance during the construction phase. This is to be offset by the establishment of grassland across the site prior to construction works commencing, providing areas of forage away from the development site. The phasing of construction across the seasons will need to take this into account. Even with this reduction, it is predicted that brent geese will be displaced from the site for a season (with the loss of forage availability that this entails). Considering the complete loss of forage ('on average') that the site provides for an entire season as a result of construction disturbance, followed by the shortfall in provision of what is likely to be >10% minimum in perpetuity, we are surprised that the assessment concludes that the impact on this feature of The Swale SPA is not significant. We disagree with this assessment.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The management prescription for the HMA includes fertiliser application to optimise foraging conditions for geese and the predicted capacity of the extended AR HMA to support brent geese has been updated during consultation and agreed in principle with Natural England. The assessment of construction disturbance on brent geese is set out in section 9.5.3.2. During the two (or possibly three) winters over which construction could occur, the HMA and other areas that are grassed but not being developed will provide some foraging opportunities for geese, but the temporary loss of resources during construction would result in an adverse effect of low magnitude that is not significant. The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.

Respondent	Comment	Applicant Response
Kent Wildlife Trust	Lapwing and Golden Plover The calculation of bird-days for Lapwing and Golden Plover is based upon a related and relevant study that looked at the carrying capacity of mixed arable farmland. However, we consider that the assessment of what can be achieved is overly optimistic, and has not taken sufficient account of the constraints and context of the HMA	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z for grassland meadow establishment (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The management prescription for the HMA includes fertiliser application to optimise foraging conditions for geese and therefore the predicted capacity of the extended HMA to support plovers and lapwings has been reduced since PEIR to be similar to that reported for mixed arable habitat, which has been agreed in principle with Natural England. The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.
Kent Wildlife Trust	Lapwing and Golden Plover feed on invertebrates in a range of open habitats. At present, it is fair to assume that they feed on invertebrates associated with the crops present at the time (phytophagous and saprophagous inverts and their predators). As stated in Paragraph 129 of the Ornithology technical Appendix, *"...abundance and availability of potential prey items present in different habitats is likely to be an important factor shaping the distribution of plovers..."*. We do not contest that switching from an arable habitat to permanent pasture will increase the forage available to plovers per hectare, but (1) this may take some time (particularly with regard to soil fauna) and (2) is likely to be constrained, both with regard to rate of increase and maximum, by management for brent geese and grazing pressure from brent geese (which will be in competition with phytophagous insects plovers feed on). While we acknowledge that a more conservative metric has been applied for years 1-5 compared to after this period, without further evidence we consider this overly optimistic. We remain unconvinced that the HMA will provide adequate mitigation for Lapwing and Golden Plover for the reasons stated above. We therefore disagree that the impacts are not significant.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The management prescription for the HMA includes fertiliser application to optimise foraging conditions for geese and therefore the predicted capacity of the extended HMA to support plovers and lapwings has been reduced since PEIR to be similar to mixed arable habitat, which has been agreed in principle with Natural England. The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.

Respondent	Comment	Applicant Response
Kent Wildlife Trust	Breeding Birds Marsh Harrier As stated in Paragraph 307 of the Ornithology chapter, the "*...core survey area and adjacent terrestrial habitats form an important foraging area for marsh harriers throughout the year.*" We also note that "Even with this mitigation however, the effect of construction activities might displace marsh harrier from nesting in the KWT South Swale reserve that borders the Development area" (paragraph 313). Regarding the statement *"In the longer term, the effect is reversible as they may be expected to nest again if they are not displaced by the presence of the operational Development.*" (paragraph 314), the may and if express the considerable uncertainty regarding the impact the solar farm may have on Marsh Harrier. This is reinforced by the statement within the assessment of habitat loss: "*...the effect on nesting birds is uncertain as there is no evidence either way in the literature regarding the effects of the presence of solar panels on the proximity of nesting marsh harriers.*" It is clear from this that, while the outcomes are uncertain, a possible impact is the loss of this "important foraging area" and nesting areas, even with the proposed mitigation. The area in question is not inconsiderable, and is a significant part of The Swale SPA. We disagree that this impact is not significant. More needs to be done to avoiding these potential impacts with regard to the proximity of solar panels to nesting habitat and width of potential foraging corridors, which is of particular concern.	Since PEIR, the offset distance from the boundary of habitats to the north of the site has been increased from a minimum of 5 m to a minimum of 15 m, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). In the majority of the site where solar panels are located, the offset between the edge of the arrays and the drainage ditch banks has been extended from 5 m to 15 m, allowing creation of large areas of lowland meadow habitat (in places extending to a width of c. 80 m) providing enhanced conditions to support prey species for marsh harrier. As described in section 9.5.3.25 of this chapter, this is expected to result in no net negative effects on marsh harrier and could result in positive effects as a result of an increased extent of suitable foraging habitat. The HRA concludes that the Development will not adversely affect the integrity of the SPA.

Respondent	Comment	Applicant Response
Kent Wildlife Trust	Skylark and Yellow wagtail As species that nest within the arable (and other open) habitats, the Skylark and Yellow Wagtail populations of the development site will lose the majority of their nesting habitat. The proposed mitigation for this is the HMA plus enhancements to the designated area to the east of this. However, given skylarks' preference for ungrazed grassland, set-aside and winter cereal (Browne et al., 20102) we are unconvinced that sufficient enhancement can be achieved to offset the impact on this species. While in theory the changes are more likely to benefit Yellow Wagtail than Skylark given slightly different habitat preferences, as mentioned earlier with regard to lapwing and Golden Plover, we are concerned that the requirements on the HMA to support so many species at a high density will result in compromises in management that may result in failure.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of grazing pasture between arrays, removal of development in Field Y/Z for lowland meadow establishment (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The assessment in section 0 of this chapter has been updated to reflect the changes and take account of the advice received in S42 responses.
Kent Wildlife Trust	We note the uncertainties regarding the overall impact on these species: "*There is some uncertainty with regards to the breeding opportunities in the areas between the solar arrays, as these species prefer more open habitats than the grassland between the arrays might provide*." (Chapter 9 Paragraph 327).	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z and extension of the HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The assessment in Chapter 9 Ornithology has been updated to reflect the changes and take account of the advice received in S42 responses.
Kent Wildlife Trust	We support the inclusion of the area of grazing marsh at to the east of the development site within the wider plans, in the interests of consistent and complementary management for wildlife, and to potentially provide enhancement measures that would be consistent with UK environmental policy. However, we reiterate our previous communication that as there exists a statutory requirement to maintain this designated site in favourable condition, it cannot meaningfully contribute to mitigation for the impacts of the solar park. We note that this is effectively stated in Paragraph 139 of Chapter 9, but in other Chapters this area is sometimes referred to separately from the HMA, and sometimes as part of the HMA.	The inclusion of the grazing marsh in the Development is not intended to provide mitigation for negative effects, but only to provide opportunity to enhance its management for the benefit of wildlife, particularly breeding and wintering birds to further the management goals of the SSSI. Clearer definitions and assessments have been provided in this chapter.

Respondent	Comment	Applicant Response
	This causes ambiguity when discussing mitigation and the final submission documents should avoid this.	
Natural England	· The development site is adjacent to The Swale Special Protection Area (SPA) and Ramsar site, and Natural England's view is that it is demonstrably functionally linked to the SPA/Ramsar by providing foraging habitat for dark-bellied brent geese, lapwing, golden plover and marsh harrier. The loss of this foraging area to the Cleve Hill Solar Park (the proposal) is likely to have a significant effect on the SPA/Ramsar. Furthermore, the construction and demolition phases are likely to lead to significant disturbance. Therefore, Natural England advises that an Appropriate Assessment will need to be carried out. It will be necessary to provide information on the mitigation measures to enable the competent authority to determine whether they are sufficient to demonstrate that an adverse effect on the integrity of the SPA/Ramsar can be avoided.	The information required to undertake the Appropriate Assessment is provided in the RIAA submitted with the DCO application.
Natural England	· Clarity is needed on the calculation of losses of functionally linked land and how this has been used to calculate the size of the habitat mitigation area. Information on the cropping regime of the development site is necessary to understand the foraging resource available over time, and to help determine which metric to use to calculate losses. In principle, the loss of arable functionally linked habitat can be mitigated by the provision of permanent grassland. However, further work is needed to determine the necessary area, and appropriate management, of the grassland.	Information on the historical crop patterns is provided in Technical Appendix A9.1. The metrics and calculations to describe the use of the Development site by brent geese, lapwings and golden plovers and the capacity of the Habitat Management Area to support them have been the subject of ongoing consultation with the Habitat Management Steering Group since PEIR. Agreement in principle on these has been reached with Natural England. They have been clearly described in section 9.6 of Technical Appendix A9.1 to the ES and in the RIAA.

Respondent	Comment	Applicant Response
Natural England	Further work is needed to determine the appropriate mitigation for potential impacts on foraging and breeding habitat for marsh harriers.	Since PEIR, the offset distance from the boundary of habitats to the north of the site has been increased from a minimum of 5 m to a minimum of 15 m, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). In the majority of the site where solar panels are located, the offset between the edge of the arrays and the drainage ditch banks has been extended from 5 m to 15 m, allowing creation of large areas of grassland habitat (in places extending to a width of c. 80 m) providing enhanced conditions to support prey species for marsh harrier. As described in section 9.5.3.25 of this chapter, this is predicted to result in no net negative effects on marsh harrier and could result in positive effects as a result of an increased extent of suitable foraging habitat. The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.
Natural England Annex	Designated nature conservation sites – further information required As detailed in the Environmental Statement (ES), the development site is in close proximity to, and has the potential to affect, the following designated sites: · The Swale Site of Special Scientific Interest (SSSI) · The Swale Special Protection Area (SPA) · The Swale wetland of international importance under the Ramsar convention (Ramsar site) · Swale Estuary Marine Conservation Zone (MCZ) Natural England considers that there could be impacts to these sites through a number of pathways, including loss of functionally linked land, noise and visual disturbance, dust, surface water quality and lighting. These are discussed in more detail below.	Potential effects on The Swale SSSI/SPA/Ramsar site are assessed in this chapter and in the RIAA. Potential effects on the Swale Estuary MCZ are scoped out of the assessment in this chapter, but are considered further in ES chapter 8 (Ecology).

Respondent	Comment	Applicant Response
Natural England Annex	Loss of functionally linked land Where SPA/Ramsar birds regularly forage on land outside the designated site, this land may be considered functionally linked to the SPA/Ramsar by providing supporting habitat. Its loss should, therefore, be considered in any in combination assessment of impacts under the Habitats Regulations. The bird surveys carried out in support of the application indicate that the development site is used by significant numbers of wintering dark-bellied brent geese (hereafter brent geese), golden plover, lapwing and breeding marsh harrier. These species are either individually named on the SPA/Ramsar citation, or are a part of the assemblage feature.	Potential effects on The Swale SSSI/SPA/Ramsar site are assessed in this chapter and in the RIAA, including detailed assessment of the loss of functionally linked land for these species.
Natural England Annex	Furthermore, JNCC's 3rd SPA Review[1] recommends that the boundaries of existing SPAs classified for dark-bellied brent geese, including The Swale, should be reviewed in order to ensure that important areas for feeding or other functional needs are included. The JNCC Review also recommends that the boundary of The Swale SPA (and other sites) is reviewed to ensure important functional areas for golden plover and lapwing are included, though it is noted that these species are not individually classified features of The Swale, but are part of the assemblage. The legal document against which the proposal should be assessed is the SPA/Ramsar citation, however the JNCC Review gives useful context to the importance of supporting habitat.	With regard to the 2016 Review, ES chapter 9 and the RIAA acknowledge the importance of functionally linked land for the qualifying interest features of The Swale SPA.

Respondent	Comment	Applicant Response
Natural England Annex	It is Natural England's advice that, without mitigation, the loss of functionally linked land would have a likely significant effect, under the Habitats Regulations, on SPA/Ramsar bird species. Therefore, an Appropriate Assessment will be needed to determine whether the mitigation proposed is sufficient to avoid an adverse effect on the integrity of the SPA/Ramsar.	A Likely Significant Effect has been assessed as a result of loss of functionally linked land in this chapter and information to inform the Appropriate Assessment is provided in the RIAA.
Natural England Annex	Dark-bellied brent geese functional land When the development site is planted with a suitable crop (winter cereals) it is clearly an important foraging resource for brent geese. For example, the peak count recorded on the development site was 3000 brent geese in January 2014[2] (compared to the peak Wetland Bird Survey (WeBS) core count of 2288 for the whole of the Swale Estuary in 2013/143). The development site is adjacent to eelgrass beds, so is in an excellent location for brent geese in that they can feed on the eelgrass at low tide, and then on winter cereals at high tide, without having to fly far and expend energy. Chapter 9, paragraph 142, describes how the use of the development site by brent geese varies with the cropping pattern and growth of the crop. Fewer geese were recorded in 15/16 as the crop grew quickly and became unsuitable and in 17/18 the development site was either left fallow or planted with winter beans and so did not provide any food for geese. Paragraph 142 goes on to compare the peak mean count of geese using arable land within the development site to the peak mean WeBS count for the Swale. Whilst these figures show that the development site is very important for geese in two out of the four seasons, it is not clear where the figures come from.	The comparison in section 9.5 of this chapter between counts of birds on the arable land and the counts of birds made by WeBS for the Swale have been amended since PEIR to show direct comparison between the peak count made during each season of baseline survey with the peak count in the Swale made by WeBS.

Respondent	Comment	Applicant Response
Natural England Annex	In principle, Natural England's view is that the loss of functionally linked arable land can be mitigated by providing an alternative area of permanent grassland.	ES chapter 9 and Technical Appendix A9.1 describe the approach to mitigating the loss of functionally linked arable land by provision of an alternative area of permanent grassland.
Natural England Annex	Natural England's view is that the amount of mitigation land should be determined by an assessment of the impacts. The goose-days metric provides an appropriate way of assessing losses against necessary mitigation. However, several different calculations of the number of goose-days are presented, based on peak or mean counts of birds. In order to determine which calculation is most appropriate, it is necessary to have information on the cropping regime for the development site.	Since PEIR, further consultations with Natural England have been undertaken regarding the appropriate metric to quantify bird use of the Development site. This is the peak-mean count as recorded by baseline surveys - or specifically, the inter-seasonal mean of the intra-seasonal monthly-peak mean. On this basis, the AR HMA has been extended since PEIR, as described this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for. The approach to quantifying use and mitigating for habitat loss, including an information on the cropping regime, is set out in Technical Appendix A9.1 and section 9.5 of this chapter.

Respondent	Comment	Applicant Response
Natural England Annex	Paragraphs 153 to 154 of Chapter 9 set out the goose-days metric for the lost arable and the new permanent grassland. These paragraphs show that, as the whole of the grassland area might not be used by geese, it only provides around half of the goose-days necessary to replace that lost. Paragraph 157 goes on to say that as the SSSI adjacent to the new permanent grassland will be enhanced, this will provide foraging habitat, which increases the number of goose-days the whole area will support. Whilst Natural England supports the intention to enhance the adjacent SSSI, this area cannot be included in any calculations of mitigation. This is because the site is already designated, is in favourable condition, and already provides a foraging resource for geese (and other birds).	The inclusion of the SSSI grazing marsh in the Development (the FGM HMA) is not intended to provide mitigation for negative effects, but only to provide opportunity to enhance its management for the benefit of wildlife, particularly breeding and wintering birds. Clearer definitions and assessments have been provided in this chapter, whereby any benefits from improved management of the SSSI is not reflected in the assessment of residual effects on IEFs. Any alteration in the management of the SSSI area will be subject to discussion and agreement with Natural England.
Natural England Annex	Therefore, the calculations in Chapter 9 point to the mitigation grassland not being large enough, and on this basis, Natural England's view at this stage is that it is not possible to conclude that an adverse effect on the integrity of the SPA/Ramsar will be avoided. However, we note the calculations of goose-days in the ornithological technical appendix, particularly Table A9.24, which indicate that the amount of mitigation grassland required depends on the management regime and the way the goose-days metric has been calculated. Therefore, we will continue to work with the applicant, and other stakeholders, through the Habitat Management Steering Group (HMSG) to advise on the mitigation necessary.	The AR HMA has been extended since PEIR to approximately 56 ha (c. 50.1 ha functionally available), as described this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for. The approach to quantifying use and mitigating for habitat loss (set out in Technical Appendix A9.1 and section 9.5 of ES chapter 9), including consideration of field use and disturbance distances, has been consulted upon with Natural England.

Respondent	Comment	Applicant Response
Natural England Annex	Golden plover and lapwing functional land The arable land within the development site is also used by golden plover and lapwing, though conversely to the brent geese, these species were more numerous in the winters of 2015/16 and 17/18. The same area of permanent grassland is proposed to mitigate for losses of wader functional habitat. In principle this is acceptable, though Natural England would welcome further discussion, though the HMSG, as to whether the optimal management required for brent geese will also provide conditions suitable for foraging waders.	Technical Appendix A9.1 sets out in detail the rationale for the management and capacity of the AR HMA. Based on the literature review and discussions with Natural England, the proposed management of the AR HMA will be primarily focussed on provision of resources for brent geese. The same area also provides for waders, but since PEIR, the expected capacity of the grassland to support lapwing and golden plover has been reduced in the analysis of area required in the AR HMA, such that it is no more than that of mixed arable land.
Natural England Annex	Marsh Harrier functional land The flight activity surveys carried out, and illustrated in figure A9.34 of the ornithology technical appendix, demonstrate that the development site, and particularly the ditch habitat, is used by foraging marsh harrier. Improvements to the ditches and their margins are proposed to benefit foraging marsh harriers (Chapter 9, paragraph 315). However, it is uncertain as to whether marsh harrier will continue to forage along the entire length of the ditches given the presence of the solar panels creating a corridor effect. Whilst parts of these corridors are wide, there are pinch points where the solar panels are closer, and it is uncertain whether these will have a barrier effect.	Since PEIR, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), in the majority of the site where solar panels are located, the offset between the edge of the arrays and the drainage ditch banks has been extended from 5 m to 15 m, allowing creation of large areas of lowland meadow habitat (in places extending to a width of c. 80 m) providing enhanced conditions to support prey species for marsh harrier. Marsh harriers are expected to continue to forage in these areas. As described in section 9.5.3.25 of this chapter, this is predicted to result in no net negative effects on marsh harrier and could result in positive effects as a result of an increased extent of suitable foraging habitat.

Respondent	Comment	Applicant Response
Natural England Annex	Paragraphs 317-318 of Chapter 9 state that marsh harriers breed within the adjacent KWT reserve, and that it is uncertain whether these birds will be displaced as a result of the presence of the solar panels within 10m of parts of the reserve. Therefore, Natural England's view is that there is likely to be a significant effect on breeding and foraging marsh harriers and an Appropriate Assessment will be necessary. At this stage, our view is that it is uncertain whether an adverse effect on integrity of the SPA/Ramsar can be avoided. However, we will continue the helpful discussions we have had on this point through the HMSG.	A Likely Significant Effect has been assessed for marsh harriers in section 9.5 of this chapter and information to inform the Appropriate Assessment is provided in the RIAA. Since PEIR, the offset distance from the boundary of habitats to the north of the site has been increased such that the minimum distance between the KWT reserve boundary and the solar panels is 20 m, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives).
Natural England Annex	Noise and visual disturbance The birds for which The Swale SPA, Ramsar and SSSI are designated are susceptible to disturbance from noise, which may impact their energy budgets by causing them to cease feeding, or fly away from the source of disturbance. Loud, intermittent noise, for example produced by percussive piling, is particularly disturbing to birds. Evidence gathered by the Institute of Estuarine and Coastal Studies (IECS) suggests that birds begin to react (heads-up, alarm calls) to a noise level of above 50dB and that moderate to high disturbance (birds moving away) occurs above 70 dBA (Cutts *et al*. 2009). Although potentially a useful rule of thumb, the authors recognise that this is a relatively simplistic approach as it does not take into account the type of disturbance nor the sensitivity and prior experience of the birds. Furthermore, as the derivation of this threshold seems to be largely related to studies of noise disturbance associated with construction works on the Humber Estuary, it is probably most relevant to locations which already experience relatively high levels of background noise. Evidence collected from monitoring work associated with construction disturbance undertaken on the Humber Estuary has either been carried out outside the sensitive season, when there are low numbers of birds present; or when the competent	Further assessment of construction noise has been undertaken in ES chapter 12 (Noise) which are reflected in section 9.5 of this chapter and in the RIAA, including amendments to the threshold levels at which bird disturbance might occur. New measures have been introduced since PEIR to mitigate potentially adverse effects, including an outline SPA Noise Construction Management Plan and Breeding Bird Protection Plan.

Respondent	Comment	Applicant Response
	authority has already determined that the proposed works will not adversely affect the integrity of the designated site. Given these limitations it is not recommended that the 70dB threshold is used as a generic threshold for noise levels which result in moderate to high disturbance of birds. Natural England advises that a potentially more suitable approach is to assess the change in noise levels, both continuous noise and sporadic noise. A difference of 3 dBA in similar types of noise is just distinguishable to people, so it is reasonable to assume that if the change in noise is no more than 3dB it is unlikely to be significant. Chapter 9, paragraph 105, states that birds using the intertidal habitat adjacent to the development site will not experience noise above 70 dB L_{Aeq} and therefore are unlikely to be disturbed. As noted above, Natural England does not recommend using this threshold, but advocates an assessment of the change in the noise levels, both continuous noise (dB L_{Aeq}) and sporadic noise (dB L_{Amax}).	
Natural England Annex	Natural England notes that Chapter 9, paragraph 110, states parts of the designated site on the landward side of the seawall support species that are important parts of the breeding bird assemblage of the SPA, including marsh harrier. Furthermore, little terns have attempted to breed at Castle Coote, within the Kent Wildlife Trust reserve. Therefore, impacts on breeding and wintering birds may occur during construction (and demolition) and should be assessed and mitigation measures included if necessary. We note that noise mitigation measures will be included in the Construction Environment Management Plan (CEMP), along with a Breeding Bird Protection Plan, though these are not yet included in the draft CEMP at Appendix A10.2. We also note that Chapter 12, paragraph 114, recommends the use of acoustic screening to reduce construction disturbance to ecological receptors.	Further assessment of construction noise has been undertaken in ES chapter 12 (Noise) which are reflected in section 9.5 of this chapter and in the RIAA, including amendments to the threshold levels at which bird disturbance might occur. New measures have been introduced since PEIR to mitigate potentially adverse effects, including an outline SPA Noise Construction Management Plan and Breeding Bird Protection Plan.

Respondent	Comment	Applicant Response
Natural England Annex	Dust, surface water quality and lighting Other than noise disturbance, construction impacts could include dust deposition, water quality impacts and disturbance from lighting. The draft CEMP at Appendix A10.2 addresses some of these issues, but Natural England would wish to see all necessary mitigation included in the final version of the document	Further assessment of potential impacts of dust emissions, changes in water quality and lighting have been undertaken in this chapter and in the RIAA. All necessary measures to mitigate adverse effects have been set out in the Outline CEMP (Technical Appendix A5.4).
RSPB	The RSPB welcomes the opportunity to comment on the Preliminary Environmental Information Report (PEIR) for the Cleve Hill Solar Park in Kent. Our primary area of concern in responding to this consultation is to ensure: · appropriate recognition is afforded to the internationally important coastal habitats, and the waders, wildfowl and seabirds these support within and adjacent to the development area · A full understanding of the impacts of the development on those nature conservation interests; · Appropriate measures identified to avoid, reduce or, where necessary, compensate for those impacts.	The importance of the bird populations associated with The Swale SPA/SSSI/Ramsar Site is recognised. This chapter and the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.
RSPB	Nature conservation value of the area As the PEIR acknowledges, the proposed development is located adjacent in an area of high nature conservation value. In particular, it is adjacent to the following protected areas: · The Swale Special Protection Area (the SPA) · The Swale Ramsar site (the Ramsar site) and · The Swale Site of Special Scientific Interest (the Swale SSSI)	The importance of the bird populations associated with The Swale SPA/SSSI/Ramsar Site is recognised. This chapter and the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.
RSPB	Comments on the Preliminary Environmental Information Report (PEIR) Our detailed comments on the PEIR are set out in the attached annex and the key issues summarised below under the following headings: · Designated sites · Potential impacts on nature conservation interests · Mitigation: consideration of management of land within The Swale SPA/Ramsar site	No comment required

Respondent	Comment	Applicant Response
RSPB	Designated sites The RSPB welcomes the recognition given in the PEIR (ES chapter 9, section 9.3.1) to the national and international importance of the Swale estuary for nature conservation, in particular its breeding, passage and wintering bird populations. The information provided in Table 9.4 (page 9-16) and subsequent paragraphs is a fair summary of the qualifying features of these protected areas. However, the PEIR omits reference to additional pertinent information contained in 2001 and 2016 reviews of the UK Special Protection Area (SPA) network. Details of the most relevant information that should be taken in to account in preparing the ES to accompany the DCO is provided in the annex section.	Reference to the 2001 and 2016 JNCC SPA Reviews have been included in this chapter and the RIAA.
RSPB	Potential impacts on nature conservation interests We welcome the effort that has been put in collecting data during 4 winters and 3 breeding seasons as well as flight patterns for the proposed site. We are content with the methodologies and surveys undertaken to assess the impacts of the development site on SPA designated features.	No comment required
RSPB	However Further discussion is needed regarding the analysis and interpretation of this data as well as further references and clarity on assumptions carried out to determine the ecological requirements of these species and, therefore, the necessary amount of land required to accommodate displaced dark bellied brent, lapwing and golden plover.	The metrics and calculations to describe the use of the Development site by brent geese, lapwings and golden plovers and the capacity of the Habitat Management Area to support them have been the subject of ongoing consultation with the Habitat Management Steering Group since PEIR. Agreement on these has been reached with Natural England. They have been clearly described in section 9.6 of Technical Appendix 9.1 to the ES.

Respondent	Comment	Applicant Response
RSPB	*Mitigation: consideration of management of land within The Swale Special Protection Area/Ramsar site* It has been suggested that land within the current SPA/Ramsar site/SSSI could be considered as mitigation for the impacts of the development. We strongly urge caution in pursuing this. It is the RSPB's view that in respect of management of land within an existing SSSI (or SPA, Ramsar site etc) there are extremely narrow circumstances when it would be possible to consider such an approach. This is because the operating assumptions are that such protected areas are either in favourable condition (and cannot be further improved) or in unfavourable condition and will be subject to remedies agreed with Natural England to restore the site to favourable condition. Before any further consideration can be given to the use of this land, it is the RSPB's view that a set of actions would be required in order to demonstrate, with robust evidence, that it would be possible to implement management measures that enable the land to be "enhanced" above favourable condition (these action are described in the annex sections). Separately, Natural England would need to provide an updated condition assessment of the relevant parts of the SPA/Ramsar site/SSSI.	The inclusion of the grazing marsh in the Development is not intended to provide mitigation for negative effects, but only to provide opportunity to enhance its management for the benefit of wildlife, particularly breeding and wintering birds. Clearer definitions and assessments have been provided in this chapter.
RSPB	We also consider that further legal analysis is required to determine whether or not the envisaged measures are properly considered as mitigation or compensation, and how this should be considered within any Habitats Regulations Assessment.	The Development can be distinguished from the project which was the subject of the ECJ ruling in Grace and Sweetman v An Bord Pleanala (Case C164/17) as both the habitat loss and the mitigation for the Development affect land outside the European Site. This is not on "all fours" with the factual matrix in Sweetman. In Sweetman, the lost habitat was part of the SPA, and the compensatory measures were also within the SPA. Habitat outside an SPA, even if functionally linked and relevant to assessing impacts on qualifying features within an SPA, should not be treated equivalent to habitat inside an SPA. There is also a high degree of confidence (no reasonable scientific doubt), with agreement in principle with Natural England, that the managed grassland is an effective measure

Respondent	Comment	Applicant Response
		that will mitigate (avoid) the impact. As the ECJ found in Sweetman, compensatory measures are inherently uncertain (i.e., there is reasonable scientific doubt), which is not the case with the AR HMA.
RSPB	Therefore the RSPB remains concerned about this development and its impacts on the SPA, Ramsar site and SSSI until further information and clarifications are made available. As it stands, we do not agree that the current proposals enables a conclusion of no adverse effect on the integrity of the SPA/Ramsar site or SSSI.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of grazing marsh pasture between solar PV arrays, removal of development in Field Y/Z for the LGM HMA and extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.
RSPB Annex	As set out above, we have set our detailed comments in an annex and consider these will help ensure that robust evidence is presented so that the potential environmental impacts can be properly understood and evaluated and appropriate measures identified to avoid, reduce or, where necessary, compensate for those impacts. Annex: RSPB detailed comments on Preliminary Environmental Information Report (PEIR) This annex sets out the RSPB's detailed comments on the Cleve Hill Solar Farm PEIR as follows: · Designated sites · Potential impacts on nature conservation interests, including measures to avoid, reduce or compensate o Construction noise impacts o Impacts on Dark-bellied brent goose (DBBG) foraging grounds o Impacts on wintering golden plover and lapwing foraging grounds o Mitigation: consideration of management of land within The Swale Special Protection Area, Ramsar site and Site of Special Scientific Interest	No response required.

Respondent	Comment	Applicant Response
RSPB Annex	Overall, the RSPB is concerned at the implications of the scheme for features of the SPA, Ramsar site and SSSI. Our starting point is that there should be no loss of habitat from the SPA/Ramsar site/SSSI or functionally linked habitat. Without prejudice to that position, we strongly recommend that the key measures, such as the wildlife refuge are provided in a manner that effectively address the impacts of this project on features of the protected areas.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of grassland between arrays, removal of development and proposal for lowland grassland meadow in Field Y/Z (LGM HMA) and extension of the AR HMA, as described in ES chapter 4 (Site Selection, Development Design and Consideration of Alternatives).
RSPB Annex	Designated sites The RSPB welcomes the recognition given in the PEIR (ES chapter 9, section 9.3.1) to the national and international importance of the Swale estuary for nature conservation, in particular its breeding, passage and wintering bird populations. As Table 9.4 recognises, the coastal habitats immediately adjacent to the proposed solar farm are, among other things, designated as: · The Swale Special Protection Area (the SPA) · The Swale Ramsar site (the Ramsar site) · The Swale Site of Special Scientific Interest (the Swale SSSI). The information provided in Table 9.4 and subsequent paragraphs is a fair summary of the qualifying features of these protected areas.	No response required.

Respondent	Comment	Applicant Response
RSPB Annex	However, the PEIR omits reference to additional pertinent information contained in the following reviews of the UK SPA network: · 2001 UK SPA Review · 2016 UK SPA Review	The 2001 and 2016 JNCC SPA Reviews have no legal standing but provide useful frame of reference for important features of The Swale SPA. Details from the 2001 and 2016 UK SPA Reviews have been included in the RIAA. With regard to the 2001 Review, Important Ecological Features have been appropriately identified in ES chapter 9 and the RIAA considers the relevant qualifying interest features that have been agreed in consultation with Natural England. With regard to the 2016 Review, ES chapter 9 and the RIAA acknowledge the importance of functionally linked land for the qualifying interest features of The Swale SPA.
RSPB Annex	Below we give a brief description of the most relevant information that should be taken in to account in preparing the ES to accompany the DCO. 2001 UK SPA Review The site account for the Swale identified additional qualifying features that should be considered: Breeding: Avocet Marsh Harrier Mediterranean Gull Non-breeding: Avocet Bar-tailed godwit Black-tailed godwit Golden plover	The 2001 Review has no legal standing in terms of the requirements of the Habitats Regulations but provide a useful frame of reference for important features of The Swale SPA. Important Ecological Features have been appropriately identified in section 9.5.1 of this chapter and the RIAA considers the relevant qualifying interest features discussed in consultation with Natural England.

Respondent	Comment	Applicant Response
	Grey plover Hen harrier Knot Ringed plover (passage) Pintail Redshank Shoveler	
RSPB Annex	We draw attention to the fact that breeding marsh harrier and wintering golden plover are identified as qualifying features as these are some of the key species likely to be impacted by the proposed solar farm.	Breeding marsh harrier and wintering golden plover have been assessed in ES chapter 9 as qualifying interest features within the breeding and wintering bird assemblages of the Swale SPA.

Respondent	Comment	Applicant Response
RSPB Annex	2016 UK SPA Review Among other things, the most recent review of the UK SPA network reviewed whether the current SPA network provided adequately for species' ecological functions. In particular this considered the issue of whether the species relied on cropped habitats (e.g., arable farmland, improved grassland) outside the current SPA boundary. The 2016 UK SPA Review identified 17 species1 that required a review of the boundaries of some or all of the SPAs classified for them to ensure the sites' adequately provide for their ecological functions. This is relevant to the Swale SPA as the review identified the need for Natural England to review the adequacy of the Swale SPA boundary for the following non-breeding species: · European white-fronted goose · Dark-bellied brent goose · Golden plover · Lapwing · Curlew. Given the importance of the Cleve Hill site for at least three of these SPA species (dark-bellied brent goose, golden plover, lapwing), the RSPB would expect Natural England to be including it as part of their area of search for any future SPA extension for these species.	The 2016 JNCC UK SPA Review has not yet been implemented and therefore has no legal standing. The assessment in this chapter recognises that the Development site provides functionally linked land important to some of the qualifying interest species of the SPA, particularly dark-bellied brent goose, lapwing and golden plover.
RSPB Annex	**Potential impacts on nature conservation interests, including measures to avoid, reduce or compensate** Our comments below concentrate on the impacts on the wintering DBBG, golden plover and lapwing features of the SPA, Ramsar site and SSSI. These focus on the approach to assessing the importance of the Cleve Hill site for these species, the predicted impacts and the adequacy of the habitat management measures to address those impacts, including the Habitat Management Area (HMA).	No response required

Respondent	Comment	Applicant Response
RSPB Annex	The HMA comprises 41ha as mitigation for functionally linked habitat for DBBG, golden plover and lapwing. The PEIR highlights that only a fraction of this area will effectively be available for foraging by DBBG and a minimum of 64.6ha is required to mitigate for foraging habitat for golden plover and lapwing. We therefore consider the 41ha of HMA being proposed to be insufficient.	The AR HMA has been extended since PEIR, as described this chapter and in ES chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site based on the highest survey counts each month is provided for. Areas required for lapwing and golden plover are not additional but can be co-located (the rationale is set out in Technical Appendix A9.1).
RSPB Annex	We are also aware that the Kent Wildlife Trust will be raising concerns relating to, among other things, breeding marsh harrier and defer to them on that species. As noted above, this species has been identified as requiring addition to the SPA's features.	Breeding marsh harrier has been assessed in section 0 as a qualifying interest feature of The Swale SPA in view of its component part of the breeding bird assemblage qualification.
RSPB Annex	Construction noise impacts While we agree with the conclusion on operational noise being unlikely to cause permanent and significant levels of disturbance to wintering birds we remain cautious regarding the impacts of construction noise until detailed mitigation measures are made available as part of the CEMP.	Further assessment of construction noise has been undertaken in section 9.5 of this chapter 9 and new measures introduced since PEIR to mitigate potentially adverse effects, including an Outline SPA Construction Noise Management Plan.
RSPB Annex	We are particularly concerned with the noise impacts on DBBG, golden plover and lapwing foraging on grazing marsh at the east end of the site which is within the SSSI/SPA/Ramsar site - as mentioned in paragraph 114, page 9-34 of the PEIR - as well as the impacts on the wildlife refuge area which needs to be available for DBBG, golden plover and lapwing to forage on.	An assessment of construction noise on this area is provided in section 9.5 of this chapter and in the RIAA.

Respondent	Comment	Applicant Response
RSPB Annex	Impacts on dark bellied brent goose (DBBG) foraging grounds The key issues to address are: · Understanding the importance of the Cleve Hill site for the DBBG from the SPA/Ramsar site, including: o The temporal and spatial use of the site by DBBG; o Agreeing on a methodology to express use and importance and assess the impacts of the development o Using that to identify the habitat measures required to address the predicted impacts.	An assessment of impacts on dark-bellied brent goose is provided in section 9.5 of this chapter and in the RIAA. It includes the rationale and approach to quantifying and mitigating the potential effects of habitat loss/change.
RSPB Annex	In light of this, we set out our comments on the PEIR below. Paragraph 142, page 9-37 of the PEIR: calculating importance of development site in respect of SPA/Ramsar site population In the bullet point section the number of birds using arable land were of peak mean counts while the number for The Swale were highest counts for the NNR and not for the WEBS counts. The correct number to make this assessment should be the following: · 2013/14: 2,000 birds in arable land compared to 2,280 in the Swale = 87% · 2014/15: 3,400 birds in arable land compared to 1,418 in the Swale = 240% · 2015/16: 370 birds in arable land compared to 3,326 in the Swale = 11% · 2017/18: 1,740 birds in arable land, Swale WeBS count currently unknown, but likely to be <50%.	The comparison in section 9.5 of this chapter between counts of birds on the arable land and the counts of birds made by WeBS for the Swale have been amended since PEIR to show direct comparison between the peak count made during each season of baseline survey with the peak count in the Swale made by WeBS.

Respondent	Comment	Applicant Response
RSPB Annex	On average, during the 3 years for which there is data available to calculate the percentage of SPA/Ramsar site population using the development site the site has hosted 82% of the DBBG SPA/Ramsar site population. However in paragraph 157 it is stated that the HMA will only provide for 22.7% of the SPA population with no further explanation or evidence on why the consultants think this is reasonable.	The quantification of bird use of the Development site has not been made simply on the basis of the highest peak count each season, but on the basis of a precautionary average measure of use as recorded by baseline surveys - specifically, the inter-seasonal mean of the intra-seasonal monthly-peak mean. The AR HMA has been extended since PEIR, as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for. The approach to quantifying use and mitigating for habitat loss (set out in Technical Appendix A9.1 and section 9.5 of ES chapter 9this chapter) has been consulted upon and agreed in principle with Natural England.

Respondent	Comment	Applicant Response
RSPB Annex	Paragraph 144, page 9-38 of the PEIR: implications of disturbance distances for amount of functionally available land As noted above, the HMA currently has a gross area of 41ha (which we consider insufficient for reasons set out elsewhere). However, it is the net area of functionally available land that it is critical to understand. This requires careful consideration of known factors affecting the spatial use of otherwise suitable land by DBBG, golden plover and lapwing. Key factors will include: disturbance distances, sightlines, topography, field shape and size, food supply. These will influence the overall land requirement and almost certainly require a larger area in order to ensure the functionally available land is sufficient to meet the ecological requirements of the SPA species.	The AR HMA has been extended since PEIR, as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for. The approach to quantifying use and mitigating for habitat loss (set out in Technical Appendix A9.1 and section 9.5 of ES chapter 9), including consideration of field use and disturbance distances, has been consulted upon and agreed with Natural England.
RSPB Annex	For example, while we appreciate the reference to the IECS tool kit Meer (1985) has found that the distance at which brent geese changed their behaviour (in reaction to a disturbance event) before actually flying off was as much as 95% greater than the flight distance (205m and 105m respectively). Disturbance can be defined as "any situation in which a bird behaves differently from its preferred behaviour" and not only when a bird is observed flying off.	The reference to the IECS Toolkit is made in relation to construction disturbance. A thorough literature review of noise thresholds and distances is made in section 9.5.2.1 of this chapter and the effect of disturbance to brent geese is assessed in section 9.5.3.2 of this chapter. Operational disturbance is scoped out of detailed assessment as significant effects are unlikely to occur.
RSPB Annex	Paragraph 107, page 9-37 of the A9.1 appendix: methodological approaches to the use of bird days We recognise the application of bird days as presented in the report could be considered a precautionary approach to assessing the potential impacts of a project such as this one. This is because it appears to assume that the geese (and other species) are present every day throughout their winter period. In the absence of a detailed survey to determine day-to-day usage at a field level, this is a reasonable approach.	No response required.

Respondent	Comment	Applicant Response
RSPB Annex	However, we consider further work is required to ensure a fuller understanding of the true value of the land for DBBG (as well as golden plover and lapwing). For this reason at this stage we consider it would be prudent to analyse the data using the mean of seasonal monthly peak mean counts instead of the mean of seasonal means which has implications for the area of HMA required. As we set out elsewhere, we consider the PEIR significantly underestimates the area required to provide sufficient functionally available land.	The mean of seasonal monthly peak mean counts has now been used in this chapter to provide a precautionary measure of the use of the Development site. The approach to quantifying use and mitigating for habitat loss (set out in Technical Appendix A9.1 and section 9.5 of this chapter) has been consulted upon and agreed in principle with Natural England. As a result, the AR HMA has been extended since PEIR, as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for.
RSPB Annex	We also wish to explore other metrics such as means with upper and lower confidence levels so that the variance of counts between years and months can be assessed. This is a standard metric used in offshore windfarms data analysis with which RSPB has experience.	Variance in the means was not considered necessary as the analysis is based on the peak counts each month, which provides for a precautionary measure of use.
RSPB Annex	Paragraph 123, page 9-40 of the A9.1 appendix: use of clover mix While we welcome the use of clovers (Trifolium sp.) at the wildlife refuge area for the purposes of calculating the amount of area needed, the RSPB is discounting this factor as there is no precise data on how much carrying capacity this grass mix will support.	The literature review of the management of grassland to support geese indicates that clover will increase its carrying capacity; however, no allowance for such a potential increase in capacity was included in the analysis in the PEIR and there is no inclusion of increased capacity from clovers in the quantification of required mitigation grassland area in the assessment in this chapter and the RIAA.

Respondent	Comment	Applicant Response
RSPB Annex	Paragraph 120/1/2, page 9-40 of the A9.1 appendix: Carrying capacity calculation and area needs for DBBG As mentioned during our Habitat Management Board meeting the RSPB would prefer that the HMA is managed without the use of fertilizers including nitrogenous in order to secure improvements to water quality. This means that the reliance placed on the use fertilisers should be discounted as unsafe.	In consultation with Natural England, the assessment in this chapter places emphasis on the need to mitigate primarily for brent geese. The ideal grassland management for brent geese includes the application of fertiliser; however, the proposed management as set out in detail in Technical Appendix A9.1, is for application of organic fertiliser, which is restricted in spatial application in fields to avoid spreading near the field boundaries. The net application of fertiliser across the Development site will be considerably reduced compared with the current arable farming management.
RSPB Annex	Having in consideration that we are discounting the use of clover and fertilizers, the maximum carrying capacity possible to achieve according to the scientific refers provided in these paragraphs would be 2,250 goose-days per hectare (Owen, 1977)3. In the RSPB's experience, while we agree that a heavily gazed grassland could provide such carrying capacity the reality of implementing such a regime in an optimum fashion is challenging and therefore we would consider it prudent to use the figure of 1,908 goose- day per hectare (Round, 1982)4 as the maximum carrying capacity figure.	Technical Appendix A9.1 sets out in detail the rationale for the management and capacity of the AR HMA. Based on the literature review and discussions with Natural England, the proposed management of the AR HMA will be primarily focussed on provision of resources for brent geese, including application of organic fertiliser, such that a capacity of 2,097 goose-days per hectare is achievable.

Respondent	Comment	Applicant Response
RSPB Annex	In this case, using the total peak mean bird days provided on table A9.23 of the A9.1 appendix (103,590 bird days) the minimum area needed to mitigate for the loss of functionally linked habitat to DBBG would be 54ha of functionally available land. This significantly exceeds the 41ha being proposed as HMA.	The AR HMA has been extended since PEIR to approximately 56 ha (c. 50.1 ha functionally available), as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for. The approach to quantifying use and mitigating for habitat loss (set out in Technical Appendix A9.1 and section 9.5 of this chapter), including consideration of field use and disturbance distances, has been consulted upon and agreed in principle with Natural England.
RSPB Annex	Paragraph 154, page 9-40 of the PEIR: geese avoidance issues It is mentioned in this paragraph that the geese might avoid areas close to the solar panels. The RSPB considers it crucial to determine the likelihood and the extent of this avoidance in order to accurately determine the area effectively available for foraging. A figure of 100m is suggested for avoidance and we would welcome a scientific reference that could confirm such distance.	Technical Appendix A9.1 sets out in detail the rationale for the management and capacity of the AR HMA, including a review of literature in relation to set-back distances from anthropogenic boundary features. This determined that there would be reduction in density of birds within 50 m of boundary features such that approximately 50 ha of the 56 ha AR HMA is functionally available.
RSPB Annex	It is also mentioned that only a fraction of the HMA will be used by the geese based on the usage recorded during the surveys i.e., DBBG were observed to only use land within 300m and occasionally 500m of the seawall and that as a consequence only approximately 29 ha would be available to DBBG. It is important to understand what factors are giving rise to this behaviour e.g., sightlines, topography, food supply, and whether this is typical behaviour for DBBG on the Swale. It clearly undermines the value of the HMA and emphasises the need for a much greater area of suitable habitat.	Technical Appendix A9.1 sets out in detail the rationale for the management and capacity of the AR HMA. Following further literature review and consultation with Natural England, as well as other anecdotal information, it was concluded that all fields within the HMA would be available to brent geese.

Respondent	Comment	Applicant Response
RSPB Annex	The RSPB expects the HMA to be a minimum of 54ha functionally available for foraging by DBBG and not an area which is only partially available.	The AR HMA has been extended since PEIR to approximately 56 ha (c. 50.1 ha functionally available), as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for. The approach to quantifying use and mitigating for habitat loss (set out in Technical Appendix A9.1 and section 9.5 of this chapter), including consideration of field use and disturbance distances, has been consulted upon and agreed in principle with Natural England.
RSPB Annex	The developer will also need to consider the possibility that DBBG might choose not to use the HMA and a provision will be required to provide land elsewhere in The Swale area.	A monitoring plan and ongoing consultation with the HMSG during the operational phase will allow for adaptive management of the AR HMA.
RSPB Annex	Impacts on wintering golden plover and lapwing foraging grounds Paragraph 133, page 9-43 of the A9.1 appendix: Carrying capacity calculation and area needs for lapwing and golden plover While we agree that the same HMA will be able to accommodate for the foraging needs of DBBG and golden plover/ lapwing under the correct management regime the same cannot be said for golden plover and lapwing. Table A9.26 shows that lapwing will need 45.6ha and golden plover 19.3ha meaning that during the first 5 years a total of 64.6ha functionally available for foraging will be required to mitigate for the functionally linked habitat of these two species.	The AR HMA has been extended since PEIR, as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives), to provide additional resources for brent geese, lapwing and golden plover in the long term, such that a precautionary average measure of use of the site is provided for. Areas required for lapwing and golden plover are not additional but can be co-located because the underlying data the capacities are based on are of counts of lapwing and golden plover in the same area (the rationale is set out in Technical Appendix A9.1).

Respondent	Comment	Applicant Response
RSPB Annex	Mitigation: consideration of management of land within The Swale SPA/Ramsar site/SSSI Discussions between the developer, the RSPB, Kent Wildlife Trust and Natural England have considered the possibility of including land to the east of the development site and located within the SPA and SSSI. The discussion centred around whether or not it was both practicable and desirable to carry out management measures of the semi-improved grassland to support SPA non-breeding birds displaced from the Cleve Hill site, specifically: dark-bellied brent goose, golden plover and lapwing.	No response required.
RSPB Annex	The RSPB is working on the basis that the land being considered corresponds to units 49 and 63 of the Swale SSSI.	Yes, the area identified in this chapter and ES chapter 4 (Site Selection, Development Design and Consideration of Alternatives) for the FGM HMA comprises two SSSI units: S15 M Attwood Cleve Marsh (049) and Cleve Marsh West (063).
RSPB Annex	It is the RSPB's view that in respect of management of land within an existing SSSI (or SPA, Ramsar site etc) there are extremely narrow circumstances when it would be possible to consider it. This is because the operating assumptions must be: · The protected area is in favourable condition and therefore there is no additional management that would improve its condition; or · The protected area is in unfavourable condition and therefore Natural England would be working with the landowner or manager to put in place the remedies to restore the land to favourable condition In both circumstances, it would not be possible for a developer to demonstrate "additionality" to that which is already required to ensure the protected area is restored to or maintained at favourable condition. The narrow circumstances referred to relate to situations where it is possible to demonstrate, with robust evidence, that it would be possible to implement management measures that enable the land to be "enhanced" above favourable condition such that: · it address the predicted adverse impacts arising from the development; and · does so without causing harm to the qualifying features of the existing designated site(s).	The inclusion of the SSSI grazing marsh in the Development (the FGM HMA) is not intended to provide mitigation for negative effects, but only to provide opportunity to enhance its management for the benefit of wildlife, particularly breeding and wintering birds. Clearer definitions and assessments have been provided in this chapter, whereby any benefits from improved management of the SSSI is not reflected in the assessment of residual effects on IEFs.

Respondent	Comment	Applicant Response
	Current condition of units 49 and 63 of the Swale SSSI The RSPB has reviewed the latest available information from Natural England with regards the condition of units 49 and 63. The condition assessment was last carried out on 28 January 2009. It states both units comprise semi-improved grassland and are in favourable condition. During meetings between the developer, the RSPB, Kent Wildlife Trust and Natural England, the view was expressed by both KWT and NE that units 49 and 63 were no longer in as good a condition as they had been previously, although no reference was made to whether or not they still met the standards for favourable condition. Therefore, before any further consideration can be given to the use of units 49 and 63, it is the RSPB's view that the following actions would be required: · Natural England to update its condition assessment for units 49 and 63 of The Swale SSSI; · The developer to: o set out the management measures it proposes would be required to address the predicted adverse impacts on the SPA/Ramsar site/SSSI arising from the development; o present robust scientific evidence that those measures would be capable of providing the necessary additionality; and o present robust scientific evidence that this additionality can be provided without causing harm to the relevant protected areas and their qualifying features i.e., the SPA, the Ramsar site and the Swale SSSI.	
RSPB Annex	Legal considerations In addition to our comments and concerns set out above, it will be important to consider the legal status of such management measures i.e., are they properly described as mitigation or compensation. This is important in terms of how the Habitats Regulations Assessment is carried out. The scenario being described is unusual and therefore needs to be thought through carefully.	The assessment presented in ES chapter 9 is clear that there is no loss of habitat within the Natura 2000 site. Loss/change of habitat is restricted to areas of functionally linked land, where mitigation, rather than compensation is applicable. The Development can be distinguished from the project which was the subject of the ECJ ruling in Grace and Sweetman v An Bord Pleanala (Case C164/17) as both the habitat loss and the mitigation for the Development affect land outside the European Site. This is not on "all fours" with the factual matrix in Sweetman. In Sweetman, the lost habitat was part of the SPA, and the compensatory measures were also within the SPA.

Respondent	Comment	Applicant Response
	The European Court of Justice has been clear in its judgments that where the loss of habitat within a Natura 2000 site mean an adverse effect cannot be ruled out, then habitat management measures elsewhere within the same Natura 2000 site are properly considered compensation. This is because nothing can be done to avoid the adverse effect. In this case, the predicted effect comprises the loss of currently non-SPA habitat used by significant numbers of SPA birds and will result in the displacement of those birds. This is predicted to result in an adverse effect on the birds themselves. Therefore, further legal analysis is required to determine whether or not the envisaged measures are properly considered as mitigation or compensation, and how this should be considered within any Habitats Regulations Assessment.	Habitat outside an SPA, even if functionally linked and relevant to assessing impacts on qualifying features within an SPA, should not be treated equivalent to habitat inside an SPA. There is also a high degree of confidence (no reasonable scientific doubt), with agreement in principle with Natural England, that the managed grassland is an effective measure that will mitigate (avoid) the impact. As the ECJ found in Sweetman, compensatory measures are inherently uncertain (i.e., there is reasonable scientific doubt), which is not the case with the AR HMA.
Swale Friends of the Earth	We also note – and welcome –the measures proposed for embedded mitigation and habitat enhancement, such as new grassland and wildflower planting, new native species hedgerow planting, tree planting in the shelterbelts, native scrub buffer planting areas and the protection of and enhancement of ditches, which will benefit insects, amphibians, birds, and the water vole population. We would urge this to be maximised and to follow the recommendations of KWT, Natural England and the RSPB in this respect, and we would want to see these plans protected through a condition in the planning consent.	KWT, Natural England and the RSPB are part of a Habitat Management Steering Group that has been actively engaged with the Applicant since March 2018.
Swale Friends of the Earth	perch-hunt." However, this is based on the typical south-facing design and there is no comment on if this applies to the proposed east-west design or the layout for this project. We would like to see greater analysis of the pros and cons of east-west orientation versus the typical south-facing design with regard to impact on biodiversity and wildlife, as this is our major concern.	The assessment in this chapter is made on the basis of the proposed east-west design. Consideration of alternatives is presented in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives).

Respondent	Comment	Applicant Response
Swale Green Party	"When considering site selection for utility scale solar developments it is generally agreed that protected areas should be avoided. This is reflected in the scientific literature where modelling approaches include many factors such as economic considerations and visual impact but also often avoid protected areas such as SPAs. This is echoed by organisations such as Natural England and the RSPB that recommend that solar PV developments should not be built on or near protected areas." (p 40. emphasis added.) [Natural England (2016). Evidence review of the impact of solar farms on birds, bats and general ecology. Retrieved on 10/07/2018 from: http://publications.naturalengland.org.uk/publication/6384664523046912.]	ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives) sets out the reasons for selecting this site and this chapter sets out the assessment of effects of the Development, taking into account the proximity of the protected areas.
Swale Green Party	· The Provisional Environmental Information Report (PEIR) considers potential displacement of dark-bellied Brent geese, lapwing, golden plover, and breeding marsh harriers from construction and operation of the solar farm. The analysis recognises a long-term negative effect of loss of foraging habitat on the site for dark-bellied Brent geese, lapwing, golden plover and breeding marsh harrier.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z for grassland enhancement (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.
Swale Green Party	· The PEIR also acknowledge likely displacement of two species, Cetti's warbler and bearded tit, which (in addition to the marsh harrier) are WCA Schedule 1 species. It also acknowledges that skylark and yellow wagtail will be disturbed. Furthermore, it is acknowledged that construction will disturb peregrines that have been recorded frequently at the site.	The Breeding Bird Protection Plan and SPA Construction Noise Management Plan incorporated into the Outline CEMP (Technical Appendix A5.4 to the ES) that will be implemented during construction avoids disturbance to Schedule 1 breeding species. Construction disturbance to peregrine and other breeding farmland birds is assessed in section 0 of the ES as not significant.

Respondent	Comment	Applicant Response
Swale Green Party	· Construction will disturb birds over at least two seasons. It is a matter of speculation whether disturbed birds will use alternative habitat nearby and will return after construction is complete. A solar farm with east-west panels has never been constructed in the UK so there is no evidence upon which to draw.	The assessment in Chapter 9 Ornithology of the ES is made on the basis of the proposed east-west design, taking into account the substantive habitat enhancements in undeveloped areas of the site. Construction disturbance to breeding farmland birds is assessed in section 0 of the ES as not significant.
Swale Green Party	· The PEIR includes a quote from the Barn Owl Trust to the effect that solar farms have the potential to benefit barn owls as the frames of solar panels provide perches from which barn owls can hunt. However, this comment refers to solar farms with south-facing panels – the only type to have been built in the UK. The east-west orientation of panels will provide far fewer suitable perch sites because they will be mounted back-to-back and much closer together. This illustrates that the research and experience on which the environmental impact analysis is based is inappropriate for the current proposal. The east-west orientation and high density will lead to a greater environmental impact than a conventional solar farm. This issue is not adequately considered in the PEIR.	The assessment in section 0 of this chapter is made on the basis of the proposed east-west design. Suitable perches will be available to barn owls on the solar panel frames, as well as fence posts throughout the Development site in close proximity to the large extents of new grassland habitat that barn owls favour as foraging habitat. There will more suitable foraging habitat present within the site with the Development than is available in the current baseline arable farm landscape.
Swale Green Party	· The solar panels themselves may present a challenge to birds who may see them as a "watery surface".	Section 0 of this chapter assesses the potential effect of collision to birds; Natural England guidance states that there is no scientific evidence of collision risk associated with solar PV arrays.
The Faversham Society	The site forms part of the North Kent Marshes Environmentally Sensitive Area. It is also directly adjacent to the Swale Ramsar site which is designated because it has an important assemblage of bird and plant species. The site will also affect the Swale Special Protection Area and the Swale Site of Special Scientific Interest, the South Swale Nature Reserve and the Swale Estuary Marine Conservation Area and on the opposite side of Faversham Creek, the Oare Marshes Nature Reserve managed by the Kent Wildlife Trust.	The importance of the bird populations associated with The Swale SPA/SSSI/Ramsar Site is recognised. This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.

Respondent	Comment	Applicant Response
The Faversham Society	The Faversham Society's initial analysis suggests there should be particular concerns about the following species: Brent geese, lapwing and golden plover : Natural England has identified the marshes as important wintering sites for these species. Avocet, Wigeon, Dunlin, Redshank, Shelduck, Teal, Little Egret, Grey Plover, Knot, Ruff, Black Tailed Godwit, Bar Tailed Godwit, Curlew, Short Eared Owls, Hobby and Peregrine Falcons: These marshes represent for these species nationally significant habitats that would be detrimental to the populations if lost. The birds use many parts of the site, not only the western end. There are breeding birds such as skylarks, dunnocks and yellow wagtails together with reed buntings, oystercatcher and lapwings nesting all over the site. Most of these are ground-nesting birds and rely on insects found in the existing vegetation to feed their young. Marsh Harriers: Functionally linked to Ramsar site for breeding	This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements. A HRA has been undertaken and submitted with the DCO application in the RIAA. A focus of the HRA is the loss of functionally linked land for brent goose, lapwing, golden plover and marsh harrier.
The Faversham Society	The developers propose to preserve and improve a small part of the marsh at the eastern end of the site specifically for Brent geese, lapwing and golden plover. (It is worth noting that this includes the additional area within the SSSI to the east of the site proposed in the original scheme.) The Faversham Society considers that this gesture would not compensate for the loss of wildlife habitat across the whole site and cannot be considered mitigation for this wider destruction of habitat.	The area of arable farm developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z for grassland enhancement (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA.
The Faversham Society	The Society notes that a recent European Court of Justice ruling regarding Habitats Regulation Assessment suggests that a full 'appropriate assessment' will have to be completed to prove that there is no harm to the Swale Special Protection Area beyond reasonable scientific doubt for the scheme to be acceptable.	A HRA has been undertaken and submitted with the DCO application in the RIAA, with full cognisance of this recent case law.

Respondent	Comment	Applicant Response
The Faversham Society	The site forms part of the North Kent Marshes Environmentally Sensitive Area. It is also directly adjacent to the Swale Ramsar site which is designated because of an important assemblage of bird species together with plant species, the Swale Special Protection Area and the Swale Site of Special Scientific Interest, the South Swale Nature Reserve and the Swale Estuary Marine Conservation Area. On the opposite side of Faversham Creek is the Oare Marshes Nature Reserve managed by the Kent Wildlife Trust.	This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.
The Faversham Society	Natural England have confirmed that they consider the land to be functionally linked land to the Ramsar site and SSSI and that birds that contribute to the Swale Assemblage use the land in winter, in particular, Brent geese, lapwing and golden plover. As a breeding site, the land is functionally linked to the Ramsar site for marsh harriers.	This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements. A HRA has been undertaken and submitted with the DCO application in the RIAA. A focus of the HRA is the loss of functionally linked land for brent goose, lapwing, golden plover and marsh harrier.

Respondent	Comment	Applicant Response
The Faversham Society	The site is best known for birds and it is mainly in this context that it should be considered in connection with the wildlife designations of the Swale mudflats and beaches and the land along the seawall. Wintering bird surveys were taken in 2013/14, 2014/15 and 2017/18. The two earlier surveys show that up to 3400 Brent geese can be found on the farmland together with up to 600 oystercatcher, 300 golden plover, 240 avocet, 300 wigeon, 1000 dunlin and 300 redshank. Figures from 2017/18 confirm that many birds use the arable and grazing marshland on the site including 1800 Brent geese, 115 shelduck, 690 wigeon, 160 teal, 22 little egret, 1190 oystercatcher, 194 avocet, 1770 golden plover, 150 grey plover, 1000 lapwing, 1660 knot, 23 ruff, 3000 dunlin, 380 black tailed godwit, 150 bar tailed godwit, 160 curlew and 370 redshank. These represent for most species at least nationally important numbers. The land is also used in winter by short eared owls and peregrine falcons in winter. The birds use many parts of the site, not only the western end.	Some of the numbers quoted in this comment are incorrect and possibly include counts of birds in the intertidal habitats (avocet, for example, were never recorded outside of the intertidal habitats). This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.
The Faversham Society	A map shows that there are breeding birds all over the site, not only in the ditches and along the existing tracks. These include skylarks, dunnocks and yellow wagtails together with reed buntings. There are also nest sites throughout the area for oystercatcher and lapwings. Most of these are ground-nesting birds and rely on insects to feed their young. They need cover and lack of disturbance that exists across the site because of its use as farmland with limited access.	This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.

Respondent	Comment	Applicant Response
The Faversham Society	As a feeding and roosting area, Brent geese use most of the land, shelduck use land at the west end, little egrets are widespread in their use of the land, mallards use the south parts of the land and golden plovers and lapwing use the whole site. Many species also use the land area at night including lapwing, golden plover, snipe, short eared owls, shelduck and mallard.	This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.
The Faversham Society	Maps also show that raptors feed and hunt over the whole site. They show the flight paths of the birds which include short eared owls, peregrine falcons, hobbies and marsh harriers. These birds mostly fly at less than 10 metres above the ground while hunting and thus are likely to find most of the site impossible to use either because of disturbance during construction or when the panels are in place.	This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, as well as the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements. For example, such species do not favour arable land for foraging, but frequently hunt along its margins where suitable wetland and grassland habitats occur. The Development will result in substantially more grassland habitat than the arable baseline, resulting in larger extents of foraging habitat.
The Faversham Society	All of the species that nest or feed on the whole site, roost on it, rest on it or hunt over it would be affected by the panels which will cover much of the area. It is considered that for this reason, the development would be harmful to the Ramsar site, the SSSI and to the other wildlife designations by taking away a large area of functionally linked land.	This chapter and the HRA documented in the RIAA provide an assessment of the potential effects of the Development on these species, including the impact of loss of functionally linked land, as well as describing the measures implemented with the Development to mitigate potentially harmful impacts and provide biodiversity enhancements.

Respondent	Comment	Applicant Response
The Faversham Society	The developers have sought to mitigate against the loss of all the land by proposing to keep part of it at the east end and improving the habitat specifically for Brent geese, lapwing and golden plover. This includes the additional area which is within the SSSI to the east of the site proposed in the original scheme. The Faversham Society considers that this would not adequately compensate for the loss of wildlife habitat across the whole site. It is not mitigation to take away all but a small part of a site and retain this in a better condition with the inclusion of another area of land that is already suitable for a bird roost and feeding area.	The area developed for solar panels has been reduced since PEIR allowing for more areas to be dedicated to habitat enhancements for birds and other wildlife; these include larger areas of lowland grassland meadow between arrays, removal of development in Field Y/Z for enhanced grassland establishment (LGM HMA) and extension of the AR HMA to c. 56 ha, as described in this chapter and in ES Chapter 4 (Site Selection, Development Design and Consideration of Alternatives). The HRA documented in the RIAA concludes that the Development will not adversely affect the integrity of the SPA. The inclusion of the SSSI grazing marsh in the Development is not intended to provide mitigation for negative effects, but only to provide opportunity to enhance its management for the benefit of wildlife, particularly breeding and wintering birds. Clearer definitions and assessments have been provided in this chapter.

Respondent	Comment	Applicant Response
The Faversham Society	We also wish to draw your attention to this recent court hearing There has been a recent European Court of Justice ruling regarding Habitats Regulation Assessment. This is likely to require that the Planning Inspectorate, who will be determining the application given its size, will be required to carry out a Habitats Regulation Assessment on this development since it would have an effect on the Swale Special Protection Area. It is clear from the correspondence between the applicant's consultants and Natural England that they are concerned about the impact of the disturbance caused by works to create the development on over-wintering birds and in summer on breeding birds across the site which they confirm is functionally linked to the SPA. They are also concerned about the loss of overwintering and foraging habitat all year as a result of the development. This means that a full 'appropriate assessment' will have to be carried out of the development in which any mitigation measures such as the extension of the site to take in an improved part of the SSSI cannot be taken into account. This appraisal would have to prove that there is no harm to the SPA beyond reasonable scientific doubt for the scheme to be acceptable.	A HRA has been undertaken and submitted with the DCO application in the RIAA, with full cognisance of this recent case law and it is expected that the competent authority will be undertaking an Appropriate Assessment. The inclusion of the SSSI grazing marsh in the Development is not intended to provide mitigation for negative effects, but only to provide opportunity to enhance its management for the benefit of wildlife, particularly breeding and wintering birds. Clearer definitions and assessments have been provided in this chapter.

9.2 Assessment Methodology and Significance Criteria

9.2.1 Legislation, Policy and Guidance

17. The following legislation, policy and guidance documents are relevant to this chapter:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna ("the Habitats Directive");
- Council Directive 2009/147/EC on the Conservation of Wild Birds ("the Birds Directive");
- The Conservation of Habitats and Species Regulations 2017 ("the Habitats Regulations") as the principal means by which the Habitats and (in respect of HRA for SPAs) Birds Directives are transposed into English law;
- Wildlife and Countryside Act 1981, as amended (WCA);
- Natural Environment and Rural Communities (NERC) Act 2006;
- The National Policy Statements EN-1 [1];
- National Planning Policy Framework (2018)[2];
- UK Post-2010 Biodiversity Framework, which supersedes and subsumes the UK Biodiversity Action Plan (UK BAP);
- Kent Biodiversity Strategy[3];
- Swale [District] Biodiversity Action Plan (Swale BAP)[4];
- Thames, Medway and Swale Estuaries – Strategic Access Management and Monitoring Strategy[5];
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine 2018[6];
- Natural England guidance on the siting, potential effects and mitigation requirements for solar parks[7];
- Natural England evidence review of the effect of solar farms on biodiversity[8];
- Royal Society for the Protection of Birds (RSPB) guidance on solar power[9];
- BRE biodiversity guidance for solar developments[10];
- Planning Inspectorate Advice Note 10: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects, version 8 (November 2017);
- Planning Inspectorate Advice Note 12: Transboundary Impacts and Process, version 5 (March 2018); and

[1] Overarching National Policy Statement for Energy (EN-1), published by the Department of Energy and Climate Change (DECC). Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf, last accessed 13/10/2018.
[2] National Planning Policy Framework 2018, published by the Ministry of Housing, Communities and Local Government. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf, last accessed 13/10/2018.
[3] *Kent Biodiversity 2020 and beyond – a strategy for the natural environment 2015-2025* published by the Kent Nature Partnership, update 6.3.15. Last accessed 28/09/2018.
[4] https://www.swale.gov.uk/assets/Strategies-plans-and-policies/Biodiversity-Action-Plan-2016.pdf
[5] Liley, D. & Underhill-Day, J. (2013). *Thames, Medway and Swale Estuaries – Strategic Access Management and Monitoring Strategy*. Unpublished report by Footprint Ecology.
[6] Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. CIEEM, Winchester.
[7] Natural England (2011). *Natural England Technical Information Note TIN101 Solar parks: maximising environmental benefits*.
[8] Natural England (2017). *Evidence review of the impact of solar farms on birds, bats and general ecology (NEER012)*.
[9] Royal Society for the Protection of Birds (RSPB) (2014). *Solar Energy RSPB Policy Briefing*. December 2014.
[10] BRE (2014). *Biodiversity Guidance for solar developments*. Eds G E Parker and L Greene.

- Planning Inspectorate Advice Note 17: Cumulative Effects Assessment, version 1 (December 2015).

18. Other guidance that is specific to the baseline surveys or assessment of effects on birds have been used, and referenced, where appropriate.

19. This ES chapter is prepared with reference to the National Policy Statements, NPPF 2018, as well as other national, regional and local planning policy documents. The core aims of these policies from an ecological perspective are to maintain and enhance the quality of the natural heritage, built environment, landscape features and landscape character of the area through the protection of designated sites for nature conservation, promotion of the aims and implementation of biodiversity planning at the local level and ensuring sustainable development through the identification and mitigation of potentially adverse effects on habitats and species.

20. The NPPF is complemented by ODPM Circular 06/2005: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System. This provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England.

21. The Kent Biodiversity Strategy provides Kent Nature Partnership's strategy to conserve, restore and sustainably manage biodiversity in Kent to be more resilient and able to adapt to change. Their mission to halt overall biodiversity loss and to contribute to the conservation of national and global biodiversity, support functional ecosystems and establish coherent ecological networks is set out through prescriptions to achieve four outcomes centred around terrestrial habitats, marine habitats, species and people.

22. The Swale BAP aims to provide a strategy for local actions working in partnership with environmental agencies to conserve, protect and enhance the biodiversity of the Borough and in part, fulfils some of the targets set in the Kent Nature Partnership's Biodiversity Strategy[3].

23. The Thames, Medway and Swale Estuaries Strategic Access Management and Monitoring Strategy (SAMMS) deals with issues relating to disturbance to wintering birds on the North Kent Marshes. The strategy's primary aims are to support sustainable growth whilst protecting the integrity of European wildlife sites from impacts relating to recreational disturbance and to reduce the current levels of recreational impact on birds using the Natura 2000 sites.

9.2.2 Study Area

24. The Core Survey Area is defined on Figure 9.1 and is broadly the area that was proposed to contain the solar farm infrastructure, before design iterations and development design mitigation began. All Development infrastructure is proposed within this area. The baseline bird surveys that started in 2014 were all undertaken from within this Core Survey Area, but the recording of birds extended outside the area into adjacent habitats at varying distances depending on the type of survey (see Technical Appendices A9.1, A9.2, A9.3 and A9.4).

25. On the basis of the initial baseline survey results and consultations, consideration was given to the potential zone of influence of the effects of the Development on birds in order to define the desk study area and baseline survey areas.

26. Having identified the types of the potential effects of the Development (section 9.1.2) and reviewed the preliminary baseline survey results, a search zone of 5 km from the Core Survey Area was considered sufficiently precautionary to identify statutory designated sites that could be affected by the Development; this was extended to 10 km for European sites of avian interest, including SPAs and proposed SPAs (pSPA), for the purposes of HRA (Figure 9.1). Birds originating from statutory designated sites beyond

5 km (or 10 km for European sites) were not considered likely to attend the site or its adjacent habitats at a level of frequency where the effects of the Development would cause a material change in their ability to survive or reproduce; therefore it was not considered that significant effects would be likely to occur on statutory designated sites more than 5 km away (or more than 10 km away for European sites of avian interest).

27. The baseline surveys were restricted to an area within 500 m of the Core Survey Area (Figure 9.1), because this was the area within which it was considered that direct effects of disturbance, displacement or collision could occur.

28. In order to enhance the baseline information and provide historical context regarding the bird species occurring at and around the Development site, the desk study area of search for non-statutory designated sites and species records was set at 2 km from Core Survey Area (Figure 9.1).

9.2.3 Desk Study

29. Details of the desk study searches are provided in Technical Appendix A9.1: *Ornithology Technical Appendix*. These comprised web searches or data requests to:

- Multi-Agency Geographic Information for the Countryside (MAGIC);
- Kent & Medway Biological Records Centre (K&MBRC);
- National Biodiversity Network (NBN);
- British Trust for Ornithology, Wetland Bird Survey (BTO, WeBS);
- KWT; and
- Kent Ornithological Society (Barn Owl records and bird-ringing data).

30. A review of the RSPB's data request form indicated that RSPB records are available through the NBN; a separate request for RSPB data was therefore not carried out.

9.2.4 Baseline Survey Methods

31. Details of the baseline survey methods are provided in Technical Appendices A9.1, A9.2, A9.3 and A9.4. A summary of the surveys carried out is provided below.

9.2.4.1 Breeding Bird Survey

32. Breeding bird surveys were undertaken over three seasons between 2014 and 2016, in each season using an adapted version of the Common Bird Census (CBC) Methodology[11].

33. In 2015, dusk surveys targeting barn owl activity were also carried out following the standard approach as set out in Gilbert *et al.* (1998)[12] for surveying barn owl. In 2016, additional surveys were carried out to survey for breeding raptors, primarily targeting marsh harrier, within 2 km of the Core Survey Area (excluding the Isle of Sheppey).

34. The aim of the surveys was to establish the breeding bird populations and spatial distribution within the Core Survey Area and immediately adjacent habitats (Figure 9.1).

9.2.4.2 Passage/Winter Bird Survey

35. Surveys of birds using the Core Survey Area and surrounding terrestrial and intertidal areas during the non-breeding season were undertaken during four passage/winter seasons in 2013/14, 2014/15, 2015/16 and 2017/18. Transects were walked around the Core Survey Area, using a simple look-see-count method to record the abundance and location of wintering birds. In winter 2015/16, the survey was extended to include four nocturnal surveys within the Core Survey Area using night-vision optics and filtered spotlight to ascertain whether or not the Core Survey Area provided more important foraging resources at night.

[11] Marchant, J. (1983). Common Birds Census Instructions. British Trust for Ornithology, Thetford.
[12] Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird Monitoring Methods*. RSPB: Sandy.

36. There was no baseline survey coverage of winter 2016/17. Following the completion of surveys in 2016, Arcus consulted with Natural England in December 2016 and there was agreement that coverage of the surveys completed at that time between 2013/14 and 2015/16 was sufficient to enable a thorough assessment of the potential impacts on SPA/Ramsar birds, and other important bird species (see the consultation advice in Technical Appendix A8.8). However, due to the extension of the project timescales, a further winter of baseline survey in 2017/18 was undertaken to provide more up-to-date baseline information on the non-breeding bird interests.

37. The aim of the surveys was to establish the non-breeding bird populations and spatial distribution within the Core Survey Area and immediately adjacent habitats. The size of the intertidal parts of the survey area differed slightly between the surveys in winters 2013/14 to 2014/15 and 2015/6 to 2017/18. In winter 2015/16 and 2017/18, the surveys included all intertidal habitat up to 500 m from the shoreline at the Core Survey Area boundary. In winter 2013/14 and 2014/15, the survey covered less extent of intertidal habitat from the shoreline including only the foreshore fronting the Core Survey Area at high tide (and did not include the Castle Coote roost); these surveys also did not include the parts of Faversham Creek south of Nagden that were covered by the latter surveys in winter 2015/16 and 2017/18. This resulted in some differences in the counts of birds in the intertidal habitats between these seasons; however, counts of birds within the arable and grassland habitats of the Development site were consistent between the survey seasons and are directly comparable.

9.2.4.3 Flight Activity Survey

38. Flight Activity Survey (FAS) was carried out between November 2015 and October 2016 using the vantage point watch method usually carried out in relation to wind energy development. The survey used two vantage points providing excellent visual coverage of the majority of the Core Survey Area (Figure 9.1). Flight activity survey would not normally be a requirement for solar PV developments; however, the survey was included for this assessment in recognition of the proximity of the Development site to The Swale SPA/SSSI/Ramsar Site with regards to the functionally linked habitat for foraging marsh harrier.

39. The aim of the survey in this case was to quantify and map the use of the Core Survey Area by birds such as marsh harrier, which forage aerially over the ground when hunting for birds and other small animals.

9.2.5 Assessment Methods and Significance Criteria

40. The process of assessing and determining the significance of potential effects on birds follows guidance published by the Chartered Institute of Ecology and Environmental Management (CEEM 2018)[6].

41. These guidelines set out the process for assessment through the following stages:

- Scoping the information required for the assessment;
- Describing the ecological baseline through desk study and survey;
- Identifying Important Ecological Features (IEFs) - these are the designated sites, habitats and species of highest ecological value that may be affected, with reference to the geographical context in which they are considered important;
- Identifying and characterising the impacts and effects on these IEFs based on the nature of construction, operation and decommissioning activities associated with the Development and assessing the significance of potential effects;
- Describing any mitigation measures associated with the Development and assessing the residual significance of effects;
- Identification of appropriate compensation to offset significant residual impacts;
- Assessment of cumulative effects;

- Identification of opportunities for ecological enhancement; and
- Identification of any monitoring requirements.

9.2.5.1 Identifying Important Ecological Features

42. The IEFs considered in this chapter are the bird species that are considered to be important and potentially affected by the Development and therefore subject to detailed assessment. The assessment focuses on species or populations afforded higher levels of legislative protection and/or those considered to be most at threat due to declines or fragility in their populations – these are referred to hereafter as '*species of conservation concern'*. These are typically species that appear on Annex 1 of the Birds Directive, Schedule 1 of WCA, Section 41 of the NERC Act and the Red-list of Birds of Conservation Concern[13]. Species that are common or widespread, not threatened, or resilient to the potential impacts of development are not considered in detail in the assessment.

43. The importance of each IEF is considered within a defined geographical context (Table 9.2). Attributing the geographic context to an IEF is generally straightforward in the case of qualifying interests of designated sites, as the designations themselves are normally indicative of a level of value. For example, a qualifying interest species of a SPA is implicitly of European (International) importance, whilst the notified feature of a SSSI is likely to be considered of National importance. For non-designated features, the use of population thresholds can be helpful in attributing the geographic scale of importance to a receptor. For example, under the Ramsar Convention, a wetland is considered internationally important if it regularly supports 1% of the individuals in a biogeographic population of one species or subspecies of waterbird. In this assessment, the 1% threshold is extended to all the geographic levels; e.g., if the survey area supports (or is likely to support) more than 1% of the county (Kent) population of a species (but less than 1% of the national population), then it is considered to be of county importance. The same is applicable to the Local geographic scale, although due to the lack of information available on population sizes at these levels, the assessment may be more subjective.

44. The term 'Importance' used for ecological impact assessment is similar to the term 'Sensitivity' used in the assessment of other technical aspects of the Development, such as Hydrology and Noise. The term 'Importance' is used in this assessment in line with CIEEM guidance[6] and to provide clarity over the difference between this and behavioural sensitivity of birds to disturbance.

Table 9.2: Geographical Context of IEFs

Importance	**Examples**
INTERNATIONAL or **VERY HIGH**	• An internationally designated site (e.g., SPA), or site meeting criteria for international (European) designations. • A qualifying feature of an internationally (European) designated site, (SPA or Ramsar). • Species population present in internationally important numbers (>1% threshold of international importance).

[13] Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. & Gregory, R.D. 2015. Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, pp. 708-746 (http://www.britishbirds.co.uk/wp-content/uploads/2014/07/BOCC4.pdf).

Importance	Examples
NATIONAL or **HIGH**	• A nationally designated site (e.g., SSSI or NNR), or sites meeting the criteria for national designation. • A notified species of a nationally designated site or a species that contributes to the assemblage of a SSSI. • Species present in nationally important numbers (>1% UK population or exceeds the 1% threshold for national importance). • UKBAP species, where the action plan states that individuals or their representative habitats should be protected. • Ecologically sensitive species such as rare breeding birds (< 300 breeding pairs in the UK).
REGIONAL/COUNTY or **MEDIUM**	• Species present in regionally important numbers, e.g., population at the site exceeds 1% of the Kent population. • Priority species identified within the county biodiversity strategy, where the strategy is that individuals or their representative habitats should be protected. • Non-statutory Local Wildlife Sites or statutory Local Nature Reserves, or a species that is a qualifying interest of such sites.
LOCAL or **LOW**	• Species of conservation interest, e.g., red- or amber-listed species or species listed in NERC Act Section 41, Birds Directive Annex 1, or WCA Schedule 1 that are not covered above that may be vulnerable to the effects of the Development.
NEGLIGIBLE	• Usually widespread and common species unlikely to be affected by the Development. Receptors falling below local value are not normally considered in detail in the assessment process.

9.2.5.2 Characterisation of Effects

45. The assessment considers the potential Development impacts and their effects on each IEF. These are characterised according to the following:

- Positive or Negative effect - environmental conditions for the IEF are either improved or reduced by the impact;
- Extent - the area over which the effect might occur;
- Magnitude - the size of the effect (this may be equivalent to the extent of effect on habitats), quantified where possible, e.g., the probable loss of individuals to the population. In practice, quantifying effects in ecological terms takes a broader range, therefore categories of the size of effect have been defined to assist the assessment (Table 9.3);
- Duration - the time over which the effect is expected to last defined in relation to species' lifecycles, usually 'short term', 'medium term', or 'long term';
- Frequency and Timing - when and how often the impact activity and subsequent effect might occur; and
- Reversibility – a reversible effect where recovery is possible within a reasonable timescale or through mitigation, or permanent/irreversible if not.

Table 9.3 Categories of Magnitude of Effect

Magnitude	Description
High	These are major changes likely to have an impact on the integrity or conservation status of an ecological feature (of more than negligible importance). They are typically long-term and often permanent/irreversible. For example, an adverse effect of high magnitude would be predicted to cause the population of a species to decline without prospect of recovery in the long-term. High magnitude positive effects would significantly benefit biodiversity, for example by having a notable improvement in conservation status.
Medium	These are changes that may in some circumstances be considered to impact the integrity or conservation status of an ecological feature. They may be long-term but are typically short- or medium-term and potentially

Magnitude	Description
	reversible, such that the long-term viability of a feature is not altered. Medium magnitude positive effects can result in some improvement in conservation status.
Low	These are changes that do not usually alter the integrity or conservation status of an ecological feature. They are often short-term and/or reversible and there is no significant long-term harm or benefit to biodiversity.
Negligible	There is very small-scale change in the ecological feature, or recovery from minor change is rapid. As an example, less than 1 % of a population or area will be affected.
No change	There is no perceptible change in the ecological feature.

46. Best practice guidelines and the precautionary principle dictate that uncertainty in the assessment should be acknowledged. It is rarely possible to provide precise quantitative confidence levels, so as a guide, the following scale is used to describe the probability of an effect occurring, or to describe the confidence in the assessment: certain/near-certain is intended to denote at least 95% confidence; likely is 50%-95%, unlikely is 5%-50%, and very unlikely is less than 5%.

47. In assessing the character of an ecological impact, it is also important to consider the behavioural sensitivity of the receptor and the potential for recovery (where the impact may be temporary and adverse). A judgement is made that takes account of information available on the responses of birds to various stimuli (e.g., predators, noise and disturbance by humans). Behavioural sensitivity can differ between similar species and between different populations of the same species. Thus, the behavioural responses of birds are likely to vary with both the nature and context of the impact and the experience of the individual species. Behavioural sensitivity also depends on the activity of the species; for example, a species is likely to be less tolerant of disturbance whilst breeding than at other times, but tolerance is likely to increase as the breeding cycle progresses.

48. This chapter includes consideration of interrelationships with effects assessed in other technical chapters of this ES. Principally, this is the case for Chapter 12: Noise, which assesses noise levels at locations of relevance to ornithological receptors. The potential "in-combination" effect of noise and other influences on bird behaviour is considered in this chapter.

9.2.6 Determining Significance

49. In accordance with CIEEM guidelines, a significant effect is one that either supports or undermines biodiversity conservation objectives for the IEFs. For species, the consideration of 'conservation status' is important in this assessment – this is defined as "*the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its population"* within the geographic context in which it is assessed.

50. Conservation status can be considered as favourable where:

- *"population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats; and*
- *the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and*
- *there is (and will probably continue to be) a sufficiently large habitat to maintain its populations on a long-term basis."*

51. The CIEEM guidelines recommend that the concept of favourable conservation status should be used, at the appropriate geographic scale, to determine whether an impact on

a species is sufficiently significant to be of concern. An effect should be judged as of concern where it would adversely affect the favourable conservation status of a species, or stop a recovering species from reaching favourable conservation status, within the geographic scale of reference assessed.

52. For European sites (also known as Natura 2000 sites), an additional process is required. Where a project is located near a European site and there is some demonstrable level of connectivity between them, it is necessary to carry out a Habitats Regulations Assessment (HRA) to determine (a) if there is if a 'likely significant effect' (as defined in the Habitats Regulations) and (b) whether or not a project will 'adversely affect the integrity' of the European site (see section 9.6).

9.2.7 Mitigation and Residual Effects, Compensation and Enhancement

53. Mitigation measures are identified with the aim of:

- Avoiding negative ecological effects – especially those that could be significant; and
- Reducing negative effects that cannot be avoided.

54. The residual effects of the project are then assessed. Any significant effects remaining after mitigation (residual effects), together with an assessment of the likelihood of success in the mitigation, are the factors to be considered against legislation, policy and development control in determining the application.

55. Compensatory measures are proposed if it is necessary to offset any remaining significant negative ecological effects that cannot be avoided by a mitigation strategy.

56. Mitigation measures and detailed design work may be necessary to avoid and reduce potentially significant effects, but it is also best practice to propose mitigation measures to reduce negative effects that are not significant and avoid net biodiversity loss or avoid legal offences relating to protected birds.

57. Enhancement measures should also be implemented where possible to achieve net ecological gain. The Development offers many opportunities for enhancement of habitats in areas not developed for solar panels. These are set out in Technical Appendix A5.2: *Outline Landscape and Biodiversity Management Plan*. Cross-reference to the LMBP is made where prescriptions are of direct relevance to an IEF identified in this assessment.

9.2.8 Assessment of Cumulative Effects

58. Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Within Ecological Impact Assessment, cumulative impacts are particularly important as many ecological features are exposed to background levels of threat or pressure and therefore may be close to reaching critical thresholds where further impact could cause irreversible decline.

59. A long list of other developments has been identified in Chapter 2: Environmental Impact Assessment of the ES. The search criteria included a zone of influence of up to 10 km from the Development site. These include projects at various stages in the planning system, as recommended in 'Planning Inspectorate Advice Note 17: Cumulative Effects Assessment' as those:

- *"under construction;*
- *permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented;*
- *submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined;*
- *projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted;*

- *projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted.*
- *identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited;*
- *identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward."*

60. For the ornithological assessment, particularly with respect to The Swale SPA/Ramsar Site, the search also included planning applications within 2 km of the SPA/Ramsar Site.

61. The planning documents for each in-combination project were examined to extract the information regarding the residual effects of the project on birds. The cumulative assessment follows the same method of assessment of effects described above.

9.3 Baseline Conditions

9.3.1 Designated Sites

62. Chapter 8: *Ecology* of this ES (Table 8.4) provides a full list of the statutory and non-statutory designated sites for nature conservation within 5 km of the Core Survey Area, along with their location relative to the Development site and a brief description of their qualifying features.

63. Those of relevance to the ornithological assessment, as well as other European sites of avian interest within 10 km of the Development site, are summarised in Table 9.4 and shown in Figure 9.2.

Table 9.4 Designated Sites with Qualifying Bird Interest

Site Name	Status	Location	Summary of Qualifying Bird Interest[14]
Statutory Designated Sites			
The Swale	SPA	Adjacent to the north, east and west	Wetland of international importance, comprising intertidal mudflats, shellbeaches, saltmarshes and extensive grazing marshes. It provides habitats for important assemblages of wintering waterfowl and also supports notable breeding bird populations. Non-breeding: dark-bellied brent goose, dunlin Breeding bird assemblage Non-breeding waterbird assemblage
The Swale	Ramsar	Adjacent to the north, east and west	Complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. Rare wetland birds breed in important numbers. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates. A number of criteria are applied to Ramsar designation to aid in the identification of wetlands of international importance. Those of ornithological relevance include: Criterion 5: Non-breeding waterbird assemblage. Criterion 6 qualifying species (passage/wintering): Redshank, dark-bellied brent goose, grey plover, ringed plover, wigeon, pintail, shoveler, black-tailed godwit Noteworthy:

[14] Further details will be presented in the HRA Report accompanying the DCO application.

Site Name	Status	Location	Summary of Qualifying Bird Interest[14]
			Breeding – Mediterranean gull, black-headed gull, little tern Passage/wintering – little egret, whimbrel, curlew, spotted redshank, greenshank, little grebe, European white-fronted goose, shelduck, teal, oystercatcher, avocet, golden plover, lapwing, knot, dunlin, ruff.
The Swale	SSSI	Adjacent to the north, east and west	The largest remaining areas of freshwater grazing marsh in Kent and is representative of the estuarine habitats found on the north Kent coast. The habitats comprise chiefly mudflats, saltmarsh, and freshwater grazing marsh, the latter being intersected by extensive dykes and fleets. The area is particularly notable for the internationally important numbers of wintering and passage wildfowl and waders, and there are also important breeding populations of a number of bird species. Associated with the various constituent habitats of the site are outstanding assemblages of plants and invertebrates. Bird species specifically mentioned in the citation include: Non-breeding – turnstone, wigeon, teal, grey plover, shoveler, knot, dunlin and spotted redshank. Breeding – ringed plover, little tern, skylark, meadow pipit, yellow wagtail, mallard, shelduck, coot, moorhen, lapwing, redshank, teal, gadwall, shoveler, pochard, garganey, pintail, ruff, black-tailed godwit.
South Bank of the Swale	LNR	Adjacent to the north and west	Part of The Swale SPA/SSSI/Ramsar, the area is managed by KWT as the South Swale Nature Reserve.
Oare Marshes	LNR	300 m to the west	Partly overlaps with The Swale SPA/SSSI/Ramsar, the area is managed by KWT.
The Swale	NNR	1.4 km to the north	Part of The Swale SPA/SSSI/Ramsar. Privately managed coast and grazing marsh habitats in the south-east of the Isle of Sheppey, supporting significant populations of waterbirds.
Seasalter Levels	LNR	1.5 km to the east	Part of The Swale SPA/SSSI/Ramsar and North Kent coast freshwater grazing marsh, it is a valuable wetland site for wintering and migratory wildfowl and wading birds, including wigeon, teal, redshank and lapwing.
Outer Thames Estuary	SPA	1.6 km to the north-east	Coastal waters of the southern North Sea between the Thames Estuary and the east Norfolk coast. The marine habitat supports an internationally important wintering population of red-throated diver, the largest aggregation of this species in the UK. It also protects foraging areas of common tern and little tern, enhancing the protection afforded to their feeding and nesting areas in adjacent coastal SPAs.
Foxes Cross Bottom	LNR	3.5 km to the east	A mosaic of neutral grassland with scrub, native broadleaved woodland and other valuable habitats such as ponds, wet ditches and hedgerows. In the summer many warblers and nightingales nest in the scrub.
Ellenden Wood	SSSI	3.6 km to the east	Coincident with part of the Blean Complex SAC, notified for its ancient woodland habitat supporting diverse flora, invertebrate and breeding bird community.
Elmley	NNR	4.3 km to the northwest	Part of The Swale SPA/SSSI/Ramsar, the area is privately managed. Wide expanse of grazing marsh divided by ditches and frequent shallow surface flooding which that

Site Name	Status	Location	Summary of Qualifying Bird Interest[14]
			home to large numbers of wintering wildfowl and breeding waders.
Blean Woods	NNR	4.4 km to the southeast	Part of the largest ancient woodland in southern Britain, supporting diverse flora, invertebrate and bird populations.
Church Woods, Blean	SSSI	4.4 km to the southeast	Coincident with part of the Blean Complex Special Area of Conservation (SAC) and Blean Woods NNR, notified for its ancient woodland habitat supporting diverse flora, invertebrate and breeding bird community.
Thanet Coast & Sandwich Bay	SPA	7.8 km to the east-northeast	Coastal site consisting of a long stretch of rocky shore, adjoining areas of estuary, sand dune, maritime grassland, saltmarsh and grazing marsh. Qualifying features include: Non-breeding: golden plover and turnstone Breeding: little tern
Non-statutory Designated Sites			
SW 44 Uplees Lake and Marsh	LWS	1.2 km to the west-northwest	Several ponds are surrounded by willow carr, scrub and grassland. The site supports a good bird fauna.
SW48 Abbey Fields, Faversham	LWS	1.0 km to the south	Designated as a site of SSSI quality, supporting scrubland bird species and has records of four breeding KRDB3 (Kent Red Data Book) species include nightingale, reed warbler, yellow hammer and house sparrow. The site also supports a high diversity of invertebrates, water voles and reptiles (common lizards, grass snakes and slow worms).
SW24 Graveney Dykes and Pasture	LWS	1.6 km to the southeast	It is designated for its dykes within the grazing marsh. Additional habitats include reed beds, acid grassland, semi-improved grazed pasture and hay meadows. A small orchard is also situated to the south-west and several small plantation woodlands.
SW01 Bysing Wood and Oare Gravel Pits	LWS	2.6 km to the southwest	Bysing Wood is designated for its ancient woodland. Oare Gravel Pits is a former industrial workings and disused gravel pits which now supports a diverse bird fauna, bats and invertebrates.

64. The protected features of The Swale Estuary MCZ are all marine habitats, some of which provide important resources for birds. The assessment of effects on habitats, including the MCZ is provided in Chapter 8: Ecology, which concludes that effects of the Development on the MCZ will be positive. As there are no likely adverse effects in this respect, the MCZ is not given further consideration in this chapter.

65. The Thanet Coast & Sandwich Bay SPA is approximately 7.8 km east-northeast of the Development site. Its qualifying interest features include breeding little tern, which will be unaffected by the Development. At a distance of nearly 8 km away, numbers of turnstones from the SPA are unlikely to range regularly as far as the Development site (where turnstones are already present within The Swale SPA) and would not make any use of the habitats within the Development site. Wintering golden plover originating from the Thanet Coast & Sandwich Bay SPA could occasionally range as far as the Development site and use the arable habitats. However, the most recent WeBS 5-year peak-mean count of golden plover for the Thanet Coast is only 34 birds. They are extremely unlikely to visit the Development site in numbers or frequency at which there would be any likely significant effects. The Thanet Coast & Sandwich Bay SPA is therefore not considered further in this assessment.

66. The Outer Thames Estuary SPA is approximately 1.6 km northeast of the Development site. It is designated for its provision of marine foraging habitat for wintering red-throated divers and breeding common and little terns, none of which make use of the Development site. The Development will have no impact on marine habitats, so this SPA is not given further consideration in this chapter.

67. Consultation has been held with Natural England regarding the composition of the assemblage features of The Swale SPA. This has identified the main component species of the non-breeding and breeding assemblages (Technical Appendix A8.8).

68. The main component species of the non-breeding waterbird assemblage are:

- Dark-bellied brent goose
- European white-fronted goose
- Shelduck
- Shoveler
- Wigeon
- Pintail
- Teal
- Little egret
- Oystercatcher
- Avocet
- Lapwing
- Golden plover
- Grey plover
- Curlew
- Bar-tailed godwit
- Black-tailed godwit
- Knot
- Ruff
- Sanderling
- Dunlin
- Green sandpiper
- Greenshank

69. In terms of qualifying breeding bird interests, the Swale SPA citation includes a number of named component species, as wells as bird species 'characteristic' of the particular SPA bird habitat, in this case, grazing marsh. Here, the advice draws on the guidelines for SSSI selection[15], directing attention to 'lowland damp grassland SSSI bird assemblage features'. The breeding bird assemblage features therefore include shelduck, mallard, moorhen, coot, lapwing, redshank, reed warbler and reed bunting as named component species and breeding ducks, waders, yellow wagtail, marsh harrier and others as characteristic species.

70. Further to this advice, it has been recognised that the 1993 SPA citation also names short-eared owl as an Annex 1 breeding and wintering species that is regularly supported by the habitats of the SPA.

71. Natural England advised that in relation to The Swale Ramsar designation, the assessment should consider the qualifying species listed under Criterion 6. The list of noteworthy fauna makes up part of the assemblage and Natural England advised that, because the SPA and Ramsar were designated at the same time under the same criterion and that the Conservation Objectives for SPAs cover the management of Ramsar interests, then only one assemblage is required on the species named for the SPA (see Paragraph 68 above).

72. The South Bank of the Swale LNR, Oare Marshes LNR, The Swale NNR, Seasalter Levels LNR and Elmley NNR are all part of The Swale SPA, SSSI and Ramsar site. Population level effects associated with potential effects on the birds outside the boundaries of the designated sites (i.e., in functionally linked land) are assessed at the SPA/SSSI/Ramsar level and are not considered individually for these components of the larger designation. However, the potential for direct effects on the habitats or birds when they are within the LNR and NNR designations are assessed.

[15] Drewitt, A.L., Whitehead, S. and Cohen, S. (2015). *Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 17 Birds*. Joint Nature Conservation Committee, Peterborough. http://jncc.defra.gov.uk/pdf/SSSI_Chptr17_Birds2015June.pdf.

73. The 2001 JNCC SPA Review[16] also provided information regarding The Swale SPA. Although it has no legal standing, the Review listed additional qualifying interests including:

- Under Article 4.1, Annex 1 breeding species: avocet, marsh harrier and Mediterranean gull.
- Under Article 4.1, Annex 1 wintering species: avocet, bar-tailed godwit, golden plover and hen harrier.
- Under Article 4.2, migratory species: ringed plover (passage), black-tailed godwit, grey plover, knot, pintail, redshank and shoveler.
- Under Article 4.2, an assemblage of 65,390 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: white-fronted goose, golden plover, bar-tailed godwit, pintail, shoveler, grey plover, knot, black-tailed godwit, redshank, avocet, cormorant, curlew, dark-bellied brent goose, shelduck, wigeon, gadwall, teal, oystercatcher, lapwing, dunlin and little grebe.

74. The current Conservation Objectives make clear that previous references to features identified in the JNCC 2001 SPA Review have been removed; however, the assemblage species listed provide a useful background as to the most important features of the SPA wintering and breeding bird assemblages.

75. A further SPA review was undertaken by in 2016 by JNCC[17]. The Review included assessment of the adequacy of the SPA network for relevant species and consideration of issues in relation to the inclusion of cropped habitats in SPAs. This is relevant for the Swale SPA, because the review identified the need for Natural England to assess the adequacy of the Swale SPA boundary for (amongst other species) brent goose, lapwing and golden plover. However, the findings of the 2016 Review has not yet been implemented and therefore has no legal standing. The assessment in this chapter and in the RIAA recognises that the Development site provides functionally linked land important to some of the qualifying interest species of the SPA, particularly dark-bellied brent goose, lapwing and golden plover.

9.3.2 Bird Species

76. Technical Appendices A9.1 to A9.4 provide detailed results of the desk study and baseline surveys.

9.3.2.1 Breeding Birds

77. The results of the breeding bird surveys in 2014, 2015 and 2016 are summarised in Table 9.5. Details and maps displaying the abundance and distribution of territories of the species of conservation concern recorded by each survey are provided in Technical Appendices A9.1 and A9.2 and Figures A9.3, A9.4 and A8.8.

Table 9.5 Breeding Birds Summary

Season	Summary
2014	Total of 59 species recorded, of which 27 species were confirmed as breeding and another 9 possibly breeding within the survey area. 13 of the breeding species are considered to be of conservation concern: • Marsh harrier • Cuckoo • Peregrine (possible) • Skylark

[16] Stroud, D.A., Chambers, D., Cook, S., Buxton, N., Fraser, B., Clement, P., Lewis, P., McLean, I., Baker, H. & Whitehead, S. (eds.) (2001). *The UK SPA Network: its Scope and Contents*. JNCC, Peterborough.
[17] http://jncc.defra.gov.uk/page-7309.

Season	Summary
	• Cetti's warbler (possible) • Starling (possible) • Song thrush (possible) • Dunnock • House sparrow • Yellow wagtail • Meadow pipit • Linnet • Reed bunting
2015	Total of 64 species recorded, of which 26 species were confirmed as breeding within the survey area. Eleven of the breeding species are considered to be of conservation concern: • Marsh harrier • Peregrine (possible) • Bearded tit • Skylark • Cetti's warbler • Starling (possible) • Dunnock • House sparrow • Yellow wagtail • Linnet • Yellowhammer (possible) • Reed bunting
2016	Total of 72 species recorded, of which 40 species were confirmed as breeding within the survey area. 13 of the breeding species are considered to be of conservation concern: • Marsh harrier • Oystercatcher • Lapwing • Cuckoo • Bearded tit • Skylark • Cetti's warbler • Song thrush • Dunnock • House sparrow • Yellow wagtail • Meadow pipit • Linnet • Reed bunting Although two adult peregrines were seen during the surveys, no evidence of breeding was found within the survey area.

78. Breeding species that are not of conservation concern that were considered to be holding territory within the survey area included: mute swan, mallard, water rail, moorhen, coot, stock dove, woodpigeon, collared dove, green woodpecker, jay, magpie, blue tit, great tit, chiffchaff, sedge warbler, reed warbler, blackcap, garden warbler, lesser whitethroat, whitethroat, wren, blackbird, robin, stonechat, pied wagtail, meadow pipit, chaffinch,

greenfinch and goldfinch. None of these species were present in the survey area in numbers exceeding local importance.

79. According to the breeding diversity criteria in Fuller (1980)[18], the survey area would be considered as of local significance for breeding birds (range for local significance: 25 – 49 species). The value of the survey area is primarily provided by the ditches and reedbeds within the site boundary and the habitats around the perimeter of the survey area, including the KWT South Swale nature reserve, tree-lines, hedgerows, houses and areas of scrub. The arable fields and margins provide ground-nesting habitat for skylark and yellow wagtail and foraging habitat for some species, including kestrel and marsh harrier. Flight activity surveys in the breeding season demonstrated that marsh harriers and kestrels frequently hunt over the site, mainly following the network of ditches and rough grassland margins to find prey.

80. Barn owls were occasionally observed hunting over the arable field margins and grazing marsh within the Core Survey Area and adjacent grazing marsh and the desk study corroborates that there are ten nest sites of this species within 5 km of the Development site that are regularly monitored by a team of licensed ringers; six of these are within 2 km of the Development site, the other four are on the Isle of Sheppey.

81. Short-eared owls were observed much less frequently, with observations of single foraging birds in April and July 2016 in the east of the Core Survey Area.

9.3.2.2 Non-breeding Birds

82. The surveys carried out over four winter seasons showed that the Core Survey Area and adjacent habitats are of value to non-breeding birds associated with the Swale. The arable fields and margins and perimeter habitats around the survey area also provide foraging resources and resting places for a diverse range of species. Technical Appendices A9.1, A9.3 and A9.4 provide detailed results of the surveys.

83. In terms of the 22 SPA component waterbird species, the majority of these were mostly recorded in the intertidal parts of the survey area adjacent to the Core Survey Area. Three species, dark-bellied brent goose, golden plover and lapwing, were frequently recorded in the arable fields within the Core Survey Area and in the adjacent pasture fields at the east end of the Core Survey Area between the arable fields and the public minor road (Seasalter Road). Table 9.6 provides a summary of the occurrence of each species during the surveys. Preliminary data analysis carried out for the PEIR has been reviewed and revised to ensure consistency with appropriate criteria for the inclusion or exclusion of bird counts, e.g., where birds took off from one field within the Core Survey Area and landed in another, these are the same birds using the site and should be recorded as such. The detailed review of the analysis has led to the removal of such double counting, as well as other details, which has led to minor changes in the baseline data reported in the ES relative to that in the PEIR.

Table 9.6 Non-breeding SPA Component Birds Summary

Season	Summary
Dark-bellied brent goose	Frequently recorded in the in the Core Survey Area and adjacent mudflats and grazing pasture, occasionally in nationally and internationally important numbers. Brent geese were recorded frequently foraging in the arable fields within the Core Survey Area, as well as intertidal habitats of the Swale and in the pasture fields to the east of the Core Survey Area. Monthly-peak mean counts of foraging birds (all birds recorded were foraging) on the arable fields within the Core Survey Area each season (November to February) of: • 2013/14 – 1855 birds (n=6)*

[18] Fuller, R.J. (1980). A method for assessing the ornithological interest of sites for conservation. *Biological Conservation* 17, pp. 229-239.

Season	Summary
	• 2014/15 – 1201 birds (n=12) • 2015/16 – 191 birds (n=26) • 2017/18 – 150 birds (n=16)
European white-fronted goose	None recorded during any survey
Shelduck	Frequently recorded in the intertidal parts of the survey area, particularly on mudflats adjacent to the north-west end of the Core Survey Area. Very occasional records of birds using the arable fields within the Core Survey Area in April. Peak counts in the intertidal area of: • 2013/14 – 18 birds • 2014/15 – 137 birds • 2015/16 – 151 birds • 2017/18 – 115 birds In the arable fields, the mean of the seasonal monthly peak-mean counts (October to April) was 0.4 birds.
Shoveler	Recorded on just two occasions (6 and 9 birds) on the sea in the intertidal area north of the Core Survey Area.
Wigeon	Frequently recorded in the intertidal habitat, particularly on mudflats adjacent to the north of the Core Survey Area and in the lagoon at Castle Coote. No use of arable or pasture was recorded. Peak counts in the intertidal area of: • 2013/14 – 110 birds • 2014/15 – 315 birds • 2015/16 – 571 birds • 2017/18 – 690 birds
Pintail	A male recorded on just one occasion in the lagoon on Castle Coote north of the Core Survey Area.
Teal	Almost always recorded in the intertidal habitat adjacent to the Core Survey Area, especially in Faversham Creek and in the lagoon on Castle Coote. Less than five occasionally recorded in the ditches between arable fields within the Core Survey Area and one record of 40 in the pool in the south of the Core Survey Area near Nagden. Peak counts in the intertidal area of: • 2013/14 – 9 birds • 2014/15 – 80 birds • 2015/16 – 239 birds • 2017/18 – 160 birds
Little egret	Recorded most abundantly and most frequently on mudflats and saltmarsh in Faversham Creek and Castle Coote. Also typically single birds recorded occasionally throughout the Core Survey Area, in ditches between arable fields but more usually in the KWT South Swale nature reserve. Peak counts in the intertidal area of: • 2013/14 – 3 birds • 2014/15 – 51 birds • 2015/16 – 8 birds • 2017/18 – 22 birds In the arable field margins, the mean of the seasonal monthly peak-mean counts (October to April) was 0.6 birds.
Oystercatcher	Frequently recorded in large numbers (although less than the threshold for national importance) in the intertidal habitat, particularly on mudflats adjacent to the north-east end of the Core Survey Area. Very occasional records of birds using the arable fields within the Core Survey Area. Peak counts in the intertidal area of:

Season	Summary
	• 2013/14 – 959 birds • 2014/15 – 213 birds • 2015/16 – 845 birds • 2017/18 – 1,186 birds In the arable fields, the mean of the seasonal monthly peak-mean counts (October to April) was 0.6 birds.
Avocet	Frequently recorded in the intertidal habitats, on some occasions in numbers exceeding the threshold for national importance, particularly on mudflats adjacent to the north-west of the Core Survey Area. No use of arable or pasture was recorded. Peak counts in the intertidal area of: • 2013/14 – 131 birds • 2014/15 – 240 birds • 2015/16 – 150 birds • 2017/18 – 194 birds
Lapwing	Lapwing were recorded frequently using the arable fields within the Core Survey Area for foraging and roosting, as well as intertidal habitats of the Swale and in the pasture fields to the east of the Core Survey Area, but numbers were below the threshold of international or national importance. Monthly-peak mean counts of foraging birds (with monthly-peak mean counts including roosting birds in brackets) on the arable fields within the Core Survey Area each season (October to March) of: • 2013/14 – 72 (72) birds (n=9) • 2014/15 – 369 (409) birds (n=15) • 2015/16 – 438 (483) birds (n=33) • 2017/18 – 352 (542) birds (n=24)
Golden plover	Golden plover were recorded frequently using the arable fields within the Core Survey Area for foraging and roosting, as well as intertidal habitats of the Swale and in the pasture fields in the east of the site, but numbers were below the threshold of international or national importance. Monthly-peak mean counts of foraging birds (with monthly-peak mean counts including roosting birds in brackets) on the arable fields within the Core Survey Area each season (October to March) of: • 2013/14 – 0 (0) birds (n=9) • 2014/15 – 8 (8) birds (n=15) • 2015/16 – 346 (351) birds (n=33) • 2017/18 – 279 (588) birds (n=24)
Grey plover	Frequently recorded in moderate numbers (although less than the threshold for national importance) in the intertidal habitat, particularly on mudflats adjacent to the north of the Core Survey Area. Occasional records of birds using the arable fields within the Core Survey Area. Peak counts in the intertidal area of: • 2013/14 – 14 birds • 2014/15 – 58 birds • 2015/16 – 262 birds • 2017/18 – 150 birds In the arable fields, the mean of the seasonal monthly peak-mean counts (October to March) was 1.1 birds.
Curlew	Frequently recorded in small numbers (much less than the threshold for national importance) in the intertidal habitat adjacent to the Core Survey Area. Also relatively frequent in small numbers on the pasture adjacent to the east of the Core Survey Area and occasional records of birds using the arable fields within the Core Survey Area. Peak counts in the intertidal area of:

Season	Summary
	• 2013/14 – 11 birds • 2014/15 – 22 birds • 2015/16 – 86 birds • 2017/18 – 59 birds In the arable fields, the mean of the seasonal monthly peak-mean counts (October to April) was 1.7 birds. In the pasture fields, the mean of the seasonal monthly peak-mean counts (October to April) was 35.7 birds.
Bar-tailed godwit	Infrequently recorded, on one occasion in numbers exceeding the threshold for international importance, particularly on mudflats to the north of the Core Survey Area. High counts were usually recorded at the high tide roost on Castle Coote. No use of arable was recorded; a single bird was observed in pasture in February 2016. Peak counts in the intertidal area of: • 2013/14 – 0 birds • 2014/15 – 0 birds • 2015/16 – 2,000 birds • 2017/18 – 150 birds
Black-tailed godwit	Infrequently recorded in the survey area, and in numbers less than the threshold for national importance, occasionally on mudflats to the north of the Core Survey Area, but typically in the high-tide roost on Castle Coote. There was one high count of 380 birds, all the rest were of less than 35 birds. No use of arable or pasture was recorded. Peak counts in the intertidal area of: • 2013/14 – 0 birds • 2014/15 – 0 birds • 2015/16 – 32 birds • 2017/18 – 380 birds
Knot	Frequently recorded, occasionally in large numbers (although less than the threshold for national importance) in the intertidal habitat, particularly on mudflats to the north of the Core Survey Area. Peak counts in the intertidal area of: • 2013/14 – 0 birds • 2014/15 – 180 birds • 2015/16 – 1,280 birds • 2017/18 – 1,660 birds
Ruff	In October/November 2017, up to 23 ruffs were recorded in the intertidal habitat near the mouth of Faversham Creek. Some of these birds were also recorded in the fallow fields at the east end of the Core Survey Area foraging amongst a flock of carrion crows and herring gulls. There were no other records of this species.
Sanderling	Only three records of one or two sanderlings in the intertidal habitat throughout the survey period.
Dunlin	Frequently recorded in moderate numbers (although less than the threshold for national importance) in the intertidal habitat, particularly on mudflats adjacent to the north of the Core Survey Area. Occasional records of birds using the arable fields within the Core Survey Area, associating with lapwing and golden plover. Peak counts in the intertidal area of: • 2013/14 – 304 birds • 2014/15 – 358 birds • 2015/16 – 1,472 birds • 2017/18 – 3,000 birds

Season	Summary
	In the arable fields, the mean of the seasonal monthly peak-mean counts (October to March) was 32.1 birds.
Green sandpiper	Up to five birds very occasionally recorded (on 8 of the 97 surveys) in the intertidal areas or in ditches within the Core Survey Area.
Greenshank	Very small numbers very occasionally recorded in the intertidal habitat of Faversham Creek, typically one or two birds and a maximum of nine on one occasion in autumn 2017.

* n = the number of survey counts from which the peak-means were derived.

84. Waterbird species that do not form important parts of the SPA assemblage and were frequently recorded included:

- Mute swan – one or two birds often recorded in the pasture adjacent to the east end of the Core Survey Area;
- Mallard – small numbers (typically less than ten, occasionally 10 – 30) recorded in intertidal and farmland habitats throughout the survey period;
- Grey heron – usually several birds in the ditches in the Core Survey Area and KWT South Swale nature reserve;
- Redshank – moderate numbers in intertidal habitats and very small numbers of birds also occasionally recorded in the ditches and arable fields within the Core Survey Area;
- Great crested grebe – typically one or two birds in the channel of the Swale;
- Little grebe – typically up to three birds in the channel of Faversham Creek;
- Ringed plover – up to 30 birds frequently recorded in the intertidal habitats adjacent to the Core Survey Area; and
- Turnstone – up to 40 birds frequently recorded in the intertidal habitats to the north of the Core Survey Area.

85. Other waterbird species recorded very occasionally within the Core Survey Area and adjacent habitats included: whooper swan, pink-footed goose, gadwall, goldeneye, goosander, guillemot, cormorant, black-necked grebe, coot, moorhen, purple sandpiper, common sandpiper, whimbrel, snipe and woodcock. A single bittern was also recorded on one occasion in mid-winter 2016 and a spoonbill in Faversham Creek in March 2018.

86. Small flocks of gulls were occasionally found foraging in arable fields within the Core Survey Area, more particularly in autumn 2017, following cultivation of the land after harvest when fields in the western half of the survey area were left fallow. These comprised up to 60 herring gulls, 60 black-headed gulls and 20 common gulls. Later in the season, from late November, foraging groups were much smaller and typically numbered less than 5 individuals.

87. Small numbers of bearded tit and Cetti's warbler were recorded. All bearded tits and most Cetti's warblers were associated with the reedbeds in the South Swale nature reserve adjacent to the north of the Core Survey Area. Cetti's warbler was also occasionally heard in a reedbed in the south of the Core Survey Area near Nagden.

88. Birds of prey that were recorded included sightings of occasional buzzards, a single red kite, frequent hunting kestrels, a hobby, one or two peregrines and very occasional merlin, short-eared owl and barn owl.

89. Up to three marsh harriers were frequently recorded at any one time foraging within the Core Survey Area and adjacent grazing marsh, particularly along the ditches and KWT South Swale nature reserve. More information is provided about this species use of the site in section 9.3.2.3, Flight Activity, below and in Technical Appendix A9.1.

90. Up to three kingfishers were very occasionally seen (three surveys), either flying along Faversham Creek or foraging within the KWT South Swale nature reserve adjacent to the Core Survey Area.

91. Flocks of carrion crows were present during the majority of surveys in winter 2017/18, numbering up to 425 birds, foraging in the fallow fields at the west end of the Core Survey Area. Smaller numbers were recorded during the previous winters, with a maximum of 334 birds in November 2014.

92. Dunnock, song thrush and other common passerine species were recorded in small numbers in the peripheral scrub, tree-line, hedgerow and garden habitats.

93. Small flocks of up to 50 fieldfare and redwing were occasionally found foraging within the arable parts of the Core Survey Area throughout the winter periods in all seasons.

94. The arable fields within the Core Survey Area provided foraging resources for wintering flocks of skylark, starling and stock dove. Peaks of 21 and 100 skylarks were recorded in winter 2013/14 and 2014/15 respectively. Similar numbers were recorded during most of winters 2015/16 and 2017/18, although in autumn 2017, a count of 1,000 skylarks was estimated to be within the arable fields following cultivation of the soil. Starlings were occasionally very numerous with peaks of 3,400, 1,000 and 10,000 in winters 2013/14, 2014/15 and 2017/18 respectively (not recorded as a target species in winter 2016/17). Meadow pipits were frequently seen in small numbers in the arable fields within the Core Survey Area.

95. Small wintering populations of reed bunting, yellowhammer and corn bunting were also recorded in the peripheral scrub and reedbed habitats surrounding the block of arable fields. However, typically less than five individuals, numbers of these species were very low.

96. Numbers of birds recorded in the Core Survey Area at night were consistently lower than counts of birds in the same area during the day. Although the ability to detect all individual birds would have been more limited at night, despite use of night-vision optics and filtered spotlight, there were no substantially large flocks of birds such as golden plover, lapwing or brent goose, as had been recorded during the day. There was therefore no evidence from the nocturnal surveys that the Core Survey Area provided more important resources for birds at night.

9.3.2.3 Flight Activity

97. A total of 818 flights were recorded from 30 target species (Table 9.7; Technical Appendix A9.1, Figures A9.30-A9.38).

98. Marsh harrier, the primary target of the surveys, was the most frequently recorded target species during the FAS with a total of 239 flights. Birds were frequently observed hunting within the Core Survey Area throughout the year. Marsh harriers were observed in flight for 17.9% of survey observation time in the non-breeding season and 10.5% of survey observation time in the breeding season.

Table 9.7: Flight Activity Survey Results Summary

Species	Total Number of Flights	Maximum number of Birds in Flight	Mean Number of Birds per Flight	Figure Reference
Mute Swan	15	7	2.87	A9.30
Greylag goose	9	13	4.44	A9.30
Brent Goose	26	250	27.27	A9.30
Shelduck	12	2	1.92	A9.31
Wigeon	4	45	19	A9.31
Gadwall	2	12	7	A9.31
Teal	4	160	65.75	A9.31
Mallard	72	70	3.76	A9.31
Shoveler	1	9	9	A9.31
Little egret	41	3	1.12	A9.32
Grey heron	89	2	1.07	A9.32
Red kite	2	1	10	A9.33
Marsh harrier	239	2	1.03	A9.34 & A9.35
Hen harrier	2	1	1	A9.33
Merlin	4	1	1	A9.33
Hobby	7	1	1	A9.33
Peregrine	31	1	1	A9.33
Oystercatcher	14	22	2.76	A9.36
Golden plover	50	900	110.62	A9.36
Lapwing	119	450	45.61	A9.37
Dunlin	1	2	2	A9.38
Snipe	4	1	1	A9.38
Curlew	13	105	43.69	A9.38
Green sandpiper	12	2	1.25	A9.38
Redshank	9	2	1.11	A9.38
Mediterranean gull	9	2	1.78	A9.39
Common tern	1	1	1	A9.39
Barn owl	1	1	1	A9.40
Short-eared owl	10	1	1	A9.40
Raven	15	3	1.53	A9.40

99. Secondary species recorded included: frequent cormorant flights transiting across the survey area, occasional buzzards and frequent kestrels hunting within the Core Survey Area and especially the adjacent grazing marsh and South Swale reserve, and very occasional sparrowhawk.

9.3.3 Future Baseline

100. The future baseline also needs to be considered in relation to climate change. As set out in Chapter 15: Climate Change, there is a long-term future prediction for 2070 – 2099 of 31.2 – 44.4 cm sea level rise, under the 50% probability level (under the medium emissions scenario). This is highly likely to change the nature of the intertidal habitats within the Swale as a result of coastal squeeze. Changes in the nature of the estuary are likely to cause changes in the bird communities it can support and it may be possible to model such changes. However, there is a high level of uncertainty in how such changes to bird populations in the estuary might change the way in which birds use the terrestrial habitats of the Development site. Furthermore, the use of the site by birds will also be governed by numerous other factors, the most significant of which is the land use (in the future baseline scenario). Agricultural policy and land ownership and management will dictate how the land within the site is farmed, which will influence the diversity and abundance of birds that use it. With such inherent uncertainties, an assessment of the effects of the Development under future climate change scenarios would yield results that are not meaningful. The assessment is therefore undertaken under the assumption that there would not be any substantive changes in the baseline (i.e., that the Development site would continue to be managed arable farmland), and/or that the effects of the Development will not change during the operational phase of the Development.

101. The Environment Agency has set out for consultation a draft Medway Estuary and Swale Strategy (MEASS) for managing flood and erosion risk in the Medway and Swale areas. The draft strategy identifies the majority of the Development site as a candidate site for managed realignment in the second epoch timescale (20-50 years). Within the draft strategy, it is suggested that the flood defences in the north of the Development site would be maintained for the next 20 years and then the Environment Agency may implement managed realignment of the defences with construction of new setback embankments, whereby the land behind the defences would be allowed to flood. This scenario relies on the implementation of measures outlined in the MEASS, which has yet to be agreed as part of the next stage of the MEASS. As the MEASS is currently under consultation, and is a strategy rather than a firm proposal with any certainty or means of implementation, managed realignment of the site is not currently considered as part of the future baseline conditions at the site. The Applicant has made representations on the MEASS regarding the Development to the Environment Agency.

9.4 Development Design Mitigation

102. The assessment takes account of embedded mitigation methods which have been incorporated into the project design. Table 9.8 sets out the designed-in mitigation measures for the Development that have been adopted entirely or in part to avoid or reduce the potential effects on birds. These are consistent with the candidate Development design set out in Chapter 5: Development Description. Further applied mitigation is set out later in section 9.7 of this chapter to minimise the potential effects on birds where adverse effects of the Development (including embedded mitigation) are identified.

Table 9.8 Development Design Mitigation

Designed-in Mitigation Measure	Reason
All development of solar arrays and energy storage is in the arable land within the Development site and does not directly affect grazing marsh habitats.	The grazing marsh habitat within the Development forms parts of The Swale SPA/Ramsar/SSSI designation. The grazing marsh at the eastern end of the Development site identified as the Freshwater Grazing Marsh Habitat Management Area (FGM HMA) has been incorporated into the Application solely to enable improved management of that part of The

Designed-in Mitigation Measure	Reason
	Swale SSSI, which will be the subject of discussion and agreement with Natural England
All electrical cabling will be fixed to mounting structures or undergrounded.	Although not primarily designed to protect birds, the absence of above ground aerial wires reduces the risk of bird collisions.
Lighting – sensors only. No continuous lighting.	In part, to prevent disturbance to wildlife.
The Outline LBMP sets out the measures incorporated into the design of the Development to provide biodiversity mitigation and enhancement: Arable Reversion Habitat Management Area (AR HMA): approximately 56 hectares (ha) of arable land is proposed for reversion to grassland managed for wintering birds. The existing grazing marsh extending over 37 ha at the east end of the site identified as the FGM HMA is included to provide support to the landowner for the ongoing management of the SSSI (Figure 9.3). Lowland Grassland Meadow Habitat Management Area (LGM HMA) is the establishment of lowland meadow grassland on 32.4 ha of previously cropped arable land for the benefit of birds and other fauna. The LBMP also sets outs measures for management of the land between and around the solar panels as coastal grazing marsh extending over approximately 48 ha, approximately 27 ha of which forms large grassland areas between the arrays. These areas are displayed on Figure 9.3.	To mitigate for loss of resources in the arable land used by wintering brent geese, golden plover and lapwing and breeding birds. To provide enhanced management opportunities in the SSSI, subject to discussion and agreement with Natural England. To provide a different range of biodiversity mitigation and enhancement relating to ground nesting birds, small mammals, birds of prey, pollinators etc. To provide a different range of biodiversity mitigation and enhancement relating to ground nesting birds, small mammals, birds of prey, pollinators etc.
Implementation of a CEMP, which will guide the construction process through environmental controls in order to promote good construction practice and avoid adverse impacts during the construction phase.	The CEMP will be a wide-ranging document that sets out the measures to avoid or reduce the risk of adverse effects on birds during the construction process. These include prescriptions such as the SPA CNMP and BBPP (e.g., deployment of an Ecological Clerk of Works (ECoW)).
Implementation of SPA CNMP which sets out management measures to be applied during construction to maintain noise levels below set thresholds within the SPA.	The noise assessment (Chapter 12 of the ES) identified that there was potential for noise during construction to exceed noise thresholds set following consultation response and a subsequent literature review (above which disturbance to birds has the potential to become significant). The SPA CNMP therefore sets out mitigation measures to ensure noise levels at the most sensitive parts of the SPA during the winter and breeding seasons do not exceed the thresholds. The assessment in section 9.5 of this chapter assumes that this mitigation is embedded in the Development Design (for the purposes of the ornithology assessment, it is not embedded for the purposes of the assessment of noise effects in the noise chapter).

103. The proposed AR HMA for wintering bird species will be developed in approximately 56 ha of what is currently arable land to the east of the proposed substation location, with the aim of providing mitigation for loss of foraging resources for wintering birds, particularly brent geese, lapwing and golden plover. The approach to its management is set out in detail in the Outline LBMP (Technical Appendix A5.2). In summary, the arable land will be converted to a 'permanent' grassland, sowed during the construction phase, with application of organic fertiliser (e.g., farmyard manure) and grazed and/or cut during the summer (and as necessary during the course of the winter) to provide a nutritious short sward favoured by foraging brent geese, lapwing and golden plover.

104. The proposed FGM HMA is an area of approximately 37 ha of grazing marsh forming part of The Swale SSSI/SPA/Ramsar site[19] adjacent to the east of the AR HMA. Following consultation, opportunities were identified to improve the management of this area to bring additional benefits over and above the baseline for biodiversity and the designated interests of the Swale and therefore this land has been included within the Development site boundary so that its management can be delivered and controlled via the DCO. In particular, water management and controlled grazing are likely to be fundamental to achieving the desired outcomes for this area. The details of the management will be adaptive and subject to consultation and agreement with Natural England. In response to consultation responses, however, any benefits the Development may bring to this area are not considered to be mitigation of effects, because the current objectives for the area to be in favourable condition should be assumed to be successfully delivered in the future baseline scenario.

105. The aim of the LGM HMA is to establish a grassland sward with greater ecological value than the existing arable land. The conversion from arable to grassland enhancement/ restoration is a complex process requiring intervention over several years to ensure its success.

106. The continued monitoring and management of these HMAs will be the subject of ongoing consultation with relevant parties in the HMSG.

[19] Comprises two SSSI units: S15 M Attwood Cleve Marsh (049) and Cleve Marsh West (063).

9.5 Assessment of Likely Effects

9.5.1 Important Ecological Features (IEFs)

107. Following the criteria in Table 9.2 in the context of the baseline information, Table 9.9 presents the IEFs that have been identified.

Table 9.9 Important Ecological Features

IEF	Importance[20]	Rationale
The Swale SSSI/SPA/Ramsar (including The Swale NNR, Elmley NNR, South Bank of the Swale LNR, Oare Marshes LNR and Seasalter Levels LNR)	VERY HIGH (International)	As a multiple designated site up to the international level, and functionally linked to the Development site, The Swale qualifies as Very High (International) Importance. Although the NNR and LNRs might be considered to be of High and Medium Importance respectively, these designated sites all form parts of the overarching SSSI/SPA/Ramsar. As such, potential effects on the NNR and LNRs are all considered to be covered by the assessment of effects on the SSSI/SPA/Ramsar. As set out in section 9.3.1, paragraphs 67 to 72, the assessment of effects on The Swale SSSI/SPA/Ramsar is undertaken through examination of the effects on the cited species and assemblage of important features that may be connected to the designated site. These are therefore: • 22 component non-breeding waterbird species listed in paragraph 68; • Breeding/wintering short-eared owl; and • Breeding marsh harrier.
Breeding Farmland Bird Community	LOW (Local)	As described in section 9.3.2.1, the Core Survey Area and adjacent habitats are considered to be of local significance by virtue of supporting between 25-49 breeding species. The Development site itself also supports a number of breeding species within this range.
Wintering Farmland Bird Community	LOW (Local)	In the non-breeding season, the Core Survey Area and adjacent terrestrial habitats support a range of species (other than those associated with The Swale SSSI/SPA/Ramsar site) considered to be of local importance.
Barn Owl	MEDIUM (County)	Although nesting does not occur within the Development site, there are at least three nest sites within 1 km of the Development site, representing more than 1% of the county population.
Peregrine	MEDIUM (County)	Although nesting was not confirmed, a pair was regularly present within the Core Survey Area. One pair represents more than 1% of the county population.

108. Individual species not listed in Table 9.9 and not forming important parts of the breeding or non-breeding farmland bird communities are considered to be of negligible value, either due to their status as very common species or that their occurrence within the baseline survey areas was sufficiently infrequent that anything more than negligible effects are unlikely to occur. Such species are not considered further in the assessment.

[20] Equivalent to 'Sensitivity' in other technical assessments.

109. There are a number of statutory and non-statutory designated sites in the local area within 5 km of the Development site:

- Outer Thames Estuary SPA;
- Foxes Cross Bottom LNR;
- Ellenden Wood SSSI;
- Blean Woods NNR;
- Church Woods, Blean SSSI;
- SW 44 Uplees Lake and Marsh LWS;
- SW48 Abbey Fields, Faversham LWS;
- SW24 Graveney Dykes and Pasture LWS; and
- SW01 Bysing Wood and Oare Gravel Pits LWS.

The breeding bird communities at these designated sites are closely associated with the local habitats at the designated sites and they are not likely to make use of the Development site at a level of frequency that could result in more than negligible effects. As such, no further consideration is given to these designated sites in the assessment.

9.5.2 Types of Effects

110. There are several potential effects on birds of the development of agricultural land for solar energy production and storage that may occur during the construction, operation and decommissioning phases of development. These are primarily concerned with:

- Noise and/or visual disturbance caused by personnel, machinery and lighting during construction and decommissioning;
- Noise and/or visual disturbance caused by maintenance activities or lighting during the operation of the solar park;
- Loss/change of habitats, which can be adverse through loss of habitats used by birds or positive through creation of enhanced conditions for wildlife through sensitive management of undeveloped areas;
- Fragmentation of habitats hindering the movement of birds and preventing access to favoured foraging or breeding grounds;
- Hydrological changes, which alter the character of habitats or the availability of water;
- Deposition of dust during construction and decommissioning affecting habitats used by birds;
- Collision of birds if they fly into the solar panels, for example if mistaking them for water; and
- Indirect effects through changes in recreational access to areas used by birds.

111. Each of these potential effects is examined below in terms of their likelihood of occurrence or potential to cause adverse effects.

9.5.2.1 Construction and Decommissioning Disturbance

112. Noise and visual stimuli during construction and decommissioning of the Development may cause disturbance to breeding, foraging and resting/roosting birds both within the Development site and beyond its boundaries, such as in the adjacent freshwater grazing marsh/reedbeds and intertidal habitats of the Swale. There will be construction/decommissioning activities in the local landscape during works, including movements of large plant vehicles (e.g., excavator, dump truck and transport), presence of personnel and operation of one or more pilers. Lighting may be used during the construction phase but will be kept to a minimum through lighting mitigation measures set out in the Outline CEMP such as pointing lights away from the SPA and avoiding unnecessary light spill onto adjacent areas.

113. Worst-case vibration levels at the Swale SPA boundary have the potential to result in an effect during piling and compacting operations. However, the predictions are based upon

the closest point to the boundary where vibration-inducing activities will take place. At a distance of 40 m or more from the SPA, vibration due to such works across the majority of the site will be below the level of (human) perceptibility at the closest part of the SPA boundary.

114. With regard to effects such as disturbance to nests within the ecological designations, no specific assessment criteria are available. However, BS 5228 presents a minimum PPV level of 15 mms^{-1} at which cosmetic damage may occur to residential buildings[21] (such as cracks in plaster, etc.). Whilst not directly comparable, the worst case level of vibration at the SPA boundary is substantially lower than this value, as set out in ES Chapter 12: Noise and Vibration. On this basis, it is considered that the risk of disturbance of nests from vibration is negligible, and vibration is not considered further in this assessment.

115. The construction period is expected to last 24 months. Phase one includes the installation of the solar panels and associated infrastructure over approximately 24 months. Phase two includes the installation of the energy storage facility and would either be undertaken during phase one, or separately, when it would last up to 6 months.

116. During construction of the solar arrays, the construction team will install panels on a field-by-field basis, completing the installation in one field, or group of small fields, before moving on to the next. Construction will therefore not occur across the whole site at the same time and direct effects will be localised at any one time.

117. In the absence of mitigation to reduce the effects of noise and visual disturbance to birds, reduced foraging, resting and breeding opportunities are likely to cause negative effects as a result of decreased survival and productivity of individuals. Mitigation is therefore proposed to reduce the magnitude of effects as set out in the Outline SPA CNMP and BBPP.

118. This assessment identifies four areas within or around the Development site in which noise and visual disturbance would have effects. The sensitivity of the different areas varies depending on the season during which the construction activity affects it. These are:

- Intertidal habitat seaward of Mean High Water Springs (MHWS) within the SPA/Ramsar Site: non-breeding season;
- Grazing marsh and reedbed habitat within the SPA/Ramsar Site to the north and west of the solar panel development area in the coastal strip landward of the sea wall: breeding season;
- Grazing marsh within the SPA/Ramsar Site to the east of the solar panel development area and AR HMA: breeding and non-breeding season;
- Arable land within the solar panel development area: breeding and non-breeding season.

119. Chapter 12: Noise of the ES provides details of the noise emitting activities with the potential to result in adverse effects in relation to the surrounding ecological receptors. Construction activities will vary as the site is developed, however the main activities are anticipated to be as follows:

- Construction of tracks and hardstanding areas;
- Installation of mounting frames (including piling);
- Installation of panels;
- Construction of the substation; and
- Construction traffic over the access road.

120. The assessment of active piling operations has been undertaken based on predicted L_{Amax} levels, while all other construction activities are based on predicted L_{Aeq} levels. Active

[21] BS 5228-2:2009 +A1:2014, Table B2

piling has been assessed based on a L_{Amax} as this activity will result in repeated impulsive high noise levels. Active piling has the potential to be intermittent, therefore it is considered appropriate to use L_{Amax} as a worst case. Other construction activities (e.g., engine noise, manoeuvring plant) will not emit impulsive, intermittent noise, and as such have been assessed as L_{Aeq} levels.

121. There are no specific criteria or thresholds for the assessment of noise (and visual) disturbance on ecological receptors. Dooling and Popper (2016)[22] provide a comprehensive literature review of the effects of traffic noise and road construction noise on birds. The key findings of this review are that the effects of traffic and construction noise may be insignificant when the noise adds little to the ambient background level, but has the potential to produce significant short- and long-term behavioural and physiological changes in birds when adding significantly to the natural ambient noise. Such impacts may include changes in foraging location and behaviour; interference in communication; failure to recognize other important biological signals, such as sounds of predators and/or prey; decreasing hearing sensitivity temporarily or permanently; and/or increasing stress and altering steroid hormone levels. These impacts have the potential to cause effects on populations through reduced survival or productivity.

122. The review culminates in guidance regarding the types of impacts on birds and the noise thresholds at which they occur. Four categories of noise effect (with increasing distance from source) were identified:

- Zone 1: Hearing damage & PTS (permanent threshold shift) – permanent hearing loss);
- Zone 2: TTS (temporary threshold shift) - temporary hearing loss which recovers over a period of minutes to days after exposure;
- Zone 3: Masking of communication signals which may also result in other behavioural and/or physiological effects; and
- Zone 4: Potential behavioural/physical response – communication is no longer masked but faintly heard sounds intruding above others may still lead to alertness and, thus, lead to other behavioural and/or physiological effects.

123. Beyond Zone 4, noise at all frequencies is completely inaudible, falling below the level of the ambient noise) and there is no effect.

124. Dooling and Popper report that previous guidelines recommended a level of 60 dBA for continuous noise (such as from traffic), but that recent research demonstrated considerable variation in sensitivity between species by as much as 10 dB. They proposed updated interim guidelines as shown in Table 9.10.

Table 9.10: Guidelines for potential effects of noise from different noise sources (from Dooling & Popper (2016)[22])

Noise Source Type	Hearing Damage	TTS	Masking	Potential Behavioural Physiological Effects
Single impulse (e.g., starter's pistol 6" from the ear)	140 dBA (1)	NA (3)	NA (5)	Any audible component of traffic and construction noise has the potential of causing behavioural
Multiple impulse (e.g., jack hammer, pile driver)	125 dBA (1)	NA (3)	Ambient dBA (6)	

[22] Dooling, R.J. & Popper, A.N. (2016). *Technical Guidance for Assessment and Mitigation of the Effects of Highway and Road Construction Noise on Birds*. California Department of Transportation Division of Environmental Analysis, Sacramento, California.

Non-strike continuous (e.g., construction noise)	None (2)	93 dBA (4)	Ambient dBA (6)	and/or physiological effects independent of any direct effects on the auditory system of PTS, TTS or masking
Traffic and construction	None (2)	93 dBA (4)	Ambient dBA (6)	
Alarms (97 dB/100 ft)	None (2)	NA (2)	NA (7)	

TTS = temporary threshold shift

dBA = A-weighted decibel

PTS = permanent threshold shift

(1) Estimates based on bird data from Hashino et al. (1988) and other impulse noise exposure studies in small mammals

(2) Noise levels from these sources do not reach levels capable of causing auditory damage and/or permanent threshold shift based on empirical data on hearing loss in birds from the laboratory.

(3) No data available on TTS in birds caused by impulsive sounds.

(4) Estimates based on study of TTS by continuous noise in the budgerigar and similar studies in small mammals.

(5) Cannot have masking to a single impulse.

(6) Conservative estimate based on addition of two uncorrelated noises. Above ambient noise levels, critical ration data from 14 bird species, well-documented short-term behavioural adaptation strategies and a background of ambient noise typical of a quiet suburban area would suggest noise guidelines in the range of 50-60 dBA.

(7) Alarms are non-continuous and, therefore, unlikely to cause masking effects.

125. Clearly, permanent or temporary damage to birds' hearing must be avoided during the construction or decommissioning of the Development. The guidance described above suggests that this would be above a threshold of 110 dBA (L_{max}).

126. In considering appropriate thresholds of noise at the SPA from the Development, it is known that the ambient noise level is relatively low as it is in a rural setting away from human habitation. The threshold at which 'disturbance' might occur, whereby there is a behavioural change in birds that could affect their feeding or incubating, or cause them to move away is difficult to determine. A study in the US investigated the effects of noise on owls and murrelets, culminating in guidance issued by the US Fish and Wildlife Service (AFWO, 2006)[23]. The purpose of the FWS guidance was to promote consistent and reasonable determinations of potential effects on either species that could result from elevated human-generated sounds or human activities in close proximity to nests during the breeding season. This guidance defined a level of disturbance termed 'harassment' which results in flushing of birds from the nest or abandonment or delaying of feeding and provisioning young. Such behaviours were interpreted to occur when noise levels at the bird exceeded ambient conditions by 20-25 dB or when visual activity of humans was within 40 m of the nest. Whilst lower noise levels and human activity further away were deemed to also cause altered behaviours, these did not result in behaviour defined as 'harassment'. Based on a low ambient noise level of around 40 dB at the Development site, noise levels causing harassment would be at 60-65 dBA (L_{max}). However, recognising that this was highly precautionary, more recent interpretation of this study by the US Nuclear Regulatory Commission (2012)[24] identifies other categories of behaviour and detectability of noise. These are interpreted as (for 40 dB ambient level and assumed to be L_{max} values at the receptor):

- 92 dB – threshold below which flushing and visible disturbance unlikely to occur;
- 70 dB – threshold above which behavioural defence likely, such as hiding, moving body or postponing feeding;

[23] AFWO (2006). *Estimating the effects of auditory and visual disturbance to northern spotted owls and marbled murrelets in Northwestern California*. U. S. Fish and Wildlife Service, Arcata, California.
[24] https://www.nrc.gov/docs/ML1225/ML12250A723.pdf

- 57 dB – arbitrary threshold for 'alertness' between detectability and behavioural-change thresholds; and
- 44 dB – threshold for detectability.

127. Other sources of guidance are available from the UK; there is evidence gathered by the Institute of Estuarine and Coastal Studies (IECS)[25] culminating in a 'Waterbird Disturbance Mitigation Toolkit'[26]. This provides a guide to noise thresholds for different categories of noise type and level received by wintering birds in intertidal habitats. These are repeated here for reference.

128. The IECS Toolkit described the types of disturbance effect and the sensitivity of different receptor species, emphasising that there will be local differences as a result of the background environment and habituation. As a general guide (a "rule of thumb"), noise and visual stimuli are classified into three categories:

- *"High Level Disturbance Stimuli:*
  - *Sudden single noise of over 60dB (at the bird) e.g., single or initial pile impact, dropping of piles on hard surface in undisturbed environment.*
  - *Continuous/repetitive noise over 72dB (at the bird) e.g., ongoing percussive or Movax vibro-piling (depending on receptor distance).*
  - *Close proximity of activities to birds e.g., works or works access undertaken less than 100m from bird activity*
  - *Works on foreshore. Potentially substantially greater level of impact compared to similar works on bank crest. Some habituation possible.*
  - *Workers operating outside of plant e.g., single operative working on the bank may have a greater impact than an operational excavator or other plant. - Workers vacating plant e.g., when an operator vacates an excavator or other plant, then disturbance levels can increase.*
  - *Works access e.g., access by operators along bank crest to and from plant can have a greater disturbance effect than the plant operation.*
  - *Large/fast moving machinery e.g., slow moving vehicles can have a lower impact than fast. However vehicles stopping can cause a flight response.*
  - *3rd parties accessing along the foreshore. Often difficult to account for and manage, but restriction to public access can be effective mitigation.*
- *Moderate Disturbance Stimuli:*
  - *Sudden noises of 55-60dB (at the bird) e.g., as above (55-60dB can be moderate or high depending on context).*
  - *Continuous/repetitive noises 60-72dB (at the bird) e.g., as above.*
  - *High level disturbance activities that have reduced impact due to habituation. As above, but if ongoing, habituation can occur reducing impact.*
  - *Slow moving/small plant. Plant movement can cause disturbance at any speed. However vehicles coming to a halt can on occasion increase response.*
- *Low Level Disturbance Stimuli:*
  - *Noise of less than 55dB (at bird). This is often below background levels in estuaries.*
  - *Noise of 55-72dB in a highly disturbed environment e.g., with background ambient noise levels of >60dB.*

[25] Cutts, N., Phelps, A. and Burdon, D. (2009). *Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance.* Report to Humber INCA. Institute of Estuarine and Coastal Studies, University of Hull.
[26] Cutts, N., Hemingway, K. and Spencer, J. (2013). *Waterbird Disturbance Mitigation Toolkit: Informing Estuarine Planning & Construction Projects.* Produced by the Institute of Estuarine & Coastal Studies (IECS) University of Hull.

- *Moderate level disturbances that have reduced impact due to habituation. As above but with regular occurrence increasing habituation.*
- *Works that are out of sight of birds and create a low level noise e.g., behind bank but overflying birds may respond and locate away from works.*
- *High level works where the birds are always over 500m away (before start up). This may be reduced to a 300m radius with habituation.*
- *Moderate level works where the birds are over 300m away (before start up). Potential for further slight range reduction with habituation (c. 250m)"*

129. On the basis of the IECS studies, in the PEIR, a noise threshold of 70 dB L_{Aeq} was assessed as a suitable threshold for significant effects on ecological designations. However, in response to the PEIR, Natural England suggested that a noise threshold of 70 dB L_{Aeq} (at the bird receptor location) is too simplistic and recommended that such a value is not used as a generic threshold for noise levels which could result in moderate to high disturbance of birds.

130. As an alternative, Natural England advised that an assessment of the change in noise levels should be used instead, suggesting that a change in 3 dB of similar noise types would be unlikely to be significant (on the basis that such change is not perceptible to the human ear, although it is known that the auditory threshold for birds is lower than that for humans (Dooling & Popper, 2016)[22] – humans hear sound at twice the distance that birds would hear the same sound).

131. A change of +3 dB or less above background noise levels during construction is defined by detectability, rather than potential impact, therefore this assessment applies a precautionary threshold noise level against which to assess the effects of disturbance and to devise a suitable construction plan that minimises the effects of noise on birds associated with The Swale SPA/Ramsar Site. In the PEIR a threshold of 70 dB L_{Aeq} was used to determine whether or not there would be a significant effect on birds. Since PEIR, this approach has been amended; instead, a lower threshold of 55 dB L_{Amax} has been set as a level below which it is considered that birds would not be disturbed in the adjacent intertidal habitats. This is considered to be precautionary, as it is 5 dB below the 60 dBA (assumed to be L_{max}) threshold for continuous, repetitive noise defined in the IECS Toolkit for 'low level disturbance stimuli'[27]. In intertidal habitats, noise and visual disturbance to birds on the mudflats would be also screened by the sea wall, although construction activity might still be visible to birds in flight. Low level noise effects are those classified in the IECS Toolkit as '*…that which is unlikely to cause response in birds using a fronting intertidal area*.'

132. Between levels of 55 dB L_{Amax} and 70dB L_{Amax}, birds in intertidal habitats would be expected to become alert and possibly reduce feeding efficiency but not move away, such that it is unlikely to result in detrimental effects that reduce their ability to survive or reproduce and would not affect their distribution. Arcus Consultancy Services undertook an assessment of the impact of piling noise at Arna Wood Solar Farm near Morecambe Bay SPA and subsequently carried out monitoring of bird behaviour during the piling activity[28]. The recommendation was to maintain noise levels in the SPA below 70 dB L_{Aeq} (by operating a single piler in areas close to the SPA and using acoustic screening in the most proximal areas within 90 m of the SPA) and to avoid sudden irregular noise above 50 dB L_{Aeq}. The bird monitoring concluded that there were no bird disturbance events that could be attributed to the construction activity. Therefore in practice, only those

[27] More specifically, the threshold for moderate disturbance stimuli for repetitive, continuous noise is 60-72 dB (at the bird), so it is assumed that noise below that threshold for repetitive/continuous sources (typically measured in dB L_{Aeq}) is in the low disturbance category.

[28] Arcus Consultancy Services (2017a). *Arna Wood Solar Farm Piling Noise Investigation*. Report to Canadian Solar, February 2017.
Arcus Consultancy Services (2017b). *Arna Wood Solar Farm Wintering Bird Mitigation Report*. Report to Canadian Solar.

areas of the intertidal habitat receiving in excess of 70 dB are considered likely to be disturbed by noise. Unlike the Arna Wood assessment, the threshold for the assessment of the CHSP Development is L_{max} rather than L_{eq} and is therefore considered to be a more precautionary approach.

133. There are no specific criteria or thresholds for the assessment of noise on breeding birds. BS 5228[29] advises that noise levels generated by construction activities are deemed to be significant for humans if the $L_{Aeq,period}$ level of construction noise exceeds lower threshold values of 65 dB(A) during daytime. As described above in relation to the reactions of wintering birds, continuous levels of 65 dB(A) are considered to be in the range that cause moderate disturbance. The acceptable threshold level to avoid disturbance to breeding birds should therefore be below this level. It is unclear whether this is L_{Aeq} or L_{Amax} therefore the precautionary approach is taken in this assessment and the threshold is set in L_{Amax}. This ensures that sudden or intermittent loud noises at a level that might cause disturbance or harm to birds is avoided. Based on the evidence provided above, for the purposes of this assessment and in consideration of the sensitivity of the receptor, a value of 65 dB L_{Amax} is set as a threshold below which it is not predicted that there would be behavioural responses by breeding birds to a degree that results in decreased survival or productivity.

134. The noise assessment (Chapter 12: Noise, Tables 12.15 and 12.17) demonstrates that, applying worst-case predictions without mitigation, the predicted noise levels at sensitive breeding bird receptors such as the coastal strip of grazing marsh/reedbed (within The Swale SPA/SSSI/Ramsar) could exceed the 65 dBA thresholds during active piling and other activities such the manoeuvring of piling equipment and the installation of the PV panels during periods when the activity comes closest to those habitats. Without mitigation, the 70 dBA thresholds could also be exceeded in the intertidal habitats of the estuary. Noise from the haul road would also exceed this threshold during construction/decommissioning where the haul road is closest to the grazing marsh in The Swale SPA/SSSI/Ramsar near to the existing site entrance off Seasalter Road.

135. Mitigation is therefore proposed in the assessment of impacts of construction/ decommissioning noise in Chapter 12: Noise to reduce the noise emissions such that sensitive ecological receptors receive noise levels below the thresholds described above. The resulting noise emissions in the four distinct habitats are discussed in further details in the subsections below.

136. The installation of the perimeter fence surrounding the solar PV arrays will involve the sequential installation of fence posts along the boundary. The noise and visual disturbance generated from installation of the fence (e.g., a team of two workers using percussive or vibratory piler) will be relatively quiet (hammer piling of wooden posts) and very localised at any one time, therefore potential disturbance events at any one location will be very short-term; it is estimated that 350-400 m of fence could be erected each day. Such localised disturbance will not exceed the baseline disturbance that occurs due to the operation of machinery during the baseline farming practices, which comprises several tractor/harvester and associated vehicles movements for sowing in autumn or spring, spraying during crop growth, harvesting in summer/autumn and ploughing and soil preparation between autumn and spring. Due to its temporary, localised impact, the installation of the fence is not expected to cause significant disturbance to breeding or non-breeding birds and is therefore not considered in further detail in this assessment.

Intertidal habitats: non-breeding season

137. Technical Appendix A12.10, Outline SPA CNMP, shows that the noise level received by birds in intertidal habitats will not exceed 70 dB L_{Amax} or 70 dB L_{Aeq} and therefore flight

[29] *British Standards 5228: Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*.

responses by birds are considered unlikely to occur – i.e., the energetically costly moderate/high level disturbance effects do not occur. Prior to the commencement of construction, the SPA CNMP will be updated to confirm that this is still the case.

138. Birds in intertidal habitats in a wider area up to 320 m from the noise source could receive noise levels above 55 dB L_{Amax} for some of the time when piling activity takes place within the fields closest to MHWS. These comprise parts of Fields A, B, C, D, E, F, H, I, K, L, M and R. The L_{Amax} levels are generated by a single active piler with acoustic screening mitigation as described in Chapter 12: Noise of the ES. The screening effect of the sea wall has also been taken into account.

139. During other construction activity, an area of up to 150 m from the noise source could receive noise levels above 55 dB L_{Aeq}. The L_{Aeq} levels are generated by manoeuvring plant and other construction activities as described in Chapter 12: Noise of the ES.

140. In order to minimise the noise exceeding 55 dB L_{Amax} reaching the SPA from the piling rig, the embedded mitigation will apply in all areas where it is demonstrated in the SPA CNMP that piling noise has the (unmitigated) potential to exceed 55 dB beyond MHWS.

141. When construction piling occurs during the winter which could result in noise levels in excess of 55 dB L_{Amax} being received beyond MHWS, only a small area of the intertidal habitats of the Swale SPA/Ramsar Site will be affected at any one time. It is proposed to minimise the noise emission of the construction activity by only actively piling using a single piling rig (in areas with the greatest potential for 55 dB L_{Amax} being exceeded within the intertidal zone) and to include acoustic screening around the piler (as set out in the SPA CNMP appended to the CEMP). The resulting intertidal area receiving >55 dB L_{Amax} noise level is approximately 10.6 ha at the point when the piling occurs at its closest location to MHWS (approximately 80 m). Based on the worst case location closest to MHWS, 10.6 ha of intertidal habitat represents 0.16% of the area within The Swale SPA/Ramsar Site or 0.42% of the estuarine mudflats in The Swale. For the majority of the time, the piler will be operating further away from MHWS than this minimum distance of 80 m and consequently the intertidal area affected by noise will become smaller with increasing distance from MHWS. In areas increasingly further from MHWS, consideration will be given to increasing the number of piling rigs able to operate simultaneously in order to reduce the amount of time that noise from piling is occurring in the area. In any case, the piling schedule will be designed to ensure that noise levels will not exceed the 70 dB noise threshold at MHWS.

142. As explained above, the proportions of the intertidal area affected by noise will only occur temporarily when piling operations take place near MHWS (i.e., for a proportion of the time in each field shown in Table 9.11).

143. The IECS Toolkit predicts that there would be 'moderate to low' effects on wintering waterbirds in intertidal habitats experiencing between 50-70 dB L_{Amax} levels of noise emitted from construction piling. This category of effect is one in which birds would not move away and are likely to become habituated to the regular noise. Birds within the area of 10.6 ha within the 55 dB L_{Amax} contour have the potential to experience noise levels of between 55 dB and 65 dB under a worst case scenario of construction activities occurring closest to the MHWS which could result in moderate to low effects on wintering waterbirds in this area, i.e., the birds would not be expected to move away and would be expected to habituate to the noise.

144. The mitigation proposed below to protect breeding birds within the SPA/Ramsar Site means that construction in Fields A, B, C, D, E, F, G, H and I will be restricted outside the breeding season (i.e., September to February inclusive). Construction within Fields A, B, C, D, E, F, H, I, K, L, M and R is expected to take approximately 43 weeks (Table 9.11). As there is a maximum of 25 weeks within the period outside the breeding season, the

disturbance would occur during all of one winter season and part of a second, or parts of two winter seasons.

145. The scheduling of construction is planned such that each field, or block of solar panel arrays would be installed sequentially. Within the approximately 43 weeks that construction in Fields A, B, C, D, E, F, H, I, K, L, M and R takes place, only a proportion of the time taken to install panels in each field will result in noise levels exceeding 55 dB L_{Amax} in intertidal habitat.

Table 9.11: Estimated construction duration in fields causing > 55 dB L_{Amax} noise levels received in intertidal areas

Field/ Block	Estimated construction duration (weeks)
A	4
B	5
C	6
D	4
E	3
F	4
G	3
H	3
I	3
K	3
L	With K
M	5
R	With M

146. The majority of the intertidal habitat fronting the Development site would remain largely undisturbed by construction noise at any one time and would also be visually screened by the sea wall. Given the precautionary criteria for noise disturbance affecting birds in the intertidal habitats adjacent to the Development site, the intermittent and temporary nature of its occurrence and the very small proportion of the available intertidal habitat being affected at any one time, it is concluded that assuming implementation of the embedded and applied noise mitigation measures, there would be no long-term adverse effects on any of the wintering waterbird species in the intertidal area.

147. During decommissioning, noise levels are expected to be of lower magnitude than during construction and the duration is expected to be shorter. It is therefore concluded that with similar noise control measures set out in a decommissioning plan, decommissioning disturbance with respect to the intertidal habitats would not have an adverse effect on any of the wintering waterbird species in the intertidal area.

Grazing marsh/reedbed (north/west): breeding season

148. The Swale SPA/Ramsar site and South Swale NNR includes the parts of the KWT nature reserve on the landward side of the sea wall embankment adjacent to the solar PV development area. The baseline surveys have demonstrated that this area does not provide frequent or important resources for the 22 wintering waterbird qualifying interest species (Count Sectors 10 to 17 and 37 during baseline surveys, counts summarised in Table 9.12); however, it provides breeding habitat for a number of species that are important components of the breeding assemblage, such as mallard, moorhen, sedge warbler, reed warbler, yellow wagtail and reed bunting, as well as marsh harrier.

Table 9.12: Summary of wintering waterbird counts in SPA coastal grazing marsh/reedbed strip between development area and sea wall

Species	**Inter-seasonal monthly peak-mean**
Dark-bellied brent goose European white-fronted goose Shelduck Shoveler Wigeon Pintail Avocet Bar-tailed godwit Black-tailed godwit Knot Ruff Sanderling Green sandpiper Greenshank	No records in coastal strip grazing marsh count sectors
Teal Little egret Oystercatcher Lapwing Golden plover Grey plover Curlew Dunlin	Less than 1.0 birds

149. For the passerine species that nest in reedbeds, the distance over which disturbance might cause an effect is likely to be small, with visual disturbance having little influence because there is no direct line of sight. However, other species such as marsh harriers may be highly sensitive to disturbance. A review carried out for Scottish Natural Heritage (SNH)[30] provided expert opinion and literature review of disturbance distances for selected species of bird. This indicated that the disturbance distance within which effects could occur on marsh harrier was between 300-500 m.

150. Without mitigation to avoid noise-related disturbance to this area, breeding birds could be subject to noise and visual disturbance at a level that has the potential to cause disturbance at nest sites, from behavioural stress resulting in lower provisioning rates, to the most extreme result being the abandonment of nesting attempts. As described above a noise level of 65 dBA is set as a threshold below which it is not predicted that there would be behavioural responses by breeding birds to a degree that results in decreased survival or productivity.

151. Technical Appendix A12.10, Outline SPA CNMP, shows that the noise level received by birds in the coastal grazing marsh/reedbeds could exceed 65 dB L_{Amax} / L_{Aeq} and therefore there is potential for moderate/high level disturbance effects to occur.

152. Construction noise exceeding 65 dB L_{Amax} / L_{Aeq} in the coastal grazing marsh/reedbed area will be avoided during the bird breeding season, defined as 1 March to 31 August inclusive. This could exclude movement of heavy plant and installation of the piles in the areas of fields adjacent to the SPA boundary during the breeding season. Aside from

[30] Ruddock, M. and Whitfield, D.P. (2007). *A Review of Disturbance Distances in Selected Bird Species*. Report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

avoiding disturbance to birds forming the SPA breeding assemblage populations, such mitigation is required as good practice to avoid disturbance to breeding birds listed on Schedule 1 of the Wildlife and Countryside Act (1981, as amended), including Cetti's warbler, bearded tit and possibly marsh harrier, if this species chooses to nest there during the construction phase.

153. With the restriction of activities which could exceed the 65 dB L_{Amax} / L_{Aeq} construction noise thresholds during the breeding season, as set out in the outline SPA CNMP appended to the CEMP, there will be no adverse effect on breeding bird species in the coastal strip landward of the sea wall that are associated with The Swale SPA/SSSI/Ramsar site. A similar plan for decommissioning would be drawn up prior to its commencement. As there is no adverse effect of construction/decommissioning disturbance on breeding birds in this area, it is concluded that construction/ decommissioning disturbance with respect to this habitat would not have an adverse effect on any of the breeding species associated with the coastal grazing marsh/reedbed.

Grazing marsh (east): breeding and non-breeding season

154. The grazing marsh at the east end of the site that is within the SSSI/SPA/Ramsar site (and included in the Development as the FGM HMA) is adjacent to the Development site access road and there is potential for disturbance to breeding and non-breeding (e.g., foraging) birds using the grazing marsh from the movement of construction vehicles entering and exiting the Development site. As with the effects of installation works, the distance over which effects might occur will vary between species and between different times of the year and life-cycle of the birds.

155. There will be an increase in noise levels received in the SPA/Ramsar site near the haul road as a result. Chapter 12: Noise indicates that noise levels exceeding 65 dB L_{Amax} will occur up to 55 m into the SPA grazing marsh habitat at this location; noise levels exceeding 70 dB L_{Amax} will occur up to 35 m into the SPA.

156. In terms of disturbance to wintering birds, this area was not found to be an important resource for any species. Lapwing, golden plover and curlew were recorded in the two fields comprising the zone within 55 m of the haul road. The mean count of curlew during the baseline surveys was less than one bird in each field, whilst mean counts of lapwing and golden plover were less than five birds in each field, these values being driven by infrequent observation of larger numbers in those fields. These two fields extend up to 190 – 400 m from the access road, so it is clear that very few birds will be affected, or that the majority of each of those fields will be beyond the threshold zone of likely disturbance. The breeding bird survey did not identify this area as important for breeding birds that form the SPA/SSSI assemblage.

157. There are not predicted to be disturbance effects resulting in any material change to the populations of wintering or breeding birds associated with the SPA/SSSI/Ramsar Site.

Arable land: breeding and non-breeding season

158. During the breeding season, the arable land, or more specifically the grassland margins and ditch/reed habitats between arable fields, have been identified as providing important resources for foraging marsh harrier, a component of the breeding bird assemblage of The Swale SPA/SSSI, as well as barn owl. The ditches between fields also provide habitat for breeding birds such as reed bunting, reed warbler and sedge warbler while the fields support breeding skylark and yellow wagtail. During the non-breeding season, the arable land has been identified as providing important foraging and roosting resources for dark-bellied brent goose, lapwing and golden plover. Disturbance during construction is likely to displace birds from areas near the construction activities. This is assessed in the IEF accounts in section 9.5.3.

9.5.2.2 Operational Disturbance

159. During the operational phase, activity on the Development site will be minimal and would be restricted principally to vegetation and livestock management, equipment / infrastructure maintenance and servicing including replacement of any components that fail, and monitoring to ensure the continued effective operation of the Development.

160. The potential effects of operational noise have been assessed in Chapter 12: Noise of this ES. The noise assessment states that with applied mitigation, the operational noise levels will be 8 dB below a threshold 50 dB(A) significance criteria for ecological receptors and concluded that the "*effect of operational noise on the identified ecological receptors is therefore assessed as negligible, and* ***not significant*** *in terms of the EIA Regulations.*"

161. No specific flood defence works over and above those likely to be undertaken on an ongoing basis by the Environment Agency to maintain the current standard of protection are currently proposed. For the purposes of this assessment, the assumption is made that there will be no change in the flood defence works over and above the future baseline.

162. It is not anticipated that the operational activity will exceed the current baseline levels of activity associated with farming the land. Other than the manned substation, there will be no continuous lighting of the Development, with lighting restricted to the security sensor lighting. Effects of operational disturbance on any of the IEFs identified are expected to be of negligible magnitude and not considered further in the assessment.

9.5.2.3 Habitat Loss/Change

163. There will be several changes to the habitats currently present at the Development site. These include the installation of the solar arrays on arable land, the introduction of grassland on land under the panels, between panel tables and between arrays, introduction of new planting of scrub, hedgerows and trees around the periphery of the Development site, alteration of some ditch habitats, arable conversion to grassland/grazing marsh in the AR HMA, conversion of arable land to lowland meadow in the LGM HMA and grazing marsh management in the existing grazing marsh at the east end of the site (FGM HMA). No development is proposed in any of the areas of designated habitat within the Development site, these being (i) the flood defences, (ii) the freshwater grazing marsh and associated habitats (managed by KWT) within the strip landward of the flood defence bund, and (iii) the freshwater grazing marsh at the eastern extent of the site (FGM HMA).

164. The principal direct habitat loss will be in arable land. All other areas of change are considered to be opportunities for the enhancement of habitats for the benefit of birds and other wildlife. The change in management of the land from arable to solar park with grassland will also have indirect effects on birds through the improvements to the aquatic habitats due to the substantial reduction of inputs of fertilisers and herbicides/pesticides. The assessment considers how these changes in habitat will affect the breeding and non-breeding bird communities that use the Development site in its current state.

165. The effects of habitat loss/change will occur in the long-term for the lifetime of the Development. The effects are reversible in that the land may be reverted to arable farmland following decommissioning of the Development.

9.5.2.4 Fragmentation of Habitats

166. Although the Development site is large, it will not be one continuous block of developed land and includes open areas of land managed around and between the arrays for the benefit of wildlife. Across the majority of the site, with the exception of fields inland in the southeast of the site, the minimum separation between ditch bank top and solar panels is 15 m. Because of the alignment of panels relative to the ditches, this provides open areas between the panels across the majority of the site ranging between

approximately 30 and 80 m wide. In the southeast of the site, minimum separation is 5 m from ditch bank top.

167. Birds are, by their nature, highly mobile species and given the extents of interconnecting habitats, it is predicted that the Development will not cause a barrier to movement that prevents or hinders birds moving between other areas.

9.5.2.5 Hydrological Change

168. The Development includes a number of embedded, designed-in good construction practice measures that are set out in the Outline CEMP (Technical Appendix A5.4) with the specific aim of avoiding adverse effects caused by increased sediment loading or pollution in the local hydrological environment. The assessment of effects on the water environment in Chapter 10: Hydrology, Hydrogeology, Flood Risk & Ground Conditions of the ES assesses all such effects as negligible. The potential for effects of hydrological change on birds or the habitats they use is therefore not considered further in this assessment.

169. In the long-term, during operation of the Development, there will be a substantive reduction in the application of herbicides, pesticides and fertiliser below the current baseline use for arable farming practice at the site. The ecological and hydrological assessments predict a net positive effect on local habitats as a result.

170. The Development includes grazing marsh within designated land (SSSI/SPA/Ramsar) at the east end of the site (FGM HMA) and management measures are being developed with Natural England to provide further enhancement to this area for the benefit of qualifying species associated with the designations. These measures are likely to include modifications to the hydrology of the area, locally increasing the height of the water table. However, the inclusion and modified management of this area in the Development are not designed to provide specific mitigation or compensatory measures for potential effects caused by the Development. Although effects of the modified management of the area are designed to be positive, any benefits the Development may bring to this area are not considered further in this assessment, because the current objectives for the area to be in favourable condition should be assumed to be successfully delivered in the future baseline scenario.

9.5.2.6 Deposition of dust

171. Fugitive dust emissions and track-out dust during construction and decommissioning have the potential to affect ecological receptors. Chapter 16: Air Quality of the ES provides an assessment of the potential effects of the impacts of dust emissions and track-out dust. The assessment concluded that in the absence of mitigation, there was a low risk of dust soiling to ecological receptors as a result of the earthworks and track-out and a negligible risk from the construction works (building of substation, control building, battery storage units, transformers and solar panel installation). Decommissioning effects were assessed to be similar in nature and no greater than those predicted for the construction phase.

172. Mitigation set out in Chapter 16: Air Quality of the ES and the Outline CEMP (Technical Appendix A5.4 of the ES) describes the good practice measures that will be adopted during construction (and decommissioning) to control the generation and dispersion of dust such that significant impacts on neighbouring habitats will not occur. This includes a hierarchy of prevention, suppression then containment. Such measures are routinely and successfully applied to construction projects throughout the UK. They are proven as capable of significantly reducing the potential for adverse nuisance dust effects associated with the various stages of construction work.

173. It is therefore concluded that there will be no adverse effects of the Development due to dust emissions/deposition on birds and this is not considered further in the assessment.

9.5.2.7 Collision

174. Natural England has published a review of the impacts of solar farms on birds, bats and general ecology[8]. The review concluded that there is no scientific evidence of collision risk associated with solar PV arrays and the risk of collision with solar panels is likely to be very low but not impossible, although there could be risk associated with overhead power lines.

175. At the Development, all electrical cabling will either be above ground fixed to the mounting structures of the solar panels, or undergrounded. The existing 11 kV overhead line crossing the south of the Development site from Nagden in a straight line westwards towards Cleve Farm with a short spur south to Warm House, will be undergrounded, reducing the collision risk to birds below that of the baseline (for example, a dead mute swan was found under this existing overhead line during the baseline surveys in winter 2017/18).

176. A security fence will be installed surrounding the solar panel arrays, which will be set back 5 m away from the edge of the arrays. Waterbirds are highly unlikely to interact with the fence in these areas as they would not be attracted to the land close to the solar panels. There is potential for terrestrial breeding birds to interact with the fence as they would be attracted to the enhanced foraging conditions provided by the grassland habitat enhancements between and around the solar panel arrays. Collision risk as a result of deer fences has been highlighted as a potential threat to grouse populations in woodland habitats. However, collision risk for birds in agricultural habitats has not been documented as a significant risk to populations. Some species make use of fences and fence posts as song posts (passerine species) and perches (some raptors, such as kestrel, merlin and marsh harrier). Fencing already exists to some extent in the local landscape around the Development site.

177. In the absence of any evidence to indicate that there is a significant risk of collision of birds with the solar panels or associated fencing, it is concluded that there is not likely to be an adverse effect of the Development on birds as a result of collision and it is not considered further in the assessment.

9.5.2.8 Changes in Recreational Access

178. One new permissive footpath is proposed during the operational phase to provide additional public access to the Development site over and above the existing public rights of way.

179. In the east of the Development site, a new permissive footpath will extend from the sea wall, running south to the substation and then southeast to join the existing public footpath to Seasalter Road. This creates a circular walking route from the Sportsman immediately to the east of the Development site. The new part of the route travels along an existing farm access track and the edges of fields within which solar panels will be located. There is no line of sight between the new route and the SPA that would cause any increase in disturbance to birds within the SPA or within functionally linked habitats.

180. There is not expected to be any notable change in the recreational use on the footpaths within and adjacent to the European Site. The effects of these changes in recreational access may be positive in that they potentially reduce the disturbance to birds in the intertidal habitats. However, the effect is not likely to improve significantly the conservation status of the populations. The potential effects of changes in recreational access are therefore not considered further in the assessment.

9.5.2.9 Decommissioning

181. When the operational phase ends, the Development will require decommissioning. All solar PV array infrastructure including modules, mounting structures, cabling, inverters and transformers would be removed from the Development site and recycled or disposed

of in accordance with good practice and market conditions at that time. The future of the Development substation would be discussed with network operators and agreed with the local planning authority prior to commencement of decommissioning. Decommissioning would be expected to take between 6 and 12 months. A Decommissioning Environmental Management Plan (DEMP), to include timescales and transportation methods, as well as noise management measures, will be agreed in advance with the local planning authority in consultation with appropriate stakeholders.

182. During decommissioning, noise levels are expected to be of lower magnitude than during construction and the duration is expected to be shorter. Although not detailed separately in the assessments in section 9.5.3, with similar embedded noise and bird protection control measures set out in a DEMP, decommissioning effects would be of a similar character to construction effects.

9.5.3 Assessment of Potential Effects

183. The assessment considers each IEF in turn (Table 9.9), providing a description of the likely effects identified above in section 9.5.2.

9.5.3.1 The Swale

184. Other than the management prescriptions set out in the LBMP for the grazing marsh at the east end of the site (FGM HMA), **no direct effects** on the habitats within the Swale SSSI/SPA/Ramsar (including all other designations contained within this) will occur.

185. The grazing marsh area at the east end of the site comprises two SSSI units: S15 M Attwood Cleve Marsh (049) and Cleve Marsh West (063). Both units have been assessed as in Favourable Condition in the most recent condition assessment undertaken by Natural England in 2009. The management prescriptions for these units are the subject of ongoing consultation with Natural England. It is anticipated that these will primarily involve water management and controlled grazing to enhance conditions for breeding and wintering waterbirds. The effect of the change in management of this area of the designated site is expected to be **positive**. However, any benefits the Development may bring to this area are not considered to be mitigation of effects, because the current objectives for the area to be in favourable condition should be assumed to be successfully delivered in the future baseline scenario.

186. On a larger scale, the change in management from arable production to solar park with grassland will result in positive changes for the water environment. section 8.8.1.1 of Chapter 8: Ecology of this ES sets out the improvements that are predicted to occur as a result of a reduction in application of nitrates and pesticides and concludes that changes in land management in the presence of the Development will provide a long-term, permanent and beneficial effect on sensitive habitats and designated sites. Whilst these may have likely significant beneficial effects on non-avian communities, they are unlikely to result in changes to bird populations to the extent that it changes their conservation status. Hydrological changes as a result of the change in management of the land at the Development site are therefore **positive**, but **not likely to be significant** with respect to the Swale's bird populations.

187. The potential effects on The Swale SSSI/SPA/Ramsar are also considered in terms of the important qualifying features that demonstrate connectivity with the Development site. This comprises 22 component wintering waterbird species forming the non-breeding assemblage, breeding/wintering short-eared owl and breeding marsh harrier, as set out in section 9.3.1.

9.5.3.2 Dark-bellied Brent Goose

188. Brent geese were recorded frequently during the non-breeding season in all years of survey, although use of the site was limited in extent and duration within any one season.

Although there were high counts of brent geese in intertidal areas in October and March, almost all records within the arable and pasture habitats were made between November and February; hence analyses in respect of bird use of those terrestrial habitats are based on the November to February period for this species. Arable habitats were more important to geese in winter 2013/14 and 2014/15, than in 2015/16 and 2017/18 when the intertidal habitat within the survey area appeared to provide the more foraging resources. The brent geese were also numerous in arable winter cereal fields, intertidal mudflats and at various grazing marsh locations on the Isle of Sheppey on the north side of the Swale during a survey undertaken to locate them in March 2018; approximately 1,000 geese were found on Sheppey, with another 320 located on the south side of the Swale at locations to the east and west of the Development site. The lower numbers using the arable parts of the Core Survey Area in 2015/16 and 2017/18 is likely to be a result of the suitability of crops; in winter 2015/16, the winter cereal crop grew quickly and the sward may have been too high to favour brent geese by the mid-winter period and in 2017/18, half of the arable area was left fallow and half was planted with winter beans, which did not frequently attract brent geese to forage. In relation to the abundance of brent geese in the Swale, the following compares the monthly-peak mean count of foraging birds using the arable land within the Development site each season with the peak count recorded by WeBS for the Swale in that season:

- 2013/14: 1,855 birds in arable land compared to 2,288 in the Swale = 81.1%
- 2014/15: 1,201 birds in arable land compared to 1,418 in the Swale = 84.7%
- 2015/16: 191 birds in arable land compared to 3,326 in the Swale = 5.7%
- 2017/18: 150 birds in arable land, Swale WeBS count currently unknown.

Construction/Decommissioning Disturbance

189. Disturbance to brent goose in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

190. Birds that would use the arable fields for foraging or roosting/loafing within the solar PV array part of the Development site are expected to be temporarily displaced by works during the construction phase of the Development, either as the site becomes incrementally developed with the solar panel arrays, or because the construction activities, including noise, will disturb the birds and displace them from the area. The IECS Toolkit[26] suggests that brent goose is of high sensitivity to disturbance.

191. The 24-month construction phase is expected overall to affect two full winter seasons, or the equivalent time across three winter seasons. As installation of the solar arrays is expected to be completed on a field-by-field basis, then in the first winter season, there would be a substantial part of the Development site remaining free of installation and free of disturbance.

192. Prior to the start of construction, the arable land will be converted to grassland in readiness for the establishment of the grassland management areas under, between and around the solar panel tables and arrays. The newly established and growing grass will provide good quality feeding resources for brent geese.

193. Prior to the start of construction, the Development will also include the reversion of the 56 ha grassland in the AR HMA north of the Cleve Hill Substation. Sowing of the AR HMA grassland will occur prior to any construction occurring during the winter, therefore the AR HMA will be capable of providing resources to brent geese during the first winter of the construction phase; however, it is adjacent to the northern site access route and the movements of construction traffic might reduce the attractiveness of southern parts of the AR HMA at this time. The IECS Waterbird Disturbance Mitigation Toolkit suggests 400 m as a zone in which mitigation should be considered, therefore the assessment of construction disturbance takes the precautionary view that the AR HMA would not be capable of supporting brent geese in approximately half of its extent during the

construction phase. In combination with the newly growing grassland in the remainder of the Development site during the first winter season, there is considered to be sufficient extent of suitable habitat beyond a zone of disturbance (of up to 400 m for brent geese) to provide resources to support brent geese equivalent in numbers supported in the pre-development baseline.

194. During the second (or third) winter seasons, the already developed area of solar panels and the disturbance caused by installation of the remaining solar panels would displace brent geese from all areas within the solar PV array development area. By this time, the AR HMA grassland refuge area will have been fully established to provide foraging and roosting opportunities for brent geese throughout the winter; however, as described above, the movement of construction traffic along the site access route may reduce its attractiveness to brent geese during this period and the precautionary approach is that approximately half of the AR HMA would not be available to brent geese during this part of the construction phase.

195. The impact of construction disturbance is therefore predicted to result in partial displacement of brent geese from foraging within the Development site during two or possibly three winter seasons, with the AR HMA partially providing alternative resources during this time. This is a negative effect of probable likelihood that would occur in the short-term during two or possibly three winter seasons. The effect is temporary in that construction disturbance will cease on completion of the works and the whole extent of the AR HMA will become available. Birds that are potentially displaced from the local area will return in future seasons. The baseline data show that the Development site is largely unsuitable for foraging brent geese in some winter seasons, such as in 2015/16 and 2017/18. During these conditions, brent geese forage in other areas around the Swale, including arable fields, intertidal areas and within the protected areas of grazing marsh on the Isle of Sheppey and the south shore of the Swale. In subsequent winters, when foraging resources are optimal again, these species return to the site.

196. If Phase 2 of the Development is completed separately from Phase 1, construction activities undertaken between 1st March and 31st August will be controlled using the methodology set out in the SPA CNMP to ensure there is no additional disturbance to wintering geese using the AR HMA.

197. Due to the temporary nature of the effects of disturbance during construction/decommissioning and the proven resilience to the absence of availability of foraging resources within functionally linked arable land over the course of some winter seasons, there would be no long-term decline in the survival or productivity of brent geese. The effects of construction/decommissioning disturbance on brent geese is therefore considered to be **adverse** of **low magnitude** and **not significant**.

Habitat Loss/Change

198. Brent geese need open vistas to feel secure from predators, therefore the installation of solar panels in arrays across the majority of the arable fields in the Development site will cause long-term displacement of brent geese from the fields that they have used for foraging in the winter period. The baseline data demonstrate that in some winters these arable fields provide important foraging resources for the geese, at times supporting the entire SPA population. A survey of land around the Swale in March 2018 showed that there are extensive alternative areas for geese; some of those areas, such as the grazing marsh at The Swale NNR, Great Bells Farm and Elmley will always be available, however the availability of alternative areas of winter cereal crops will depend on the cropping patterns and management (e.g., scaring) in the wider area. Without the embedded mitigation to provide alternative habitat, the loss of availability of foraging resources within the Development site would be significant.

199. This potential adverse effect was recognised at an early stage in the project, therefore an undeveloped area of the Development site was identified for habitat management to provide foraging and resting/roosting opportunities for geese and other waterbirds. This has been referred to as the AR HMA. Prior to the start of construction, the Development will include the reversion of approximately 56 ha of arable fields to grassland in the AR HMA north of the Cleve Hill substation, which provides 50.1 ha of functionally available grassland area after taking into account a 50 m avoidance zone near the solar panel arrays in which there may be a reduced density of birds (see Technical Appendix A9.1).

200. The approach to devising mitigation requirements for loss of foraging resources for wintering geese is to calculate the amount of land and type of management that would be needed to support the number of foraging bird-days that the arable land within the Development site has supported in the four winters studied.

201. Baseline surveys comprised 'snapshot' counts of the number of birds in each field/compartment throughout the winter season. The number of surveys in each month and in each season has varied across the course of the survey period. A number of metrics were explored to describe bird-use of the site. Following consultation with Natural England and the HMSG, it was considered that the most appropriate metric to provide a precautionary measure of average use of the site each season is the 'inter-annual mean of the intra-annual mean of the peak monthly counts' derived from the survey data (hereafter called 'peak-mean'). Survey count data for brent goose are provided in of Appendix A9.1.

202. The total number of foraging brent geese in the arable parts of the Development site on each survey were obtained by summing the number of birds in each arable count sector on each survey (made during baseline surveys as described in Technical Appendix A9.1, with accompanying Figure A9.6), taking action where necessary to remove double counts (when the same flock of birds was recorded in two different fields on the same survey)[31]. The peak-mean counts for the arable area were then calculated for each season (i.e., the intra-annual mean of the highest counts each month) and the means of those seasonal peak-means (i.e., 'inter-annual mean of the intra-annual mean of the peak monthly counts) were obtained for each species by averaging across the seasons. This was done to smooth out the variation in the number of surveys in each season. Metrics were calculated on the November to February period for brent goose because the number of birds recorded in the arable fields outside this period was almost zero.

203. The peak-mean count of foraging brent geese was 849.5 birds. This represents an average number of birds per day foraging within the arable fields of the Development site from November to February, calculated in a precautionary manner by using only the highest counts of birds in that area each month.

204. Technical Appendix A9.1 sets out the method and rationale as to how the bird count data across the four winter seasons have been used to calculate the average number of bird-days supported by the arable land each winter and capacity of the AR HMA to support brent geese in the future. Based on the analysis presented in Technical Appendix A9.1, the arable land has supported an average 101,940 bird-days per winter, which would require 48.6 ha of available grassland to provide resources at a capacity rate of 2,097 brent goose bird-days per ha. The AR HMA provides 50.1 ha of functionally available grassland resources for foraging brent geese which will be constantly available during all phases of the Development. The area is of sufficient size with appropriate management

[31] Preliminary data analysis carried out for the PEIR has been reviewed and revised to ensure consistency with appropriate criteria for the inclusion or exclusion of bird counts, e.g., where birds took off from one field within the Core Survey Area and landed in another, these are the same birds using the site and should be recorded as such. The detailed review of the analysis has led to the removal of such double counting, as well as other details, which has led to minor changes in the baseline data reported in the ES relative to that in the PEIR.

to mitigate for the average loss of resources provided by the arable baseline, such that there would not be any net loss for this species.

205. The impact of habitat loss/change is therefore predicted to result in no change to the brent goose population of The Swale. The effect is reversible in that at the end of the life-time of the Development, the site will have all infrastructure removed and could be reverted to arable production or remain as grazing pasture, which geese will be able to utilise. The baseline data show that the Development site is unsuitable for foraging brent geese in some winter seasons, such as in 2017/18. During these conditions, brent geese forage in other areas around the Swale, including on winter cereal fields, intertidal areas and within the protected areas of grazing marsh on the Isle of Sheppey and in other areas on the south side of the Swale. The AR HMA will provide resources that are constantly available to geese, rather than the variable availability that the arable habitats provide.

206. Subject to the establishment and ongoing management of the AR HMA, it is not predicted that the effect of habitat loss/change will substantively improve or decrease the conservation status of brent geese, therefore the effects of habitat loss/change with respect to the functionally-linked arable land for wintering brent goose is **negligible** and **not significant**.

9.5.3.3 European White-fronted Goose

207. No white-fronted geese were recorded during the baseline surveys and none have been recorded in the South Swale WeBS count sector in the most recent five-year WeBS recording period.

208. **No effects** are predicted on European white-fronted geese as a result of the Development.

9.5.3.4 Shelduck

209. Shelducks were recorded frequently during the non-breeding season in all years of survey almost exclusively in the intertidal parts of the survey area. Use of the Core Survey Area or adjacent grazing marsh was extremely infrequent, with a monthly-peak mean average across the four seasons of just 0.4 birds in arable habitat and none using the grazing marsh at the east end of the site. Numbers of birds in the intertidal habitat were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

210. Disturbance to shelduck in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

211. The arable fields in the Core Survey Area and adjacent grazing marsh habitats are not important in supporting shelduck associated with The Swale SSSI/SPA/Ramsar site. Disturbance to the very small number of birds that only very occasionally use the Development site would have no meaningful effect on their population.

212. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on shelduck, which is **not significant**.

Habitat Loss/Change

213. The change in arable habitats to solar arrays will have a negligible effect on shelduck, as this species does not make substantive use of the arable fields during the winter. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to shelduck.

214. There is predicted to be a **negligible** effect of habitat loss/change on wintering shelduck, which is certain to be **not significant**.

9.5.3.5 Shoveler

215. Shovelers were very rarely recorded during the non-breeding season in all years of baseline survey and those that were observed were in the intertidal habitat. WeBS counts of the South Swale count sector also demonstrated little occurrence of this species in the area near the Development site.

216. **No effects** are predicted on shoveler as a result of the Development.

9.5.3.6 Wigeon

217. Wigeon were recorded frequently during the non-breeding season in all years of survey exclusively in the intertidal habitat. There was no use of arable fields in the Core Survey Area or adjacent grazing marsh habitats to the east. Numbers of birds in the intertidal habitat adjacent to the Core Survey Area were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

218. Disturbance to wigeon in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

219. The arable fields in the Core Survey Area and adjacent grazing marsh to the east are not important in supporting wigeon associated with The Swale SSSI/SPA/Ramsar site. No disturbance effects are predicted to occur.

220. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on wigeon, which is **not significant**.

Habitat Loss/Change

221. The change in arable habitats to solar arrays will have no effect on wigeon, as this species does not make any material use of the arable fields during the winter. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to wigeon.

222. There is predicted to be a **negligible** effect of habitat loss/change on wintering wigeon, which is certain to be **not significant**.

9.5.3.7 Pintail

223. Only one pintail was recorded during the baseline surveys. **No effects** are predicted on pintail as a result of the Development.

9.5.3.8 Teal

224. Teal were recorded frequently during the non-breeding season in all years of survey mostly in the intertidal habitat adjacent to the Core Survey Area. There was no use of arable or grazing marsh habitats, although small numbers (usually less than five) were recorded in the ditches within the Core Survey Area. Numbers of birds in the intertidal habitat were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

225. Disturbance to teal in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

226. The arable and grazing marsh habitats within the Development site are not important in supporting teal associated with The Swale SSSI/SPA/Ramsar site. There may be some disturbance to birds using the ditch network within the site, although the localised nature of the point of works at any one time during construction means that the majority of ditches would not be disturbed. Negligible disturbance effects are predicted to occur.

227. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on teal, which is **not significant**.

Habitat Loss/Change

228. The change in arable habitats to solar arrays will have no effect on teal, as this species does not make any material use of the arable fields during the winter. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to teal.

229. There is predicted to be a **negligible** effect of habitat loss/change on wintering teal, which is near-certain to be **not significant**.

9.5.3.9 Little egret

230. Little egrets were recorded frequently during the non-breeding season in all years of survey mostly in the intertidal habitat adjacent to the Core Survey Area. There was no use of arable or grazing marsh habitats, although small numbers were recorded in the ditches within the Core Survey Area, with a monthly-peak mean average count across the four seasons of 0.6 birds. Numbers of birds in the intertidal habitat adjacent to the Core Survey Area were consistently lower than the threshold for national importance, although there was one count of 51 birds in a roost on Castle Coote, which exceeds the threshold limit for national importance (45).

Construction/Decommissioning Disturbance

231. Disturbance to little egret in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

232. The arable and grazing marsh habitats within the Development site are not important in supporting little egret associated with The Swale SSSI/SPA/Ramsar site. There may be some disturbance to birds using the ditch network within the site, although the localised nature of the point of works at any one time during construction means that the majority of ditches would not be disturbed. Negligible disturbance effects are predicted to occur.

233. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on little egret, which is **not significant**.

Habitat Loss/Change

234. The change in arable habitats to solar arrays will have no effect on little egret, as this species does not make any material use of the arable fields during the winter. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to little egret.

235. The LBMP refers to the Aquatic Habitat Management Plan (AHMP) which will include measures to improve the nature of the ditches throughout the Development site through sensitive and flexible management. This in turn is likely to provide enhanced conditions for aquatic vertebrates on which little egrets feed. It is not expected that little egrets will be discouraged from foraging in the ditches between the solar arrays or be inhibited from moving between them, therefore there will be some long-term benefits for this species.

236. There is predicted to be a probable, **positive** effect on wintering little egret that will operate in the long-term, for the lifetime of the Development. The effect is likely to be of **negligible** to **low magnitude** and is unlikely to significantly improve the conservation status of the population; it is therefore **not significant**.

9.5.3.10 Oystercatcher

237. Oystercatchers were recorded frequently during the non-breeding season in all years of survey almost exclusively in the intertidal habitat adjacent to the Core Survey Area. Use of the Development site was extremely infrequent, with a monthly-peak mean average across the four seasons of just 0.6 birds in arable habitat and very small numbers using the grazing marsh to the east of the Core Survey Area only in winter 2013/14. Numbers

of birds in the intertidal habitat were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

238. Disturbance to oystercatcher in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

239. The arable and grazing marsh habitats within the Development site are not important in supporting oystercatcher associated with The Swale SSSI/SPA/Ramsar site. Disturbance to the very small number of birds that only very occasionally use the Development site would have no meaningful effect on their population.

240. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on oystercatcher, which is **not significant**.

Habitat Loss/Change

241. The change in arable habitats to solar arrays will have a negligible effect on oystercatcher, as this species does not make substantive use of the arable fields during the winter.

242. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to oystercatcher. There is predicted to be a **negligible effect** of habitat loss/change on wintering oystercatcher, which is near-certain to be **not significant**.

9.5.3.11 Avocet

243. Avocets were recorded frequently during the non-breeding season in all years of survey exclusively in the intertidal habitat adjacent to the Core Survey Area. There was no use of arable or grazing marsh habitats. Numbers of birds in the intertidal habitat occasionally exceeded the threshold for national importance.

Construction/Decommissioning Disturbance

244. Disturbance to avocet in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

245. The arable and grazing marsh habitats within the Development site are not important in supporting avocet associated with The Swale SSSI/SPA/Ramsar site. No disturbance effects are predicted to occur.

246. It is therefore certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on avocet, which is **not significant**.

Habitat Loss/Change

247. The change in arable habitats to solar arrays will have no effect on avocet, as this species does not make any use of the arable fields during the winter.

248. The enhancements provided by the Habitat Management Areas will not be of direct benefit to avocet. There is predicted to be **no effect** of habitat loss/change on wintering avocet.

9.5.3.12 Lapwing

249. Lapwings were recorded frequently and throughout the Core Survey Area and adjacent intertidal and grazing marsh habitats during the non-breeding season in all years of survey, although their distribution was limited in extent at any one time. Records within the Development site were made primarily between October and March; hence analyses in respect of bird use of the Development site are based on the October to March period for this species. Conversely to brent geese, arable habitats were more important to lapwing in winter 2015/16 and 2017/18, than in 2013/14 and 2014/15. Lapwings were also numerous in various grazing marsh and arable locations on the Isle of Sheppey on

the north side of the Swale during a survey undertaken to locate them in March 2018; approximately 1,100 were found on Sheppey. The variation in the use of the arable fields in the Development site is likely to be mainly driven by the suitability of crops. In relation to the abundance of lapwing in the Swale, the following compares the monthly-peak mean count of foraging bird using the arable land within the Development site each season with the peak count recorded by WeBS for the Swale in that corresponding season:

- 2013/14: 72 birds in arable land compared to 5,610 in the Swale = 1.3%
- 2014/15: 369 birds in arable land compared to 1,825 in the Swale = 20.2%
- 2015/16: 438 birds in arable land compared to 8,046 in the Swale = 5.4%
- 2017/18: 352 birds in arable land, Swale WeBS count currently unknown.

Construction/Decommissioning Disturbance

250. Disturbance to lapwing in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

251. Birds that would use the arable fields for foraging or roosting/loafing within the solar PV array part of the Development site are expected to be temporarily displaced by works during the construction phase of the Development, either as the site becomes incrementally developed with the solar panel arrays, or because the construction activities will disturb the birds and displace them from the area. The IECS Toolkit[26] suggests that lapwing is of moderate sensitivity to disturbance.

252. The construction phase is expected overall to affect two full winter seasons, or the equivalent time across three winter seasons. As installation of the solar arrays is expected to be completed on a field-by-field basis, then in the first winter season, there would be a substantial part of the Development site remaining free of disturbance.

253. Prior to the start of construction, the arable land will be converted to grassland in readiness for the establishment of the grassland management areas under, between and around the solar panel tables and arrays. The newly established grassland will provide foraging resources and roosting areas for lapwing.

254. Prior to the start of construction, the Development will also include the reversion of the 56 ha grassland in the AR HMA north of the Cleve Hill substation. Sowing of the AR HMA grassland will occur prior to any construction occurring during the winter, therefore the AR HMA will be capable of providing resources to lapwing during the first winter of the construction phase; however, it is adjacent to the main site access route and the movements of construction traffic might reduce the attractiveness of southern parts of the AR HMA at this time. The IECS Waterbird Disturbance Mitigation Toolkit suggests 300 m as a zone in which mitigation should be considered, therefore the assessment of construction disturbance takes the precautionary view that the AR HMA would not be capable of supporting lapwing in part (approximately 35%) of its extent during the construction phase. In combination with the newly growing grassland in the remainder of the Development site during the first winter season, there is considered to be sufficient extent of suitable habitat beyond a zone of disturbance (of up to 300 m for lapwing) to provide resources to support lapwing equivalent in numbers supported in the pre-development baseline.

255. During the second (or third) winter seasons, the already developed area of solar panels and the disturbance caused by installation of the remaining solar panels would displace lapwing from all areas within the solar PV array development area. By this time, the AR HMA grassland refuge area will have been established to provide foraging and roosting opportunities for waterbirds throughout the winter; however, as described above, the movement of construction traffic along the site access route may reduce its attractiveness to lapwing during this period and the precautionary approach is that approximately 35%

of the AR HMA would not be available to lapwing during this part of the construction phase.

256. The impact of construction disturbance is therefore predicted to result in partial displacement of lapwing from foraging within the Development site during two or possibly three winter seasons, with the AR HMA partially providing alternative resources during this time. This is a negative effect of probable likelihood that would occur in the short-term during two or possibly three winter seasons. The effect is temporary in that construction disturbance will cease on completion of the works and the whole extent of the AR HMA will become available. Birds that are potentially displaced from the local area will return in future seasons. The baseline data show that the Development site supports relatively small numbers of lapwing in some winter seasons, such as in 2013/14. Large numbers were present in the Swale in that winter (WeBS peak count of 5,610), therefore lapwing must have been favouring other habitats around the Swale.

257. If Phase 2 of the Development is completed separately from Phase 1, construction activities undertaken between 1st March and 31st August will be controlled using the methodology set out in the SPA CNMP to ensure there is no additional disturbance to wintering lapwing using the AR HMA.

258. Due to the temporary nature of the effects of disturbance during construction/ decommissioning and the proven resilience to the absence of availability of foraging resources within functionally linked arable land over the course of some winter seasons, there would be no long-term decline in the survival or productivity of lapwing. The effects of construction/decommissioning disturbance on lapwing is therefore considered to be **adverse** of **low magnitude** and **not significant**.

Habitat Loss/Change

259. Lapwings need open vistas to feel secure from predators, therefore the installation of solar panels in arrays across the majority of the arable fields in the Development site will cause long-term displacement of lapwing from the fields that they have used for foraging/roosting in the winter period. The baseline data demonstrate that in some winters these arable fields provide important foraging resources for the lapwing, at times supporting approximately 20% of the SPA population. A survey of land around the Swale in March 2018 showed that there are extensive alternative areas for lapwing; some of those areas, such as the grazing marsh at The Swale NNR, Great Bells Farm and Elmley will always be available, however the availability of alternative areas of winter crops will depend on the cropping patterns and management (e.g., scaring) in the wider area. Without the embedded mitigation to provide alternative habitat, the loss of availability of foraging resources within the Development site would be significant.

260. This potential adverse effect was recognised at an early stage in the project, therefore an undeveloped area of the Development site was identified for habitat management to provide foraging and resting/roosting opportunities for lapwing and other waterbirds. This has been referred to as the AR HMA. Prior to the start of construction, the Development will include the reversion of approximately 56 ha of arable fields to grassland in the AR HMA north of the Cleve Hill substation, which provides 50.1 ha of functionally available grassland area after taking into account a 50 m avoidance zone near the solar panel arrays in which there may be a reduced density of birds (see Technical Appendix A9.1).

261. The approach to devising mitigation requirements for loss of foraging resources for wintering lapwing is the same as that set out for brent goose - to calculate the amount of land and type of management that would be needed to support the number of foraging bird-days that the arable land within the Development site has supported in the four winters studied. However, metrics were calculated on the October to March period for lapwing as this was the period when birds were typically recorded in the arable fields.

262. The peak-mean count of foraging lapwing was 307.8 birds. This represents an average number of birds per day foraging within the arable fields of the Development site from October to March, calculated in a precautionary manner by using only the highest counts of birds in that area each month.

263. Technical Appendix A9.1 sets out the method and rationale as to how the bird count data across the four winter seasons have been used to calculate the average number of bird-days supported by the arable land each winter and capacity of the AR HMA to support lapwing in the future. Based on the analysis presented in Technical Appendix A9.1, the arable land has supported 56,023 bird-days per winter, which would require 56.0 ha of available grassland to provide resources at a capacity rate of 1,000 lapwing bird-days per ha. The AR HMA provides 50.1 ha of functionally available grassland resources for foraging lapwing which will be constantly available during all phases of the Development. This theoretically falls short of the requirement for lapwing, however, it exceeds the requirement for golden plover (see below). Lapwing and golden plover overlap to a large extent in their foraging requirements, feeding on similar invertebrate prey, and therefore assuming they are interchangeable, the AR HMA would support more lapwing-days if there are fewer golden plover-days to support. As there are more than 6 ha spare capacity in the AR HMA for golden plovers, these could be utilised by lapwing and the AR HMA will provide sufficient resources to accommodate the average Development site use based on the baseline survey counts, such that there would not be any new loss for this species.

264. The impact of habitat loss/change is therefore predicted to result in no change to the lapwing population of The Swale. The effect is reversible in that at the end of the life-time of the Development, the site will have all infrastructure removed and could be reverted to arable production or remain as grazing pasture, which lapwing will be able to utilise. The baseline data show that use of the Development site varies between seasons and it is known that alternative areas are also abundantly available around the Swale.

265. Subject to the establishment and ongoing management of the AR HMA, it is not predicted that the effect of habitat loss/change will substantively improve or decrease the conservation status of lapwing, therefore the effects of habitat loss/change with respect to the functionally-linked arable land for wintering lapwing is **negligible** and **not significant**.

9.5.3.13 Golden plover

266. Golden plovers were recorded frequently, often associating with lapwing, during the non-breeding season in all years of survey. Their distribution was sometimes limited in extent and duration within any one season. Records within the Development site were made primarily between October and March; hence analyses in respect of bird use of the Development site are based on the October to March period for this species. Arable habitats were more important to golden plover in winter 2015/16 and 2017/18, than in 2013/14 and 2014/15. Golden plovers were also numerous (approximately 300 birds) in various arable and grazing marsh locations on the Isle of Sheppey on the north side of the Swale during a survey undertaken to locate them in March 2018. The variation in the use of the arable fields is likely to be mainly driven by the suitability of crops. In relation to the abundance of golden plover in the Swale, the following compares the monthly-peak mean count of foraging birds using the arable land within the Development site each season with the peak count recorded by WeBS for the Swale in that corresponding season:

- 2013/14: 0 birds in arable land compared to 1,700 in the Swale = 0%
- 2014/15: 8 birds in arable land compared to 1,220 in the Swale = 0.7%
- 2015/16: 346 birds in arable land compared to 2,310 in the Swale = 17.2%
- 2017/18: 279 birds in arable land, Swale WeBS count currently unknown.

Construction/Decommissioning Disturbance

267. Disturbance to golden plover in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

268. Birds that would use the arable fields for foraging or roosting/loafing within the solar PV array part of the Development site are expected to be temporarily displaced by works during the construction phase of the Development, either as the site becomes incrementally developed with the solar panel arrays, or because the construction activities will disturb the birds and displace them from the area. The IECS Toolkit[26] suggests that golden plover is of moderate sensitivity to disturbance.

269. The construction phase is expected overall to affect two full winter seasons, or the equivalent time across three winter seasons. As installation of the solar arrays is expected to be completed on a field-by-field basis, then in the first winter season, there would be a substantial part of the Development site remaining free of disturbance.

270. Prior to the start of construction, the arable land will be converted to grassland in readiness for the establishment of the grassland management areas under, between and around the solar panel tables and arrays. The newly established grassland will provide foraging resources and roosting areas for golden plover.

271. Prior to the start of construction, the Development will also include the reversion of the 56 ha grassland in the AR HMA north of the Cleve Hill substation. Sowing of the AR HMA grassland will occur prior to any construction occurring during the winter, therefore the AR HMA will be capable of providing resources to golden plover during the first winter of the construction phase; however, it is adjacent to the main site access route and the movements of construction traffic might reduce the attractiveness of southern parts of the AR HMA at this time. The IECS Waterbird Disturbance Mitigation Toolkit suggests 300 m as a zone in which mitigation should be considered, therefore the assessment of construction disturbance takes the precautionary view that the AR HMA would not be capable of supporting golden plover in part (approximately 35%) of its extent during the construction phase. In combination with the newly growing grassland in the remainder of the Development site during the first winter season, there is considered to be sufficient extent of suitable habitat beyond a zone of disturbance (of up to 300 m for golden plover) to provide resources to support golden plover equivalent in numbers supported in the pre-development baseline.

272. During the second (or third) winter seasons, the already developed area of solar panels and the disturbance caused by installation of the remaining solar panels would displace golden plover from all areas within the solar PV array development area. By this time, the AR HMA grassland refuge area will have been established to provide foraging and roosting opportunities for waterbirds throughout the winter; however, as described above, the movement of construction traffic along the site access route may reduce its attractiveness to golden plover during this period and the precautionary approach is that approximately 35% of the AR HMA would not be available to golden plover during this part of the construction phase.

273. The impact of construction disturbance is therefore predicted to result in partial displacement of golden plover from foraging within the Development site during two or possibly three winter seasons, with the AR HMA partially providing alternative resources during this time. This is a negative effect of probable likelihood that would occur in the short-term two or possibly three winter seasons. The effect is temporary in that construction disturbance will cease on completion of the works and the whole extent of the AR HMA will become available. Birds that are potentially displaced from the local area will return in future seasons. The baseline data show that the Development site supports relatively small numbers of golden plover in some winter seasons, such as in

2013/14 and 2014/15. Large numbers were present in the Swale in that winter (WeBS peak counts of 1,700 and 1,220 respectively), therefore golden plover must have been favouring other habitats around the Swale.

274. If Phase 2 of the Development is completed separately from Phase 1, construction activities undertaken between 1st March and 31st August will be controlled using the methodology set out in the SPA CNMP to ensure there is no additional disturbance to wintering geese using the AR HMA.

275. Due to the temporary nature of the effects of disturbance during construction/decommissioning and the proven resilience to the absence of availability of foraging resources within functionally linked arable land over the course of some winter seasons, there would be no long-term decline in the survival or productivity of golden plover. The effects of construction/decommissioning disturbance on golden plover are therefore considered to be **adverse** of **low magnitude** and **not significant**.

Habitat Loss/Change

276. Golden plovers need open vistas to feel secure from predators, therefore the installation of solar panels in arrays across the majority of the arable fields in the Development site will cause long-term displacement of golden plover from the fields that they have used for foraging/roosting in the winter period. The baseline data demonstrate that in some winters these arable fields provide important foraging resources for foraging golden plover, in some seasons supporting approximately 17% of the SPA population. A survey of land around the Swale in March 2018 showed that there are extensive alternative areas for golden plover; some of those areas, such as the grazing marsh at The Swale NNR, Great Bells Farm and Elmley will always be available, however the availability of alternative areas of winter crops will depend on the cropping patterns and management (e.g., scaring) in the wider area. Without the embedded mitigation to provide alternative habitat, the loss of availability of foraging resources within the Development site would be significant.

277. This potential adverse effect was recognised at an early stage in the project, therefore an undeveloped area of the Development site was identified for habitat management to provide foraging and resting/roosting opportunities for golden plover and other waterbirds. This has been referred to as the AR HMA. Prior to the start of construction, the Development will include the reversion of approximately 56 ha of arable fields to grassland in the AR HMA north of the Cleve Hill substation, which provides 50.1 ha of functionally available grassland area after taking into account a 50 m avoidance zone near the solar panel arrays in which there may be a reduced density of birds (see Technical Appendix A9.1).

278. The approach to devising mitigation requirements for loss of foraging resources for wintering golden plover is the same as that set out for lapwing - to calculate the amount of land and type of management that would be needed to support the number of foraging bird-days that the arable land within the Development site has supported in the four winters studied. Metrics were calculated on the October to March period for golden plover as this was the period when birds were typically recorded in the arable fields.

279. The peak-mean count of foraging golden plover was 158.3 birds. This represents an average number of birds per day foraging within the arable fields of the Development site from October to March, calculated in a precautionary manner by using only the highest counts of birds in that area each month.

280. Technical Appendix A9.1 sets out the method and rationale as to how the bird count data across the four winter seasons have been used to calculate the average number of bird-days supported by the arable land each winter and capacity of the AR HMA to support golden plover in the future. Based on the analysis presented in Technical Appendix A9.1, the arable land has supported 28,802 bird-days, which would require 18.5 ha of available

grassland to provide resources at a capacity rate of 1,560 golden plover bird-days per ha. The AR HMA provides 50.1 ha of functionally available grassland resources for foraging golden plover which will be constantly available during all phases of the Development. The area is of sufficient size with appropriate management to mitigate for the average loss of resources provided by the arable baseline, such that there would not be any net loss for this species. There is a substantial excess of resources available in the AR HMA for golden plover. Lapwing and golden plover overlap to a large extent in their foraging requirements, feeding on similar invertebrate prey, and therefore assuming they are interchangeable, the additional capacity available may be used by lapwing.

281. The impact of habitat loss/change is therefore predicted to result in no change to the golden plover population of The Swale. The effect is reversible in that at the end of the life-time of the Development, the site will have all infrastructure removed and could be reverted to arable production or remain as grazing pasture, which golden plover will be able to utilise. The baseline data show that use of the Development site varies between seasons and it is known that alternative areas are also abundantly available around the Swale.

282. Subject to the establishment and ongoing management of the AR HMA, it is not predicted that the effect of habitat loss/change will substantively improve or decrease the conservation status of golden plover, therefore the effects of habitat loss/change with respect to the functionally-linked arable land for wintering golden plover is **negligible** and **not significant**.

9.5.3.14 Grey plover

283. Grey plovers were recorded frequently during the non-breeding season in all years of survey almost exclusively in the intertidal habitat adjacent to the Core Survey Area. Use of the arable fields was extremely infrequent, with a monthly-peak mean average across the four seasons of just 1.1 birds in arable habitat and no use of the grazing marsh at the east end of the site. Numbers of birds in the intertidal habitat were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

284. Disturbance to grey plover in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

285. The arable and grazing marsh habitats within the Development site are not important in supporting grey plover associated with The Swale SSSI/SPA/Ramsar site. Disturbance to the very small number of birds that only very occasionally use the Development site would have no meaningful effect on their population.

286. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on grey plover, which is **not significant**.

Habitat Loss/Change

287. The change in arable habitats to solar arrays will have a negligible effect on grey plover, as this species does not make substantive use of the arable fields during the winter.

288. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to grey plover. There is predicted to be a **negligible effect** of habitat loss/change on wintering grey plover, which is near-certain to be **not significant**.

9.5.3.15 Curlew

289. Curlews were recorded frequently during the non-breeding season in all years of survey mainly in the intertidal habitat adjacent to the Core Survey Area. Use of the arable fields in the Core Survey Area was extremely infrequent, with a monthly-peak mean average across the four seasons of 1.7 foraging birds in arable habitat. Use of the grazing marsh

to the east of the Core Survey Area by foraging birds was more consistent and frequent, with a monthly-peak mean average across the four seasons of 35.7 birds in grazing marsh habitat. Numbers of birds recorded in total by each survey were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

290. Disturbance to curlew in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

291. The arable habitats within the Development site are not important in supporting curlew associated with The Swale SSSI/SPA/Ramsar site. The grazing marsh at the east end of the Development site provides more regular resources for foraging curlew during the winter and birds there could be disturbed by movements of construction traffic along the access route over the one or two winters that the construction phase will take place.

292. The IECS Toolkit for waterbird disturbance mitigation during construction suggests that curlew is a moderate sensitivity species and recommends that "*birds that are closer than 300m should be considered when commencing works and efforts should be made to avoid high level disturbance at such a time if possible, especially if it includes workers on the mudflat/fronting intertidal zone*". The Toolkit states that birds are more tolerant of vehicles, but react more strongly if personnel get out of the vehicle. At a precautionary distance of 300 m from the main access route into the Development site, nearly half of the grazing marsh (Winter Bird Survey count sectors 32, 34 and 35) would be within a possible disturbance distance, with count sectors 29, 30, 31 and 33 being beyond the likely disturbance distance. There was more frequent use by curlew of the latter count sectors outside the likely disturbance distance and relatively little use of those closer to the main access route.

293. Disturbance to a small number of birds that only occasionally use the grazing marsh close to the access route would not have a meaningful effect on the curlew population in The Swale SSSI/SPA/Ramsar site. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on curlew, which is **not significant**.

Habitat Loss/Change

294. The change in arable habitats within the Development site boundary to solar arrays will have a negligible effect on curlew, as this species does not make substantive use of the arable fields during the winter.

295. The HMA will include the conversion of approximately 56 ha of arable land to grassland. The AR HMA will therefore provide improved conditions that may be favoured by small numbers of foraging and roosting curlew.

296. There is predicted to be a probable, **positive** effect on wintering curlew that will operate in the long-term, for the lifetime of the Development. The effect is likely to be of **negligible to low magnitude** and will not significantly improve the conservation status of the population; it is therefore **not significant**.

9.5.3.16 Bar-tailed godwit

297. Bar-tailed godwits were recorded infrequently during the non-breeding season in the latter two winters of baseline survey, almost exclusively in the intertidal habitat adjacent to the Core Survey Area. Numbers were typically lower than the threshold for national importance, although on one occasion there was a count of 750 birds, which exceeds national importance, and another count of 2,000 birds, which exceeds the threshold for international importance. There were two observations of single birds in the grazing marsh to the east of the Core Survey Area and no records of bar-tailed godwit in the arable habitat.

Construction/Decommissioning Disturbance

298. Disturbance to bar-tailed godwit in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

299. The arable and grazing marsh habitats within the Development site are not important in supporting bar-tailed godwit associated with The Swale SSSI/SPA/Ramsar site. No disturbance effects are predicted to occur.

300. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on bar-tailed godwit, which is **not significant**.

Habitat Loss/Change

301. The change in arable habitats to solar arrays will have no effect on bar-tailed godwit, as this species does not make any use of the arable fields during the winter.

302. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to bar-tailed godwit. There is predicted to be **no effect** of habitat loss/change on wintering bar-tailed godwit.

9.5.3.17 Black-tailed godwit

303. Black-tailed godwits were recorded infrequently during the non-breeding season in the latter two winters of baseline survey, exclusively in the intertidal habitat adjacent to the Core Survey Area. There was no use of arable fields or adjacent grazing marsh habitats. Numbers of birds in the intertidal habitat adjacent to the Core Survey Area were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

304. Disturbance to black-tailed godwit in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

305. The arable and grazing marsh habitats within the Development site are not important in supporting black-tailed godwit associated with The Swale SSSI/SPA/Ramsar site. No disturbance effects are predicted to occur.

306. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on black-tailed godwit, which is **not significant**.

Habitat Loss/Change

307. The change in arable habitats to solar arrays will have no effect on black-tailed godwit, as this species does not make any use of the arable fields during the winter.

308. The enhancements provided by the Habitat Management Areas are not predicted to be of direct benefit to black-tailed godwit. There is predicted to be **no effect** of habitat loss/change on wintering black-tailed godwit.

9.5.3.18 Knot

309. Knot were recorded frequently during the non-breeding season in the latter two winters of baseline survey, exclusively in the intertidal habitat adjacent to the Core Survey Area. There was no use of arable fields or adjacent grazing marsh habitats. Numbers of birds in the intertidal habitat adjacent to the Core Survey Area were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

310. Disturbance to knot in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

311. The arable and grazing marsh habitats within the Development site are not important in supporting knot associated with The Swale SSSI/SPA/Ramsar site. No disturbance effects are predicted to occur.

312. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on knot, which is **not significant**.

Habitat Loss/Change

313. The change in arable habitats to solar arrays will have no effect on knot, as this species does not make any use of the arable fields during the winter.

314. The enhancements provided by the Habitat Management Areas will not be of direct benefit to knot. There is predicted to be **no effect** of habitat loss/change on wintering knot.

9.5.3.19 Ruff

315. Ruffs were only recorded over a two month period between October and November in winter 2017/18 and were not observed in the three other winters surveyed. Although numbers were small, one count exceeded 1% of the national population. Birds were observed on the Swale near the mouth of Faversham Creek and regularly during this period foraging in the fallow fields at the east end of the Core Survey Area, often associating with a foraging flock of carrion crows and gulls.

Construction/Decommissioning Disturbance

316. Disturbance to ruff in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

317. The arable and grazing marsh habitats within the Development site are not important in supporting ruff associated with The Swale SSSI/SPA/Ramsar site. Disturbance to the small number of birds that only very occasionally use the Development site would have no meaningful effect on their population.

318. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on ruff, which is **not significant**.

Habitat Loss/Change

319. The change in arable habitats to solar arrays will have a negligible effect on ruff, as this species does not make substantive use of the arable fields during the winter.

320. The enhancements provided by the Habitat Management Areas will not be of direct benefit to ruff. There is predicted to be a **negligible** effect of habitat loss/change on wintering ruff, which is near-certain to be **not significant**.

9.5.3.20 Sanderling

321. One or two sanderlings were very rarely recorded during the baseline surveys and those that were observed were in the intertidal habitat adjacent to the Core Survey Area. WeBS counts of the South Swale count sector also demonstrated little occurrence of this species in the area near the Development site.

Construction/Decommissioning Disturbance

322. Disturbance to sanderling in the intertidal area of the Swale is predicted to be temporary and of negligible magnitude and will not result in long-term adverse effects.

323. The arable and grazing marsh habitats within the Development site are not important in supporting sanderling associated with The Swale SSSI/SPA/Ramsar site. No disturbance effects are predicted to occur.

324. It is therefore certain that the impact of construction/decommissioning disturbance would result in **no effect** on sanderling.

Habitat Loss/Change

325. The change in arable habitats to solar arrays will have no effect on sanderling, as this species does not make any use of the arable fields during the winter.

326. The enhancements provided by the Habitat Management Areas will not be of direct benefit to sanderling. There is predicted to be **no effect** of habitat loss/change on wintering sanderling.

9.5.3.21 Dunlin

327. Dunlins were recorded frequently during the non-breeding season in all years of survey almost exclusively in the intertidal habitat adjacent to the Core Survey Area. Use of the arable fields in the Core Survey Area was infrequent, with a monthly-peak mean average across the four seasons of 32.1 foraging birds in arable habitat and no use of the grazing marsh to the east of the Core Survey Area. Numbers of birds in the intertidal habitat adjacent to the Core Survey Area were consistently lower than the threshold for national importance.

Construction/Decommissioning Disturbance

328. Disturbance to dunlin in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

329. The arable and grazing marsh habitats within the Development site are not important in supporting dunlin associated with The Swale SSSI/SPA/Ramsar site. Disturbance to the small number of birds that only very occasionally use the Development site would have no meaningful effect on their population.

330. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on dunlin, which is **not significant**.

Habitat Loss/Change

331. The change in arable habitats to solar arrays will have a negligible effect on dunlin, as this species does not make substantive use of the arable fields during the winter.

332. The enhancements provided by the Habitat Management Areas will not be of direct benefit to dunlin. There is predicted to be a **negligible effect** of habitat loss/change on wintering dunlin, which is near-certain to be **not significant**.

9.5.3.22 Green sandpiper

333. Green sandpipers were recorded in small numbers very infrequently during the non-breeding season surveys. There was no use of arable fields in the Core Survey Area or the adjacent grazing marsh to the east, although one or two birds (and on one occasion, five) were recorded in the ditches between arable fields. Up to four birds were also observed on two occasions on the intertidal habitat of the Swale.

Construction/Decommissioning Disturbance

334. Disturbance to green sandpiper in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

335. The arable and grazing marsh habitats within the Development site are not important in supporting green sandpiper associated with The Swale SSSI/SPA/Ramsar site. There may be some disturbance to birds using the ditch network within the site, although the localised nature of the point of works at any one time during construction means that the majority of ditches would not be disturbed. Negligible disturbance effects are predicted to occur.

336. It is therefore near-certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on green sandpiper, which is **not significant**.

Habitat Loss/Change

337. The change in arable habitats to solar arrays will have no effect on green sandpiper, as this species does not make any material use of the arable fields during the winter. It is likely that birds will continue to use the ditches during the operational phase of the Development.

338. The enhancements provided by the Habitat Management Areas will not be of direct benefit to green sandpiper. There is predicted to be a **negligible effect** of habitat loss/change on wintering green sandpiper, which is near-certain to be **not significant**.

9.5.3.23 Greenshank

339. Greenshanks were recorded very infrequently during the non-breeding season in the latter two winters of baseline survey, exclusively in the intertidal habitat adjacent to the Core Survey Area. There was no use of arable or grazing marsh habitats. Numbers of birds in the intertidal habitat were usually lower than the threshold for national importance, although on one occasion, an observation of nine greenshanks represents more than 1% of the national population.

Construction Disturbance

340. Disturbance to greenshank in the intertidal area of the Swale is predicted to be temporary and of low to negligible magnitude and will not result in long-term adverse effects.

341. The arable and grazing marsh habitats within the Development site are not important in supporting greenshank associated with The Swale SSSI/SPA/Ramsar site. No disturbance effects are predicted to occur.

342. It is therefore certain that the impact of construction/decommissioning disturbance would result in a **negligible effect** on greenshank, which is **not significant**.

Habitat Loss/Change

343. The change in arable habitats to solar arrays will have no effect on greenshank, as this species does not make any use of the arable fields during the winter.

344. The enhancements provided by the Habitat Management Areas will not be of direct benefit to greenshank. There is predicted to be **no effect** of habitat loss/change on wintering greenshank.

9.5.3.24 Breeding/Wintering Short-eared Owl

345. The baseline flight activity surveys in 2015/16 demonstrated that the Development site is occasionally used by foraging short-eared owls. A single short-eared owl was observed on one survey in January 2016 and single owls were recorded in April and July 2016. Birds were recorded in flight for 0.3% of survey observation time in the breeding season and 0.9% of survey observation time in the non-breeding season.

Construction/Decommissioning Disturbance

346. The Development site, particularly the arable crop dominated area proposed for solar panel and energy storage installation, does not form an important foraging area for short-eared owls throughout the year. The effects of construction/decommissioning disturbance are therefore **negligible** and near-certain to be **not significant**.

Habitat Loss/Change

347. The installation of the Development will result in a change from growing crops in the arable fields to the presence of solar panels and the energy storage facility. Areas between the arrays in each field were identified as potential habitat enhancement areas foraging birds of prey. Since PEIR, the set-back of the extent of the solar arrays across the majority of the Development site has been increased from a minimum of 5 m to a

minimum of 15 m, resulting in a substantial increase in the amount of suitable foraging habitat available.

348. The extents of open habitats that will be managed to provide enhanced foraging for habitat between the arrays are substantial, with minimum set back of 15 m either side of the ditch banks separating the arrays across the majority of the site (in places this could extend up to 80 m at some points between arrays). It is predicted that short-eared owls will continue to forage in the favourable habitat between the arrays which will be larger in extent following installation of the development than in the baseline condition, where arable crops, which comprise unsuitable foraging habitat, extend to within 2 m of the ditch banks.

349. Due to the increased extent of suitable foraging habitat available with the Development, there is a potential **positive effect** on short-eared owls, although it is **unlikely to be significant** in terms of substantively improving the conservation status of the species.

9.5.3.25 Breeding Marsh Harrier

350. Marsh harriers form part of the breeding assemblage qualification of The Swale SPA. The JNCC SPA Review in 2001 states that based on a count in 1995, there were 24 pairs representing 15% of the GB breeding population. This is likely to have changed considerably in the last 23 years as the marsh harrier populations nationally and in Kent have increased. The most recent estimate reported in Musgrove *et al.* (2013)[32] is of 320-380 breeding females. In Kent, the breeding population is estimated to be 80-100 breeding females, with 40-50 of these on Sheppey[33].

351. Marsh harriers have nested in most years between 2004 and 2017 (information from confidential KWT reports) within the Development site, almost always within the KWT reserve and occasionally in reedy ditches or crops close to the reserve. Breeding density was much higher between 2004 and 2012, with breeding attempts by three to eight pairs each year. However, since 2013, there has only been one nesting attempt each year. The baseline survey in 2016 covered a larger geographical area and it was thought that a pair attempted nesting in The Swale SSSI/SPA/Ramsar site to the south-west of the site.

352. The flight activity surveys over a 12 month period in 2015/16 demonstrated that the Core Survey Area and adjacent terrestrial habitats form an important foraging area for marsh harriers throughout the year, with birds being recorded in flight for 10.5% of survey observation time in the breeding season and 17.9% of survey observation time in the non-breeding season. This comprised an unknown number of individuals. Birds were mostly recorded hunting along the linear ditch and rough grassland features between the arable fields, with considerable activity over the KWT South Swale reserve.

Construction/Decommissioning Disturbance

353. Plant movement and installation of the Development will cause localised disturbance to foraging marsh harrier. This is predicted to occur within up to 100 m of construction activity (access routes and any active construction areas) at any one time. The 100 m threshold in this case is based on personal observations by the author of marsh harriers foraging within 100 m of operating plant machinery near Great Bells Farm on the Isle of Sheppey, as well as Bright et al. (2009)[34] (quoting from Gamauf, 1993) that marsh harriers would not fly closer than about 90 m to visible tourist activity in the open. In

[32] Musgrove, A.J., Aebischer, N.J., Eaton, M.A., Hearn, R.D., Newson, S.E., Noble, D.G., Parson, M., Risely, K. and Stroud, D.A. (2013). Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 106: 64–100.
[33] Clements, R., Orchard, M., McCanch, N. and Wood, S. (2015). *Kent Breeding Bird Atlas 2008-13.* Kent Ornithological Society.
[34] Bright, J.A., Langston, R.H.W. & Anthony, S. (2009). *Mapped and written guidance in relation to birds and onshore wind energy development in England*. RSPB Research Report No 35.

addition, baseline surveys for Kemsley Mill K4 Combined Heat and Power Generating Station in 2009 and 2016 (described in the HRA Report submitted with the DCO for that application by RPS)[35] demonstrated that marsh harriers nested within 100 m of a busy haul road subject to heavy HGV traffic. The construction phase may extend over two breeding seasons and as construction progresses, more of the open, formerly arable habitat will be replaced with the installation of solar panels. The effect of localised disturbance is therefore likely to increase in the context of the available area for foraging as the construction phase progresses. However, the extents of open habitats managed to provide enhanced foraging for marsh harrier between the arrays are substantial, with minimum set back of 15 m either side of the ditch banks separating the arrays across the majority of the site (in places this could extend up to 80 m at some points between arrays). It is predicted that marsh harriers will continue to forage in the favourable habitat between arrays which will be larger in extent following installation of the development than in the baseline condition, where arable crops, which comprise unsuitable foraging habitat, extend to within 2 m of the ditch banks.

354. Based on the tolerance of marsh harriers to such activities as described above (and in Ruddock and Whitfield, 2007)[36], it is considered that marsh harriers will continue to forage in undisturbed areas beyond 100 m from sources of construction works. The majority of the grazing marsh/reedbed in the north and west (the KWT South Swale Reserve) and majority of the ditches and associated adjacent meadow habitat will therefore be available for marsh harriers to forage along during the construction works. Marsh harriers have large foraging ranges and there are also considerable extents of suitable foraging habitat outside the Development site to support them.

355. Due to the localised nature of the disturbance at any one point in time and the temporary nature of the effect extending over two (or possibly three) breeding seasons or parts of breeding seasons, it is not considered that construction disturbance will cause displacement of marsh harriers to the extent that it would significantly affect their ability to survive and reproduce during the breeding season.

356. Marsh harriers will be more sensitive to disturbance at a nest site. Based on the review made by Ruddock and Whitfield (2007), construction disturbance distance was suggested to be 300-500 m. Marsh harriers nesting at the Development site may be more tolerant of human disturbance, as they experience frequent human activity from recreational use of the footpath and adjacent grassland bordering the north of the site (along the Saxon Shore Way). However, increasing recreational pressure might also be contributing to the decline in the number of nesting attempts and productivity in this area. There are also legal implications with regard to the Schedule 1 status of marsh harrier, which are protected from disturbance while nesting.

357. Without mitigation, there is a risk that construction disturbance could lead to the failure of nesting attempts by up to one pair of marsh harriers resulting in a low magnitude effect, although this is not likely to be significant as the conservation status of the population would be maintained. Mitigation is therefore embedded in the design of the construction programme to minimise noise and visual disturbance to birds nesting in the coastal strip of grazing marsh/reedbed as set out in the outline SPA CNMP appended to the CEMP. A Breeding Bird Protection Plan (BBPP) also forms part of the CEMP setting out the good construction practice measures included to avoid disturbance to nesting marsh harriers, such as the presence of an Ecological Clerk of Works, pre-construction and during-construction nesting bird surveys and sensitive zoning of construction.

[35] DHA Environment (2018). Document 3.1- ES Volume 2; Appendix 10.2; *Habitats Regulation Assessment: The Kemsley Mill K4 Combined Heat and Power Generating Station Development Consent Order.* June 2018 - Section 51 Version. PINS Ref: EN010090.

[36] Ruddock, M., Whitfield, D.P., (2007). *A review of disturbance distances in selected bird species*. Report from Natural Research (Projects) Ltd. to Scottish Natural Heritage. Natural Research, Banchory, UK.

358. Taking into account the likely increase in the breeding population of marsh harriers in the Swale SSSI/SPA/Ramsar site in recent years and the temporary low risk of displacement of nesting birds during two breeding seasons during which construction or decommissioning will occur, the effect of construction/decommissioning disturbance on marsh harriers is considered to be **adverse** of **negligible or low magnitude** and is **not significant**.

Habitat Loss/Change

359. The installation of the Development will result in a change from growing crops in the arable fields to the presence of solar panels and the energy storage facility. This potentially reduces the area available for foraging marsh harriers, although the arable crops are not favoured foraging habitat, rather, they focus foraging efforts on the grassland field margins and throughout the coastal strip of grazing marsh/reedbed. This potential adverse effect was recognised at an early stage in the project and areas between the arrays in each field were identified as potential habitat enhancement areas for marsh harriers and other wildlife. Since PEIR, the set-back of the extent of the solar arrays across the majority of the Development site has been increased from a minimum of 5 m to a minimum of 15 m, resulting in a substantial increase in the amount of suitable habitat available to be managed for the benefit of foraging marsh harriers.

360. The extents of open habitats that will be managed to provide enhanced foraging for marsh harrier between the arrays are substantial, with minimum set back of 15 m either side of the ditch banks separating the arrays across the majority of the site (in places this could extend up to 80 m at some points between arrays). It is predicted that marsh harriers will continue to forage in the favourable habitat between the arrays which will be larger in extent following installation of the development than in the baseline condition, where arable crops, which comprise unsuitable foraging habitat, extend to within 2 m of the ditch banks. The author of this chapter has witnessed a marsh harrier foraging along the edge of Old Rides Solar Farm on Sheppey on one occasion, where there is a narrow (c. 6 m) strip of grassland between the panels and the adjacent arable field; this was a casual observation made during a search for foraging brent geese, rather than part of a quantitative study.

361. The habitat management measures implemented with the Development will improve conditions for foraging marsh harrier and improvements in reedbed habitats made by the Aquatic Habitat Management Plan could also improve conditions for nesting marsh harrier.

362. Similarly, as a result of increasing the set-back of the solar arrays from the boundary habitats since PEIR, the presence of the solar panels is not predicted to cause displacement of nesting birds.

363. Subject to the appropriate management of large grassland swathes between the solar arrays, there is a potential **positive** effect on breeding marsh harrier, although it is **unlikely to be significant** in terms of substantively improving the conservation status of the species.

9.5.3.26 Breeding Farmland Bird Community

364. The breeding bird community within the Core Survey Area and adjacent habitats has been assessed as of local importance due to the diversity of breeding species present. The local breeding bird community includes a number of species of conservation concern, including (other than marsh harrier) two WCA Schedule 1 species: Cetti's warbler and bearded tit.

365. For the purposes of the assessment, the farmland breeding bird community can be subdivided into those species breeding and utilising the field margin and boundary habitats and those breeding within the arable fields. Species of conservation concern

breeding (or showing territorial behaviour) within arable fields included lapwing, oystercatcher, skylark and yellow wagtail. Species of conservation concern nesting in field margin habitats included cuckoo, bearded tit, Cetti's warbler, starling, song thrush, dunnock, house sparrow, meadow pipit, linnet, yellowhammer and reed bunting. Other common breeding species in these habitats included good numbers (but less than of County importance) of reed warbler, sedge warbler and whitethroat.

Construction/Decommissioning Disturbance

366. Construction works are likely to cause localised disturbance to breeding birds resulting in temporary displacement across one or two breeding seasons depending on the scheduling and duration of the construction phase. Not all areas within the Development site will experience potentially disturbing effects to breeding birds at the same time, so the effects will be localised at any point in time.

367. With regard to Schedule 1 breeding birds, as well as all breeding birds, the BBPP and Outline SPA CNMP appended to the CEMP set out protective measures to ensure that disturbance to nesting Schedule 1 birds is avoided and that damage or harm to nesting birds in general is avoided.

368. Construction/decommissioning disturbance is predicted to cause a temporary decrease in the populations of breeding birds during the construction phase. The effect is **adverse** of **low magnitude** with respect to the regional (County) populations of each species and will be short-term and reversible. As the effect of construction/decommissioning disturbance is not predicted to change the conservation status of breeding species, it is **not considered to be significant**.

Habitat Loss/Change

369. The majority of the Development site will experience change when arable fields are replaced with solar panels surrounded by grassland between the tables and arrays and there is establishment of the AR HMA and LGM HMA resulting in substantial gains in the presence of diverse grassland habitat. The LBMP includes measures to improve the quality of the ditches and extent of reedbed throughout the Development site, with further enhancements made including planting of hedgerows, scrub and trees.

370. The habitat management measures implemented with the Development will improve conditions for breeding species associated with the field margin and boundary habitats. This would provide a positive effect for those species as a result of additional nesting opportunities and supporting habitats. It is considered that breeding birds such as reed bunting, reed warbler and sedge warbler will continue to utilise the ditch habitats in the wide networks between the solar panel arrays. The hedgerow, scrub and tree enhancements will provide additional resources for species such as song thrush, dunnock, whitethroat, linnet and yellowhammer. Ditch enhancements and other measures set out in the Aquatic Habitats Management Plan will enhance conditions for Cetti's warbler and possibly bearded tit.

371. Open habitat species that breed within or at the edges of the arable fields include lapwing, skylark and yellow wagtail. These species are expected to be displaced by the installation of solar panels. However, the LBMP includes measures for the management of habitats around the solar panel arrays as well as in some of the undeveloped blocks of land within the Development site (other than the AR HMA at the east end of the site). The AR HMA includes the conversion of approximately 56 ha of arable land to grassland aimed at provision of foraging resources for wintering geese and waders. During the summer, the AR HMA will be a grazed grassland and is likely to provide nesting opportunities for species such as lapwing. The LGM HMA sets out the establishment of 13.3 ha of wildflower rich habitat in fields in the south-east (parcels Y and Z) and in the west of the site. These measures are expected to provide enhanced conditions for breeding lapwing, skylark and yellow wagtail. There is some uncertainty with regards to the breeding

opportunities in the new grassland areas between the solar arrays (in total amounting to 26.7 ha across the site), as these species prefer more open habitats than the grassland between the arrays might provide. Lapwings are unlikely to nest in those areas between arrays, whereas in some areas, the extents between the edges of the arrays are likely to be large enough to accommodate skylark and possibly yellow wagtail.

372. Overall, it is considered that there will be a change in the breeding bird community. If the more open habitat preferring species do not find that space between the arrays is sufficiently large to be attractive to them, then there would be lower numbers of skylark and yellow wagtail, although the larger grassland extents provided by the HMAs will provide enhanced habitat. It is expected that the community of other breeding species that favour marginal habitats, including hedgerow/scrub as well as ditch habitat, will be at least maintained and likely improved. The management of the AR HMA at the eastern end of the Development site would provide more opportunity for breeding lapwing.

373. One of the aims of the Development is to provide improved conditions where possible for breeding birds. This will be a **positive** effect on the breeding bird community, although due to a degree of uncertainty regarding how birds will react to the presence of the solar panels in the landscape, it is not certain to occur. The conservation status of breeding species is unlikely to be altered substantively, therefore the effect is considered to be **not significant**.

9.5.3.27 Wintering Farmland Bird Community

374. The arable fields within the Core Survey Area hosted large numbers of some farmland bird species, such as skylark and starling for short periods during the non-breeding seasons that were surveyed. This was especially prevalent during the periods after harvesting and cultivating the land. Other large flocks included carrion crow, stock dove and woodpigeon and occasionally fieldfare and redwing.

Construction/Decommissioning Disturbance

375. Construction works are likely to cause localised disturbance to foraging birds resulting in temporary displacement across one or two winter seasons depending on the scheduling and duration of the construction phase. Not all areas within the Development site will experience potentially disturbing effects at the same time, so the effects will be localised at any point in time.

376. Construction/decommissioning disturbance is predicted to cause a temporary decrease in the populations of non-breeding birds during the construction phase. The effect is **adverse** of **low magnitude** with respect to the regional (County) populations of each species and will be short-term and reversible. As the effect of construction/decommissioning disturbance is not predicted to change the conservation status of any of the species, it is **not considered to be significant**.

Habitat Loss/Change

377. The installation of solar panels and the change in management of the majority of the land from arable to grassland is likely to result in displacement of flocks of winter foraging birds.

378. Some benefits to wintering farmland birds will occur through the implementation of the habitats management measures detailed in the LBMP, including the provision of grassland and structural habitats such as the scrub, hedgerow and trees.

379. Overall, it is considered that there will be a change in the wintering farmland bird community. The large numbers of flocking species that use the site are not likely to be attracted because the temporarily rich resources they favour at and after harvest of crops will no longer be available. However, the habitat management measures set out in the LBMP resulting in substantive increases in the extent of seed-rich grassland habitat will

improve conditions for wintering seed-eating species that preferentially forage in the grassland habitats. The conservation status of wintering farmland birds is unlikely to be altered substantively, therefore the effect is considered to be **not significant**.

9.5.3.28 Barn Owl

380. There are six monitored barn owl nest sites within 2 km of the Development site. None are actually within the site; however, at least some of these birds make use of the site for foraging, as barn owls have often been observed hunting there.

Construction/Decommissioning Disturbance

381. Construction activities and lighting could displace barn owls from foraging close to the areas of works. However, the works will be localised at any one time and there will be substantial remaining areas within the Development site available for barn owls to forage in. The construction phase may extend over two breeding seasons and as construction progresses, more of the open arable habitat will be replaced with the installation of solar panels. The effect of localised disturbance is therefore likely to increase in the context of the available area for foraging as the construction phase progresses, if birds are displaced from foraging areas in close proximity to the solar panels.

382. It is considered likely that barn owls will continue to forage in undisturbed areas beyond 100 m from any source of construction works. The majority of the KWT South Swale Reserve and many of the ditches across the Development site will therefore be available for barn owls to forage along during the construction works, if they are not displaced from doing so by the presence of the solar panels as they are installed.

383. It is not considered that there will be any direct disturbance to nest sites of barn owls.

384. Overall, because construction/decommissioning works will be localised, extending along the access route to the point of solar panel installation at any one time, and there will be large extents of suitable foraging habitat remaining undisturbed, it is not considered that construction/decommissioning disturbance will cause displacement of barn owls to the extent that it would affect their ability to survive and reproduce. The effect of construction/decommissioning disturbance on barn owls is therefore of **low magnitude** and **not considered to be significant**.

Habitat Loss/Change

385. The majority of the Development site will experience change when arable fields are replaced with solar panels surrounded by grassland between the tables and arrays and with the establishment of large extents of grassland in the AR HMA (56 ha) and LGM HMA (13.3 ha). The LBMP includes measures to improve the quality of the ditch margins and convert arable land to grassland throughout the Development site, resulting in a further 26.7 ha of suitable grassland foraging habitat. The habitat management measures implemented with the Development will improve conditions for foraging barn owls.

386. It is intended that the grassland around the solar panel arrays will be grazed by sheep; however, the grazing intensity will be low and in line with best practice for managing lowland grasslands for conservation purposes. The Barn Owl Trust states:

"*…solar PV 'farms' have the potential to be of great benefit to Barn Owls as the array frameworks are typically at a height from which Barn Owls can perch-hunt. In order to benefit Barn Owls, the grass below and around the arrays should be allowed to develop into good Barn Owl foraging habitat – rough tussocky grassland with a litter-layer not less than 70mm deep.*"[37]

387. Although the east-west aspect of the solar panels of the Development is of a different nature to typical south-facing solar farms, the structures offer the same opportunities for

[37] https://www.barnowltrust.org.uk/hazards-solutions/barn-owls-ground-mounted-solar-panels/

perching birds and it is predicted that barn owls will find suitable perches within the Development, either on the solar panels (typically at the edges), or using the posts of the perimeter fence. Due to the substantive increase in the availability of suitable foraging habitat with the Development, there is predicted to be a **low magnitude positive** effect of habitat change for barn owls, although it is not expected that it will change the conservation status of the species; hence the effect is **not considered to be significant**.

9.5.3.29 Peregrine

388. A pair of peregrines has been recorded frequently in the Core Survey Area, usually perching on the pylons that run across the site. The pylons presumably provide an ideal perch from which to observe prey and initiate hunting. No territorial or breeding behaviour has been observed and it is not known if and where the birds have bred.

Construction/Decommissioning Disturbance

389. The construction/decommissioning activities are likely to disturb peregrines where they perch on the pylons. It was noted during the baseline surveys that birds would sometimes take flight as the surveyor approached, although sometimes they would remain perched. If disturbed by construction/decommissioning activities, the effect will be localised and the birds are predicted to fly to another location along the string of pylons across the site. The energetic consequences of this are minimal and **no material effects** on peregrine are predicted to occur.

Habitat Loss/Change

390. The peregrines are likely to hunt primarily waterbirds from the estuary. The waterbird population in the estuary is predicted to remain unchanged. Peregrines also hunt birds such as lapwing, golden plover, woodpigeons and stock doves that forage across the arable fields within the Development in the non-breeding season. Such potential prey would no longer be available to them with the change to solar panel arrays. The AR HMA is designed in part to host lapwing and golden plover during the winter period, so there would be some potential prey still available within the site during the operational phase of the Development.

391. Peregrines are not predicted to be displaced by the presence of the Development therefore there is predicted to be **no effect** of change in habitats at the Development site on peregrine.

9.6 Habitats Regulations Assessment (HRA)

392. HRA fulfils the requirements of the European Habitats and Birds Directives as implemented in English law via the Habitats Regulations. Under the terms of this legislation, a HRA is required before a project which may affect a European Site(s) can be lawfully undertaken or authorised.

393. Having ascertained that the Development is not connected with the management of a European Site for nature conservation, the HRA comprises four stages:

- Screening: assessing whether or not the project would have a 'likely significant effect' (LSE) on the European Sites, either alone, or in combination with other plans or projects. If the Screening procedure cannot discount any likely significant effect(s) on a European Site, then an Appropriate Assessment (Step 2) would apply. If LSE can be discounted, then the project may be authorised.
- Appropriate Assessment (AA): the AA is undertaken by the competent authority responsible for determining the application. Its purpose is to assess the implications of the project in respect of the European Sites' Conservation Objectives, which should enable the competent authority to determine whether or not the project would adversely affect the integrity of the designated sites. If it

can be ascertained beyond reasonable scientific doubt that the project would not adversely affect the integrity of the European Sites, then it can be authorised. If not, Steps 3 and 4 would apply.

- Alternative Solutions: where the project would damage the integrity of a designated site, alternative solutions which would deliver the project objective(s) need to be considered. If there are no alternatives that do not also affect the integrity of the European Sites, step 4 applies.
- Imperative Reasons of Overriding Public Interest (IROPI): projects that adversely affect the integrity of a European site may proceed for imperative reasons of overriding public interest subject to compensatory measures being secured.

394. The first stage of the HRA process is screening for those potential European sites which need to be scoped into the HRA. On the basis of consultation undertaken to date with Natural England at this stage in the assessment process, it is anticipated that LSE is identified only for The Swale SPA/Ramsar site, due to the connectivity and the potential for effects of the Development on its qualifying features, both within the designated site and in land that is functionally linked to the designated site. It is not considered that there will be LSE in relation to any other European sites designated for their avian interest.

395. A HRA has been undertaken for the Development and documented in a Report to Inform an Appropriate Assessment (RIAA) which is submitted as part of the application for a Development Consent Order (DCO).

396. The RIAA concludes that with the embedded and applied mitigation measures set out in the LBMP, the Development alone and in combination with other plans or projects, will not undermine the conservation objectives of The Swale SPA/Ramsar Site in a way that will prevent the site contributing to the aims of the Birds Directive. The Development is not predicted to adversely affect the integrity of the Swale SPA/Ramsar Site.

9.7 Mitigation Measures and Residual Effects

397. The mitigation and enhancement measures relating to provision of new or enhanced habitats for birds are set out in the LBMP and hence are designed in, or embedded within the project and those measures have been included in the assessment described above.

398. Further mitigation measures are set out in the Outline CEMP, and documents such as the outline SPA CNMP and BBPP which is also part of the Development process and hence also embedded mitigation.

399. There are no additional applied mitigation measures to consider beyond those already embedded within the Development; therefore the residual effects are as described above in section 0.

400. A monitoring plan will be drawn up in consultation and agreement with the HMSG in order to review the effectiveness of the measures incorporated into the Development to mitigate effects and enhance the biodiversity at the site and adapt management where necessary or appropriate.

9.8 Cumulative Effects Assessment

401. This section compiles information on other plans and projects that might contribute to cumulative effects on the IEFs identified in the assessment. An assessment is made as to whether any cumulative adverse effects might occur that did not result from the Development alone.

402. Table 9.13 provides each cumulative project's application reference, location, status and type along with a summary of the residual effects. The list is presented in three tiers as

defined by Planning Inspectorate Guidance[38]. Cumulative developments are grouped into tiers, reflecting the likely degree of certainty attached to each development, with Tier 1 being the most certain and Tier 3 least certain and most likely to have limited publicly available information to inform assessments.

[38] Planning Inspectorate Guidance Note Seventeen on Cumulative Effects Assessment, December 2015. Available online: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf Accessed 12/02/2018

Table 9.13: Cumulative projects and summary of residual effects on The Swale SPA/Ramsar Site

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
TIER 1 SITES					
Land At Oare Gravel Works, Ham Road, Faversham, Kent, ME13 7TS	SW/14/0257	1 km southwest, 272 m west of SPA Permitted	Residential development for 330 dwellings.	Potential adverse impact as a result of increased recreational pressure on the SPA. Incorporation of new greenspace for recreation diverting visitors away from the SPA, with contributions to the Strategic Access Management and Monitoring Plan (SAMM) results in No likely significant effects (LSE).	None
Land at, and adjacent to, Site D, Oare Creek, Faversham, Kent, ME13 7TX	KCC/SW/0090/2018	1.1 km southwest, 100 m south of SPA Awaiting Decision	Redevelopment of an existing waste management facility and inclusion of additional land into a waste management use (part retrospective)	Preliminary Ecological Appraisal (PEA) completed by KB Ecology did not undertake HRA, but recommended that proposals are in line with recommendations of the North Kent Environmental Planning Group's access management strategy (the SAMM). Natural England advised that with appropriate financial contribution to the SAMM and inclusion of measures to avoid water quality impacts, there would be no LSE.	None
Land To The East Of Ham Road Faversham Kent ME13 7ER	16/504575/OUT	1.7 km south, 500 m south of SPA Awaiting Decision	Outline application for residential development (30 units) including access and parking, together with public open space and drainage.	PEA completed by KB Ecology did not undertake HRA, but recommended that proposals are in line with recommendations of the North Kent Environmental Planning Group's access management strategy (the SAMM). Natural England advised that with appropriate financial contribution to the SAMM and inclusion of measures to avoid water quality impacts, there would be no LSE.	None

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
Land North Of Graveney Road Faversham Kent ME13 8UJ	16/508643/FULL	2.7 km south, 1.2 km SE of SPA Permitted	105 residential units, comprising 72 houses and 33 flats, and associated, parking, landscaping and open space.	No HRA documentation provided by the applicant. Natural England advised that additional recreational pressure on the SPA would be adequately mitigated by appropriate contribution to the SAMM leading to no LSE, therefore could be screened out of AA.	None
Ospringe Brickworks Sumpter Way Faversham Kent ME13 7NT	17/502604/REM / 14/502729/OUT	3.1 km southwest, 1 km south of SPA Permitted / Awaiting Decision	Demolition of brick making and drying shed, 2 stores, existing site office and a cottage; Construction of up to 250 dwellings, new vehicular access and roundabout on Western Link, public open space and associated infrastructure.	Extended Phase 1 Habitat Survey by Soltys Brewster Ecology stated that due to the distance between the project and the European sites, they were of no direct relevance to the appraisal. Online documents available on the Council Planning Portal are not clear with respect to the consideration of impacts on The Swale SPA. However, information available in NE and KWT responses indicates that with appropriate contribution to the SAMM, recreational pressure on the SPA would be adequately mitigated and there would be no LSE.	None
Land At Perry Court London Road Faversham Kent ME13 8YA	15/504264/OUT / 17/506603/REM	3.9 km south, 2.1 km south of SPA Permitted / Awaiting Decision	Outline application for a mixed use development comprising: up to 310 dwellings, 11,875sqm of B1a floorspace; 3,800sqm of B1b floorspace; 2,850sqm of B1c floorspace; a hotel (up to 3,250sqm) of up to 100 bedrooms including an ancillary restaurant; a care home (of up to 3,800sqm) of up to 60 rooms and ancillary floor space; a local convenience store of 200sqm; 3 gypsy pitches and associated landscaping.	Assessment by FCPR identified potential effects as a result of increased recreational pressure on the SPA. Incorporation of 15 ha of green infrastructure for recreation diverting visitors away from the SPA, with contributions to the SAMM results in No Likely Significant Effect. Natural England advised that additional recreational pressure on the SPA would be adequately mitigated by appropriate contribution to the SAMM leading to no LSE.	None

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
Land At Preston Fields Salters Lane Faversham Kent ME13 8YD	16/508602/OUT	4.1 km south, 1.9 km south of SPA Awaiting Decision	Outline application for erection of up to 250 dwellings with all matters reserved except for access.	Royal Haskoning DHV assessed all impacts on designated sites as imperceptible and negligible. KCC and NE advised that with appropriate financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and there would be no LSE.	None
Land Between Frognal Lane And Orchard View Lower Road Teynham Kent ME9 9TU	16/507689/OUT	6.7 km west, 1.8 km south of SPA Permitted	Outline Application for mixed use development including up to 300 dwellings; employment area; sports ground; open space; access; reserve site for health centre; and associated parking and servicing areas, landscaping, wildlife areas, swales and other drainage / surface water storage areas, and related development.	ESL (Ecological Services Ltd) concluded that there would be no direct effects on the SPA or its qualifying species. Increased recreational disturbance would be mitigated by contribution to the SAMM. KCC and NE advised that with appropriate financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and there would be no LSE.	None
Blacketts Farm House Blacketts Road Tonge Sittingbourne Kent ME9 9AU	17/501404/FULL	7.3 km west, 160 m south of SPA Permitted	Proposal to create a wetland complex within a 12ha field to enhance, extend and link the existing available habitats for a suite of wetland species, including water voles, wetland birds and aquatic invertebrates.	NE advised that the proposals would enhance the adjacent designated sites.	Positive contribution
Eurolink V Swale Way Sittingbourne Kent ME9 9AR	15/510589/OUT	8.3 km west, 356 m south of SPA Permitted	Construction of business park), including associated accesses (including alteration to existing northern relief road), parking and servicing areas, landscaping, bunds, surface water storage area, and related development.	The ES concluded no adverse effects on the integrity of the SPA. NE advised no LSE and no requirement for Appropriate Assessment.	None
Land North & West Of Tonge Corner Farm Tonge Corner Road Tonge Kent ME9 9BB	SW/14/0224	8.7 km east, 150 m south of SPA Permitted	Solar farm, comprising the erection of solar arrays of photovoltaic panels and associated equipment.	Assessment by Michael Woods Associates Ltd concluded no residual adverse effects on ecological receptors.	None; already operational and part of baseline

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
New Hook Farm Lower Road Minster-on-sea Kent ME12 3SU	16/507943/FULL	8.7 km north west, 1.4 km south of SPA Permitted	Construction of an agricultural anaerobic digestion plant and associated infrastructure.	Ecological appraisal by Ecus concluded that development is unlikely to result in any significant effects on the designated sites. NE advised no LSE.	None
Land At Stones Farm The Street Bapchild Kent ME9 9AD	14/501588/OUT	8.8 km west, 1 km south of SPA Permitted	Hybrid application: Outline consisting of development of 550-600 houses and all necessary supporting infrastructure	Ecosulis carried out an ecological assessment concluding that with provision of open green space, the development would be unlikely to lead to a significant adverse impact on The Swale SPA/Ramsar site and the features for which it has been designated. NE advised that contribution to the SAMM would be required in addition to the provision of natural green space to avoid LSE of increased recreational pressure. S106 states that the developer covenants that appropriate contribution to the SAMM would be made prior to occupation.	None
Parcel H East Hall Farm Sittingbourne Kent ME10 3TJ	15/510149/REM / SW/12/0260	9.5 km west, 550 m SW of SPA Permitted	Approval of Reserved Matters following outline approval SW/12/0260 for the construction of 68 dwellings with associated estate roads, parking and landscaping.	NE advised that with appropriate mitigation and financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and there would be no LSE on The Swale SPA.	None
Ceres Court Sittingbourne Kent ME10 3RJ	15/508661/FULL	9.6 km west, 1 km SW of SPA Permitted	Demolition of existing 3 x four storey block of flats and erection of 40 affordable dwelling houses with associated parking and landscaping.	PEA carried out by KB Ecology identified no impacts on designated sites. NE advised no LSE. KCC advised no LSE with appropriate financial contribution to the SAMM if necessary, to avoid recreational disturbance impacts on The Swale SPA.	None

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
Kemsley Paper Mill (K4) CHP Plant	NSIP	10 km northwest, 350m NW of SPA Accepted for Examination	A Combined Heat and Power Plant comprising a gas turbine (52MW), Waste Heat Recovery Boilers (105MWth steam) and Steam Turbine (16MW). Land within the south-eastern part of the Kemsley Paper Mill, Kemsley, Sittingbourne	Currently in examination phase. HRA Report completed by RPS Group concluded that the DCO application for the Kemsley CHP Plant will not compromise the conservation objectives of Natura 2000 sites, and there will be no adverse effect on site integrity. The HRA report included a comprehensive in-combination assessment, which identified no additional significant effects.	None, further details regarding the developments assessed in-combination is provided below.
Land north of Thanet Way, Whitstable, CT5	CA//15/01296	5.89 km east of site, 1.4 km south of SPA Permitted	Outline planning application for the demolition of existing buildings and the erection of up to 400 dwellings including affordable housing, extension to Duncan Down, green infrastructure, multi-use games area, parking, access and associated infrastructure and other ancillary works.	NE advised that with appropriate mitigation and financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and there would be no LSE on The Swale SPA.	None
Land off Plover Road Minster-on-sea, Kent, ME12 3BT	18/503855/OUT	1.5 km north of SPA, 12 km NW of site boundary Awaiting decision	Outline application for the residential development on the land off Plover Road, including associated access, parking and landscaping.	NE advised that with financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and this would need to be confirmed through appropriate assessment.	None
Land West Of Barton Hill Drive Minster-on-sea Kent ME12 3LZ	18/503135/OUT	970 m north of SPA, 12 km NW of site boundary Awaiting decision	Outline application for the development of up to 700 dwellings and all necessary supporting infrastructure including land for provision of a convenience store / community facility, internal access roads, footpaths, cycleways and parking, open space, play areas and landscaping, drainage, utilities and service infrastructure works.	NE and KCC advised that with provision of greenspace and financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and this would need to be confirmed through appropriate assessment.	None

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
Neatscourt Marshes Brielle Way Queenborough Kent	14/506802/FULL	500 m north of SPA, 13 km NW of site boundary Permitted	Erection of a regional distribution centre (Use Class B8) with ancillary office accommodation (use Class B1 (a)) and associated gatehouse and access arrangements, service station, refuse and recycling area, car parking and landscaping	Tyler Grange assessed potential adverse impacts from habitat loss, noise, lighting and water quality. Compensatory habitat had already been created at Harty Marshes to mitigate habitat loss and construction and design mitigation measures were appropriate to mitigate other potential effects. NE advised no objection	None
Land At Great Grovehurst Farm Grovehurst Road Sittingbourne Kent ME9 8RB	18/502372/EIOUT	880 m south of SPA, 11.3 km NW of site boundary Awaiting decision	EIA Outline application for the development of up to 110 dwellings and all necessary supporting infrastructure including emergency access, roads, footpath and cycle links, open space, play areas and landscaping, parking, drainage and all utilities and service infrastructure works. All detailed matters are reserved for subsequent approval except (a) mitigation of impacts on Great Crested Newts; (b) vehicular access to Grovehurst Road and (c) extraction of brickearth.	HRA Screening Report completed by The Ecology Partnership concluded no LSE. NE and KCC advised that with provision of greenspace and financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and this would need to be confirmed through appropriate assessment. Water quality and construction impacts would be suitably mitigated by SuDS provision and CEMP; this would need to be confirmed through appropriate assessment.	None
Land North Quinton Road Sittingbourne Kent ME10 2SX	18/502190/EIHYB	1.1 km north of SPA, 12 km west of site boundary Awaiting decision	Full Planning Application - Phase 1 North - Erection of 91 dwellings accessed from Grovehurst Road, public open and amenity space (including an equipped children's play area) together with associated landscaping and ecological enhancement works, acoustic barrier to the A249, internal access roads, footpaths, cycleways and parking, drainage (including infiltration basins and tanked permeable paving), utilities and service infrastructure works. Full Planning Application - Phase 1 South - Erection of	HRA Screening Report completed by The Ecology Partnership concluded no LSE. NE and KCC advised that with provision of greenspace and financial contribution to the SAMM, recreational disturbance impacts would be adequately mitigated and this would need to be confirmed through appropriate assessment. Water quality and construction impacts would be suitably mitigated by SuDS provision and CEMP; this would need to be confirmed through appropriate assessment.	None

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
			252 dwellings (including 34 affordable dwellings) accessed from Quinton Road, public open and amenity space, together with associated landscaping and ecological enhancement works, internal access roads, footpaths, cycleways and parking, drainage (including infiltration swales, ring soakaways, and permeable paving), utilities and service infrastructure works. Outline Planning Application - for up to 857 new dwellings (including 10% affordable housing, subject to viability), a site of approximately 10 ha for a secondary and primary school, a mixed use local centre, including land for provision of a convenience store, public open and amenity space (including equipped children's play areas), together with associated landscaping and ecological enhancement works, acoustic barrier to the A249, internal access roads, footpaths, cycleways and parking, drainage (including a foul water pumping station and sustainable drainage systems), utilities and service infrastructure. All matters reserved, except for access for the schools site from Grovehurst Road.		
Milton Pipes Site, Gas Road, Sittingbourne, Kent, ME10 2QB	SW/14/503276 OR KCC/SW/0282/2014	1.7 km west of SPA, 11. km west of Site boundary Granted with conditions	Location and operation of an aggregate recycling plant (including weighbridge office and car parking) to process up to 150,000 tpa of construction, demolition and excavation materials from local developments and crushing and screening, via industry standard processes, into recycled secondary	Ecological assessment by SLR concluded no impacts predicted on The Swale SPA/Ramsar Site.	None

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
			aggregates for re-sale into the local market		
Land off Barge Way, Kemsley Fields Business Park, Kemsley, Sittingbourne, Kent, ME10 2FE	SW/15/500348 KCC/SW/0010/2015	1.2 km west of SPA, 11 km west of site boundary Granted with conditions	4Evergreen Technologies is proposing to install an advanced thermal conversion and energy facility at the Kemsley Fields Business Park to produce energy and heat a project known as the Garden of England Energy Project. The project will involve: construction of new buildings to house the thermal conversion and energy generation plant and equipment; construction of associated offices; erection of external plant including storage tanks; and the erection of a discharge stack	The environmental assessment concluded no significant impact on protected sites. Argus Ecology carried out an assessment of air quality impacts on the SPA and concluded there would be no significant ecological impact although critical load of nitrogen deposition would be exceeded cumulatively.	None, no air quality impacts of the Development.
Countrystyle Recycling Storage Land, Ridham Dock, Iwade, Sittingbourne, Kent, ME9 8SR	SW/16/501484 KCC/SW/0019/2016	300m west of SPA, 10.8 km NW of site boundary	The construction and operation of a gypsum recycling building with plant and machinery to recycle plasterboard and the re-configuration of the existing lorry park to include office/welfare facilities and ancillary supporting activities, including rain water harvesting tanks, container storage, new weighbridges, fuel tanks, hardstanding, safe lorry sheeting access platform and automated lorry wash	SLR completed a HRA, which concluded that subject to construction timing being restricted to the summer months, there would be no adverse effect on integrity of The Swale SPA/Ramsar Site	None
Kemsley IBA Recycling Facility, Ridham Avenue, Sittingbourne, Kent, ME10 2TD	SW/16/507687 KCC/SW/0265/2016	350 m west of SPA, 10.1 km NW of site boundary Granted	The construction and operation of an Incinerator Bottom Ash (IBA) Recycling Facility on land adjacent to the Kemsley Sustainable Energy Plant	RPS concluded no likely significant effects subject to fence screening and provision of alternative habitat for breeding marsh harrier elsewhere.	None
LKM Recycling, Bonham Drive, Eurolink Business Park, Sittingbourne, Kent, ME10 3SY	KCC/SW/0050/2018	1 km west of SPA, 10.2 km west of site boundary	A part retrospective application to allow the development and operation of a Materials Recycling Facility (MRF), including construction of a number of external covered storage bays and	No significant noise or air quality impacts were predicted.	None

Cumulative Development Address	Planning Ref	Location and Status	Summary of Development	Summary of residual effects assessed for The Swale SPA/Ramsar Site	Contribution to cumulative effect
		Under Construction	provision of a site office. The construction of a waste reception/handling building and the installation of materials recycling plant/equipment		
Land at Ladesfield, Vulcan Close, Whitstable, CT5 4LZ	CA//18/01280	435 m south of SPA, 4.1 km east of site boundary Registered	Outline application for proposed 14 no. dwellings with all matters reserved except access	Tim Moya Associates concluded no direct impacts on the Swale SPA/Ramsar Site and no significant impacts of increased recreational pressure. KCC Ecology response advised that contribution to the SAMM would be required and tested through appropriate assessment.	None
TIER 2 SITES					
Land South and East Of Sittingbourne Kent	Scoping - 17/506551/EIASCO	8.7km east, 1.9 km south of SPA Unknown	Mixed-use development including up to 11,250 residential dwellings, commercial space, new infrastructure to create new junctions onto the M2 and A2 joined by a new relief road, new retail and health facilities, leisure facilities, educational facilities and community facilities at land to the south and east of Sittingbourne.	NE scoping response identifies potential impacts on designated sites through changes in air quality and increased recreational pressure. This application is substantially larger than other residential developments in the impact risk zone and NE advise that avoiding adverse effects on the integrity of the SPA would require site specific measures, in addition to the appropriate SAMM contributions.	None predicted with appropriate mitigation
TIER 3 SITES					
None considered					

403. The DCO application for the Kemsley Paper Mill (K4) CHP Plant[35] includes a HRA Report (June 2018). The in-combination assessment provided therein comprised a cumulative assessment of the scheme 'with proposed developments near the [Kemsley Paper Mill] site that are currently in the planning process or have been approved but are not yet constructed'. A summary of the in-combination developments reviewed in the Kemsley Paper Mill (K4) CHP Plant HRA Report is provided here in order to demonstrate that there are no other projects likely to have additional impacts beyond those described above in Table 9.13 that would lead to significant effects on The Swale SPA/Ramsar Site.

- SW/10/444 Kemsley K3 SEP Plant: construction and operational disturbance to breeding marsh harrier mitigated by screening and alternative habitat provided resulting in no in-combination effects. No in-combination effects are therefore predicted for the Development.
- EN010083 Kemsley K3 Wheelabrator Power Upgrade: construction and operational disturbance to breeding marsh harrier mitigated by screening and alternative habitat provided resulting in no in-combination effects. No in-combination effects are therefore predicted for the Development.
- 16/507687/COUNTY Incinerator Bottom Ash Recycling Facility at Kemsley: construction and operational disturbance to breeding marsh harrier mitigated by screening and alternative habitat provided resulting in no in-combination effects. No in-combination effects are therefore predicted for the Development.
- 16/501484/COUNTY Gypsum recycling building 650 m north of Kemsley: water quality changes and wintering bird disturbance during construction. Construction timed to avoid winter so no disturbance to wintering birds. No in-combination effects are therefore predicted for the Development.
- SW/11/1291 Kemsley Anaerobic Digestion (AD) Plant: cumulative air quality impacts below critical threshold and disturbance to marsh harrier mitigated by provision of alternative habitat. No in-combination effects are therefore predicted for the Development.
- SW/12/1001 Access road extension for Kemsley Paper Mill: no additional in-combination impacts beyond those assessed for Kemsley K3 SEP Plant. No in-combination effects are therefore predicted for the Development.
- 14/500327/OUT 8000 m2 Class B1/B2 floorspace with extension to Milton Country Park: potential cumulative effects associated with increased recreational use were dismissed because Kemsley K4 has no recreational disturbance impacts. The same applies for the Development, therefore no in-combination effects are predicted.
- 14/502737/EASCO and 16/506935/COUNTY various industrial uses at Ridham Docks: variations to existing conditions, none of which were likely to have cumulative effects with Kemsley K4. No in-combination effects are therefore predicted for the Development.
- SW/15/500348 Thermal conversion and energy facility: cumulative air quality impacts were assessed as unlikely. There are no air quality impacts associated with the Development therefore there are no in-combination effects with the Development.
- 17/505073/FULL Tile Factory: slight increase in noise not considered to negatively affect birds using the SPA/Ramsar Site. No in-combination effects are therefore predicted for the Development.
- 16/506193/ENVSCR outline application for 275 dwellings: effects likely to be associated with increased recreational access which would be mitigated through contribution to the SAMMS. No in-combination effects are therefore predicted for the Development.
- 17/503713/ENVSCR new residential development of 440 dwellings: effects likely to be associated with increased recreational access which would be mitigated

through contribution to the SAMMS. No in-combination effects are therefore predicted for the Development.

- 18/500257/EIFUL new residential development of 155 dwellings: potential adverse effects likely to be associated with increased recreational access which would be mitigated through contribution to the SAMMS and provision of new greenspace. No in-combination effects are therefore predicted for the Development.
- 18/500393/FULL gas power plant: effects likely to be associated with changes in air quality, assessed as likely to be within relevant thresholds. No in-combination effects are therefore predicted for the Development.
- 16/506014/EIASCO sustainable urban extension with 1,100 new dwellings: potential adverse effects are associated with increased recreational access which would be mitigated through contribution to the SAMMS and new greenspace. No in-combination effects are therefore predicted for the Development.
- 16/501228/FULL new baling plant building at Kemsley Mill: no LSE predicted. No in-combination effects are therefore predicted for the Development.
- SW/12/0816 relocation of transport depot: potential noise impacts were screened out and air quality impacts were mitigated. No in-combination effects are therefore predicted for the Development.
- SW/12/0224 Solar farm at Tonge Corner: already operational; no adverse effects were predicted. No in-combination effects are therefore predicted for the Development.
- SW/12/1211 Materials recycling facility and waste transfer station: no adverse impacts of noise or air quality were predicted. No in-combination effects are therefore predicted for the Development.

9.8.1 Conclusion of Cumulative Assessment

404. No cumulative effects have been identified that would elevate the magnitude of the effects of the Development to a level that would be significant.

9.9 Transboundary Effects

405. As the Development is a NSIP that falls within the remit of an EIA development, it will be necessary for the Secretary of State (SoS) to determine whether or not the Development is likely to have significant effects on the environment in another European Economic Area (EEA) State. These are termed 'transboundary effects'.

406. Whether or not a development is likely to result in transboundary effects is determined by a screening process undertaken by the Planning Inspectorate.

407. PINS issued the Applicant with notification of the outcome of the first transboundary screening on 13th July 2018 following the Request for a Scoping Opinion and publication of the Preliminary Environmental Information Report:

> *"Under Regulation 32 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 2017 EIA Regulations) and on the basis of the current information available from the Applicant, the Inspectorate is of the view that the Proposed Development is not likely to have a significant effect on the environment in another EEA State."*

408. Information is provided here to assist the Inspectorate in continuing to fulfil this duty.

409. The Swale SPA/Ramsar includes a number of migratory species of bird. During consultation, Natural England have advised that the non-breeding interests of the SPA include 22 species that qualify in their own right as cited species or as important parts of the non-breeding bird assemblage:

- Dark-bellied brent goose
- European white-fronted goose

- Shelduck
- Shoveler
- Wigeon
- Pintail
- Teal
- Little egret
- Oystercatcher
- Avocet
- Lapwing
- Golden plover
- Grey plover
- Curlew
- Bar-tailed godwit
- Black-tailed godwit
- Knot
- Ruff
- Sanderling
- Dunlin
- Green sandpiper
- Greenshank

410. These species are migratory and will occur as qualifying interests in their own right, or as important assemblage features, in numerous Natura 2000 sites in other EEA States. In theory, therefore, there is a risk of potential transboundary, or long-range, effects. However, DECC (now BEIS) guidelines relating to transboundary effects[39] make it clear that proximity is an important factor and that transboundary effects are primarily concerned with offshore wind energy developments where effects on highly mobile seabird species could be associated with protected sites in other EEA States. This implies that the qualifying feature potentially affected should originate from the protected site in the other EEA State, rather than the idea that the qualifying feature potentially affected might also spend some of its time at a protected site in another EEA State.

411. The Development has the potential to affect the qualifying features of The Swale SPA, through short-term disturbance during construction and through long-term displacement from foraging/resting areas in functionally-linked land during the operational lifetime of the Development; there is also consideration in the assessment of the potential for additional mortality as a result of collision with the solar panels. The closest Natura 2000 site outside the UK that includes some of the same features that might be affected by the Development is located approximately 50 km away in coastal France (Cap Gris-Nez). The features potentially affected by the Development are directly associated with The Swale SPA and it is not considered feasible that migratory birds directly associated with Natura 2000 sites in other EEA States at least 50 km away would be disturbed or suffer from loss of foraging or resting opportunities in any way that would result in likely significant effects on those Natura 2000 sites.

412. As such, the Applicant is of the view that the Development is not likely to have a significant effect on the environment in another EEA State.

9.10 Summary of Likely Effects

413. This chapter has identified no likely significant adverse effects on birds, following the embedded measures (outlined in Technical Appendices A5.2 and A5.4) in the design of the Development.

414. Table 9.14 summarises the predicted effects of the Development on birds.

[39] https://www.gov.uk/government/publications/guidelines-on-the-assessment-of-transboundary-impacts-of-energy-developments-on-natura-2000-sites-outside-the-uk

Table 9.14 Summary of Predicted Effects of the Development

Receptor	Potential Effect	Magnitude and Significance of Effect	Mitigation Proposed	Residual Significance
Construction and Decommissioning				
All receptors	Hydrological changes	Negligible Not significant	None (embedded measures in CEMP)	Negligible Not significant
All receptors	Dust deposition	Negligible Not significant	None (embedded measures in CEMP)	Negligible Not significant
Habitats within The Swale SSSI/SPA/Ramsar site, including other locally or nationally designated sites within its boundary	Disturbance	No effect Not significant	None	No effect Not significant
22 wintering assemblage species	Disturbance	Low magnitude adverse, not significant – brent goose, lapwing, golden plover Negligible adverse, not significant – shelduck, wigeon, teal, little egret, oystercatcher, avocet, grey plover, curlew, bar-tailed godwit, black-tailed godwit, knot, ruff, dunlin, green sandpiper, greenshank No effect – European white-fronted goose, shoveler, pintail, , sanderling	None (embedded measures in CEMP)	Low magnitude adverse, not significant – brent goose, lapwing, golden plover Negligible adverse, not significant – shelduck, wigeon, teal, little egret, oystercatcher, avocet, grey plover, curlew, bar-tailed godwit, black-tailed godwit, knot, ruff, dunlin, green sandpiper, greenshank No effect – European white-fronted goose, shoveler, pintail, sanderling
Breeding/wintering short-eared owl	Disturbance	Negligible Not significant	None (embedded measures in CEMP)	Negligible Not significant
Breeding marsh harrier	Disturbance	Low magnitude Not significant	ECoW and specific measures in CEMP	Negligible or Low magnitude Not significant
Breeding Farmland Bird Community	Disturbance	Low magnitude Not significant	None	Low magnitude Not significant
Wintering Farmland Bird Community	Disturbance	Low magnitude Not significant	None	Low magnitude Not significant
Barn Owl	Disturbance	Low magnitude Not significant	None	Low magnitude Not significant

Receptor	Potential Effect	Magnitude and Significance of Effect	Mitigation Proposed	Residual Significance
Peregrine	Disturbance	Negligible Not significant	None	Negligible Not significant
Operation				
All receptors	Disturbance	Negligible Not significant	None (embedded design measures)	Negligible Not significant
All receptors	Habitat fragmentation	Negligible Not significant	None	Negligible Not significant
All receptors other than habitats within the Swale SPA/SSSI/Ramsar	Hydrological changes	Negligible Not significant	None	Negligible Not significant
All receptors	Collision	Negligible Not significant	None	Negligible Not significant
All receptors	Change in recreational access	Negligible Not significant	None	Negligible Not significant
Habitats within The Swale SSSI/SPA/Ramsar site, including other locally or nationally designated sites within its boundary	Hydrological changes	Positive Not significant	None	Positive Not significant
Habitats within The Swale SSSI/SPA/Ramsar site, including other locally or nationally designated sites within its boundary	Habitat loss/change	No effect Not significant	None	No effect Not significant
22 wintering assemblage species	Habitat loss/change	Negligible adverse, not significant – brent goose, shelduck, wigeon, teal, oystercatcher, lapwing, golden plover,grey plover, ruff, dunlin, green sandpiper No effect – European white-fronted goose, shoveler, pintail, avocet, bar-tailed godwit, black-tailed godwit, knot, sanderling, greenshank Low magnitude positive, not significant –little egret, curlew	None (embedded design measures and HMAs as set out in LBMP)	Negligible adverse, not significant – brent goose, shelduck, wigeon, teal, oystercatcher, lapwing, golden plover, grey plover, ruff, dunlin, green sandpiper No effect – European white-fronted goose, shoveler, pintail, avocet, bar-tailed godwit, black-tailed godwit, knot, sanderling, greenshank Low magnitude positive, not significant –little egret, curlew

Receptor	Potential Effect	Magnitude and Significance of Effect	Mitigation Proposed	Residual Significance
Breeding/wintering short-eared owl	Habitat loss/change	Negligible to Low magnitude positive Not significant	None (embedded design measures and habitat management as set out in LBMP)	Negligible to Low magnitude positive Not significant
Breeding marsh harrier	Habitat loss/change	Negligible to Low magnitude positive Not significant	None (embedded design measures and HMAs as set out in LBMP)	Negligible to Low magnitude positive Not significant
Breeding Farmland Bird Community	Habitat loss/change	Uncertain positive, not significant	None (embedded design measures and HMAs as set out in LBMP)	Uncertain positive, not significant
Wintering Farmland Bird Community	Habitat loss/change	Low magnitude adverse, some low magnitude positive Not significant	None (embedded design measures and HMAs as set out in LBMP)	Low magnitude adverse, some low magnitude positive Not significant
Barn Owl	Habitat loss/change	Low magnitude positive Not significant	None (embedded design measures and HMAs as set out in LBMP)	Low magnitude positive Not significant
Peregrine	Habitat loss/change	No effect	None	No effect

9.11 Statement of Significance

415. This chapter has assessed the likely significance of effects of the Development on birds. Following embedded mitigation measures in the design of the project and applied mitigation measures implemented through a Breeding Bird Protection Plan and other measures set out in the CEMP, the Development has been assessed as having the potential to result in adverse and positive effects of low magnitude. No effects are considered to be significant in terms of the EIA Regulations.

416. In terms of the Habitats Regulations, screening has concluded that there is a 'likely significant effect' on The Swale SPA/Ramsar site. As such, it will be necessary for the secretary of state, as the competent authority, to undertake an Appropriate Assessment of the implications of the plan or project for that site in view of that site's conservation objectives. A Report to Inform an Appropriate Assessment (RIAA) accompanies the DCO application to provide the information required by the secretary of state to carry out its duties in this respect.