East Anglia ONE North Offshore Windfarm

Chapter 23

Onshore Ornithology

Environmental Statement
Volume 1

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Glossary of Acronyms

AIS	Air Insulated Switchgear
AONB	Area of Outstanding Natural Beauty
BBPP	Breeding Bird Protection Plan
BBS	Breeding Bird Survey
BCT	Bat Conservation Trust
BoCC	Birds of Conservation Concern
BTO	British Trust for Ornithology
CCS	Construction Consolidation Site
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice
CRoW	Countryside and Rights of Way Act 2000
CWS	County Wildlife Site
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMF	Electro-magnetic fields
EMP	Ecological Management Plan
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
GIS	Gas Insulated Switchgear
ha	hectares
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
ICZM	Integrated Coastal Zone Management
IOFs	Important Ornithological Features
IPC	Infrastructure Planning Commission
JNCC	Joint Nature Conservation Committee
km	Kilometres
LMP	Landscape Management Plan
LNR	Local Nature Reserve
LSE	Likely Significant Effect
LWS	Local Wildlife Site
m	metres
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
NPS	National Policy Statements
NSIP	Nationally Significant Infrastructure Project
OLEMS	Outline Landscape and Ecological Management Strategy
PEIR	Preliminary Environmental Information Report
PIDs	Public Information Days
PRoWs	Public Rights of Way
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPR	ScottishPower Renewables
SSSI	Site of Special Scientific Interest
WeBS	Wetland Birds Survey

Glossary of Terminology

Applicant	East Anglia ONE North Limited.
Cable sealing end compound	A compound which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Cable sealing end (with circuit breaker) compound	A compound (which includes a circuit breaker) which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Construction consolidation sites	Compounds associated with the onshore works which may include elements such as hard standings, lay down and storage areas for construction materials and equipment, areas for vehicular parking, welfare facilities, wheel washing facilities, workshop facilities and temporary fencing or other means of enclosure.
Development area	The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order).
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia ONE North windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.
Jointing bay	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers within the onshore cable route housing electrical earthing links.
Mitigation areas	Areas captured within the Development Area specifically for mitigating expected or anticipated impacts.

National electricity grid	The high voltage electricity transmission network in England and Wales owned and maintained by National Grid Electricity Transmission
National Grid infrastructure	A National Grid substation, cable sealing end compounds, cable sealing end (with circuit breaker) compound, underground cabling and National Grid overhead line realignment works to facilitate connection to the national electricity grid, all of which will be consented as part of the proposed East Anglia ONE North project Development Consent Order but will be National Grid owned assets.
National Grid overhead line realignment works	Works required to upgrade the existing electricity pylons and overhead lines (including cable sealing end compounds and cable sealing end (with circuit breaker) compound) to transport electricity from the National Grid substation to the national electricity grid.
National Grid overhead line realignment works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia ONE North project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to two fibre optic cables and up to two distributed temperature sensing cables.
Onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located (described as the ‘order limits‘ within the Development Consent Order).
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia ONE North project from landfall to the connection to the national electricity grid.
Onshore preparation works	Activities to be undertaken prior to formal commencement of onshore construction such as pre–planting of landscaping works, archaeological

	investigations, environmental and engineering surveys, diversion and laying of services, and highway alterations.
Onshore substation	The East Anglia ONE North substation and all of the electrical equipment within the onshore substation and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia ONE North project.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

23 Onshore Ornithology

23.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the potential impacts on onshore ornithology associated with the construction, operation and decommissioning of the proposed East Anglia ONE North project.

2. The specific objectives of this chapter are to:

   - Describe the ornithological baseline;
   - Outline future trends in relation to onshore ornithological receptors;
   - Describe the assessment methodology and significance criteria used in completing the impact assessment;
   - Describe the potential impacts of predicted impacts on onshore ornithological receptors;
   - Describe the mitigation measures proposed to address likely significant impacts; and
   - Assess the residual impacts remaining following the implementation of mitigation, including cumulatively with other projects.

3. The assessment has been carried out by MacArthur Green, following relevant guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018), Natural England (2010; 2015a) and Scottish Natural Heritage (SNH 2016; 2018) relevant to the surveying and assessment of onshore renewable energy projects.

4. It should be noted that the East Anglia TWO offshore windfarm project (the proposed East Anglia TWO project) is also in the application stage. The proposed East Anglia TWO project has a separate Development Consent Order (DCO) process which has been submitted at the same time as the proposed East Anglia ONE North project. This assessment considers the cumulative impact of the proposed East Anglia ONE North project with the proposed East Anglia TWO project (***Appendix 23.2***) and subsequently with other proposed developments (***section 23.7***).

5. This ES chapter should also be read in conjunction with ***Chapter 22 Onshore Ecology***, which provides further information on other ecological interests, including habitats within the onshore development area that have been referred to here. This chapter should also be read in conjunction with ***Chapter 12 Offshore Ornithology***, which assesses the potential impacts on offshore bird species.

23.2 Consultation

6. Consultation is a key feature of the Environmental Impact Assessment (EIA) process, and continues throughout the lifecycle of a project, from its initial stages through to consent and post-consent.

7. To date, consultation with regards to onshore ornithology has been undertaken via the Onshore Ecology and Ornithology Expert Topic Group (ETG), described within ***Chapter 5 EIA Methodology***, with meetings held in February, April and November 2018 and January and May 2019, through the East Anglia ONE North Scoping Report (SPR 2017) and the Preliminary Environmental Information Report (PEIR) (SPR 2019). Feedback received through this process has been considered in preparing the ES where appropriate and this chapter has been updated for the final assessment submitted with the DCO application.

8. The responses received from stakeholders with regards to the Scoping Report, PEIR, as well as feedback to date from the Onshore Ecology and Ornithology ETGs, are summarised in ***Appendix 23.1***, including details of how these have been taken account of within this chapter.

9. Ongoing public consultation has been conducted through a series of Public Information Days (PIDs) and Public Meetings. PIDs have been held throughout Suffolk in November 2017, March 2018, June / July 2018 and February / March 2019. A series of stakeholder engagement events were also undertaken in October 2018 as part of phase 3.5 consultation. Details of the consultation phases are discussed further in ***Chapter 5 EIA Methodology***.

10. ***Table 23.1*** shows public consultation feedback pertaining to onshore ornithology. Full details of the proposed East Anglia ONE North project consultation process are presented in the Consultation Report (document reference 5.1), which is provided as part of the DCO application.

Table 23.1 Public Consultation Responses relevant to Onshore Ornithology

Topic	Response / where addressed in the Chapter
Phase 1	
• None	-
Phase 2	
• None	-

Topic	Response / where addressed in the Chapter
Phase 3	
• Habitat loss impacting bird species including: barn owl, tawny owl, little owl, nightingale, blackcap, warblers, curlew, lapwing, woodcock and turtle dove • Impacts of electro-magnetic fields (EMF) on birds • Impact on migratory birds • Impacts on sand martins nesting in cliffs	Habitat loss is assessed for protected species and other species of conservation concern in ***section 23.6.3.1.*** Impacts on seabirds are assessed in ***Chapter 12 Offshore Ornithology***
Phase 3.5	
• Impacts on migratory birds • Impacts on songbirds, barn owl, tawny owl, buzzard, little owl, lapwing, curlew, skylark, marsh harrier, yellowhammer, greenfinch, goldfinch, tits, fieldfare, redwing and cuckoo – some birds on the RSPB 'Red List'	Impacts on protected species and species of conservation concern are assessed in ***section 23.6.3*** (construction phase impacts) and ***section 23.6.4*** (operational phase impacts).
Phase 4	
• Concern over impacts on nightingales • Impact on bird habitats • Impacts on breeding Woodlark and Nightjar in the Sandlings SPA	Potential impacts in relation to nightingales are given with regard to habitat loss and disturbance in ***sections 195*** and ***23.6.3.2.4*** respectively. Potential impacts on bird species due to habitat loss are given in ***section 23.6.3.1*** Potential impacts in relation to woodlark are given with regard to habitat loss and disturbance in ***sections 23.6.3.1.2*** and ***23.6.3.2.2*** respectively. This includes consideration of populations within the Sandlings SPA. Potential impacts in relation to nightjar are given with regard to habitat loss and disturbance in ***sections 23.6.3.1.1*** and ***23.6.3.2.1*** respectively. This includes consideration of populations within the Sandlings SPA.

23.3 Scope

23.3.1 Study Area

11. The onshore infrastructure for the proposed East Anglia ONE North project includes the following elements:

- Landfall;
- Onshore cable corridor;
- Onshore substation; and
- National Grid Infrastructure.

12. A full description of, and associated information for, the onshore infrastructure is provided in ***Chapter 6 Project Description***.

13. The study areas for specific onshore ornithological features are provided in ***Table 23.2***. The onshore ornithology study area is based on the onshore development area, which includes the elements listed above. Based on scientific evidence (e.g. Ruddock and Whitfield 2007) and professional judgement, a 400m buffer has also been included around the onshore development area, which is considered to be the uppermost spatial extent of potential disturbance-displacement impacts associated with any ornithological feature assessed in this ES chapter. The actual extent of potential impacts is likely to be species-specific, with some species having smaller extents of potential impact than 400m from source. The onshore ornithology study area is shown in ***Figure 23.1***. The onshore ornithology study area was agreed with stakeholders as part of the ETG meetings and publication of the Onshore Ecology and Onshore Ornithology Method Statement (SPR 2018).

14. It should be noted that at the time of undertaking baseline ornithology surveys in 2018, the onshore development area was yet to be finalised, and therefore surveying was completed on a larger scoping onshore development area (which the onshore development area is a refined (smaller) version of) plus a 400m buffer from this scoping area boundary. The data collected in 2018 are therefore considered to be robust and applicable to the onshore development area. The information presented in this chapter is described in terms of the onshore development area, as shown on the figures accompanying this chapter.

Table 23.2 Study Areas for different Onshore Ornithological Receptors

Data/Survey	Study Area
Statutory designated sites	Designated sites that are located within, and up to 10 kilometres (km) from, the onshore ornithology study area. This buffer is to take into consideration the maximum extent of foraging range for any SSSI species present within the onshore development area
Biological Records	Within 2km of the onshore ornithology study area
Onshore ornithology study area	Within and up to 400m of the onshore development area

23.3.1.1 Offsite Highway Improvements

15. Offsite highway improvements may take place at three locations; the A1094 / B1069 junction, the A12 / A1094 junction and Marlesford Bridge. These works are part of the onshore preparation works which may take place prior to the commencement of main construction. Therefore, detailed assessment of these works does not form part of the assessment of construction impacts presented in ***section 23.6.*** These works are to allow larger construction vehicles to access

and navigate certain parts of the public road network. Any modifications to roads would be undertaken in consultation with and in accordance with the requirements of the local Highways Authority in accordance with the requirements of the draft DCO. Further details of the works required are presented in ***Chapter 6 Project Description.***

16. The offsite highway improvements at the A1094 / B1069 and A12 / A1094 junctions would involve the temporary moving of street furniture and temporary local widening of the highway (or creation of overrun areas). Offsite highway improvements at Marlesford Bridge would additionally require temporary laydown areas for structural works to accommodate abnormal indivisible loads.

17. The offsite highway improvements will have a small footprint, largely within the existing highway boundary. Given the footprint and temporary nature of these works and distance from statutory designated sites with ornithology qualifying interests, along with adherence to the best practice detailed in ***section 23.3.3,*** it is considered that the offsite highway improvements will not give rise to any impacts on onshore ornithology through habitat loss or disturbance.

18. All offsite highway improvements will be subject to pre-construction ecological surveys to ensure appropriate ecological mitigation (if required) is in place prior to commencement of the relevant works secured through the production of an Ecological Management Plan to discharge requirements of the draft DCO. This will be in accordance with the Outline Landscape and Ecological Management Strategy (OLEMS) that has been submitted with this DCO application (document reference 8.7). The OLEMS outlines the requirement for landscape and ecological (including ornithological) mitigation measures.

23.3.2 Worst Case Scenarios

19. This section identifies the realistic worst case scenarios associated with the proposed East Anglia ONE North project alone.

20. ***Chapter 6 Project Description*** details the project parameters using the Rochdale Envelope approach for the ES.

21. The realistic worst case scenarios that are relevant to potential impacts on onshore ornithology during construction, operation and decommissioning phases of the proposed East Anglia ONE North project are presented in ***Table 23.3***. Please refer to ***Chapter 6 Project Description*** for more detail regarding specific activities, and their durations, which fall within the construction phase. Areas provided for onshore infrastructure are maximum footprints with indicative dimensions provided in brackets.

22. As described in ***Chapter 5 EIA Methodology,*** there are two co-located onshore substation locations for either the proposed East Anglia ONE North project or the proposed East Anglia TWO project. It should be noted that the draft DCOs for both the proposed East Anglia ONE North and East Anglia TWO projects have the flexibility for either project to use either onshore substation location. There is no difference in the scoped in and assessed impacts between the two onshore substation locations, therefore the 'project alone' assessment in ***section 23.6,*** and associated chapter figures**,** have been presented on the intended development strategy of the proposed East Anglia ONE North project using the eastern onshore substation location.

Table 23.3 Realistic Worst Case Scenarios

Impact	Parameter	Notes
Construction		
Impacts related to the landfall	HDD temporary working area: 7,000m^2 (70m x 100m) Transition bay temporary working area (for 2 transition bays): 1,554m^2 (37m x 42m) Landfall Construction Consolidation Site (CCS) (x1): 7,040m^2 (88m x 80m)	
Impacts related to the onshore cable route	Onshore cable route: 290,912m^2 (9,091m x 32m) Jointing bay temporary working area: 570m^2 (30.6m x 18.6m). Total for 38 jointing bays: 21,660m^2 (570m^2 x 38) HDD (retained as an option to cross SPA / SSSI): Entrance pit temporary working area (x1): 6,300m^2 (90m x 70m) Exit pit temporary working area (x1): 2,700m^2 (90m x 30m) Onshore cable route large CCS (1): 16,500m^2 (165m x 100m). Onshore cable route medium CCS (2): 14,080m^2 total (88m x 80m per each medium CCS) Onshore cable route small CCS (2): 6,000m^2 total (60m x 50m per each small CCS) Total footprint of all onshore cable route CCS: 36,580m^2 Onshore cable route laydown area: 1,000m^2	Refer to ***section 23.3.3*** for instances of onshore cable route adopting a narrower width

Impact	Parameter	Notes
	Onshore cable route haul road between landfall and Snape Road (7,331m in length x 4.5m wide with additional 4m for passing places at approximately 90m intervals): 40,435m^2 Onshore cable route and substation access haul road (1,570m in length x 9m wide): 14,130m^2 Temporary access roads (957m in length x 4.5m wide with additional 4m for passing places at approximately 90m intervals): 5,231m^2	
Impacts related to the onshore substation	Onshore substation CCS: 17,100m^2 (190m x 90m) Permanent footprint (used as CCS during construction): 36,100m^2 (190m x 190m) Substation operational access road: 13,600m^2 (1,700m x 8m)	
Impacts related to the National Grid Infrastructure	National Grid CCS: 23,350m^2 National Grid operational substation (Air insulated switchgear (AIS) technology) (used as a CCS during construction): 44,950m^2 (310m x 145m) Temporary pylon/mast temporary working area (x4): 10,000m^2 (2,500m^2 per each temporary pylon) Permanent pylon permanent footprint (x4): 1,600m^2 (400m^2 per each permanent pylon) Permanent pylon temporary working area (x4): 8,400m^2 (2,100m^2 per each permanent pylon) Overhead line realignment temporary working area: 5,000m^2 Cable sealing end/Cable sealing end (with circuit breaker) compounds permanent footprint: 10,000 m^2 (total for three compounds) Cable sealing end/cable sealing end (with circuit breaker) compounds temporary working area: 30,000m^2 (for three compounds) Temporary access road (for pylon works): (1,100m in length x 4.5m wide with additional 4m for passing places at approximately 90m intervals): 5,629m^2	AIS technology is assessed as the worst case due to a larger footprint. Further detail regarding gas insulated switchgear (GIS) technology is provided in ***Chapter 6 Project Description***.

Impact	Parameter	Notes
	Permanent access road to sealing end compound: 1,850m^2 (500m x 3.7m)	
Operation		
Impacts related to the landfall	No above ground infrastructure	
Impacts related to the onshore cable route	No above ground infrastructure	
Impacts related to the onshore substation	Operational footprint: 36,100m^2 (190m x 190m) Substation operational access road: 13,600m^2 (1,700m x 8m)	The operational footprint does not include the additional landscaping footprint.
Impacts related to the National Grid Infrastructure	National Grid operational substation (AIS technology): 44,950m^2 (310m x 145m) Pylon operational footprint (x4): 1,600m^2 (20m x 20m per each permanent pylon) Cable sealing end compound operational footprint: 10,000m^2 (for three sealing end compounds) Permanent access road to sealing end compound: 1,850m^2 (500m x 3.7m)	Four permanent pylons include up to three reconstructed/ relocated pylons and up to one additional new pylon. The operational footprint does not include the additional landscaping footprint. AIS technology is assessed as the worst case due to a larger footprint. Further detail regarding GIS technology is provided in ***Chapter 6 Project Description***.
Decommissioning		
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.		

23.3.3 Embedded Mitigation and Best Practice

23. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process. Where embedded mitigation measures have been developed into the design of the proposed East Anglia ONE North project with specific regard to onshore ornithology, these are described in ***Table 23.4***. Any further mitigation measures suggested within this chapter are therefore considered to be additional.

Table 23.4 Embedded Mitigation and Best Practice Measures for Onshore Ornithology

Parameter	Mitigation Measures Embedded into the Project Design
General	
Outline Landscape and Ecological Management Strategy	An Outline Landscape and Ecological Management Strategy (OLEMS) has been submitted with this DCO application. The OLEMS outlines the requirement for landscape and ecological (including ornithological) mitigation measures that are reflective of the surveys and impact assessment carried out for the onshore infrastructure of the proposed East Anglia ONE North project. A final detailed Landscape Management Plan (LMP) and Ecological Management Plan (EMP) will be produced post-consent in order to discharge the relevant draft DCO requirements, prior to construction of the proposed East Anglia ONE North project, and will be in line with the OLEMS. The final LMP and EMP will provide a key mechanism, required to discharge relevant DCO requirements, through which the relevant regulatory authorities can be assured that ecological management and provision of landscaping associated with the construction of the onshore infrastructure will be formally controlled and implemented.
Onshore development area	Refinements to the onshore cable route and location of associated infrastructure have taken place throughout the design and refinement process, taking into consideration the locations of target species' nest sites, and distribution of suitable habitat for target species. The onshore development area has also been designed to avoid locating infrastructure within a 200m buffer of the SPA where possible. This is in order to achieve a suitable distance between the designated site and construction works associated with the proposed East Anglia ONE North project to minimise disturbance and habitat loss to sensitive ornithological receptors. For further details please refer to ***Chapter 4 Site Selection and Assessment of Alternatives***.
Construction disturbance	A final Code of Construction Practice (CoCP) will be developed for the construction activities and will adhere to construction industry good practice guidance, as secured under the requirements of the draft DCO. This will incorporate a Breeding Bird Protection Plan (BBPP) which will ensure that the nests, eggs and young of any bird species are protected. Detail with regard to mitigation measures and the content of the BBPP is given in the OLEMS submitted with this DCO application, as secured under the requirements of the draft DCO.
Habitat reinstatement	Following reinstatement of soil and subsoil, final restoration would commence where possible. Pasture and arable land would be reseeded, fences would be reinstated, and suitable hedgerow species replanted. Hedges and any replacement planting would be carried out during the first appropriate planting season following site restoration. In ecologically sensitive areas special restoration may be necessary. Detail is given in the OLEMS submitted with this DCO application, as secured under the requirements of the draft DCO.

Parameter	Mitigation Measures Embedded into the Project Design
Landfall	
Designated Sites	The landfall location was influenced from the onset of the project design process by the presence of designated sites, specifically the Leiston-Aldeburgh SSSI. The project has committed to the use of HDD (refer to ***Chapter 6 Project Description***) at the landfall to avoid direct habitat loss within the Leiston-Aldeburgh SSSI at the landfall location, and reduce risks of disturbance to qualifying features using this part of the SSSI. The final landfall construction methodology will be detailed within the Landfall Construction Method Statement produced post-consent to discharge the requirements of the draft DCO.
Onshore Cable Corridor	
Designated Sites	The route of the onshore cable corridor was influenced from the onset of the project design process by the location of designated sites, specifically The Sandlings SPA and component Leiston-Aldeburgh SSSI. The project design minimises the overlap of the onshore cable corridor with these designated sites, choosing a crossing at the narrowest point. Where the onshore cable corridor crosses these designated sites, an open-cut crossing technique is the preferred crossing methodology. When using an open-cut methodology, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) within the Sandlings SPA for a length up to 300m depending on the detailed design when crossing the Sandlings SPA. The Applicant will not undertake onshore cable route construction works to cross the Sandlings Special Protection Area (SPA) / Leiston – Aldeburgh Site of Special Scientific Interest (SSSI) within the SPA/SSSI boundary or within 200m of the SPA/SSSI boundary during the breeding bird season unless otherwise agreed with Natural England that bird breeding activities within 200m of the SPA/SSSI crossing works area have ceased. The timing of this seasonal restriction will be based on monitoring information provided by the Ecological Clerk of Work (likely to be mid-February to end of August)Open trench works associated with crossing the SPA (including works within 200m of the SPA boundary) will be undertaken within approximately three months of excavation works commencing (comprising approximately one month within the boundary of the SPA and approximately two months within 200m of the boundary of the SPA). HDD works associated with crossing the SPA (including the establishment and subsequent removal of HDD entry pit and exit pit working areas) will be undertaken over a two year period with works restricted to up to six months per year due to the seasonal restriction. Landscaping works such as hedgerow replanting may be undertaken outside these periods to ensure optimal planting conditions are achieved.

Parameter	Mitigation Measures Embedded into the Project Design
National Grid Substation and Onshore Substation	
Habitat loss	The potential loss of woodland habitat for birds was identified early in the project design process, and therefore the locations of substations are positioned so as to minimise woodland removal, in an area of arable farmland, which is of lower conservation value for target species.

23.3.4 Monitoring

24. Post-consent, the final detailed design of the proposed East Anglia ONE North project will refine the worst-case parameters assessed in this ES. It is recognised that monitoring is an important element in the management and verification of the actual impacts based on the final detailed design. Where monitoring is proposed for onshore ornithology, this is described in the OCoCP (document reference 8.1) and OLEMS (document reference 8.7) submitted with this DCO application. Final details of monitoring will be agreed post-consent with the Local Planning Authority and relevant stakeholders.

23.4 Assessment Methodology

23.4.1 Guidance

23.4.1.1 Legislation and Policy

25. There are a number of pieces of legislation applicable to onshore ornithology. A summary of the key pieces of International and UK legislation relevant to this chapter are provided in the following sections.

23.4.1.1.1 Birds Directive - Council Directive 2009/147/EC on the Conservation of Wild Birds

26. This Directive provides a framework for the conservation and management of wild birds in Europe. The most relevant provisions of the Directive are the identification and classification of Special Protection Areas (SPA) for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4). It also establishes a general scheme of protection for all wild birds (required by Article 5). The Directive requires national Governments to establish SPAs and to have in place mechanisms to protect and manage them. The SPA protection procedures originally set out in Article 4 of the Birds Directive have been replaced by the Article 6 provisions of the Habitats Directive.

23.4.1.1.2 Habitats Directive - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora

27. The Directive provides protection for specific habitats listed in Annex I and species listed in Annex II of the Directive. The Directive sets out decision making procedures for the protection of Special Areas of Conservation (SAC)

and SPAs and these are implemented in the UK through The Conservation of Habitats and Species Regulations 2017.

23.4.1.1.3 Wildlife and Countryside Act 1981 (as amended)

28. The Act makes it an offence (with certain exceptions) to intentionally: kill, injure, or take any wild bird; take, damage or destroy the nest of any wild bird while that nest is in use or being built; and take or destroy an egg of any wild bird.

29. The Act makes provision for the notification and confirmation of Sites of Special Scientific Interest (SSSI).

23.4.1.1.4 The Conservation of Habitats and Species Regulations 2017

30. The Regulations transpose the Council Directive 92 / 43 / EEC the 'Habitats Directive' in to national law (in respect of England and Wales) and requires the state to designate SACs and SPAs.

31. The Regulations require competent authorities to consider or review planning permission, applied for or granted, affecting a European site, and, subject to certain exceptions, restrict or revoke permission where the integrity of the site would be adversely affected.

23.4.1.1.5 Natural Environment and Rural Communities (NERC) Act 2006

32. Section 41 of the Act requires the Secretary of State to compile a list of habitats and species of principal importance for the conservation of biodiversity in England (herein 'S41 species').

33. Decision makers of public bodies, in the execution of their duties, must have regard to the conservation of biodiversity in England, and the list is intended to guide them.

23.4.1.1.6 Marine and Coastal Access Act 2009

34. The act includes provisions for the coastal environment including improving access to the coast and undertaking Integrated Coastal Zone Management (ICZM), which brings policy makers, decision makers and stakeholders together to manage coastal and estuarine areas.

23.4.1.1.7 Countryside and Rights of Way Act 2000 (CRoW)

35. The Act amends the law relating to Public Rights of Way (PRoW) including making provision for public access on foot to certain types of land. Amendments are made in relation to SSSIs to improve their management and protection, as well as to the Wildlife and Countryside Act 1981, to strengthen the legal protection for threatened species. Provision is also made for Areas of Outstanding Natural Beauty (AONB) to improve their management.

23.4.1.1.8 National Policy Statements

36. The assessment of potential impacts upon onshore ornithology has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision making documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to the proposed East Anglia ONE North project are:

- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change) (DECC) 2011a);
- NPS for Renewable Energy Infrastructure (EN-3) (DECC,2011b); and
- NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c)

37. The specific assessment requirements for onshore ornithology, as detailed in the NPSs, are summarised in ***Table 23.5***, together with an indication of the paragraph numbers of the ES chapter where each is addressed.

Table 23.5 NPS Assessment Requirements

NPS requirement	NPS reference	ES reference
EN-1 Overarching NPS for Energy		
'Where the development is subject to EIA the applicant should ensure that the ES clearly sets out any effects on internationally, nationally and locally designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. The applicant should provide environmental information proportionate to the infrastructure where EIA is not required to help the Infrastructure Planning Commission (IPC) consider thoroughly the potential effects of a proposed project.'	Section 5.3.3.	Existing environment is discussed in ***section 23.5.*** Assessment is set out in ***sections 23.6*** and ***23.7.***
'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'	Section 5.3.4.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.***
'When considering the application, the IPC will have regard to the Government's biodiversity strategy is set out in 'Working with the grain of nature', which aims to halt or reverse declines in priority habitats and species; accept the importance of biodiversity to quality of life. The IPC will consider this in relation to the context of climate change. *As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and*	Sections 5.3.5, 5.3.7and 5.3.8.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.***

NPS requirement	NPS reference	ES reference
consideration of reasonable alternatives (as set out in section 4.4 above); where significant harm cannot be avoided, then appropriate compensation measures should be sought. *In taking decisions, the IPC should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; habitats and other species of principal importance for the conservation of biodiversity; and to biodiversity and geological interests within the wider environment.'*		
'For the purposes of considering development proposals affecting them, as a matter of policy the Government wishes pSPAs to be considered in the same way as if they had already been classified. Listed Ramsar sites should, also as a matter of policy, receive the same protection'.	Section 5.3.9.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to minimise impacts to interest features at designated sites.
'Many SSSIs are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection.'	Section 5.3.11.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to minimise impacts to interest features at designated sites.
'Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted. *Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs.'*	Section 5.3.11.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to minimise impacts to interest features at designated sites.
'The IPC will have regard to sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites when considering applications since they are recognised to have a fundamental role in meeting overall national biodiversity targets.'	Section 5.3.13.	Designated sites are discussed in ***section 23.6.*** Site selection decisions have been made to minimise impacts to interest features at designated sites.
The IPC will aim to maximise opportunities to build in beneficial biodiversity features when considering proposals as part of good design.	Section 5.3.15.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.*** This includes replanting and reinstatement of habitat

NPS requirement	NPS reference	ES reference
		where considered necessary.
The IPC shall have regard to the protection of legally protected species and habitats and species of principal importance for nature conservation. *'The IPC shall refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context, the IPC should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development.'*	Sections 5.3.16 – 5.3.17.	Existing environment is discussed in ***section 23.5***. Assessment is set out in ***sections 23.6*** and ***23.7.***
The applicant should include appropriate mitigation measures as an integral part of the proposed development and demonstrate that: During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; During construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements; Habitats will, where practicable, be restored after construction works have finished; and Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.	Section 5.3.18.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.*** This includes replanting and reinstatement of habitat where considered necessary.
'The IPC will need to take account of what mitigation measures may have been agreed between the applicant and Natural England has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'	Section 5.3.20.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.***
EN-3 NPS for Renewable Energy Infrastructure		
'Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.'	Section 2.4.2.	Project design has avoided sensitive features, including designated sites, where possible. Embedded mitigation measures are presented in ***section 23.3.3***
'Ecological monitoring is likely to be appropriate during the construction and operational phases to identify the actual impact so that, where appropriate, adverse effects can then be mitigated and to enable further useful information to be published relevant to future projects.'	Section 2.6.71.	Monitoring is discussed in ***section 23.3.4***

NPS requirement	NPS reference	ES reference
'There may be some instances where it would be more harmful to the ecology of the site to remove elements of the development, such as the access tracks or underground cabling, than to retain them.'	Section 2.7.15.	Decommissioning is discussed in ***section 23.6.5***
EN-5 NPS for Electricity Networks Infrastructure		
'The applicant will need to consider whether the proposed line will cause such problems at any point along its length and take this into consideration in the preparation of the EIA and ES (see Section 4.2 of EN-1). Particular consideration should be given to feeding and hunting grounds, migration corridors and breeding grounds.' *"The IPC should ensure that this issue has been considered in the ES and that appropriate mitigation measures will be taken where necessary.'*	Section 2.7.2 - 2.7.3.	Embedded mitigation measures are presented in ***section 23.3.3*** and further mitigation measures are set out in ***section 23.6.***

23.4.1.2 Local Planning Policy

38. Relevant local planning policy is presented in ***Chapter 3 Policy and Legislative Context*.**

23.4.1.3 Assessment Guidance

39. The onshore ornithology assessment will be carried out in accordance with the principles contained within the following guidance documents:

- British Standard 42020:2013 – Biodiversity. Code of Practice for planning and development;
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester;
- Construction Industry Research and Information Association (CIRIA) Guidance note C692 Environmental Good Practice on Site Guide (3rd edition);
- European Commission (2010). Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels;
- Natural England (2010) Assessing the effects of onshore wind farms on birds. Technical Information Note TIN069, First edition;
- Natural England (2015a) Standing advice on wild birds
- Scottish Natural Heritage (2016). Assessing connectivity with Special Protection Areas (SPAs). Version 3; and

- Scottish Natural Heritage (2018). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2.

23.4.2 Data Sources

40. To facilitate the refinement of the onshore ornithology study area and to inform the scope and approach to ornithological surveys, the following desk-based data have been obtained.

Table 23.6 Desk-Based Data Sources to Inform the Assessment

Data	Data source
Internationally designated nature conservation sites (i.e. Ramsar sites)	Joint Nature Conservation Committee (JNCC). MAGIC website
European designated nature conservation sites (i.e. SPA)	JNCC. MAGIC website. RSPB.
Nationally designated nature conservation sites (i.e. SSSI, National Nature Reserves (NNR), Local Nature Reserves (LNR)	JNCC. MAGIC website. RSPB.
Locally designated nature conservation sites (i.e. County Wildlife Sites (CWS), Local Wildlife Sites (LWS)	Suffolk Biodiversity Information Service RSPB
Protected Species records	Suffolk Biodiversity Information Service RSPB Suffolk Community Barn Owl Project

41. A summary of data sources made available for the onshore ornithology assessment is presented in ***Table 23-7***.

Table 23-7 Data Source Features

Data	Year	Coverage	Confidence	Notes
Breeding Barn Owl Data	2018	Onshore ornithology study area	High	Suffolk Community Barn Owl Project
Breeding Nightjar	2009-18	Sandlings SPA / Leiston-Aldeburgh SSSI / North Warren RSPB reserve	High	RSPB reserve data
Breeding Woodlark	2008-18	Sandlings SPA / Leiston-Aldeburgh	High	RSPB reserve data

Data	Year	Coverage	Confidence	Notes
		SSSI / North Warren RSPB reserve		
Breeding Turtle dove	2012-18	Sandlings SPA / Leiston-Aldeburgh SSSI / North Warren RSPB reserve	High	RSPB reserve data
Breeding nightingale	2009-18	Sandlings SPA / Leiston-Aldeburgh SSSI / North Warren RSPB reserve	High	RSPB reserve data
Breeding Dartford warbler	2009-18	Sandlings SPA / Leiston-Aldeburgh SSSI / North Warren RSPB reserve	High	RSPB reserve data

23.4.2.1 Baseline Surveys

42. ***Table 23.8*** presents the surveys undertaken in order to inform the onshore ornithology assessment. The scope and methodology of these surveys were agreed with the Onshore Ecology and Ornithology ETG during consultation. Further surveys in 2019, as outlined in ***Table 23.8***, were agreed during ETG consultation and results are presented in ***Appendix 23.3***.

Table 23.8 Onshore Ornithology Surveys

Survey	Surveying period	Summary of survey
Wintering bird surveys	February – March 2018	Walkover surveys within the onshore ornithology study area, focussing on areas of habitat suitable for wintering wildfowl and waders.
Breeding bird surveys	February – August 2018	Series of surveys within the onshore ornithology study area designed to record the distribution and abundance of breeding target species: • One specific woodlark survey in late February within the Sandlings SPA boundary to record early breeding activity; • One winter walkover survey in March, focussing on suitable habitat for wintering wildfowl and waders within the onshore ornithology study area; • Two general breeding bird surveys (incorporating woodlark) per month between April and July within the Sandlings SPA boundary;

Survey	Surveying period	Summary of survey
		• Monthly general breeding bird surveys between April and July in the remainder of the onshore ornithology study area; • Two dusk nightjar surveys in June and July, within the Sandlings SPA boundary; and • Two hobby surveys in August focussing on the Sandlings SPA and areas of previous records.
Wintering bird surveys	November 2018 – March 2019	Walkover and scanning surveys covering all habitats identified as suitable for supporting wintering birds. Surveys included coverage of wetland areas within the Leiston-Aldeburgh SSSI that are outside of the onshore ornithology study area, to determine levels of connectivity.
Breeding bird surveys	May – August 2019	Series of surveys within the onshore ornithology study area designed to record the distribution and abundance of breeding target species: • Two general breeding bird surveys per month between May and July within the Sandlings SPA boundary. • Monthly general breeding bird surveys between May and July in the remainder of the onshore ornithology study area. • Two dusk nightjar surveys in June and July, within the Sandlings SPA boundary. • Hobby surveys in August focussing on the Sandlings SPA and areas of previous records.

43. The breeding bird surveys focussed on the target species identified as being confirmed or potential breeders within the onshore ornithology study area, based on the habitats found there. Target breeding species were defined as:

- Qualifying interests of the Sandlings SPA;
- Species listed in the citation for the Leiston-Aldeburgh SSSI;
- Schedule 1 breeding species; and
- Birds of Conservation Concern (BoCC) Red-listed species (Eaton et al. 2015) that breed in low numbers nationally.

44. Counts of other species of low conservation concern were made during each survey transect, but were not systematically territory-mapped, so that the primary objective of locating target breeding species was not compromised during surveys.

45. The breeding bird surveys followed the Breeding Bird Survey (BBS) methodology as described by the British Trust for Ornithology (BTO)[1]. Specific woodlark surveys followed guidance in Gilbert et al. (1998), and nightjar surveys followed guidance for national surveys in Conway et al. (2007). Hobby surveys followed recommended guidance in Hardey et al. (2013). Further details of methods and results are outlined in ***Appendix 23.3***.

46. Winter bird surveys were conducted in February and March 2018, and November 2018 to March 2019, to provide information on the non-breeding bird assemblage. Target species were primarily wildfowl and waders, although any other SPA/SSSI, Schedule 1 or rare species of conservation concern were also recorded. Further details of methods and results are outlined in ***Appendix 23.4***.

23.4.3 Impact Assessment Methodology

47. This section defines the methods used to assess the significance of impacts through the process of an evaluation of sensitivity (a combination of Nature Conservation Importance and conservation status) and magnitude of impact on ornithological features for each identified impact.

48. There can often be varying degrees of uncertainty over the sensitivity or magnitude of impacts as a result of limited information. A precautionary approach is therefore adopted where the response of a population to an impact is uncertain.

49. The evaluation for wider-countryside interests (interests unrelated to a SPA, but including a SSSI) involves the following process:

- Identifying the potential impacts of the proposed East Anglia ONE North project;
- Considering the likelihood of occurrence of potential impacts where appropriate;
- Defining the Nature Conservation Importance and conservation status of the bird populations present to establish level of sensitivity;
- Establishing the magnitude of the likely impact (both spatial and temporal);
- Using the above information, to reach an evidence based judgement as to whether or not the resultant impact is significant with respect to the EIA Regulations;
- If a potential impact is determined to be significant, suggesting measures to mitigate or compensate the impact where required;
- Considering opportunities for enhancement where appropriate; and

[1] https://www.bto.org/sites/default/files/bbs_instructions_0.pdf

- Confirming residual impacts after mitigation, compensation or enhancement are considered.

50. ***Chapter 5 EIA Methodology*** provides a summary of the general impact assessment method, and the following sections describe the methodology used to assess the potential impacts of the proposed East Anglia ONE North project on onshore ornithological interests.

23.4.3.1 Sensitivity

51. Determination of the level of sensitivity of a feature is based on a combination of the feature's Nature Conservation Importance and conservation status, described in the sections below. Overall sensitivity level is driven primarily by Nature Conservation Importance, but is influenced by conservation status, e.g. if a Medium sensitivity species' population is in unfavourable condition, this would raise the sensitivity to Medium-High.

52. There are three levels of Nature Conservation Importance as detailed in ***Table 23.9***.

Table 23.9 Determining Factors of a Population's Nature Conservation Importance

Importance	Description
High	Populations receiving protection as a feature of a SPA, proposed SPA, Ramsar Site, SSSI or which would otherwise qualify under selection guidelines. Species present in nationally important numbers (>1% national breeding population).
Medium	The presence of species listed in Annex 1 of the Birds Directive (but population does not meet the designation criteria under selection guidelines). The presence of breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The presence of target species noted on the latest Birds of Conservation Concern (BoCC) Red list due to their inherent rareness in the UK (<300 breeding pairs, or <900 wintering individuals). Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the proposed development. Species present in regionally important numbers (>1% regional breeding population).
Low	All other species' populations not covered by the above categories.

53. Target species taken forward for assessment in ***section 23.6*** are recorded species of Medium or High Nature Conservation Importance, and are referred to as Important Ornithological Features (IOFs).

54. The concept of conservation status of a species has been defined by SNH (2018) as "*the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest (which for the purposes of the Birds Directive is the EU)*".

55. Conservation status is considered 'favourable' under the following circumstances:

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

56. SNH (2018) recommends that *"An impact should therefore be judged as of concern where it would adversely affect the existing favourable conservation status of a species or prevent a species from recovering to favourable conservation status"*.

57. In the case of breeding species populations not associated with designated sites, the relevant scale for assessment is considered to be the regional (Suffolk) population. For wintering or migratory species, the national UK population is often considered to be the relevant scale for determining impacts on the conservation status and this approach is applied here.

23.4.3.2 Magnitude

58. An impact is defined as a change of a particular magnitude to the abundance and/or distribution of a population as a result of the proposed East Anglia ONE North project. Impacts can be adverse, neutral or beneficial.

59. In determining the magnitude of impacts, the resilience of a population to recover from temporary adverse conditions is considered in respect of each potentially affected population.

60. The response of individual species to disturbance during relevant behaviours is considered when determining spatial and temporal magnitude of impact and is assessed using guidance described by Bright et al. (2006), Hill et al. (1997) and Ruddock and Whitfield (2007).

61. Impacts are judged in terms of magnitude in space and time. There are five levels of spatial impacts, and three durations of temporal impacts as detailed in in ***Table 23.10*** and ***Table 23.11*** respectively.

Table 23.10 Spatial Magnitude

Value	Definition
Very High	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80% of population lost, or increase in additive mortality.
High	Major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 21-80% of population lost, or increase in additive mortality.
Medium	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 6-20% of population lost, or increase in additive mortality.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 1-5% of population lost, or increase in additive mortality.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the "no change" situation. Guide: < 1% of population lost, or increase in additive mortality.

Table 23.11 Temporal Magnitude

Value	Definition
Long-term	Impacts which occur over the multiple breeding or wintering seasons, i.e. typically impacts which occur over more than one year.
Medium-term	Impacts which occur over the full duration of a breeding or wintering season, i.e. typically impacts which occur over a matter of months or one year
Short-term	Impacts which at most occur over a part of – or over a part of a key period of a breeding or wintering season, i.e. typically impacts which occur over a matter of days or weeks.

23.4.3.3 Impact Significance

62. The potential significance of the impact is determined through a standard method of assessment based on a review of evidence and professional judgement, considering both sensitivity and magnitude of change (spatial and temporal) as detailed in ***Table 23.12*** and ***Table 23.13***. Major and moderate impacts are considered significant in the context of the EIA Regulations.

Table 23.12 Significance Criteria

Significance	Definition
Major	Significant impact, as the impact is likely to result in a permanent/ long term and very high/ high extent significant adverse impact on the integrity of the feature.
Moderate	Significant impact, as the impact is likely to result in a medium term and high / medium extent partially significant adverse impact on the feature.
Minor	The impact is likely to adversely affect the feature at an insignificant level by virtue of its limited duration and/or extent, but there would probably be no impact on its integrity. This is not a significant impact.
Negligible	No material impact. This is not a significant impact.

Table 23.13 Impact Significance Matrix

		Negative Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	*Major*	*Major*	*Moderate*	*Minor*	*Minor*	*Moderate*	*Major*	*Major*
	Medium	*Major*	*Moderate*	*Minor*	*Minor*	*Minor*	*Minor*	*Moderate*	*Major*
	Low	*Moderate*	*Minor*	*Minor*	*Negligible*	*Negligible*	*Minor*	*Minor*	*Moderate*
	Negligible	*Minor*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Minor*

23.4.4 Cumulative Impact Assessment

63. The proposed East Anglia ONE North project cumulative impact assessment (CIA) will initially consider the cumulative impact with only the East Anglia TWO project against two different construction scenarios (i.e. construction of the two projects concurrently and sequentially). The worst case scenario of each impact is then carried through to the main body of the CIA which considers other developments which have been screened into the CIA.

64. For a general introduction to the methodology used for the CIA please refer to ***Chapter 5 EIA Methodology***. Further detail of the CIA in regard to onshore ornithology is given in ***Appendix 23.2*** and ***section 23.7.1***.

23.4.5 Assessment of Likely Significant Effects on a Natura 2000 Site

65. The method for assessing the significance of a likely effect on a Natura 2000 designated site (a SPA or Ramsar site) is different from that employed in the EIA for wider-countryside ornithological interests. This involves taking cognisance of the Habitats Directive, which is transposed into domestic

legislation by the Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations').

66. The Habitats Regulations Assessment (HRA) process consists of several phases that are described in Planning Inspectorate Advice Note 10 (Planning Inspectorate 2016). The purpose of the HRA process is to identify where potential Likely Significant Effects (LSEs) may occur and to provide information to the competent authority so that they can determine whether an LSE is expected to occur through an Appropriate Assessment.

67. For those sites where LSE cannot be excluded in Stage 1 (Screening), further information to inform the assessment is reported separately in the Information to Support Appropriate Assessment report (document reference 5.3) which has been submitted alongside the ES as part of the DCO application. The Information to Support Appropriate Assessment report (document reference 5.3) provides information to determine whether a project alone or in-combination could adversely affect the integrity of a Natura 2000 site in view of its conservation objectives.

23.4.6 Transboundary Impact Assessment

68. There are no transboundary impacts with regards to onshore ornithology as the onshore development area is not sited in proximity to any international boundaries. Transboundary impacts are therefore scoped out of this assessment and will not be considered further.

23.5 Existing Environment

23.5.1 Onshore Ornithology Study Area Description

69. The onshore ornithology study area stretches from the coastline between Sizewell and Thorpeness in the east, to Friston inland to the west (***Figure 23.1***). The landfall area, north of Thorpeness, is within a mix of arable farmland, and areas of scrub that form part of the Leiston-Aldeburgh SSSI. The construction footprint would avoid the section of the Leiston-Aldeburgh SSSI, which falls within the landfall location, by the use of HDD techniques. To the west of the landfall, the Sandlings SPA, which overlaps with much of the eastern half of the onshore ornithology study area buffer, is made up of lowland heathland, acid grassland and forestry plantations on sandy soils.

70. The heaths support both acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation value. Woodlark and nightjar have adapted to breeding in the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground.

71. Further inland from the Sandlings SPA, the landscape of the study area is dominated by large arable fields and pasture, with small blocks of woodland and hedgerows throughout. The study area is broken up by numerous roads and small villages.

23.5.2 Designated Sites

72. Designated sites that are located within, and up to 10km from, the onshore ornithology study area is listed in ***Table 23.14*** and shown on ***Figure 23.2***.

Table 23.14 Statutory Designated Sites with an Ornithological Interest within 10km of the Onshore Ornithology Study Area

Designated site	Ornithological qualifying interests	Proximity to closest point of onshore ornithology study area
Sandlings SPA	During the breeding season; • Nightjar • Woodlark	Within study area
Leiston-Aldeburgh SSSI	Breeding species present include nightjar, woodlark, skylark, tree pipit, turtle dove, bullfinch and nightingale, water rail, marsh harrier, gadwall and grasshopper warbler, with Bewick's swan, bittern, white-fronted goose, gadwall and teal in winter.	Within study area
Sizewell Marshes SSSI	The breeding bird assemblage is of national significance, including shoveler, gadwall, teal, snipe and lapwing.	0.5km
Minsmere - Walberswick Ramsar	An important assemblage of rare breeding birds associated with marshland and reedbeds including: Bittern, gadwall, teal, shoveler, marsh harrier, avocet, bearded tit Noteworthy fauna: Marsh harrier, Mediterranean gull, black-headed gull, little tern, bittern, teal, ruff, black-tailed godwit, spotted redshank, greenshank, greater white-fronted goose, gadwall, shoveler, hen harrier, water rail, avocet, golden plover, redshank, lesser black-backed gull.	1.8km

Designated site	Ornithological qualifying interests	Proximity to closest point of onshore ornithology study area
Minsmere to Walberswick SPA	During the breeding season; • Avocet • Bittern • Little Tern • Marsh Harrier • Nightjar • Woodlark Over winter; • Avocet • Bittern • Hen Harrier	1.8km
Minsmere – Walberswick Heath and Marshes SSSI	Reedbed habitat for reed warbler, bearded tit, marsh harrier, bittern, Cetti's warbler, garganey and water rail. Lagoons for avocet, shoveler, gadwall, teal and shelduck. Large blocks of grazing marsh support a high number of species of breeding waterfowl such as snipe, redshank, gadwall, shoveler and black-tailed godwit. Heathland habitat for woodlark and nightjar.	1.8km
Snape Warren SSSI	Nightjar	2.3km
Alde-Ore Estuary SPA	During the breeding season; • Avocet • Little Tern • Marsh Harrier • Sandwich Tern • Lesser Black-backed Gull Over winter; • Avocet • Redshank Assemblage qualification: • A seabird assemblage of international importance • A wetland of international importance.	3.5km

Designated site	Ornithological qualifying interests	Proximity to closest point of onshore ornithology study area
Alde-Ore Estuary Ramsar	Noteworthy fauna: Marsh harrier, Mediterranean gull, Sandwich tern, little tern, black-tailed godwit, spotted redshank, greenshank, greater white-fronted goose, shelduck, wigeon, teal, pintail, shoveler.	3.5km
Alde-Ore Estuary SSSI	The site is of national importance for its birdlife, including avocet, gadwall, shoveler, oystercatcher, ringed plover, common tern, Arctic tern, sandwich tern and little tern, common gull, short-eared owl, wheatear and marsh harrier. There are also very large breeding colonies of black-headed gull, lesser black-backed gull and herring gull.	3.5km
Sandlings Forest SSSI	Nightjar and woodlark	4.6km
Blaxhall Heath SSSI	Nightjar and tree pipit	5.2km

23.5.3 Historic Records

73. Biological records within, and up to 2km from, the onshore ornithology study area were obtained from the Suffolk Biodiversity Information Service, in order to help determine scope of baseline surveys. These have been reviewed and the following target species records were provided:

- Red kite;
- White-tailed eagle; and
- Goshawk.

74. No evidence of breeding activity was associated with these records, which likely relate to non-breeding individuals.

75. Records of target breeding species within the part of the Sandlings SPA that overlaps with the onshore development area were provided by the RSPB in December 2017 and May 2019, and are presented within the text in ***section 23.5.4*** and in ***Figures 23.10 to 23.14***. Data were provided from 2009 to 2018, prior to which, monitoring and survey methods were different.

76. Barn owl monitoring information from 2018 was provided The Suffolk Community Barn Owl Project, for the onshore ornithology study area.

23.5.4 Field Surveys

77. The following paragraphs present a summary of abundance and distribution of target species that were recorded during baseline onshore ornithology surveys within the onshore ornithology study area during the 2018 breeding season and 2018-19 non-breeding season. Details of survey observations are shown on ***Figures 23.3*** to ***Figure 23.9*** and ***Figure 23.15.*** A summary of historic RSPB records are also included to provide a longer-term context for the 2018 results. Preliminary results from 2019 breeding bird surveys are presented in ***Confidential Figure 23.16***. In general, these results indicate a similar range of species and distribution as recorded in 2018.

23.5.4.1 Breeding Birds

78. For each breeding target species, expert professional judgement has been used to define the number of territories based on the survey observations. The number of territories for each species are then presented in this ES chapter. This includes species that are listed in Schedule 1 of the Wildlife and Countryside Act 1981 and afforded additional legal protection from disturbance. As such, the details of sensitive locations of any nest sites are not included here but are shown in the following confidential figures ***Figure 23.3, Figure 23.4, Figure 23.8, Figure 23.10*** and ***Figure 23.11***.

79. A summary of target species recorded within the onshore ornithology study area during baseline breeding bird surveys, and their breeding status, is presented in ***Table 23.15***.

Table 23.15 Summary of Target Species Recorded During 2018 Baseline Breeding Bird Surveys

Species	Conservation Status	Breeding Status Within Onshore Ornithology Study Area	Shown on Figure	Estimated Number of Territories
Barn owl *Tyto alba*	Schedule 1; BoCC Green	Probable (entering nest box)	23.8	1
Bittern *Botaurus stellaris*	SSSI species; Annex 1, Schedule 1, BoCC Amber	Probable (booming male)	23.8	1
Bullfinch *Pyrrhula pyrrhula*	SSSI species; BoCC Amber	Possible (suitable habitat)	-	7
Cetti's warbler *Cettia cetti*	Schedule 1; BoCC Green	Probable (singing males)	23.8	5
Crossbill *Loxia curvirostra*	Schedule 1, BoCC Green	Possible (suitable habitat)	23.8	1

Species	Conservation Status	Breeding Status Within Onshore Ornithology Study Area	Shown on Figure	Estimated Number of Territories
Dartford warbler *Sylvia undata*	Schedule 1, BoCC Amber	Confirmed (fledged young)	23.8	4
Gadwall *Anas strepera*	SSSI species; BoCC Amber	Possible (suitable habitat)	-	2-3
Hobby *Falco subbuteo*	Schedule 1, BoCC Green	Confirmed (occupied nest)	23.8	2+
Kingfisher *Alcedo atthis*	Annex 1, Schedule 1, BoCC Amber	Confirmed (occupied nest)	23.8	1
Marsh harrier *Circus aeruginosus*	SSSI species; Annex 1, Schedule 1, BoCC Amber	Probable (displaying pairs)	23.7	2-3
Marsh warbler *Acrocephalus palustris*	Schedule 1, BoCC Red	Possible (singing male)	23.8	1
Nightingale *Luscinia megarhynchos*	SSSI species; BoCC Red	Probable (singing males, adult with juveniles)	23.6	6
Nightjar *Caprimulgus europaeus*	SPA species; Annex 1, BoCC Amber	Probable (churring males)	23.4	6
Peregrine *Falco peregrinus*	Annex 1, Schedule 1, BoCC Green	Non-breeding	23.9	0
Red kite *Milvus milvus*	Annex 1, Schedule 1, BoCC Green	Possible (pair in suitable habitat)	23.9	0-1
Short-eared owl *Asio flammeus*	Annex 1, BoCC Amber	Migrant	23.9	0
Skylark *Alauda arvensis*	SSSI species; BoCC Red	Probable (singing males)	-	c.30-40
Spotted flycatcher *Muscicapa striata*	BoCC Red	Probable (family)	23.9	1
Turtle dove *Streptopelia turtur*	SSSI species; BoCC Red	Probable (pairs and singing males)	23.5	10
Water rail *Rallus aquaticus*	SSSI species; BoCC Green	Probable (calling)	-	1
Woodlark *Lullula arborea*	SPA species; BoCC Green	Confirmed (families)	23.3	7
Yellow wagtail *Motacilla flava*	BoCC Red	Confirmed (provisioning)	23.9	2-3

23.5.4.1.1 Woodlark

80. Approximately seven woodlark territories were located during surveys in 2018, and all but one of these records were located within suitable heath, scrub and forestry habitats within the Sandlings SPA, with the other near Aldringham (***Figure 23.3***). The species was absent from the more intensive farmland to the west of Aldringham. Of the territories that have been determined based on locations of records, up to three may overlap in part with the onshore development area.

81. The RSPB provided survey data from 2009 to 2018 for the part of the North Warren Reserve that overlaps with the onshore ornithology study area (***Confidential Figure 23.10***). No further woodlark territories that may overlap with the onshore development area were recorded by RSPB in 2018. Distribution in 2017 was similar to that recorded in 2018, with the species showing a strong preference for the open heath habitats within the Sandlings SPA. Results showed that six woodlark territories were recorded in 2017, in broadly similar locations to those found in 2018. Woodlark numbers appear to be reasonably stable since 2012. Between 2009 and 2011 a maximum of two territories were recorded. A further two territories were usually recorded within Thorpeness Golf Course, outside of the North Warren reserve.

23.5.4.1.2 Nightjar

82. Nightjars breed on dry lowland heaths in England although can also breed in open woodland with bracken, and clearings in conifer plantation. Suitable habitat within the onshore ornithology study area is limited to the Sandlings SPA, and so coordinated dusk surveys in 2018 focussed on this area. A total of six territories were recorded in the SPA (outside of the onshore development area), signified by the presence of churring males (***Figure 23.4***).

83. Historic RSPB records from 2009 to 2018 show a consistent pattern of distribution within the heath habitats, closely resembling that of the 2018 survey results. In 2017 the RSPB recorded four churring males within the North Warren reserve, in similar locations to the churring males in 2018. Numbers from 2009 to 2017 varied between zero and five males. Up to two males may be present within Thorpeness Golf Course, outside of the North Warren reserve.

23.5.4.1.3 Turtle dove

84. Up to ten turtle dove territories were recorded during surveys in 2018, mainly within the northern part of the Sandlings SPA and adjacent farmland (***Figure 23.5***). The species was also present in the Aldringham area, but there were no records west of Knodishall Common. The distribution was consistent with the historic RSPB data from 2012 to 2018 (***Figure 23.12***).

85. RSPB counted six turtle dove territories within the part of the RSPB's North Warren reserve within the onshore ornithology study area in 2017, which until 2018 was the highest number since annual counts began in 2012. Two territories in 2017 were within the northern part of the SPA which overlaps with the onshore development area.

23.5.4.1.4 Nightingale

86. Approximately seven territories were recorded during surveys in 2018. Five of these were at the scrubby edges of the Sandlings SPA, with a further two in scrub habitats that form part of the Leiston-Aldeburgh SSSI, within the landfall area (***Figure 23.6***). The species was absent to the west of Aldringham.

87. Historic records provided by the RSPB since 2009 (***Figure 23.13***) show that there is a strong correlation with scrub and woodland edge habitats within the SPA/SSSI. RSPB counted 16 territories within the part of the RSPB's North Warren reserve within the onshore ornithology study area in 2017, with a broadly similar distribution around the edges of the SPA, as recorded in 2018. Two territories were found within the northern part of the SPA which overlaps with the onshore development area. Numbers have been relatively stable since 2009 (with a peak of 18 in 2016).

23.5.4.1.5 Marsh harrier

88. No marsh harrier nest sites were confirmed within the onshore ornithology study area. However, it is likely that around 2-3 pairs made use of the area in 2018, with activity largely confined to The Fens area of the Sandlings SPA where suitable reedbed habitat exists (***Figure 23.7***). A pair was also recorded quartering a field beside the onshore development area, to the north of the landfall. No breeding activity is likely to take place west of Aldringham where the habitat is generally less suitable for the species.

23.5.4.1.6 Barn owl

89. During 2018 surveys, one barn owl was recorded, entering a nest box in the western end of the onshore ornithology study area. No further barn owl nest sites within the onshore ornithology study area were known to the Suffolk Community Barn Owl Project in 2018.

23.5.4.1.7 Bittern

90. Bitterns prefer tall vegetation within standing water, adjacent to open water. *Phragmites* reedbeds are particularly favoured in England. One booming male was present within the onshore ornithology study area in 2018, within The Fens reedbed area (outside of the onshore development area).

23.5.4.1.8 Cetti's warbler

91. Approximately five territories were recorded in 2018, four of which were within The Fens outside of the onshore development area, with a further territory within scrubby habitat in the landfall area.

23.5.4.1.9 Crossbill

92. One possible crossbill territory was located within the Sandlings SPA in 2018, outside of the onshore development area, but there were no other records apart from a flock of 15 individuals that were seen on Aldringham Walks in early April.

23.5.4.1.10 Dartford warbler

93. Dartford warblers are found in heathland with gorse scrub and scattered trees. These habitats within the onshore ornithology study area are restricted to the Sandlings SPA.

94. Four territories were recorded in heathland within the SPA in 2018, and a recently fledged family group was recorded to the north of the SPA near the onshore development area (***Confidential Figure 23.8***).

95. Historic RSPB records were strongly correlated with the heathland habitats within the SPA, all outside of the onshore development area (***Confidential Figure 23.14***). RSPB counted six territories within the part of the North Warren reserve that overlaps with the onshore ornithology study area in 2017, and numbers have remained relatively stable since 2009.

23.5.4.1.11 Hobby

96. Hobbies breed in lowland areas with mature trees, either in groves, in clumps, in lines, or at woodland edges, where good numbers of large, flying insects are found (Hardey et al. 2013). Their favoured habitats include heaths, open woodland and mixed farmland. Nesting territories are often near wetlands.

97. Baseline surveys recorded foraging hobbies within the Sandlings SPA and at The Fens wetland area, with a single record at Aldringham. Breeding behaviour was recorded late in the season (hobbies become more demonstrative as young grow) at two locations outside of the onshore development area: within the Sandlings SPA where a pair were alarm calling above a nest in a pine tree, and a single bird was alarm calling at The Fens. Numbers of individuals recorded (up to nine simultaneously over the North Warren reedbed) suggest that more pairs may be present in the local area.

23.5.4.1.12 Kingfisher

98. Kingfishers nest in vertical bankside holes in slow-moving, shallow rivers or streams which are clean enough to support abundant small fish.

99. Breeding activity was recorded at one location in 2018, outside of the onshore development area on a stream near Thorpeness Golf Club.

23.5.4.1.13 Marsh warbler

100. Marsh warbler is a rare breeder in the UK, with an estimated 2-8 pairs present in any year (Musgrove et al. 2013), distributed mainly in southeast England. They are found in areas of dense vegetation with taller bushes nearby.

101. There was one record of a singing male within an area of suitable breeding habitat within the landfall area, which is considered to represent a possible territory. No further breeding evidence was recorded at this, or any other location.

23.5.4.1.14 Skylark

102. Skylarks were recorded throughout the onshore ornithology study area, with a peak count of 48 individuals within the eastern transect loop between Thorpeness and Sizewell in March 2018. During the breeding season, numbers peaked at 15 individuals in the Friston transect, 32 individuals in the Knodishall transect, and 20 in the Thorpeness-Sizewell transect. An estimated 30-40 pairs were considered present within the onshore ornithology study area in 2018.

23.5.4.1.15 Bullfinch

103. Bullfinches were present throughout the onshore ornithology study area in 2018, with peak counts of one to four individuals recorded along each of the transect loops. The species is likely to breed within the onshore ornithology study area in small numbers.

23.5.4.1.16 Water rail

104. Water rail was present in wetland habitat along the Thorpeness-Sizewell transect loop, outside of the onshore development area, where a single individual was recorded during the breeding season. A count of three individuals was made after the main breeding season in August 2018.

23.5.4.1.17 Gadwall

105. Gadwall was present in wetland habitat along the Thorpeness-Sizewell transect loop, where two to three individuals were recorded on more than one occasion, and 10 individuals were recorded in May 2018. The species is likely to breed in small numbers in suitable wetland habitat outside of the onshore development area.

23.5.4.1.18 Peregrine

106. One peregrine was recorded in flight to the north of The Sandlings SPA, but no breeding evidence within the onshore ornithology study area was recorded in

2018. The species is known to breed in the wider area, and it is possible that the eastern extent of the onshore ornithology study area forms part of a wider breeding territory.

23.5.4.1.19 Red Kite

107. In June 2018, two birds were recorded soaring above the reedbeds at The Fens alongside buzzards, but no further observations, and no breeding evidence was recorded. The species is unlikely to breed within the vicinity of the onshore ornithology study area.

23.5.4.1.20 Short-eared owl

108. An individual short-eared owl was flushed during a survey in the Sandlings SPA in April 2018. This is likely to be a migrant, with no other observations made within the onshore ornithology study area during baseline surveys.

23.5.4.1.21 Spotted flycatcher

109. Spotted flycatcher is Red-listed, with numbers declining rapidly and consistently since the 1960s. A spotted flycatcher family (adult with juveniles) was recorded in farmland in July 2018, around 500m northwest of the onshore development area. No further observations were made during baseline surveys.

23.5.4.1.22 Yellow wagtail

110. Yellow wagtail is Red-listed, and the species has been in rapid decline since the early 1980s, with notable range contractions in East Anglia. Britain holds almost the entire world population of the *flavissima* race, so population changes in the UK are of global conservation significance. It breeds in a variety of habitats in the UK, including arable farmland, wet pastures and upland hay meadows.

111. A total of 2-3 pairs were likely to have bred within the onshore ornithology study area in 2018, with records on farmland on the northern edge of the Sandlings SPA.

23.5.4.2 Wintering Species

23.5.4.2.1 Winter Walkover Surveys 2018

112. Walkover surveys were initially undertaken in February and March 2018 (one visit per month), with the aim of identifying habitat within the onshore ornithology study area, focussing on waterbodies, wetland and agricultural habitats that may be suitable for wintering birds of conservation concern, in particular wildfowl and waders.

113. The only area of standing freshwater within the onshore ornithology study area that is known to attract wildfowl and waders is the agricultural reservoir to the north of the Sandlings SPA, in The Walks area (see Compartment 6 of ***Figure***

23.15). A small number of ponds distributed across the onshore ornithology study area were also checked.

114. The agricultural reservoir was found to be used by tufted duck *Aythya fuligula*, little grebe *Tachybaptus ruficollis*, mallard *Anas platyrhynchos* and a number of common gulls *Larus canus* and black-headed gulls *Chroicocephalus ridibundus*. Lapwings *Vanellus* were present in the onshore ornithology study area in February and March, with total counts of 26 and 75 individuals, respectively. The only other wader species recorded in these months was a count of two woodcock *Scolopax rusticola* in March. Counts of up to 13 greylag geese *Anser* and two Canada geese *Branta Canadensis* were also made in February and March, but no other geese species were present.

23.5.4.2.2 Winter Walkover Surveys 2018-19

115. A series of walkover surveys were conducted twice per month within the onshore ornithology study area, and wetland habitats in the wider area, from November 2018 to March 2019. Based on survey results in February and March 2018 and extensive local surveyor knowledge, surveys focussed on areas of suitable habitat (e.g. wetlands, waterbodies, marshy fields and suitable winter crop fields) potentially utilised by target species.

116. Key areas identified were predominantly near the coast and within the vicinity of the Sandlings SPA and Leiston-Aldeburgh SSSI, particularly to the south of the onshore development area, with a comparative lack of suitable habitat identified within the onshore development area itself, particularly to the west of Aldringham. It was determined upon the first visit that, since groups of birds are highly mobile throughout the survey, distinct locations used by target species should be compartmentalised based on clear habitat type/field boundaries, so that peak counts per species, per survey could be made within each compartment. ***Figure 23.15*** shows the seven compartments considered in the surveys.

117. Of key importance was to determine potential connectivity of populations found within the nearby Leiston-Aldeburgh SSSI, with birds recorded within the onshore development area. Surveys therefore also covered parts of the SSSI known to be important for wintering birds in order to establish whether these birds also use the onshore development area, and to provide relative context of the importance of the onshore development area for particular target species.

118. The remaining parts of the onshore ornithology study area, particularly to the west of Aldringham primarily consist of agricultural land which is known to be of low importance to wintering birds. Nevertheless, each survey visit included a system of field scanning from public roads and footpaths within the onshore ornithology study area to record any target species present.

119. No target species were recorded to the west of Aldringham, or within any other part of the onshore ornithology study area, apart from those compartments outlined below. Although Thorpeness Meare (within the south of Compartment 3) is within 500m of the onshore development area, it is separated by Thorpeness village and golf course, and impacts on target species are therefore considered unlikely. North Warren Reedbed (within the southern half of Compartment 4) where target species were recorded is over 500m from the onshore development area and also likely to be of sufficient distance so as to be unaffected by construction or operational impacts.

120. Detailed results of surveys within all compartments are presented in ***Appendix 23.4***.

23.5.4.2.3 Onshore Development Area: Aldringham Walks Compartment (5)

121. The Aldringham Walks compartment (see ***Figure 23.15***) comprises the northern portion of the Sandlings SPA and Leiston-Aldeburgh SSSI, and overlaps with much of the onshore development area to the east of Aldringham. The area is of low importance for wintering birds in comparison with wetland areas within the SPA/SSSI further south, with mainly small numbers of gulls present (***Table 23.16***).

23.5.4.2.4 Onshore Development Area: Agricultural Reservoir Compartment (6)

122. The small agricultural reservoir to the north of the SPA/SSSI represents the only waterbody for wildfowl and waders within the onshore ornithology study area. The reservoir, which is located outside of the onshore development area, was mainly used by gulls during the winter months, although mallard, pintail, tufted duck and shoveler were also recorded in 2018-19.

23.5.4.2.5 Onshore Development Area: Hawsell's Farm (7)

123. The Hawsell's Farm compartment is adjacent to the north of the onshore development area, close to Leiston. During the walkover surveys, fields were used by Bewick's swans, Egyptian goose (an introduced species) and gulls. A number of casual records obtained on non-survey days were also provided for this location, showing peak counts of 13 Bewick's swan, plus the presence of small numbers of tundra bean goose and pink-footed goose.

Table 23.16 Results of Wintering Bird Surveys 2018-19 in Compartments within Onshore Ornithology Study Area

Species	Status	Peak Survey Count (no. individuals)		
		Aldringham Walks	Agricultural Reservoir	Hawsell's Farm
Bewick's swan	Leiston-Aldeburgh SSSI Annex I, Schedule 1	-	-	13
Black-headed gull	Minsmere - Walberswick Ramsar Alde-Ore Estuary SSSI	4	249	150
Common gull	Alde-Ore Estuary SSSI	-	287	22
Egyptian goose	-	5	-	3
Great black-backed gull	-	1	11	-
Herring gull	Alde-Ore Estuary SSSI Red-listed	12	84	4
Lesser black-backed gull	Minsmere - Walberswick Ramsar Alde-Ore Estuary SPA, SSSI	1	8	-
Little grebe	-	18	33	-
Mallard	-	-	11	-
Pink-footed goose	Annex II migratory species	-	-	2
Pintail	Alde-Ore Estuary Ramsar	-	11	-
Shoveler	Sizewell Marshes SSSI Minsmere - Walberswick Ramsar Minsmere – Walberswick Heath and Marshes SSSI Alde-Ore Estuary Ramsar, SSSI	-	9	-
Tufted duck	-	-	49	-
Tundra bean goose	Annex II migratory species	-	-	2

23.5.5 Anticipated Trends in Baseline Condition

124. In accordance with the 2017 EIA Regulations, climate impacts require consideration in the assessment, which covers both the impacts of the proposed East Anglia ONE North project on climate change and the vulnerability of the proposed East Anglia ONE North project to climate change. The potential trends in baseline onshore ornithology conditions are considered here.

125. According to ClimateUK (2012[2]), The Environment Agency suggests that in the east of England, mean monthly river flows between July and November could decrease by 30-80% if temperature rises associated with medium to high climate change scenario assumptions up to 2050 are realised. Bird species associated with coastal zones, semi-natural grasslands, wetlands and freshwater habitats are likely to be particularly vulnerable to changes in water availability. Ecosystems are likely to face increasing pressure due to changes in soils and invasion of non-native species, pests and diseases.

126. Changes in climate (most likely temperature increases, and rainfall decreases) may over the long-term (i.e. within the next 25 years, but likely to continue permanently beyond that) affect the bird assemblage within the onshore ornithology study area, by altering habitats and prey availability. Sensitive species such as spotted flycatcher for example, have declined in numbers over the long-term, and climate change has been suggested as a contributing factor.

127. The onshore ornithology study area comprises mainly agricultural habitats, which are by-and-large likely to remain relatively unchanged over the short- to medium-term at least. Warmer temperatures and carbon fertilisation may present opportunities to increase yields in the short-term, but lower water availability in the summer and increased flooding, accompanied by increased incidences of pests and diseases in the longer term may mean that the type of agriculture in the area may alter, potentially affecting the suitability of habitats for the current bird assemblage.

128. As identified in Natural England's (2014) *Climate Change Adaptation Manual*, fire risk associated with warmer, drier weather may increase in heathland habitats, particularly close to urban areas where there is more recreational pressure, which may adversely affect species within the Sandlings SPA, in particular the populations of nightjar and woodlark.

129. On balance, it is likely that most target species currently found within the onshore ornithology study area would decline in numbers over the long-term, should climate changes occur as predicted. This would likely be reflective of

[2] http://www.greensuffolk.org/assets/Greenest-County/Adaptation/General/Summary-of-climate-change-risks-to-East-of-England.pdf

national trends, potentially resulting in increased nature conservation value for some species that may become rarer or become more restricted in distribution. It is also possible that some species currently found in hotter, drier climates may colonise the area and begin to breed, as seen with the expansion of Cetti's warbler and Dartford warbler populations in southeast England in recent decades (Hayhow et al. 2017). Habitat is also more likely to remain suitable for turtle dove, according to Hayhow et al. (2017).

130. Despite possible long-term changes in abundance, distribution and sensitivity of ornithological receptors, the results of the baseline surveys and assessment in this chapter are considered to be sufficiently robust to be able to characterise the situation during the operational period of the proposed East Anglia ONE North project.

23.6 Potential Impacts

131. The following sections describe the impacts upon those onshore ornithology receptors described in ***section 23.5*** that have the potential to arise as a result of the construction, operation and decommissioning phases of the proposed East Anglia ONE North project. The assessments are based on the worst-case parameters set out in ***section 23.3.2*** and include the incorporation of embedded mitigation and project commitments set out in ***section 23.3.3***.

23.6.1 Scoped-in Important Ornithological Features

132. The assessment of likely impacts will be applied to those 'scoped-in' IOFs of Medium or High Nature Conservation Importance (see ***Table 23.9***) recorded within the onshore ornithology study area that are known to be present within or adjacent to the onshore development area (as confirmed through survey results and desk studies outlined above).

133. The ten breeding species considered to be IOFs of Medium or High Nature Conservation Importance comprise those listed in ***Table 23.17***. In addition, Bewick's swan is included as an IOF due to its presence during the non-breeding season.

Table 23.17 Nature Conservation Importance of IOFs

Species	Season	Nature Conservation Importance	Reason
Barn owl	Breeding	Medium	Schedule 1; BoCC Green
Cetti's warbler	Breeding	Medium	Schedule 1; BoCC Green
Dartford warbler	Breeding	Medium	Schedule 1, BoCC Amber

Species	Season	Nature Conservation Importance	Reason
Marsh harrier	Breeding	High	SSSI species; Annex I, Schedule 1, BoCC Amber
Marsh warbler	Breeding	High	>1% of national breeding population, Schedule 1, BoCC Red
Nightjar	Breeding	High	SPA species; Annex I, BoCC Amber
Nightingale	Breeding	High	SSSI species; BoCC Red
Turtle dove	Breeding	High	SSSI species; BoCC Red
Woodlark	Breeding	High	SPA species; BoCC Green
Yellow wagtail	Breeding	Medium	BoCC Red
Bewick's swan	Non-breeding	High	SSSI species; Annex I, Schedule 1; BoCC Amber

134. It is also necessary to consider the species' conservation status when assessing the likely impacts. Relevant conservation status information for the 'scoped in' IOFs is detailed within ***Table 23.18***.

Table 23.18 Conservation Status of Scoped-in IOFs

Species	Conservation Status Information	Conservation Status
Barn owl	Green list	According to the Suffolk Community Barn Owl project the regional barn owl population has recovered from a low of approximately 45 breeding pairs in the late 1980s, to an average of 450 occupied nest boxes over the last six years, with 469 in 2017[3]. The regional population is therefore considered to be in favourable conservation status.
Cetti's warbler	Green list	Cetti's warblers first bred in Suffolk in the 1970s, and since then the national population has risen to 1,827 pairs (Hayhow et al. 2017). East Anglia is one of the strongholds for the species in the UK and so regional population is considered to be in favourable conservation status.
Dartford warbler	Amber list (HDRec, BL)	The national Dartford warbler population was estimated to be 3,200 pairs in 2006. An expansion in range over the last few decades has led to an increase in numbers by 70%, with this trend projected to continue (Hayhow et al. 2017). The regional population is therefore considered likely to be in favourable conservation status.

[3] http://www.eadt.co.uk/news/suffolk-barn-owl-scheme-s-success-leads-to-new-approach-1-5474965

Species	Conservation Status Information	Conservation Status
Marsh harrier	Amber list (HDRec, BL)	The national marsh harrier population is estimated to be 365 pairs, which represents a long-term increase of 479% over the last 25 years (Hayhow et al. 2017). The regional population is likely to reflect this trend, with East Anglia one of the main areas for breeding. It is therefore considered to be in favourable conservation status.
Marsh warbler	Red list (BDp1, BDp2, BR)	Marsh warbler is a scarce UK breeder with an estimated population average of eight pairs (Hayhow et al. 2017), mainly in southeast England. It was identified as a species with a high likelihood of extinction in the UK in Hayhow et al. (2017), and so the regional population is likely to be very small, and in unfavourable conservation status.
Nightingale	Red list (BDp1, BDp2, BDr2)	Nightingales exhibited a 48% decline nationally, between 1995 and 2015, and a similar trend was replicated within the Suffolk region. The UK population was estimated to be 5,542 territorial males in 2012-13[4]. According to the Suffolk Bird Report 2014 (Mason 2015), numbers have declined regionally. The regional population is likely to be in unfavourable conservation status.
Nightjar	Amber list (BDMr2)	The British population was estimated to be 4,600 males in 2004, representing a 36% increase in 12 years. The 2004 survey did however reveal a decline in the Suffolk population (284 males) by around 11% albeit with lower confidence in results[5]. According to Natural England's (2015b) Site Improvement Plan for the Sandlings, the nightjar population on the Suffolk coast has declined by 66% since Sandlings SPA notification in 2001. Numbers recorded locally by RSPB seem to have remained steady since 2012, suggesting that the SPA population is likely to be stable.
Turtle dove	Red list (BDp1, BDp2, BDMr1, BDr2, ERLOB)	Turtle doves have undergone a massive long-term decline, with numbers down nationally by 98% between 1970 and 2015. The population was last estimated to be 14,000 territories in 2009 (Musgrove et al. 2013). It has been identified by Hayhow *et al.* (2017) as a species at high risk of extinction in the UK, even though it is predicted that the climate will remain suitable for the species. Estimates from Balmer et al. (2013) indicate that Suffolk supports almost 17% of the UK population. From public sighting records 2012-2013, turtle doves were reported from 89% of the 10km grid squares. Breeding numbers are however likely to be historically low in the region, with the population in unfavourable conservation status.

[4] https://www.bto.org/volunteer-surveys/nightingale-survey/results

[5] https://www.suffolkbis.org.uk/sites/default/files/biodiversity/priorityspecieshabitats/actionplans/nightjar.pdf

Species	Conservation Status Information	Conservation Status
Woodlark	Green list	The national woodlark population was last estimated at 3,100 pairs in 2006 (Musgrove et al. 2013), with 370 pairs in Suffolk. The Sandlings area held around 16% of the regional total, according to the Suffolk Local Biodiversity Action Plan woodlark species account[6]. Recent trends are unclear but there was a large increase in numbers nationally from 1986 to 2006 (up 1,086%) as the species greatly expanded its range. Conversely, according to Natural England's (2015b) Site Improvement Plan for the Sandlings, the woodlark population on the Suffolk coast has declined by 65% since Sandlings SPA notification in 2001.
Yellow wagtail	Red list (BDp1, BDp2, BDMr1, BDMr2)	The UK yellow wagtail population has shown a large long-term decline of 67%. The population was estimated to be 15,000 territories in 2009. Range contraction has been identified in many areas, including parts of East Anglia (Balmer et al. 2013) and so the regional population is considered to be in unfavourable conservation status.
Bewick's swan	Amber List (ERLOB, WDMp1, WL, WI)	The British wintering population has been estimated as 7,000 individuals (Musgrove et al. 2013), with an estimated sharp long-term decline of 95% from 1989-90 to 2014-15 (Hayhow et al. 2018). WeBS counts from Suffolk sites provided a 5-year mean of 28 individuals, with a mean of 10 individuals recorded at Minsmere (Frost et al. 2018). The national and regional populations are considered to be in unfavourable conservation status.

BoCC criteria (Eaton et al. 2015):

HDRec: Historical decline in breeding population but showing recovery.

BL: breeding localisation. Species were considered localised if more than 50% of the UK population was found at ten or fewer sites.

BDp: Breeding population decline. Severe decline in the UK breeding population size (>50%) over 25 years (BDp^1) or the longerterm (BDp^2), defined as the entire period used for assessments since the first BoCC review, starting in 1969.

BDr: Breeding range decline. Severe decline in UK range (>50%) between the breeding bird atlases in 1988–91 and 2007–11 (BDr^1) or 1968–71 and 2007–11 (BDr^2), as measured by the calculated change in the number of occupied 10-km squares.

BDMr: Breeding range decline. As for Red list criterion BDr, but with moderate decline (>25% but <50%) between 1988–91 and 2007–11 (BDMr^1) or 1968–71 and 2007–11 (BDMr^2).

ERLOB: European Red List status.

WDMp: Non-breeding population decline. Moderate decline (>25% but <50%) over 25 years (WDMp^1) or the longer-term period (WDMp^2).

WL: Non-breeding localisation. More than 50% of the UK population was found at ten or fewer sites in the non-breeding season.

WI: Non-breeding international importance. The UK holds at least 20% of the European population in the non-breeding season.

6 https://www.suffolkbis.org.uk/sites/default/files/biodiversity/priorityspecieshabitats/actionplans/woodlark.pdf

23.6.1.1 Designated Sites

23.6.1.1.1 Natura 2000 Sites

135. Based on the information presented in ***section 23.5*** for each qualifying feature associated with Natura 2000 sites within 10km of the onshore ornithology study area, it is concluded that a Likely Significant Effect cannot be discounted at this stage for the following Natura 2000 site and associated features:

- Sandlings SPA: nightjar and woodlark populations due to the proximity to the onshore development area.

136. The information to inform the assessment of potential impacts on the integrity of these designated sites is presented in the Information to Support Appropriate Assessment report (document reference 5.3) accompanying this ES.

23.6.1.1.2 National Designated Sites

137. Based on the above information relating to noted features of SSSIs within 10km of the onshore ornithology study area, the following national-level designated site and its associated noted features is considered in this chapter within an EIA context:

- Leiston-Aldeburgh SSSI: noted features that are assessed as IOFs below are nightingale, turtle dove and marsh harrier (breeding) and Bewick's swan (non-breeding).

23.6.2 Scoped-out Ornithological Receptors

138. The species listed in ***Table 23.19,*** recorded during baseline surveys have been scoped out of the EIA, with rationale provided.

139. Based on the information presented on qualifying and noted features in ***Table 23.19,*** all designated sites other than those listed in ***section 23.6.1.1*** have been scoped out of the assessment due to a lack of likely connectivity for qualifying interests.

140. It is acknowledged that the onshore development area lies within theoretical maximum foraging range of breeding marsh harriers from the Minsmere to Walberswick SPA and Ramsar site, Minsmere – Walberswick Heath and Marshes SSSI, and the Alde-Ore Estuary SPA, SSSI and Ramsar site. However, with the Leiston-Aldeburgh SSSI marsh harrier population occurring in much closer proximity to where roaming individuals were recorded during baseline surveys within the onshore ornithology study area, no connectivity of the onshore development area with any other designated site's breeding marsh harrier population is predicted.

Table 23.19 Scoped out Ornithological Receptors

Species	Closest breeding record to onshore development area	Preferred habitat	Rationale for scoping out
Bittern	800m	Tall vegetation within standing water, adjacent to open water. *Phragmites* reedbeds.	No suitable habitat within onshore development area, so no habitat loss. Closest construction activity would be visually and audibly screened, at a distance likely beyond any disturbance impacts.
Crossbill	300m	Conifer woodland including plantation.	No suitable habitat within onshore development area, so no habitat loss. Closest construction activity would be visually and audibly screened, at a distance likely beyond any disturbance impacts (up to 150m, FCS 2006[7]).
Hobby	420m	Mature trees, either in groves, in clumps, in lines, or at woodland edges. Favoured habitats include heaths, open woodland and mixed farmland, often near wetlands.	No observed activity within onshore development area, and agricultural habitats are likely to be of lower suitability for foraging. Ruddock and Whitfield (2007) did not include hobby in their expert literature review of disturbance reactions, presumably due to a lack of breeding pairs in Scotland (the report was commissioned by Scottish Natural Heritage). For the most similar species reviewed, merlin (which can be tree-nesting), a disturbance range of up to 300-500m was suggested. However, the authors advised that like most other raptors, if previously exposed to relatively innocuous disturbance merlin are capable of developing a tolerance to relatively high levels of at least some forms of human disturbance when free from direct interference. The location of the closest hobby nest is likely to be screened from any activities.
Kingfisher	250m	Slow-moving, shallow rivers or streams	No suitable habitat within onshore development area. It is relatively common for kingfishers to nest in areas of human activity, and so birds are unlikely to be disturbed at this distance from any activity.
Peregrine	N/A	Open upland and coastal areas with cliffs and secure nest sites.	No breeding or foraging activity recorded – one bird flying over unlikely to breed nearby.

[7] https://scotland.forestry.gov.uk/images/corporate/pdf/Guidancenote32Birddisturbance.pdf

Species	Closest breeding record to onshore development area	Preferred habitat	Rationale for scoping out
Red kite	N/A	Open stands of coniferous and broadleaved woodland. Marginal agricultural land and mixed farming.	No breeding or foraging activity recorded – two birds flying over reedbeds unlikely to breed nearby.
Short-eared owl	N/A	Heather moorland, rough grazing, bogs and young conifer plantation	Individual recorded likely to be a migrant – no breeding activity.
Spotted flycatcher	900m	Mature deciduous or mixed woodland with open clearings, farmland with scattered trees.	Closest record likely to be beyond potential disturbance distance associated with construction.
Skylark	Within onshore development area	Open countryside including arable habitats.	Species is widespread within the onshore ornithology study area, with large areas of suitable habitat. The majority of localised impacts are likely to be to non-SSSI birds, and unlikely to be significant within the context of the SSSI or regional populations.
Bullfinch	N/A (possible within onshore development area)	Mixed woodland, parks, coniferous forest.	No confirmed breeding within the onshore ornithology study area – possible breeding in low numbers and SSSI birds unlikely to be affected.
Gadwall	N/A (possible within onshore ornithology study area)	Freshwater lakes with abundant vegetation	No confirmed breeding within the onshore ornithology study area – no suitable freshwater habitat is likely to be within potential range of impacts associated with construction.
Water rail	N/A (possible within onshore ornithology study area)	Thick reedbeds and marshes	No confirmed breeding within the onshore ornithology study area – no suitable habitat is likely to be within potential range of impacts associated with construction.
Wintering species (wildfowl and waders)	N/A	Usually associated with waterbodies, wetland and particular types of agricultural land.	No other wintering species recorded within the onshore ornithology study area were found in numbers that were potentially significant within a national / migratory population context.

Species	Closest breeding record to onshore development area	Preferred habitat	Rationale for scoping out
			Connectivity of SSSI noted features and individuals found within the onshore ornithology study area is considered unlikely, with SSSI birds unlikely to move widely away from SSSI wetland habitats to those of lower suitability within the onshore development area.
Wintering species (gulls)	N/A	Widely ranging, making use of waterbodies, wetlands, agricultural land	Gull species are noted features of SSSIs within 10km but significant levels of connectivity with the onshore ornithology study area is considered unlikely as individuals are wide-ranging, and in some cases migratory in winter months. Gulls are commonly found in close proximity to human activities and so disturbance impacts are unlikely.

23.6.3 Potential Impacts during Construction

141. The key aspects of construction with respect to the IOFs are the construction of the onshore substation, National Grid infrastructure, the excavation works (and supporting activities) associated with the onshore cable corridor and landfall during construction. There is the potential for direct impacts where land used by IOFs and the footprint of the proposed works overlap leading to loss or fragmentation of habitat (Impact 1), which could be short- to medium-term (e.g. localised excavation works, temporary compounds) or long-term (e.g. permanent onshore substation and National Grid infrastructure). This could impact on breeding or foraging individuals. Displacement and disruption of breeding and foraging birds as a result of noise and general disturbance (Impact 2) may occur over a short- or medium-term period (either the duration of a particular construction activity within working hours, or the duration of the whole construction period).

142. Impacts on breeding or wintering birds would be confined to areas in the locality of infrastructure. Few attempts have been made to quantify the impacts of disturbance of birds, due to activities of this type, and much of the available information is inconsistent. However, as a broad generalisation, larger bird species such as raptors, or those that feed in flocks in the open tend to be more susceptible to disturbance than small birds living in structurally complex habitats (such as woodland, scrub and hedgerow) (Hill et al. 1997).

23.6.3.1 Impact 1: Habitat Loss

23.6.3.1.1 Nightjar

143. As a qualifying interest of the Sandlings SPA and the Leiston-Aldeburgh SSSI, and an Annex I species, nightjar is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be stable, albeit with limited recent data. Overall the species' sensitivity is therefore considered to be High.

144. Potential impacts on nightjar require consideration here in an EIA context, and separately within the context of the Sandlings SPA population in the Information to Support Appropriate Assessment (document reference 5.3) report.

23.6.3.1.1.1 Impact Associated with the Landfall

145. Nightjars in Suffolk have been observed to prefer to nest on heathlands and young coniferous plantation up to five years old (Ravenscroft 1989). Birds may forage short distances from the nest, particularly when they have eggs or young (Schlegel 1967, Cross et al. 2005), although distances have been recorded up to 3.1km (Alexander and Cresswell 1990). A study of radio-tracked nightjars in southeast England by Sharps et al. (2015) showed that nightjars travelled a mean maximum distance of 747m from their territory centre each night. When leaving their smaller song territories, individuals preferred pre-closure canopy forest and newly planted forest as well as open grazed grass heath.

146. Baseline surveys in 2018 recorded nightjar territories that were regularly distributed within The Sandlings SPA in dry heath habitats (***Confidential Figure 23.4***). This distribution was consistent with historic records provided by the RSPB (***Confidential Figure 23.11***). The Sandlings SPA is located approximately 150m from the landfall area at its closest point, and the closest territory (from 2016) was approximately 400m away. The landfall area mainly comprises arable land and improved grassland, unsuitable for nightjar foraging, with no habitat loss occurring within the Leiston-Aldeburgh SSSI due to the deployment of HDD techniques in this area. The transition bays would be located in arable farmland unsuitable for nightjar.

147. No habitat loss for nightjar is therefore predicted to result from works associated with the landfall.

23.6.3.1.1.2 Impact Associated with the Onshore Cable Corridor

148. Two territory centres within the SPA were within 200m of the onshore development area in 2018 (see ***Confidential Figure 23.4***), and this is likely to be the maximum number in any year, based on historic RSPB data (***Confidential Figure 23.11***) and preliminary results in 2019 (***Confidential Figure 23.16***). In 2018, two further territories were within 500m, and two further

territories were within 750m, suggesting that there may be some potential for foraging ranges to overlap with the onshore development area.

149. The results of the Extended Phase 1 Habitat Survey in ***Figure 22.3.3*** however show that there is no suitable nightjar habitat (taken to be heath, coniferous woodland or scattered trees) within the onshore cable corridor, apart from a small amount of scrub in the part where the onshore cable corridor overlaps with the northernmost part of the Sandlings SPA, which is dominated in parts by bracken. The proposed East Anglia ONE North project design has minimised the overlap of the onshore cable corridor with the SPA, choosing a crossing at the narrowest point.

150. Where the onshore cable corridor crosses this part of the SPA, an open-cut crossing technique is the preferred crossing methodology. When using an open-cut methodology, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) within the Sandlings SPA for a length up to 300m depending on the detailed design when crossing the Sandlings SPA. Crossing the SPA using an open-cut methodology will last an estimated one month in duration.

151. If HDD techniques are used to cross this part of the SPA, boring operations will be completed within approximately six months. HDD entrance and exit pit temporary working areas would be located outside of the SPA.

152. The Applicant has committed to undertaking work crossing the SPA, either open-cut or HDD methodology, outside of the breeding bird season, therefore minimising potential impacts to the features of the Sandlings SPA and Leiston-Aldeburgh SSSI. The breeding bird season is considered to be mid-February to August inclusive. This will be confirmed post-consent through the production of the EMP.

153. Taking into consideration these embedded mitigation measures for the SPA, and since no nightjars have previously been recorded within the area of the SPA where the open-cut trenching would be located (at least since 2009 according to RSPB data), it is unlikely that any suitable nightjar habitat for nesting or foraging would be lost due to open-cut trenching or HDD work associated with the proposed East Anglia ONE North project.

154. A negligible spatial, and medium-term temporal impact magnitude is therefore predicted.

23.6.3.1.1.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

155. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for nightjar, and over 3km from the nearest recorded territory in 2017 or 2018. No impacts on nightjar would result from the construction of the substations.

23.6.3.1.1.4 Significance of Impact

156. As discussed above, the species sensitivity is high and the magnitude of impact is negligible. Therefore, the unmitigated impact on the regional and Leiston-Aldeburgh SSSI nightjar populations from habitat loss is considered to be **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.1.5 Mitigation

157. None required.

23.6.3.1.1.6 Residual Impact

158. The residual impacts on the regional and SSSI populations of Nightjar are unchanged (**minor adverse** and not significant).

23.6.3.1.2 Woodlark

159. As a qualifying interest of the Sandlings SPA and Leiston-Aldeburgh SSSI, and a Schedule 1 species, woodlark is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

160. Potential impacts on woodlark require consideration here in an EIA context, and separately within the context of the Sandlings SPA in the Information to support Appropriate Assessment report (document refence 5.3).

23.6.3.1.2.1 Impact Associated with the Landfall

161. Woodlarks may breed on heaths, scrubland, neglected farmland and golf courses, avoiding areas of intensive agriculture. In England, the largest population is in the Breckland region of Suffolk and Norfolk, where most pairs breed in areas of pine forest that has been felled and replanted (Forrester et al. 2007).

162. The distribution of woodlark territories recorded during baseline surveys in 2018, and in historic data provided by RSPB, reflects these habitat preferences, with all observations occurring within heath or scrub habitats, mainly within the SPA.

163. The closest woodlark territory from 2009 to 2018 was over 300m from the landfall area (***Confidential Figures 23.3*** and ***23.10***), with the landfall area largely comprising intensively farmed land surrounding the SPA. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on the Leiston-Aldeburgh SSSI. It is therefore unlikely there would be any habitat loss due to construction works and a negligible spatial and short-term temporal magnitude is predicted.

23.6.3.1.2.2 Impact Associated with the Onshore Cable Corridor

164. The majority of the onshore development area comprises intensive agricultural habitats, with only small areas of scrub and semi-improved grassland where it overlaps with the northernmost part of the SPA, and to a lesser extent in patches south of Aldringham. It is possible that some of the suitable habitat within the northern part of the SPA may be lost during the construction phase – however from 2018 baseline survey data, and historic RSPB data since 2008, woodlarks were not recorded in this area of the SPA, showing that it is not likely to be part of any territories. Indeed, the habitat here mainly comprises dense scrub, dominated by bracken in places, which is less suited to woodlarks.

165. The likelihood of significant temporary loss of suitable woodlark habitat due to open-cut trenching within this part of the SPA is further reduced when considering embedded mitigation measures (spatial and temporal restrictions), as outlined in ***Table 23.4*** and above, for nightjar, in ***section 23.6.3.1.1.2***. No habitat loss impact from within the SPA is therefore predicted, regardless of whether open-cut trenching or HDD techniques are used to cross the SPA.

166. Two of the three territories from 2018 that may have been at least partially overlapping with the onshore development area to the north of the SPA, were located beside the area allocated for turtle dove mitigation (see section 23.6.3.1.4.5) rather than construction activities. Therefore, no habitat would be lost to project infrastructure in this area, and indeed the habitat may become more suitable for woodlark than at present.

167. The onshore development area at Aldringham which is approximately 200m from a possible woodlark territory comprises an access route to the main onshore development area corridor and so little, if any, suitable habitat would be lost. The overall magnitude of habitat loss within a regional population context is therefore considered to be negligible spatial and medium-term temporal.

23.6.3.1.2.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

168. The onshore substation and National Grid infrastructure located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for woodlark, and over 2km from the nearest recorded territory. No impacts on woodlark would result from the construction of the substations.

23.6.3.1.2.4 Significance of Impact

169. As discussed above, the species sensitivity is high and the magnitude of impact is negligible. Therefore, the unmitigated impact on the regional woodlark population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations. Within the context of the Leiston-Aldeburgh SSSI population (taken to be approximately seven territories, as per 2018 Sandlings SPA counts), this would also be a **minor adverse** and not significant unmitigated impact.

23.6.3.1.2.5 Mitigation

170. None required.

23.6.3.1.2.6 Residual Impact

171. The residual impacts on the regional and SSSI populations are unchanged (**minor adverse** and not significant).

23.6.3.1.3 SPA Species Summary

172. Both nightjar and woodlark are features of the designation of the Sandlings SPA and have been regularly recorded breeding within similar parts of the Sandlings SPA, preferring more open heath habitats within the main extent of the SPA, south of the onshore development area.

173. The refinement of the onshore development area has taken into consideration the habitat requirements of these two species, by avoiding areas close to the SPA where birds are likely to breed and forage. The large majority of the onshore development area comprises unsuitable habitats for these species, and so no direct habitat loss is predicted.

174. If required, with the assistance of an Ecological Clerk of Works (ECoW), micro-siting will be used to avoid suitable nightjar and woodlark nest locations, where possible. As Nightjar and Woodlark have similar habitat requirements and distribution, micro-siting of the onshore cable route to avoid any nesting birds of one species is therefore unlikely to conflict with the requirements of the other species.

23.6.3.1.4 Turtle dove

175. As a named feature of the Leiston-Aldeburgh SSSI, turtle dove is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

23.6.3.1.4.1 Impact Associated with the Landfall

176. Turtle doves nest in mature hedgerows, tall scrub and woodland edges, often close to freshwater, feeding in weedy arable fields. The closest record of a territory to the landfall area from 2012 to 2018 was around 350m to the north (***Figure 23.5*** and ***Figure 23.12***). At the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. With intensive agricultural habitats generally of lower suitability for the species, and the position of construction footprint avoiding Leiston-Aldeburgh SSSI, no habitat loss is predicted relating to construction works associated with the landfall.

23.6.3.1.4.2 Impact Associated with the Onshore Cable Corridor

177. Most turtle dove records in 2018 were within, or in proximity to the Sandlings SPA, particularly the area to the north around the agricultural reservoir and arable fields where the most suitable habitat exists (and ***23.12***).

178. A total of six turtle dove territories may be present in proximity to the onshore development area. Two turtle dove territories were recorded by the RSPB in 2017 (***Figure 23.12***), where the SPA/SSSI overlaps with the onshore development area (with two again within or adjacent to the SPA/SSSI in 2018, ***Figures 23.5***). A further two territories were likely to have been present in 2018 to the southwest of the agricultural reservoir, north of the SPA/SSSI, and two further possible territories were recorded in 2018, at scrub/woodland edge habitat adjacent to the onshore development area near Aldringham.

179. The impact of habitat loss on the two territories where the onshore development area overlaps with the SPA/SSSI depends on whether open-cut trenching or HDD techniques are deployed.

180. Where the onshore cable corridor crosses this part of the SPA/SSSI, an open cut crossing technique is the preferred crossing methodology. When using an open cut methodology, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) within the SPA/SSSI for a length up to 300m depending on the detailed design when crossing the SPA/SSSI.

181. Crossing the SPA/SSSI using an open cut methodology will last an estimated one month in duration. The Applicant has further committed to conducting this open cut trenching through the SPA outside of the breeding bird season, therefore minimising potential impacts to the features of the SPA/SSSI. The breeding bird season is considered to be mid-February to August inclusive, covering the period of time that turtle doves would be nesting. This process will be confirmed post-consent through the production of the EMP. Although this embedded mitigation would minimise the extent of habitat loss due to open-cut trenching within the SPA/SSSI, a temporary impact upon up to two territories may still occur if habitats are not fully reinstated prior to the subsequent breeding season.

182. If an HDD technique were to be deployed, also undertaken outside of the breeding bird season, no nesting habitat within the SPA/SSSI would be lost, although small feeding areas for up to two territories may be affected, depending on the location of the associated entrance and exit pits and duration of habitat reinstatement after construction activities have ceased. Establishment of a HDD entry pit working area and HDD exit pit working area will be completed within approximately two months of excavation works commencing. Boring operations will be completed within approximately six months. Reinstatement of the HDD entry pit working area and HDD exit pit working area will be completed within approximately two months.

183. The above phased work may be undertaken over two years to comply with the seasonal restriction associated with crossing the SPA/SSSI (mid-February to August inclusive). Landscaping works such as hedgerow replanting may be undertaken outside these periods to ensure optimal planting conditions are achieved.

184. When considering the embedded mitigation for open-cut trenching and HDD techniques outlined above, up to two territories may be affected where the onshore cable corridor crosses the SPA/SSSI. In a worst-case scenario, up to four further territories (two within or adjacent to the SPA/SSSI, and a further two territories to the west) may be affected by habitat loss due to the construction footprint. This temporary loss of up to six territories would potentially affect 0.25% of the regional turtle dove population (approximately 2,380 territories), which is considered to be an impact of negligible spatial and medium to long-term temporal magnitude. It should be noted that the two territories to the west fall within the turtle dove feeding area described in ***section 23.6.3.1.4.5*** which will not be subject to construction footprint, and are therefore included within this habitat loss assessment on a precautionary basis.

185. When taken within the context of the Leiston-Aldeburgh SSSI population (taken to be a minimum of eight territories, and probably fewer than 15 territories,

based on 2018 surveys in the northern half of the SSSI) up to four territories may be affected by habitat loss. Although the majority of at least some of these territories is likely to be within the SSSI, and therefore outside of the onshore development area, it is possible that a small loss of habitat could lead to a reduction in productivity during the construction period. This is considered to be an impact of medium spatial and medium to long-term temporal magnitude to the SSSI population.

23.6.3.1.4.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

186. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for turtle dove, and around 1.6km from the nearest recorded territory in 2018. No impacts on turtle dove would result from the construction of the substations.

23.6.3.1.4.4 Significance of Impact

187. As discussed above, the species sensitivity is high and the magnitude of impact on the regional population is negligible. Therefore, the unmitigated impact on the regional turtle dove population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

188. Within the context of the Leiston-Aldeburgh SSSI population, a reduction in productivity or numbers due to temporary habitat loss would represent a **major adverse** and potentially significant unmitigated impact as the magnitude of the impact is increased from negligible spatial at a regional level to medium spatial in the context of the Leiston-Aldeburgh SSSI population.

23.6.3.1.4.5 Mitigation

189. According to the Operation Turtle Dove initiative[8], the loss of suitable habitat on the UK breeding grounds and the associated food shortages for turtle doves are the most important factors driving turtle dove declines. In response to possible loss of habitat, an area of 3ha within the onshore development area (see ***Figure 23.5***) has been identified for creation and management of suitable turtle dove feeding habitat during construction. Further details and timings of this habitat management would be included in the final EMP, submitted to discharge a requirement of the draft DCO, and details are provided in the OLEMS submitted with this DCO application.

190. This feeding area has in recent years been used for arable and pig farming, and based on advice provided by Operation Turtle Dove initiative, is suitable for turtle doves, being located within 300m of previously recorded turtle dove

[8] https://www.operationturtledove.org

territories, in an open location adjacent to field boundaries, and also in proximity to water (the agricultural reservoir).

191. Management would commence prior to construction so that the habitat would be available to turtle doves before any existing habitat is lost, and prior to the breeding season so there is a suitable source of seeds available when the birds first arrive back from migration in order that they can quickly reach breeding condition.

192. The aim for this area would be to provide a suitable turtle dove foraging area comprising low, sparse vegetation containing native seed-bearing plants. A seed-rich habitat would be provided by sowing a suitable seed mix in blocks or strips, approximately 6m in width between 1st August and 15th October, in the year prior to construction. During the following summer, between mid-June and early July, half of the plot would be cut or scarified, and the whole area would then be cut or scarified between 1st and 30th September and the arisings removed in order to avoid patches of dead vegetation becoming established.

193. To ensure sufficient food is available, particularly in the early breeding season, supplementary feeding using a suitable seed mix may also be required from mid-April until late June, or until turtle dove breeding activity is known to have ceased. If required, part of the identified feeding area would be prepared for supplementary feeding, to comprise a bare surface free of vegetation, or have vegetation that is short (<15cm) and patchy, including at least 30% (preferably 50-60%) bare areas in April. The feeding area would be subject to cutting or use of a rotovator if the vegetation subsequently covered all the ground and became taller than 25cm before the end of the feeding period in late June. A mix of suitable seed types as advised by Operation Turtle Dove would be sown weekly.

194. In addition, where possible all habitats of conservation value subject to temporary loss, including within the SPA/SSSI, would be reinstated post-construction in agreement with Natural England.

23.6.3.1.4.6 Residual Impact

195. When considering the mitigation measure outlined above, specifically designed to aid the turtle dove Leiston-Aldeburgh SSSI population, and the positioning of the construction footprint to avoid the SSSI as far as possible, the level of significance of construction impacts on turtle dove, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.1.5 Nightingale

196. As a named feature of the Leiston-Aldeburgh SSSI, nightingale is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

23.6.3.1.5.1 Impact Associated with the Landfall

197. Nightingales occupy a range of habitats, but prefer scrub and woodland thickets, often in the vicinity of water. Scrubby field margins coupled with an adjacent belt of rank grass and ruderal vegetation provide thick cover that nightingales require for foraging. The UK population was estimated to be approximately 5,500 males in 2012 (Massimino et al. 2017). Although the regional (Suffolk) population is unknown, Balmer et al. (2013) shows that southeast England is the stronghold for the species.

198. Two territories were recorded in scrub habitat within the Leiston-Aldeburgh SSSI and landfall area in 2018 (***Figure 23.6)*** with 3-4 territories recorded by RSPB in this area in 2017 (***Figure 23.13***). At the landfall area, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. HDD works are included as embedded mitigation for the landfall area (***Table 23.4***), and no habitat loss is predicted for these territories. An impact of negligible spatial and short-term temporal magnitude is therefore predicted.

23.6.3.1.5.2 Impact Associated with the Onshore Cable Corridor

199. It is estimated that in any year, up to three nightingale territories may be located within or adjacent to the onshore cable corridor. One territory recorded in 2018 and 2019 was adjacent to the onshore development area where it overlaps with the SPA/SSSI (***Figures 23.6 and 23.16)***. RSPB records show that in 2017, nightingale distribution was very similar to that recorded in 2018, but with an additional territory recorded within the part of the onshore development area which overlaps with the SPA/SSSI (***Figure 23.13***). In 2016, 2-3 territories were recorded within this part of the SPA/SSSI.

200. Holt et al. (2012) examined habitat selection by male nightingales in eastern England through territory mapping and radio-tracking. They found that territories were restricted to scrub and adjacent woodland habitats, with open areas actively avoided. Mean home-range area of seven radio-tracked nightingales was 11,386m^2, which would equate to a ranging radius of 60m if a circular territory is assumed.

201. Based on this information, it is therefore possible that some suitable nesting habitat may be affected within the onshore development area, which may affect

up to three territories. The nature, and magnitude of this loss does however depend on which of the two construction methods are deployed where crossing the SPA/SSSI, i.e. open-cut trenching or HDD techniques.

202. If open-cut trenching is conducted, assuming that works could take place at any location within the onshore development area, some nightingale habitat may be adversely affected where the onshore cable corridor crosses the SPA/SSSI. Works would take place over the period of an estimated one month outside of the breeding season, with a period of reinstatement of habitat afterwards. These embedded mitigation measures would help minimise habitat loss impacts. However, under this scenario, a total of three nightingale territories may still be affected if habitat is not fully reinstated prior to the subsequent breeding season.

203. If HDD techniques are used where the onshore cable route crosses the SPA/SSSI, no nightingale nesting or feeding habitat there is likely to be affected, with entry and exit pits located outside of the SPA/SSSI in unsuitable habitat.

204. The potential loss of up to three territories if open-cut trenching is used, is likely to represent less than 1% of the population, and so the impact is likely to be of negligible spatial and medium to long-term temporal magnitude. Within the context of the Leiston-Aldeburgh SSSI population (likely to be at least 18 territories, based on RSPB data), the unmitigated impact on up to four territories would however represent a worst-case impact of medium spatial and medium to long-term temporal magnitude.

23.6.3.1.5.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

205. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for nightingale, and around 3km from the nearest recorded territory. No impacts on nightingale would result from the construction of the substations.

23.6.3.1.5.4 Significance of Impact

206. In total up to three nightingale territories may be affected by habitat loss, under the open-cut trenching scenario, at the SPA/SSSI crossing. As discussed above, the species sensitivity is high and the magnitude of impact on the regional population is negligible, regardless of which construction technique is deployed for crossing the SPA/SSSI. Therefore, the unmitigated impact on the regional nightingale population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

207. Within the context of the Leiston-Aldeburgh SSSI population (taken to be approximately 18 territories), the temporary impact on up to three territories (based on occupied territory locations in 2016 to 2019) if open-cut trenching is used, would represent a **major adverse** and potentially significant unmitigated impact. If HDD techniques are used where the cable corridor crosses the SPA/SSSI, the significance of habitat loss would be reduced to **minor adverse** and therefore not significant.

23.6.3.1.5.5 Mitigation

208. As noted in ***Table 23.4***, under the scenario of open-cut trenching being used to cross the SPA/SSSI, the cable route working width would be minimised to the minimum required (16.1m), and limited to cable trenches and working area only. With the assistance of an ECoW, micro-siting will be used to avoid suitable nightingale nest habitat when trenching through the SPA/SSSI, where possible.

209. In addition, habitat suitable for nightingale that is within both the SPA/SSSI and the onshore development area (i.e. where the onshore development area overlaps the SPA/SSSI), but outside of the 16.1m cable corridor footprint, would be managed following recommended guidelines (e.g. BTO 2015), with the aim of providing optimal habitat for breeding nightingale prior to the breeding season that overlaps with construction activities. This may involve thinning or removal of bracken (which dominates in much of this area) or maintenance of scrub by cutting any patches that are getting too old and 'leggy', and therefore providing a supply of vigorous new growth. A dense field margin of rank grass and taller herbs around the scrub should also be retained by avoiding mowing during the breeding season. This management would commence prior to the breeding season that overlaps with construction activities to provide the best opportunity for nightingales to utilise the habitat, so that birds displaced by construction works are not lost from the SSSI population. The management would continue through the duration of construction undertaken along cable route sections 1 and 2, until any suitable nightingale habitat which would be subject to temporary loss is reinstated post-construction. Further details and timings of this habitat management would be included in the final EMP, submitted to discharge a requirement of the draft DCO, and are detailed within the OLEMS submitted with this DCO application.

23.6.3.1.5.6 Residual Impact

210. If it is assumed that HDD techniques are deployed in the onshore cable corridor crossing of the SPA/SSSI areas, the residual impact would remain **minor adverse** and not significant within the context of the EIA Regulations, for both the regional, and Leiston-Aldeburgh SSSI populations.

211. Under the open-cut trenching scenario, the mitigation measures described above would reduce the magnitude of impact of habitat loss on the Leiston-Aldeburgh SSSI population to negligible, therefore the impact is **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.1.6 Marsh harrier

212. As a named feature of the Leiston-Aldeburgh SSSI, marsh harrier is classified as being of High Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in favourable conservation status. Overall sensitivity is therefore considered to be medium-high.

23.6.3.1.6.1 Impact Associated with the Landfall

213. No marsh harriers were recorded within the landfall area, although in June 2018 a pair was recorded quartering in a field directly to the northwest (***Figure 23.7***). An individual was also recorded above the SSSI within the landfall area in 2019 (***Confidential Figure 23.16)***. Marsh harriers generally occur near freshwater or brackish marshes and swamps with extensive areas of dense reeds and rushes, and individuals were regularly recorded over The Fens reedbeds, around 1km south of the landfall area. Although in more recent times the species has shown an adaptation to nest and forage on arable farmland, the majority of fields within the landfall area are unlikely to be suitable habitat for the species. As such no habitat loss impacts are predicted.

23.6.3.1.6.2 Impact Associated with the Onshore Cable Corridor

214. There were two marsh harrier observations in proximity of the onshore development area in 2018, one of a pair in flight as described above, and one of a single bird in flight above an arable field. Although no breeding evidence was recorded, it is possible that some foraging habitat may be lost due to construction works in this area. The intensively managed arable fields within the onshore development area are however likely to be suboptimal foraging and nesting habitat compared to other nearby habitats such as reedbed areas in The Fens. Within the context of the regional, Leiston-Aldeburgh SSSI population, the magnitude of temporary loss of a small amount of suboptimal foraging habitat is considered to be negligible spatial and medium-term temporal.

23.6.3.1.6.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

215. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for marsh harrier, and around 2.5km from the nearest observation in 2018. No impacts on marsh harrier would result from the construction of the substations.

23.6.3.1.6.4 Significance of Impact

216. As discussed above, the species sensitivity is medium-high and the magnitude of impact is negligible Therefore, the unmitigated impact on marsh harriers from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations, within the context of the regional population, Leiston-Aldeburgh SSSI population, and other SSSI populations.

23.6.3.1.6.5 Mitigation

217. None required.

23.6.3.1.6.6 Residual Impact

218. The residual impacts on the regional and SSSI populations are unchanged (**minor adverse** and not significant).

23.6.3.1.7 Barn owl

219. As a Schedule 1 breeding species, barn owl is classified as being of Medium Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in favourable conservation status. Overall sensitivity is therefore considered to be low-medium.

23.6.3.1.7.1 Impact Associated with the Landfall

220. No barn owls were recorded within the vicinity of the landfall area, and no historic breeding records, or known nest boxes are within this area. It therefore follows that there would be no impacts of construction works within the landfall area on barn owl.

23.6.3.1.7.2 Impact Associated with the Onshore Cable Corridor

221. No barn owls were recorded within the onshore development area in 2018, although it is acknowledged that the range of surveys undertaken were not designed for recording this species. The Suffolk Community Barn Owl Project did know of any other nest sites within the onshore ornithology study area in 2018. It therefore follows that there would be no impacts of construction works within the onshore cable corridor on barn owl.

23.6.3.1.7.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

222. One occupied barn owl nest box was recorded within the onshore substation and National Grid infrastructure areas in 2018 (***Confidential Figure 23.8***). The substations would be located in an area of agricultural land that is potentially suitable for barn owl foraging, and so habitat loss may affect a breeding pair that may use the nest box. The possible loss of one barn owl pair would represent less than 1% of the regional breeding population (around 450 pairs)

and so impacts at this scale would be of negligible spatial and long-term temporal magnitude.

23.6.3.1.7.4 Significance of Impact

223. As discussed above, the species sensitivity is low-medium and the magnitude of impact is negligible. Therefore, the unmitigated impact on the regional barn owl population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.7.5 Mitigation

224. Any potential losses of territories will aim to be mitigated for by the erection of new nest boxes in suitable locations within the local area where possible, in consultation with the Suffolk Community Barn Owl Project. New nest boxes would be in place and available to barn owls prior to the commencement of construction of the onshore substation and National Grid infrastructure. This mitigation is secured within the EMP and detailed within the OLEMS submitted with this DCO application.

23.6.3.1.7.6 Residual Impact

225. When considering the mitigation measure outlined above, the level of significance of construction impacts on barn owl can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.1.8 Cetti's Warbler

226. As a Schedule 1 breeding species, Cetti's warbler is classified as being of Medium Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in favourable conservation status. Overall sensitivity is therefore considered to be low-medium.

23.6.3.1.8.1 Impact Associated with the Landfall

227. Cetti's warblers breed in thick vegetation including reedbed margins, willow carr, willowherb and nettles, usually in proximity to water or marshy land. The distribution of the species within the onshore ornithology study area reflected these preferences, with four of five territories located within The Fens, with a single territory within scrubby habitat at the edge of the Leiston-Aldeburgh SSSI, within the landfall area (***Confidential Figure 23.8***).

228. At the landfall, construction will use HDD techniques under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. The predicted magnitude of impact is therefore negligible spatial and short-term temporal.

23.6.3.1.8.2 Impact Associated with the Onshore Cable Corridor

229. No Cetti's warbler territories were recorded within the onshore cable corridor section of the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.1.8.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

230. No Cetti's warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.1.8.4 Significance of Impact

231. As discussed above, the species sensitivity is low-medium and the magnitude of impact is negligible. Therefore, the unmitigated impact on the regional Cetti's warbler population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.8.5 Mitigation

232. None required. It would be ensured that any habitats of conservation value which would be subject to temporary loss are reinstated post-construction in agreement with Natural England.

23.6.3.1.8.6 Residual Impact

233. The residual impacts on the regional population are unchanged (**minor adverse** and not significant in the context of the EIA Regulations).

23.6.3.1.9 Dartford Warbler

234. As a Schedule 1 breeding species, Dartford warbler is classified as being of Medium Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in favourable conservation status. Overall sensitivity is therefore considered to be low-medium.

23.6.3.1.9.1 Impact Associated with the Landfall

235. Dartford warblers are found in heathland with gorse scrub and scattered trees. These habitats within the onshore ornithology study area are generally restricted to the Sandlings SPA. The closest territory to the landfall area in any year was over 500m away (***Confidential Figures 23.8 and 23.14***), and so no habitat loss impacts are predicted to occur.

23.6.3.1.9.2 Impact Associated with the Onshore Cable Corridor

236. Four Dartford warbler territories were recorded in 2018 within the SPA, although a recently fledged family group was recorded to the north of the SPA within 100m of the onshore development area, suggesting that some habitat used by

Dartford warblers may be lost during the construction period. This is unlikely to significantly affect any breeding pairs which are likely to be confined to the heathland habitat within the main SPA for nesting. As such the magnitude of impact, within the context of the regional population, is considered to be negligible spatial and medium-term temporal.

23.6.3.1.9.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

237. No Dartford warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.1.9.4 Significance of Impact

238. As discussed above, the species sensitivity is low-medium and the magnitude of impact is negligible. Therefore, the unmitigated impact on the regional Dartford warbler population from habitat loss is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.9.5 Mitigation

239. None required.

23.6.3.1.9.6 Residual Impact

240. The residual impacts on the regional population are unchanged (**minor adverse** and not significant).

23.6.3.1.10 Marsh Warbler

241. As a Schedule 1 breeding species found in very low numbers in the UK, marsh warbler is classified as being of High Nature Conservation Importance (***Table 23.9***). Marsh warbler is a rare breeder in the UK, with an estimated two to eight pairs present in any year (Musgrove et al. 2013), distributed mainly in southeast England. The regional population is considered to be very small each year, and therefore in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

23.6.3.1.10.1 Impact Associated with the Landfall

242. Marsh warblers are found in areas of dense vegetation with taller bushes nearby. During baseline surveys, there was one record of a singing male within an area of suitable scrubby breeding habitat at the edge of the Leiston-Aldeburgh SSSI and within the landfall area, which is considered to represent a possible territory (***Confidential Figure 23.8***). No further breeding evidence was recorded at this location.

243. At the landfall, construction will comprise of HDD techniques under the Leiston-Aldeburgh SSSI with no construction footprint within the Leiston-Aldeburgh SSSI. The predicted magnitude of impact is therefore negligible spatial and short-term temporal.

23.6.3.1.10.2 Impact Associated with the Onshore Cable Corridor

244. No marsh warbler territories were recorded within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.1.10.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

245. No marsh warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.1.10.4 Significance of Impact

246. As the construction footprint will not result in any habitat loss to the Leiston-Aldeburgh SSSI, the unmitigated impact on the national marsh warbler population from construction is classified as **minor adverse** and therefore not significant in the context of the EIA Regulations.

23.6.3.1.10.5 Mitigation

247. None required.

23.6.3.1.10.6 Residual Impact

248. The level of significance of habitat loss on marsh warbler is unchanged (**minor adverse** and not significant within the context of the EIA Regulations).

23.6.3.1.11 Yellow Wagtail

249. As a scarce Red-listed breeding species, yellow wagtail is classified as being of Low-Medium Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be medium.

23.6.3.1.11.1 *Impact Associated with the Landfall*

250. No yellow wagtail observations were made in 2018 within 1km of the landfall area. The species breeds in arable farmland, wet pastures and upland hay meadows, and so no suitable habitat exists in the area. No impacts are therefore predicted.

23.6.3.1.11.2 *Impact Associated with the Onshore Cable Corridor*

251. A total of one to two pairs were likely to have bred within or adjacent to the onshore development area in 2018, with records on farmland on the northern edge of the Sandlings SPA (***Figure 23.9***). A third possible territory was around 250m from the onshore development area.

252. As the territories recorded adjacent to the onshore development area were beside the planned turtle dove mitigation area rather than where the construction footprint would be, it is unlikely that any pairs would be significantly affected by habitat loss. Even as a worst-case, the loss of up to two territories during the construction period would be unlikely to reach significance at a regional level (the breeding population of which is unknown, but likely to be more than 200 pairs). As such the magnitude of impact is considered to be low spatial, and medium-term temporal.

23.6.3.1.11.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

253. No yellow wagtail territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, although habitat may be suitable for the species. No impacts are however predicted.

23.6.3.1.11.4 Significance of Impact

254. As discussed above, the species sensitivity is medium and the magnitude of impact is low. Therefore, the unmitigated impact on the regional yellow wagtail population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.1.11.5 Mitigation

255. None required.

23.6.3.1.11.6 Residual Impact

256. The residual impacts on the regional population are unchanged (**minor adverse** and not significant).

23.6.3.1.12 Bewick's Swan

257. As a non-breeding species listed in the Leiston-Aldeburgh SSSI citation, Bewick's swan is classified as being of high Nature Conservation Importance (***Table 23.9***). The regional population is considered to be in unfavourable conservation status. Overall sensitivity is therefore considered to be high.

23.6.3.1.12.1 *Impact Associated with the Landfall*

258. No Bewick's swan observations were made in the 2017-18 or 2018-19 winters within 2km of the landfall area. In winter, the species feeds on agricultural land, especially on waste root crops, grain stubbles and winter cereals, moving from arable foods to natural grasses through the winter. The landfall area comprises habitats that are unsuitable for the species. No impacts are therefore predicted.

23.6.3.1.12.2 *Impact Associated with the Onshore Cable Corridor*

259. The only location that Bewick's swans were recorded in proximity to the onshore development area was at Hawsell's Farm, in an arable field adjacent to the northern boundary (Compartment 7 shown on ***Figure 23.15***). No habitat recorded as being used by Bewick's swans would therefore be lost due to the construction of the onshore cable corridor. No impacts are therefore predicted.

23.6.3.1.12.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

260. No Bewick's swans were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area. No impacts are therefore predicted.

23.6.3.1.12.4 Significance of Impact

261. As discussed above, no habitat loss is predicted for Bewick's swan within the onshore development area. Therefore, there would be **no impact** on the Leiston-Aldeburgh SSSI or national populations, which is therefore not significant in the context of the EIA Regulations.

23.6.3.1.12.5 Mitigation

262. None required.

23.6.3.1.12.6 Residual Impact

263. The residual impacts on the SSSI and national populations are unchanged (**no impact** and not significant).

23.6.3.2 Impact 2: Construction Disturbance

23.6.3.2.1 Nightjar

23.6.3.2.1.1 Impact Associated with the Landfall

264. In their review of expert literature, Ruddock and Whitfield (2007) indicated that for nightjar, there was an active disturbance (e.g. taking flight, moving away from the observer) upper limit of <10m for nesting nightjar during incubation and 50–100m during chick rearing. Murison (2002) however found a significant negative impact on nightjar density within 500m of a path, suggesting that failures could be linked to predation by corvids and dogs operating in conjunction with human disturbance. Furthermore, FCS (2006) advocated a

safe working distance of forestry operations from nightjar nest sites of 50-200m, based on Currie and Elliott (1997) who advocated set-back working distances of 200m at egg stage and 50-100m at chick stage.

265. Recently, Shewring and Carrington (2017) reported on nightjar monitoring during the construction period of the Pen y Cymoedd Wind Farm in Wales over a three year period. They found no significant difference detected between chick numbers or nest success at nests within and outside 200m disturbance buffers, and suggested that the current standard 200m disturbance buffer is likely to be excessive.

266. Based on the information presented above, any disturbance impacts on nightjar within the onshore development area beyond a 200m buffer from a nest would likely to be those related to increased access for predators, dogs or humans, rather than noise or visual disturbance associated with any construction activities within the onshore development area. The level of access within and surrounding the Sandlings SPA is not however anticipated to change as a result of construction of the proposed East Anglia ONE North project, with most works taking place in agricultural fields not used by the public, suggesting no additional adverse disturbance impacts would occur beyond 200m from a disturbance source.

267. The closest nightjar territory to the edge of the landfall location, recorded from 2009 to 2018, was around 400m away, and as such, the unmitigated construction activity within the landfall area is unlikely to disturb any territories with nesting birds. Additionally, no foraging would be affected in the landfall area due to a lack of suitable habitat, and notably, HDD techniques being used within the landfall area to avoid habitat loss within the SSSI. The associated transition bays would be located in arable farmland, unsuitable for nightjar. A negligible spatial and short-term temporal magnitude of impact is predicted.

23.6.3.2.1.2 Impact Associated with the Onshore Cable Corridor

268. When considering the 200m potential disturbance buffer for nesting nightjars, as a worst-case, two territory centres recorded in the SPA in 2018 were within 200m of the onshore development area, which may potentially be affected by unmitigated construction activities during the construction period. This is likely to be the maximum amount of territories within this range, based on historic RSPB data and 2018 and 2019 nightjar surveys. One of these territories is in proximity to the area demarcated for turtle dove mitigation (see ***Figure 23.5*** and ***section 23.6.3.1.4.5***), and so the risk of construction-related disturbance to breeding birds within this territory is low, with the nearest infrastructure occurring over 200m from the nest site. Remaining unmitigated disturbance risks are therefore likely to be associated with the other territory closer to the

part of the onshore cable corridor that is near to, and crosses the northernmost part of the SPA/SSSI.

269. The likelihood and extent of the territory within proximity to the SPA/SSSI crossing area being affected would depend on the seasonal and spatial restrictions of open-cut trenching or HDD crossing techniques.

270. Where the onshore cable corridor crosses the SPA/SSSI, an open-cut crossing technique is the preferred crossing methodology. Crossing the SPA using this methodology will last an estimated one month in duration, which would take place outside of the breeding bird season, therefore avoiding potential disturbance impacts to breeding nightjar. As a migratory species, no individuals would be present when open-cut trenching through the SPA would take place.

271. Although works along the remainder of the onshore cable corridor (beyond 200m from the SPA/SSSI crossing) could take place within the nightjar breeding season, it is considered unlikely that any breeding nightjars would be disturbed by this, occurring beyond 200m from any probable nest site locations, in unsuitable foraging habitat. As such, a negligible spatial and medium-term temporal magnitude of impact is predicted under the open-cut trenching scenario.

272. If an HDD technique is used to cross the SPA/SSSI, seasonal restrictions within 200m of the SPA/SSSI would again mean that nightjars would not be present within this area when works were carried out, and therefore would not be at risk of disturbance. This includes works associated with the establishment of a HDD entry pit working area and HDD exit pit working area, HDD boring operations and reinstatement of the HDD entry pit and HDD exit pit working areas, which may be split over a number of non-breeding seasons to avoid overlap with breeding activity (as per ***Table 23.4***).

273. Given the seasonal and spatial restrictions associated with the SPA/SSSI crossing, as described above, it is considered unlikely that any nesting nightjars would be subject to disturbance during the construction period. Although it is possible that works during the breeding season along parts of the onshore cable corridor (beyond 200m from the SPA/SSSI overlap) may be within the theoretical maximum foraging range of breeding birds, this would take place in unsuitable habitat. As such, the magnitude of disturbance impact on the regional and SSSI populations is considered to be negligible spatial and medium-term temporal.

23.6.3.2.1.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

274. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for nightjar, and over 3km from the nearest recorded territory. No impacts on nightjar would result from the construction of the substations.

23.6.3.2.1.4 Significance of Impact

275. The unmitigated impact on the regional and SSSI nightjar (high sensitivity) populations from construction is classified with a negligible magnitude of impact as **minor adverse** and therefore not significant. This would be the case for both open-cut trenching and HDD techniques when crossing the SPA/SSSI.

23.6.3.2.1.5 Mitigation

276. Although no significant disturbance impact is predicted, based on known nightjar breeding distribution and habitat requirements, onshore cable corridor work beyond 200m from the SPA/SSSI crossing area may take place during the breeding season. In order to safeguard breeding individuals from disturbance, a Breeding Bird Protection Plan (BBPP) would ensure compliance with the Wildlife and Countryside Act 1981. This will be developed post-consent in consultation with the relevant regulating authorities and is secured under the requirements of the draft DCO. Further detail on the BBPP is provided in the OLEMS submitted with this DCO application, as secured under the requirements of the draft DCO.

277. When undertaking construction works (excluding personnel and vehicle use of haul roads) within 200m of the SPA and SSSI boundary during the breeding bird season (mid-February to August inclusive) the following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- The BBPP will highlight the risks to breeding birds and detail measures to ensure the protection of their nests;
- Pre-construction bird surveys will be undertaken to establish the presence of breeding birds;
- Measures will be adopted to minimise noise, light and disturbance on identified breeding birds, such as visual screening (e.g. opaque fencing) where necessary;
- Construction activities would be monitored by an ECoW or suitably qualified ornithologist, who would seek to ensure compliance with the Wildlife and Countryside Act 1981 by avoiding destruction of nests, eggs or young, and

affording increased protection from disturbance to Schedule 1 species breeding birds; and

- Where breeding bird activity within the SPA is recorded within 200m of construction works, those construction works would be halted immediately until a disturbance risk assessment is undertaken by a suitably qualified ecologist. The risk assessment would consider the nature of construction activity, likelihood of disturbance, and possible implications of the construction activities on the breeding attempt and set out measures to ensure that no disturbance occurs. Where it is determined that breeding birds are not likely to be affected, construction works will continue. Where it is determined that breeding birds may be affected, additional mitigation works will be implemented to prevent disturbance. Where, in the opinion of the suitably qualified ecologist, disturbance cannot be avoided by mitigation, construction works within the area of disturbance will be suspended until chicks have fledged.

23.6.3.2.1.6 Residual Impact

278. When considering the additional BBPP mitigation outlined above, the likelihood of disturbance to any breeding nightjars outside of the seasonally-restricted buffer of 200m from the SPA/SSSI crossing would be minimised. The overall magnitude of impact therefore remains negligible (for both open-cut trenching and HDD techniques), and therefore significance of construction impacts on nightjar, including the Leiston-Aldeburgh SSSI population remains **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.2.2 Woodlark

23.6.3.2.2.1 Impact Associated with the Landfall

279. The closest woodlark territory from 2009 to 2018 was within the Sandlings SPA, over 300m from the landfall onshore development area boundary, and at this distance, construction disturbance is considered unlikely, with visual and noise screening likely to occur naturally due to intermediate habitats, including scrub and woodland. The overall magnitude of impact from landfall construction activities woodlark is therefore considered to be negligible spatial and short-term temporal.

23.6.3.2.2.2 Impact Associated with the Onshore Cable Corridor

280. Approximately seven woodlark territories were recorded in 2018, all but one of these were located within suitable heath, scrub and forestry habitats within the SPA/SSSI, with another possible territory near Aldringham. Of these territories, up to three may overlap in part with the onshore development area (see ***Figure 23.3***).

281. Two of these three territories were however located beside the area allocated for turtle dove mitigation (see ***Figure 23.5*** and ***section 23.6.3.1.4.5***), and so no disturbance would likely affect birds within these territories, with the closest infrastructure occurring beyond 200m away. For the other 2018 territory, close to the northern SPA/SSSI overlapping area, RSPB data show records within a similar location in 2017 and 2018, which was within approximately 200m of the onshore development area. It is therefore possible that unmitigated, construction activities associated with the SPA/SSSI crossing could disturb breeding or foraging birds associated with this territory.

282. In the scientific literature on woodlark disturbance, Mallord et al. (2006) found that the distribution of woodlarks on Dorset heaths was significantly affected by the presence of people and dogs. Heavily disturbed areas were still used for foraging, although the habitat was theoretically suitable for both foraging and nesting. However, there was no recorded impact of disturbance on nest survival or productivity. Dolman (2015) conducted a study of 147 woodlark nests in Breckland Forest, which showed strong evidence that neither woodlark nests success, nor the productivity of successful nests, were affected by the levels of recreational activity observed. Analysis of broods from 54 successful nests gave no evidence that recreational activity affected post-fledging survival.

283. Activities associated with construction within the onshore development area are likely to be more predictable and less intrusive than those associated with recreational access described in the above studies, and indeed those currently occurring in the local area. As such, although there may be some disturbance to foraging birds away from a nest site within the SPA caused by unmitigated construction activities, this is unlikely to affect the species at a regional population level (370 pairs) with breeding likely continuing at similar numbers.

284. The likelihood and extent of the territory closest to the SPA/SSSI crossing area being affected would depend on the seasonal and spatial restrictions of open-cut trenching or HDD crossing techniques.

285. Works associated with open-cut trenching of the SPA/SSSI crossing would take an estimated one month to complete, and occur outside of the woodlark breeding season. The closest breeding territory would therefore be unaffected by any disturbance impacts. Disturbance to any woodlarks present within the SPA during the non-breeding season, when open-cut trenching would take place, are considered to be of negligible spatial and medium-term temporal magnitude, based on the literature evidence provided above.

286. If an HDD technique is used to cross the SPA/SSSI, associated works within 200m of the SPA/SSSI crossing area would also take place outside of the

breeding season, although the phases of construction (see ***Table 23.4***) may be undertaken over two years to comply with the seasonal restriction.

287. Given the seasonal and spatial restrictions associated with the SPA/SSSI crossing, as described above, it is considered unlikely that any nesting woodlarks would be subject to disturbance during the construction period. As works during the breeding season along the remainder of the onshore cable corridor would take place in unsuitable habitat, the magnitude of disturbance impact on the regional and SSSI populations is considered to be negligible spatial and medium-term temporal.

23.6.3.2.2.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

288. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for woodlark, and over 2km from the nearest recorded territory. No impacts on woodlark would result from the construction of the substations.

23.6.3.2.2.4 Significance of Impact

289. The unmitigated impact on the regional and SSSI woodlark populations (high sensitivity) from disturbance associated with construction is classified as **minor adverse** and not significant in the context of the EIA Regulations. This would be applicable for both the open-cut and HHD crossing techniques.

23.6.3.2.2.5 Mitigation

290. Although no significant disturbance impact is predicted, based on known woodlark breeding distribution and habitat requirements, onshore cable corridor work beyond 200m from the SPA/SSSI crossing area may take place during the breeding season. In order to safeguard breeding individuals from disturbance, the mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for woodlark. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting woodlarks are disturbed by construction activities.

23.6.3.2.2.6 Residual Impact

291. When considering the additional BBPP mitigation outlined above, the likelihood of disturbance to any breeding woodlarks outside of the seasonally-restricted buffer of 200m from the SPA/SSSI crossing would be minimised. The overall level of significance of construction impacts on the regional and SSSI woodlark populations remains **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.2.3 Turtle dove

23.6.3.2.3.1 Impact Associated with the Landfall

292. The closest record of a territory to the edge of the landfall area in any year was around 350m to the north, at the edge of the Sandlings SPA. With intensive agricultural habitats within the landfall area generally of lower suitability for the species, disturbance impacts are considered unlikely and a negligible spatial and short-term temporal magnitude of impact is predicted.

23.6.3.2.3.2 Impact Associated with the Onshore Cable Corridor

293. As a species adapted to taking advantage of agricultural practices, it is likely that turtle doves are tolerant of some level of human disturbance, with a number of survey records in proximity to PRoWs, houses and other buildings, as well as intensively managed farmland. A lack of seed food has probably been the major factor limiting the breeding success of turtle doves in recent decades, coupled with land changes and hunting pressures outside of the UK, rather than any pressures from human disturbance.

294. Based on 2018 survey results, and historic records, a total of up to six turtle dove territories may be affected by construction disturbance. With the majority of records to the north of the SPA/SSSI (***Figure 23.5***), the exact extent, duration and nature of disturbance within the onshore cable corridor is likely to be largely dependent on seasonal and spatial restrictions to open-cut trenching or HDD methods used to cross the SPA/SSSI. Disturbance impacts are likely to be restricted to within 100m as the species is relatively tolerant of human presence.

295. Works associated with open-cut trenching across the SPA/SSSI would take an estimated one month to complete, and occur outside of the turtle dove breeding season, when birds are absent. The two closest breeding territories would therefore be unaffected by any disturbance impacts. In other parts of the onshore development area, where no seasonal restrictions are in place, there remains a possibility that unmitigated construction activities could lead to disturbance to up to four territories.

296. All works associated with HDD crossing of the SPA/SSSI would also take place outside of the breeding season, albeit potentially phased over two years to comply with the seasonal restriction (see ***Table 23.4*** for details). The closest two territories are therefore again unlikely to be unaffected by disturbance. Nevertheless, depending on the location of construction activities along the remainder of the onshore cable corridor, construction work has the possibility of suppressing breeding success or productivity of the four remaining pairs present.

297. This worst-case disturbance of up to four territories would potentially affect 0.16% of the regional turtle dove population (approximately 2,380 territories), which is considered to be an impact of negligible spatial and short-term temporal magnitude. When taken within the context of the Leiston-Aldeburgh SSSI population (8-15 territories) however (presuming around two territories may be affected, with the other two outside of the SSSI), the loss of some foraging habitat and possible reduction in productivity is considered to result in an impact of medium spatial and medium-term temporal magnitude.

23.6.3.2.3.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

298. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for turtle dove, and around 1.5km from the nearest recorded territory. No impacts on turtle dove would result from the construction of the substations.

23.6.3.2.3.4 Significance of Impact

299. Under both open-cut trenching and HDD scenarios, the unmitigated impact on the regional turtle dove population from construction disturbance, is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations. Within the context of the comparatively small Leiston-Aldeburgh SSSI population, unmitigated disturbance would represent a **major adverse** and significant impact.

23.6.3.2.3.5 Mitigation

300. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for turtle dove. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting birds are disturbed by construction.

301. In addition to nesting birds, the site identified for turtle dove feeding habitat outlined in ***section 23.6.3.1.4.5*** and shown on ***Figure 23.5*** would provide a benefit for the SSSI breeding population, and would also be subject to ongoing monitoring as part of the BBPP. Measures would be undertaken to ensure that feeding birds in this area are not disturbed by construction activities. The location of this area in proximity to two territories means that no infrastructure would be located in this part of the onshore development area, thereby reducing risks of disturbance to nesting birds within these territories.

23.6.3.2.3.6 Residual Impact

302. When considering the mitigation measures outlined above, including the beneficial effects of the turtle dove feeding area, the likelihood of disturbance has been minimised, and the level of significance of construction impacts on

turtle dove, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant within the context of the EIA Regulations, under both open-cut trenching and HDD scenarios.

23.6.3.2.4 Nightingale

23.6.3.2.4.1 Impact Associated with the Landfall

303. Two territories were recorded in scrub habitat at the edge of the part of the Leiston-Aldeburgh SSSI that would be within the landfall area in 2018 (***Figure 23.6***), although 3-4 territories may have been occupied in 2017 (***Figure 23.13***).

304. Based on the restricted territorial range of the species and the proximity of nest sites to potential sources of disturbance such as PRoWs, disturbance is likely to be limited to within around 100m of nest sites, subject to the nature of the disturbance source. At the landfall, construction will comprise drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. However, some construction activity associated with the transition bays and landfall HDD may cause disturbance for one breeding season, depending on the distance they are sited from the SSSI. It is therefore possible that up to four territories may be affected if construction works occur within 100m of the SSSI. The impact is likely to be of negligible spatial and short-term temporal magnitude within the context of the regional population, but medium spatial and short-term temporal within the context of the Leiston-Aldeburgh SSSI population (at least 18 territories) if in a worst-case these territories are lost for the duration of construction works in this area.

23.6.3.2.4.2 Impact Associated with the Onshore Cable Corridor

305. Up to three further territories were recorded inside, or adjacent to the onshore development area in 2016 to 2018 where there is overlap with the northern section of the SPA/SSSI (***Figure 23.6*** and ***Figure 23.13***). Additionally, in 2016 and 2017 a further territory was recorded adjacent to the onshore development area at Sizewell Common, with a 2017 territory recorded within 100m of the onshore development area near Aldringham.

306. It is possible that these five territories, if all occupied, may be subject to disturbance during the construction period. The likelihood and extent of the three within the SPA/SSSI crossing area being affected would depend on the seasonal and spatial restrictions of open-cut trenching or HDD crossing techniques.

307. Works associated with open-cut trenching across the SPA/SSSI would take an estimated one month to complete, and occur outside of the nightingale breeding season, when birds are absent. The three closest breeding territories would therefore be unaffected by any disturbance impacts. In other parts of the

onshore cable corridor, where no seasonal restrictions are in place, there remains a possibility that unmitigated construction activities could lead to disturbance to up to two territories.

308. All works associated with HDD crossing of the SPA/SSSI would also take place outside of the breeding season, albeit potentially phased over two years to comply with the seasonal restriction (see ***Table 23.4*** for details). The closest three territories are therefore again unlikely to be unaffected by disturbance. Nevertheless, depending on the location of construction activities along the remainder of the onshore cable corridor, construction work has the possibility of suppressing breeding success or productivity of the two remaining pairs present.

309. The unmitigated loss of up to two territories for the duration of construction, would not likely reach significance (negligible spatial and short-term temporal magnitude). Neither of these territories are within the proximity of the SSSI and so there would be no impacts on the SSSI population under either the open-cut trenching or HDD scenarios.

23.6.3.2.4.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

310. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for nightingale, and around 3km from the nearest recorded territory. No impacts on nightingale would result from the construction of the substations.

23.6.3.2.4.4 Significance of Impact

311. When considering both the landfall and onshore cable corridor sections, a total of up to six nightingale territories may be affected by unmitigated construction disturbance. Of these, four territories (all at the landfall area) would form part of the SSSI population. The total unmitigated impact on the regional nightingale population from disturbance is likely to be of at worst, low magnitude, and therefore classified as **minor adverse** and not significant in the context of the EIA Regulations. Within the context of the Leiston-Aldeburgh SSSI population, the temporary loss of up to four territories as a worst-case scenario would represent a **major adverse** and potentially significant unmitigated impact.

23.6.3.2.4.5 Mitigation

312. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for nightingale. The BBPP, as outlined in ***Table 23.4*** would ensure that no nesting birds are disturbed by construction activities.

23.6.3.2.4.6 Residual Impact

313. When considering the mitigation measures outlined above, the likelihood of disturbance is minimised and the level of significance of construction impacts on nightingale, including the Leiston-Aldeburgh SSSI population can be reduced to **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.2.5 Marsh harrier

23.6.3.2.5.1 Impact Associated with the Landfall

314. Although present in flight in the area, no marsh harriers were recorded utilising the landfall area. The majority of fields within the landfall area are unlikely to be suitable breeding or foraging habitat for the species. As such no disturbance impacts are predicted.

23.6.3.2.5.2 Impact Associated with the Onshore Cable Corridor

315. There was one marsh harrier observation within the onshore development area in 2018, of a bird in flight above arable fields, and there are no historic breeding records. It is possible that some foraging habitat may be lost due to disturbance associated with construction works in this area. The intensively managed arable fields within the onshore development area are however likely to be suboptimal foraging habitat compared to areas nearby such as The Fens where birds were regularly recorded, and so within the context of the regional population and Leiston-Aldeburgh SSSI population, the magnitude of disturbance from a small amount of suboptimal foraging habitat is considered to be negligible spatial and medium-term temporal.

23.6.3.2.5.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

316. The onshore substation and National Grid infrastructure, located at the westernmost part of the onshore development area, would not be within an area of suitable habitat for marsh harrier, and around 2km from the nearest observation in 2018. No impacts on marsh harrier would result from the construction of the substations.

23.6.3.2.5.4 Significance of Impact

317. As discussed above, the species sensitivity is medium-high and the magnitude of impact is negligible. Therefore, the unmitigated impact on marsh harriers from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations, including within the context of the Leiston-Aldeburgh SSSI and other SSSI populations.

23.6.3.2.5.5 Mitigation

318. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding marsh harrier territories within

400m of the onshore development area (based on disturbance evidence in Ruddock and Whitfield 2007), and seek to ensure that no breeding activity is disturbed by construction works that would occur from late March to August inclusive, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***.

23.6.3.2.5.6 Residual Impact

319. When considering the mitigation measures outlined above, the level of significance of construction impacts on marsh harrier, including the Leiston-Aldeburgh SSSI population can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.6 Barn owl

23.6.3.2.6.1 Impact Associated with the Landfall

320. No barn owls were recorded within the vicinity of the landfall area, and no historic breeding records, or known nest boxes are within this area. It therefore follows that there would be no impacts of construction activities within the landfall area on barn owl.

23.6.3.2.6.2 Impact Associated with the Onshore Cable Corridor

321. No barn owls were recorded within the onshore development area in 2018, although it is acknowledged that the range of surveys undertaken were not designed for recording this species. The Suffolk Community Barn Owl Project did not know of any other nest sites within the onshore ornithology study area in 2018. It therefore follows that there would be no impacts of construction activities within the onshore cable corridor on barn owl.

23.6.3.2.6.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

322. One occupied barn owl nest box was recorded within the onshore substation and National Grid infrastructure areas in 2018. The nest box is within a working farmyard, so direct disturbance to nesting birds (based on a recommended protection zone from construction disturbance of up to 175m, advocated by Shawyer 2011) is considered unlikely. Nevertheless, the possible loss of one barn owl pair due to disturbance of foraging activity associated with construction of the onshore substation and National Grid infrastructure would represent less than 1% of the regional breeding population (around 450 pairs) and so impacts at this scale would be of negligible spatial and short-term temporal magnitude.

23.6.3.2.6.4 Significance of Impact

323. As discussed above, the species sensitivity is low-medium and the magnitude of impact is negligible. Therefore, the unmitigated impact on the regional barn

owl population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.6.5 Mitigation

324. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding barn owl nest sites within 200m of the onshore development area, and seek to ensure that no breeding activity is disturbed by construction activities, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***. This mitigation is secured within the EMP and detailed within the OLEMS submitted with this DCO application.

325. If it is predicted that any barn owl nest sites would be affected by construction activities, then as outlined in ***section 23.6.3.1.7.5***, prior to construction the erection of new nest boxes in suitable locations within the onshore development area would take place where feasible.

23.6.3.2.6.6 Residual Impact

326. When considering the mitigation measure outlined above, the level of significance of construction impacts on barn owl can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.7 Cetti's Warbler

23.6.3.2.7.1 Impact Associated with the Landfall

327. A single territory was located in 2018 within scrubby habitat at the edge of the SSSI, in the landfall area.

328. At the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI, and therefore the risk of disturbance would be reduced. However, some construction activity associated with the transition bays and landfall HDD may cause disturbance depending on the distance they are sited from the SSSI. It is therefore possible that one territory may be affected for a single breeding season if HDD or open-cut trenching construction activity takes place within 100m of a nest site (based on the limited extent of breeding territories and current proximity to PRoWs etc.). Although the regional Cetti's warbler population is unknown, Suffolk is recognised as a stronghold for the national population (1,827 pairs), and so the predicted magnitude of impact is negligible spatial and short-term temporal.

23.6.3.2.7.2 Impact Associated with the Onshore Cable Corridor

329. No Cetti's warbler territories were recorded within the onshore cable corridor area of the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.2.7.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

330. No Cetti's warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.2.7.4 Significance of Impact

331. As discussed above, the species sensitivity is low-medium and the magnitude of impact (temporary loss of up to one territory) is negligible. Therefore, the unmitigated impact on the regional Cetti's warbler population from temporary construction disturbance is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.7.5 Mitigation

332. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding Cetti's warbler territories within 100m of the onshore development area, and seek to ensure that no breeding activity is disturbed by construction works, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5.***

23.6.3.2.7.6 Residual Impact

333. When considering the mitigation measures outlined above, the level of significance of construction impacts on Cetti's warbler can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.8 Dartford Warbler

23.6.3.2.8.1 Impact Associated with the Landfall

334. The closest territory to the edge of the landfall area in any year was over 500m away, and so no disturbance impacts are predicted to occur. The majority of the landfall area comprises unsuitable habitat for the species, with the small area of scrub within the SSSI being unaffected due to HDD techniques being deployed in this area.

23.6.3.2.8.2 Impact Associated with the Onshore Cable Corridor

335. Approximately four Dartford warbler territories were recorded within the SPA in 2018, with the closest occurring around 200m from the onshore development area (***Confidential Figure 23.8***). A recently fledged family group was however recorded to the north of the SPA within 100m of the onshore development area, suggesting that some disturbance to post-breeding birds may occur during the construction period. No RSPB historic records were located within at least 150m of the onshore development area, and recorded distribution is consistent with that observed in 2018 (***Confidential Figure 23.14***).

336. Under the open-cut trenching method for crossing the SPA/SSSI, works would take place over the period of one month, outside of the Dartford warbler breeding season. No breeding territories are therefore likely to be affected by disturbance under this scenario.

337. HDD crossing of the SPA/SSSI is also unlikely to affect any breeding pairs, also occurring outside of the breeding season, with no historic records of birds using this part of the SPA/SSSI, which is generally of suboptimal dense scrub habitat.

338. The magnitude of impact, within the context of the regional population, is considered to be negligible spatial and short-term temporal for both open-cut trenching and HDD methods.

23.6.3.2.8.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

339. No Dartford warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.2.8.4 Significance of Impact

340. As discussed above, the species sensitivity is low-medium and the magnitude of impact is negligible. Therefore, the unmitigated impact on the regional Dartford warbler population from construction disturbance is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.8.5 Mitigation

341. The mitigation outlined in ***section 23.6.3.2.1.5*** for nightjar, is also applicable for Dartford warbler. The BBPP, as outlined in ***Table 23.4,*** would ensure that no nesting birds are disturbed by construction.

23.6.3.2.8.6 Residual Impact

342. When considering the mitigation measures outlined above, the level of significance of construction impacts on Dartford warbler can be reduced to **negligible** and not significant within the context of the EIA Regulations.

23.6.3.2.9 Marsh Warbler

23.6.3.2.9.1 Impact Associated with the Landfall

343. In 2018 there was one record of a singing male within an area of suitable scrubby breeding habitat within the landfall search area, which is considered to represent a possible territory (***Figure 23.8***). There have been no marsh warbler records during surveys in 2019. It should be noted that at the landfall, construction will comprise of drilling under the Leiston-Aldeburgh SSSI with no construction footprint on Leiston-Aldeburgh SSSI. However, some construction

activity associated with the transition bays and landfall HDD may cause disturbance depending on the distance they are sited from the SSSI (likely to be confined to within 100m based on restricted territory extent of the species). It is therefore possible that one territory may be affected. This would result in a medium spatial and short-term temporal impact magnitude at a national level, assuming a population of around eight pairs.

23.6.3.2.9.2 Impact Associated with the Onshore Cable Corridor

344. No marsh warbler territories were recorded within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.2.9.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

345. No marsh warbler territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, with habitat generally unsuitable for the species. No impacts are therefore predicted.

23.6.3.2.9.4 Significance of Impact

346. Although there is a commitment to HDD techniques in the landfall area, the possibility of associated construction disturbance in proximity to the SSSI may result in a magnitude of impact of medium and a **major adverse** unmitigated impact on the national marsh warbler population, which is significant in the context of the EIA Regulations.

23.6.3.2.9.5 Mitigation

347. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding marsh warbler territories within 100m of the onshore development area, and seek to ensure that no breeding activity is disturbed by construction activities that would occur, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***.

23.6.3.2.9.6 Residual Impact

348. When considering the mitigation measures outlined above, the likelihood of disturbance has been minimised and the level of significance of construction impacts on marsh warbler can be reduced to **minor adverse** and not significant within the context of the EIA Regulations.

23.6.3.2.10 Yellow Wagtail

23.6.3.2.10.1 *Impact Associated with the Landfall*

349. No yellow wagtail observations were made in 2018 within 1km of the edge of the landfall area. The species breeds in arable farmland, wet pastures and

upland hay meadows, and so little suitable habitat exists in the area. No impacts are therefore predicted.

23.6.3.2.10.2 *Impact Associated with the Onshore Cable Corridor*

350. One to two pairs were likely to have bred within or adjacent to the onshore development area in 2018 (***Figure 23.9***), with records on farmland on the northern edge of the Sandlings SPA that has been identified for turtle dove supplementary feeding during construction (see ***section 23.6.3.1.4.5***). Distribution in 2019 has been similar (***Figure 23.16***).

351. It is therefore unlikely that, based on the distance of the construction footprint from recorded territories, any suitable breeding or foraging habitat would be affected due to construction disturbance impacts. Even as a worst-case, the loss of up to two territories during the construction period would be unlikely to reach significance at a regional level. As such the magnitude of impact is considered to be low spatial, and short-term temporal.

23.6.3.2.10.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

352. No yellow wagtail territories were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area, although habitat may be suitable for the species. No impacts are however predicted.

23.6.3.2.10.4 Significance of Impact

353. As discussed above, the species sensitivity is medium and the magnitude of impact is low. Therefore, the unmitigated impact on the regional yellow wagtail population from construction is classified as **minor adverse** and is therefore not significant in the context of the EIA Regulations.

23.6.3.2.10.5 Mitigation

354. During the construction phase, surveys conducted by the ECoW or a suitably qualified ornithologist would identify any breeding yellow wagtail territories within 100m of the onshore development area, and seek to ensure that no breeding activity is disturbed by construction works, following a similar procedure as to that outlined for nightjar in ***section 23.6.3.2.1.5***.

23.6.3.2.10.6 Residual Impact

355. The residual impacts on the regional yellow wagtail population are unchanged (**minor adverse** and not significant).

23.6.3.2.11 Bewick's Swan

23.6.3.2.11.1 *Impact Associated with the Landfall*

356. No Bewick's swan observations were made in the 2017-18 or 2018-19 winters within 2km of the landfall area. No impacts are therefore predicted.

23.6.3.2.11.2 *Impact Associated with the Onshore Cable Corridor*

357. Up to 11 Bewick's swans were recorded adjacent to the north of the onshore development area, in an arable field on Hawsell's Farm (Compartment 7, ***Figure 23.15***) during surveys in 2018-19. Birds were present in December and January only. Although this location is around 3km from the closest suitable habitat within the Leiston-Aldeburgh SSSI, individuals may forage widely and be connected to the SSSI population.

358. Very little information exists as to disturbance risks to Bewick's swan, although Rees et al. (2006) studied the response of whooper swans to disturbance within the Black Cart SPA, Scotland, and found that distances that humans could approach before birds were alerted depended on disturbance type. Generally, ground-level disturbance occurred at ranges of around 150m to 400m. Anglers and wildfowlers alerted the swans at greater distances than other pedestrians, and cars and bicycles were able to approach closer than other vehicles. The distance at which >5% of the flock became alert because of human activity decreased with the number of previous incidents in the day, indicating that swans become less sensitive to disturbance events if daily disturbance frequency is high, but there was no evidence that habituation to disturbance persisted over longer periods. Disturbance frequency resulting from human activity was lower with increasing flock size and with increased distance to the nearest road or track.

359. It is therefore possible that birds present on the adjacent Hawsell's Farm field may be disturbed by unmitigated HDD or open-cut trenching construction activities, particularly in midwinter, depending on how close they are from occupied fields. The SSSI and regional populations are likely to be low (probably <50 birds in total) and so the displacement, and therefore potential loss, of up to 11 individuals (maximum count in 2018-19) would represent an impact of medium spatial temporal magnitude. In practice it is however more likely that rather than being lost to the population, disturbed birds would relocate to suitable habitat elsewhere within the region, for example within the SSSI, and individuals' fitness would not be significantly affected. An impact of low spatial, and short-term temporal magnitude is therefore predicted.

23.6.3.2.11.3 Impact Associated with the Onshore Substation and National Grid Infrastructure

360. No Bewick's swans were recorded within the onshore substation and National Grid infrastructure areas within the onshore development area. No impacts are therefore predicted.

23.6.3.2.11.4 Significance of Impact

361. As discussed above, the species sensitivity is high and the magnitude of impact is low. Therefore, the unmitigated impact on the Leiston-Aldeburgh SSSI and regional Bewick's swan populations from construction is classified as **moderate adverse** and is therefore potentially significant in the context of the EIA Regulations.

23.6.3.2.11.5 Mitigation

362. The occupied fields around Hawsell's Farm are within an area subject to intensively managed farmland and close to PRoWs. As such, swans and geese here are likely to be tolerant of some forms of human presence, meaning that avoidance reactions at the lower end of disturbance ranges referenced above are predicted. Therefore, it is planned that if construction activities are due to take place within 200m of Compartment 7 (***Figure 23.15***) during the midwinter period (November to February), the following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- Bird surveys will be undertaken prior to commencement of works in this area, to establish the presence of wintering Bewick's swan;
- Measures will be adopted to minimise noise, light and disturbance on identified areas (Compartment 7), such as visual screening (e.g. opaque fencing) where necessary; and
- Construction activities would be monitored by an ECoW or suitably qualified ornithologist, who would determine whether any further mitigation measures are required to avoid disturbance.

363. These mitigation measures, if required, would also reduce the likelihood of disturbance to geese species (e.g. tundra bean goose, pink-footed goose) that may also be present in Compartment 7.

23.6.3.2.11.6 Residual Impact

364. With the mitigation measures outlined above designed to minimise the likelihood of a significant disturbance impact on Bewick's swans, the residual impacts on the Leiston-Aldeburgh SSSI and regional populations are reduced to (**minor adverse** and not significant.

23.6.4 Potential Impacts during Operation

365. The predicted worst-case operational parameters are outlined in ***Table 23.3***, which describes a situation with an above ground infrastructure footprint, and associated activities, centred on the onshore substation and National Grid infrastructure. Further information is presented in ***Chapter 6 Project Description***. The possible associated operational impacts for onshore ornithology are described and assessed below.

23.6.4.1 Impact 1: Disturbance from Maintenance Activities

366. Routine maintenance is not anticipated for the onshore cable route.

367. It is anticipated that the onshore substation would not be permanently staffed. There would be the occasional maintenance visits. Maintenance of the National Grid infrastructure would be undertaken regularly to ensure its continued safe and efficient operation.

368. Along the onshore cable route, emergency repairs are therefore expected to be infrequent and short-term in duration. This would only briefly affect IOFs within the immediate vicinity of the area(s) being visited. With the exception of barn owl, a species tolerant of human presence, no IOFs are likely to be found in proximity to the substation or National Grid infrastructure. As a consequence, disturbance from noise and human presence is predicted to be **minor adverse** and therefore not significant.

23.6.4.2 Impact 2: Disturbance to Fauna from Operational Lighting and Noise

369. Operational lighting will be required for operation and maintenance activities at the onshore substation and National Grid substations only, and under normal conditions the substation would not be permanently lit. External lighting would be installed on the perimeter and within the onshore substation and the National Grid substation and cable sealing end compounds for security purposes and to facilitate maintenance or repair works during the hours of darkness or low light, although the National Grid infrastructure would not normally be lit. Additional temporary task lighting may also be used in any area in which maintenance or repair works are being undertaken.

370. With the exception of barn owl, a species tolerant of human presence, no IOFs are likely to be found in proximity to the onshore substation or National Grid infrastructure.

371. An Artificial Light Emissions Management Plan will be developed for the final design for the permanent infrastructure, as secured under the requirements of the draft DCO, which will include measures to minimise light spill following the recommendations regarding birds set out in the Bat Conservation Trust's (BCT)

Artificial Lighting and Wildlife guidance (2014). As a consequence, disturbance from lighting (above general operational movements on and off site) is predicted to be **minor adverse**, with a negligible magnitude of impact on medium-high sensitivity) and therefore not significant, and only have the potential to affect IOFs in the immediate vicinity of the onshore and National Grid substation areas. This is detailed further within the OLEMS submitted with this DCO application.

23.6.4.3 Mitigation

372. No additional mitigation measures are required, for Impact 1 or Impact 2.

23.6.4.4 Residual Impact

373. Residual impacts remain **minor adverse** and therefore not significant for all IOFs, due to operational impacts.

23.6.5 Potential Impacts during Decommissioning

374. No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

23.7 Cumulative Impacts

23.7.1 Cumulative Impact with proposed East Anglia TWO Project

375. The East Anglia TWO offshore windfarm project (the proposed East Anglia TWO project) is also in the application phase. The proposed East Anglia TWO project has a separate DCO application which has been submitted at the same time as the proposed East Anglia ONE North project. The two projects share the same landfall location and onshore cable corridor and the two onshore substations are co-located, and connect into the same National Grid substation.

376. The proposed East Anglia ONE North project CIA therefore initially considers the cumulative impact with only the East Anglia TWO project.

377. The CIA considers the proposed East Anglia ONE North project and the proposed East Anglia TWO project under two construction scenarios:

- Scenario 1 - the proposed East Anglia ONE North project and proposed East Anglia TWO project are built simultaneously; and
- Scenario 2 - the proposed East Anglia ONE North project and the proposed East Anglia TWO project are built sequentially.

378. The worst case (based on the assessment of these two construction scenarios) for each impact is then carried through to the wider CIA which considers those developments which have been screened into the CIA (***section 23.7.2***). The operational phase impacts will be the same irrespective of the construction scenario. For a more detailed description of the assessment scenarios please refer to ***Chapter 5 EIA Methodology***.

379. Full assessment of scenario 1 and scenario 2 can be found in ***Appendix 23.2***. This assessment found that scenario 2 represented the worst case impacts for onshore ornithology. A summary of those impacts can be found in ***Table 23.20***.

Table 23.20 Summary of Potential Cumulative Impacts Identified for Onshore Ornithology under Construction Scenario 2

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation Measures	Residual Impact
Cumulative Construction Impacts with the proposed East Anglia TWO project						
Impact 1: Habitat loss	All IOFs	Medium-High	Unchanged As per proposed East Anglia ONE North project alone – ***section 23.6.3.1***	Unchanged As per proposed East Anglia ONE North project alone	No additional mitigation required. As per proposed East Anglia ONE North project alone: turtle dove feeding area, SPA habitat management for nightingale, barn owl nest box provision within the onshore development area, habitat reinstatement.	**Negligible or minor adverse** **Not Significant**
Impact 2: Disturbance	All IOFs	Medium-High	Unchanged As per proposed East Anglia ONE North project alone – ***section 23.6.3.2***	Unchanged As per proposed East Anglia ONE North project alone	No additional mitigation required. As per proposed East Anglia ONE North project alone: BBPP	**Negligible or minor adverse** **Not Significant**
Cumulative Operation Impacts with the proposed East Anglia TWO project						
Impact 1: Disturbance	All IOFs	Medium-High	Unchanged As per proposed East Anglia ONE North project alone	Unchanged (minor adverse) As per proposed East Anglia ONE North project alone	No mitigation required.	**Minor adverse** **Not Significant**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation Measures	Residual Impact
Impact 2: Lighting	All IOFs	Medium-High	Unchanged As per proposed East Anglia ONE North project alone	Unchanged (minor adverse) As per proposed East Anglia ONE North project alone	No mitigation required.	**Minor adverse** **Not Significant**
Cumulative Decommissioning Impacts with the proposed East Anglia TWO project						
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.						

23.7.2 Cumulative Impact Assessment with Other Developments

380. The assessment of cumulative impacts has been undertaken here as a two stage process. Firstly, all impacts considered in ***section 23.6*** have been assessed for the potential to act cumulatively with other projects. Potential cumulative impacts are set out in ***Table 23.21***.

Table 23.21 Potential Cumulative Impacts

Impact	Potential for Cumulative Impact	Rationale
Construction		
Habitat loss	Yes	Cumulative direct habitat loss impacts arising from two or more projects are possible. Impacts may occur where project boundaries overlap on habitats used by a particular IOF. Such impacts have the potential to affect breeding and/or foraging activities.
Construction disturbance	Yes	Cumulative disturbance may arise when the construction periods of two or more projects overlap temporally, within suitable habitats used by a particular IOF. This may impact on breeding and/or foraging activities.
Operation		
Disturbance from maintenance activities	No	Maintenance activities likely to be highly localised, short-term and lower intensity than construction activities so unlikely to affect any IOF.
Disturbance from operational lighting and noise	No	Impacts are likely to be restricted to around the onshore substation and National Grid substation. No IOFs are likely to be affected due to lack of suitable habitat in the vicinity.
Decommissioning		
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.		

381. The second stage of the CIA is an assessment of whether there is spatial overlap between the extent of potential impacts of the onshore infrastructure and the potential impacts of other projects scoped into the CIA upon the same receptors.

To identify whether this may occur, the potential nature and extent of impacts arising from all projects scoped into the CIA have been identified and any overlaps between these and the impacts identified in ***section 23.6.*** Where there is an overlap, an assessment of the cumulative magnitude of impact is provided.

382. Following a review of projects which have the potential to overlap temporally or spatially with the proposed East Anglia ONE North project, two developments have been scoped into the CIA. ***Table 23.22*** provides detail regarding these projects.

383. The full list of projects for consideration has been developed in consultation with the Local Planning Authority. The remainder of the section details the nature of the cumulative impacts against all those receptors scoped in for cumulative assessment.

Table 23.22 Summary of Projects considered for the CIA in Relation to Onshore Ornithology

Project Name	Status	Development Period	[9]Distance from East Anglia TWO Onshore Development Area	Project Definition	Level of Information Available	Included in CIA	Rationale
Sizewell C New Nuclear Power Station	PEIR formally submitted 04.01.19	Planning application expected in 2020. Construction expected to commence in 2021.	1.4km	A new nuclear power station at Sizewell in Suffolk. Located to the north of the existing Sizewell B Power Station Complex, Sizewell C New Nuclear Power Station would have an expected electrical capacity of approximately 3,260 megawatts (MW). Full PEIR available: https://www.edfenergy.com/download-centre?keys=&tid=1380&year%5Bvalue%5D%5Byear%5D=	Tier 5[10]	Yes	Onshore development area in close proximity to Sizewell C site boundary, may result in impacts on IOFs during the construction phase.
Sizewell B Power Station Complex	Planning application formally submitted 18.04.19. Awaiting Decision.	Construction expected to commence in 2022. Expected construction timetable of 53 months. Peak construction expected 2022, completion expected 2027.	1.4km	The demolition and relocation of facilities at the Sizewell B Power Station Complex. In outline, demolition of various existing buildings (including the outage store, laydown area, operations training centre and technical training facility), and erection of new buildings, including a visitor centre, and the construction of new access road, footpath and amended junction at Sizewell Gap; and associated landscaping and earthworks/recontouring. Full planning application available: https://publicaccess.eastsuffolk.gov.uk/onlineapplications/applicationDetails.do?activeTab=summary&keyVal=PQ5NVGQXJJ100	Tier 4[11]	Yes	Onshore development area in close proximity to Sizewell B site boundary, may result in impacts on IOFs during the construction phase.

[9] Shortest distance between the considered project and East Anglia TWO– unless specified otherwise
[10] Based on criteria set out in ***section 5.7.2*** of ***Chapter 5 EIA Methodology***
[11] Based on the definition of Tier 4 outlined in ***section 5.7.2*** of ***Chapter 5 EIA Methodology***

23.7.2.1 Cumulative Impacts during Construction

384. The main development site for Sizewell C New Nuclear Power Station would be located directly to the north of the existing Sizewell B Power Station, approximately 1.3km from the onshore development area (and 1.6km from the Sandlings SPA) at its closest point. The Sizewell C development comprises the nuclear power station, access roads and temporary development required for construction. According to the Sizewell C PEIR (EDF Energy 2019), the most common habitats within the main development site are agricultural farmland with large areas of conifer plantation and smaller areas of deciduous woodland, acid grassland and heathland.

385. The Sizewell B Power Station Complex project comprises the relocation and consolidation of nineteen of the existing Sizewell B Power Station Complex facilities. Several of the facilities would need to be relocated from the area of land that is nominated as being part of the site proposed for the development of the Sizewell C New Nuclear Power Station. There will be two main areas of expansion associated with these plans: a car park, laydown area and training centre to the west of the existing Sizewell A power station in an area of mixed plantation woodland and scrub; and the creation of an outage car park and access, to the south of Sizewell A within an area of semi-improved grassland ('Pillbox Field'). The Pillbox Field car park is the closest point of the Sizewell B and C developments to the onshore development area, being around 450m to the east (and approximately 650m east of the Sandlings SPA).

386. In the scenario where the Sizewell C Project application is consented and implemented, Sizewell B Power Station Complex would be completely built out and the area of land that is nominated for Sizewell C New Nuclear Power Station power station, to the north of the Sizewell B Power Station Complex site, would be left ready for future development. In the event that the planning application for Sizewell B Power Station Complex is consented and implemented, but the Sizewell C New Nuclear Power Station development does not come forward within a timescale agreed with East Suffolk Council, outage car park construction at Pillbox Field and phase two works would not be progressed.

387. According to the Sizewell C PEIR, baseline studies conducted over four breeding seasons recorded the following IOFs: Cetti's warbler, barn owl, and marsh harrier. The Sizewell C New Nuclear Power Station proposed Nuclear Development Scoping Report (2014) noted that studies recorded Cetti's warbler within wet woodland in Sizewell Marshes, and barn owl foraging widely. Sizewell Marshes supports small numbers of breeding Cetti's warbler. Marsh harrier were recorded nesting at Minsmere and hunting over Sizewell Marshes SSSI and adjacent arable farmland.

388. There was no evidence to suggest that any other IOFs, including nightjar or woodlark are currently breeding within the Sizewell C New Nuclear Power Station study area. Baseline surveys for the Sizewell B Power Station Complex project did not record any IOFs within the study area (comprising mainly areas of existing infrastructure).

389. Therefore, based on the available Sizewell C New Nuclear Power Station and Sizewell B Power Station Complex information, there is the potential for cumulative impacts on the following IOFs: marsh harrier, barn owl and Cetti's warbler. These species have been taken forward into the CIA.

23.7.2.1.1 Impact 1: Habitat Loss

23.7.2.1.1.1 Marsh harrier

390. The evidence provided above in ***section 23.6.3.1*** shows that the onshore development area does not generally appear to be a suitable habitat for marsh harrier, with birds recorded only on a small number of occasions over the onshore ornithology study area.

391. No direct habitat loss for marsh harrier was predicted by the Sizewell B Power Station Complex and Sizewell C New Nuclear Power Station projects, although the Sizewell C New Nuclear Power Station project plans include a vehicular and pedestrian crossing over the Sizewell Marshes SSSI south of Goose Hill. However, as part of the embedded mitigation for Sizewell C New Nuclear Power Station, alternative foraging habitat, designed to support large populations of marsh harrier prey species, would be established across the northern part of the EDF Energy Estate in advance of construction, to mitigate any potential disturbance impacts (see below) and allow continuation of foraging over parts of the Minsmere South Levels and Sizewell Marshes SSSI during construction. No suitable marsh harrier habitat would be affected by the Sizewell B proposals.

392. No additional significant cumulative impacts on the marsh harrier regional or SSSI populations are therefore predicted due to a lack of habitat loss (temporary and permanent) predicted for the East Anglia ONE North project alone, and for Sizewell B and C, particularly when embedded mitigation for Sizewell C New Nuclear Power Station, in the form of habitat provision is considered (**minor adverse** and not significant).

23.7.2.1.1.2 Barn Owl

393. Barn owl was recorded only in the vicinity of the onshore substation and National Grid infrastructure (one nest site within farm buildings), and so any birds affected by the proposed East Anglia ONE North project would be different individuals from those near the Sizewell C New Nuclear Power Station and Sizewell B Power Station Complex developments. No significant loss of barn owl habitat was

predicted due to the East Anglia ONE North project alone, particularly when the mitigation of nest box provision is included. Similarly, provision of nest boxes was included as mitigation for the Sizewell C New Nuclear Power Station project, despite no habitat loss being predicted. No barn owls were recorded for Sizewell B baseline surveys. Overall, no significant cumulative impacts on the regional barn owl population are predicted (**minor adverse** and not significant).

23.7.2.1.1.3 Cetti's warbler

394. For Cetti's warbler, proposed East Anglia ONE North project works associated with the landfall would use HDD crossing techniques, and therefore no habitat loss is considered likely.

395. Sizewell Marshes supports small numbers of breeding Cetti's warbler, and the Sizewell C New Nuclear Power Station project plans include a vehicular and pedestrian crossing over the Sizewell Marshes SSSI south of Goose Hill. Any loss of habitat would however be mitigated by the establishment of new reedbed and ditches at Aldhurst Farm to the west of Sizewell B (completed in 2016), which according to the Sizewell C New Nuclear Power Station PEIR ((EDF 2019), have been established successfully.

396. No additional cumulative impacts on the regional Cetti's warbler population is therefore predicted (**minor adverse** and not significant).

23.7.2.1.2 Impact 2: Construction Disturbance

397. The construction of the Sizewell C New Nuclear Power Station is predicted to take between 9 and 12 years. The construction period (including associated demolition works) associated with Sizewell B Power Station Complex is expected to approximately four and a half years which would therefore overlap with four to five breeding seasons.

23.7.2.1.2.1 Marsh harrier

398. With habitat largely unsuitable for marsh harrier, disturbance impacts associated with the proposed East Anglia ONE North project were considered to be of negligible magnitude.

399. The Sizewell C New Nuclear Power Station PEIR (EDF 2019) identified that noise levels, along with visual disturbance from construction across the Sizewell C main development site could potentially act as a barrier to the movement of marsh harriers south into Sizewell Marshes SSSI from breeding sites within the Minsmere to Walberswick SPA and Ramsar site to the north. Marsh harriers could therefore be displaced from suitable foraging habitat within Sizewell Marshes SSSI, and arable habitat on the western side of the main development

site. This loss of foraging habitat was judged to potentially have a long-term impact on the breeding success of marsh harriers.

400. As outlined in Impact 1, to mitigate this potential adverse impact, as part of the embedded mitigation, alternative foraging habitat for marsh harrier would be established across the northern part of the EDF Energy Estate in advance of construction. In addition, boundary treatments are included within the Sizewell C New Nuclear Power Station construction masterplan to minimise noise and visual disturbance to adjacent designated sites or valuable habitats.

401. No additional cumulative disturbance impacts on the regional and SSSI marsh harrier populations are therefore predicted (**minor adverse** and not significant).

23.7.2.1.2.2 Barn Owl

402. Disturbance impacts for barn owl, associated with the proposed East Anglia ONE North project were considered to be of negligible magnitude. Although not specifically addressed in the Sizewell C New Nuclear Power Station PEIR, disturbance impacts on the species are unlikely to be significant. If barn owl nest sites or potential nest sites are identified during construction, then alternative nest structures would be provided.

403. No additional cumulative disturbance impacts on the regional barn owl population are therefore predicted (**minor adverse** and not significant).

23.7.2.1.2.3 Cetti's warbler

404. For Cetti's warbler, proposed East Anglia ONE North project works associated with the landfall would use HDD crossing techniques. It was however considered a possibility that one territory may be affected due to construction disturbance associated with these works, if unmitigated.

405. Although not addressed specifically in the Sizewell C New Nuclear Power Station PEIR, it is possible that construction activity, particularly in proximity to suitable habitat within the Sizewell Marshes may affect a small number of Cetti's warblers. This is unlikely to reach significance at a regional level. As noted in Impact 1 above, suitable reedbed habitat creation away from the construction areas would help offset any displacement impacts.

406. No additional cumulative disturbance impacts on the regional Cetti's warbler population are therefore predicted (**minor adverse** and not significant).

23.7.2.2 Cumulative Impacts during Operation

407. As outlined in ***Table 23.21***, no cumulative operational impacts are predicted due to the lack of impacts during the operational phase on all IOFs, associated with the proposed East Anglia ONE North project alone.

408. No significant impacts on bird species arising from lighting or visual disturbance during the operational period were predicted in the Sizewell C New Nuclear Power Station PEIR (EDF 2019). The Sizewell B Power Station Complex ES noted that outage events (every 18 months) would cause an increase in the number of pedestrians using the footpath within Sizewell Marshes SSSI and footbridges adjacent to Sizewell Marshes SSSI, which would lead to an increase in noise, lighting and human disturbance in the area. The overall impact would be short-term and restricted to a small area. In addition, Sizewell Marshes SSSI would be screened from lighting and visual disturbance from the footpath by a planted hedgerow on the western side, and by woodland at the location of the footbridges. It was concluded that there would be no significant operational impacts.

23.8 Inter-relationships

409. A summary of the likely inter-related impacts arising from the proposed East Anglia ONE North development on onshore ornithology are presented in ***Table 23.23***.

Table 23.23 Onshore Ornithology Inter-Relationships

Inter-relationship all phases and linked chapter	Section where addressed	Rationale
Chapter 22 Onshore Ecology	Habitats described within the onshore development area have been fully considered in this chapter in respect to potential habitat loss and its impact on IOFs.	Habitats which support IOFs
Chapter 25 Noise and Vibration	***Section 23.6.3***	Noise disturbance on IOFs
Chapter 29 Landscape and Visual Impact	***Section 23.6.4.2.***	Lighting impacts to IOFs

23.9 Interactions

410. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction.

411. The two main potential impacts during the construction period are:

- Direct habitat loss; and
- Indirect habitat loss due to disturbance.

412. Although these can happen simultaneously, the spatial extent of the impact is effectively the same as that for disturbance only.

No significant impacts were predicted for the operational period, although any habitat loss that began during the construction period may continue over a longer term where permanent infrastructure is located above ground (e.g. substations). Lighting impacts associated with the substations may increase the extent of effective habitat loss.

413. ***Table 23.24*** provides an assessment for each receptor (or receptor group) related to these impacts in two ways. Firstly, the impacts are considered within a development phase (i.e. construction, operation or decommissioning) to see if, for example, multiple construction impacts could combine. Secondly, a lifetime assessment is undertaken which considers the potential for impacts to affect receptors across development phases. The significance of each individual impact is determined by the sensitivity of the receptor and the magnitude of effect; the sensitivity is constant whereas the magnitude may differ. Therefore, when considering the potential for impacts to be additive it is the magnitude of effect which is important – the magnitudes of the different effects are combined upon the same sensitivity receptor. If minor impact and minor impact were added this would effectively double count the sensitivity.

Table 23.24 Potential Interactions Between Impacts on Onshore Ornithology

Receptor	Construction	Operational	Decommissioning	Phase Assessment	Lifetime Assessment
Species (habitat loss and disturbance)	Minor adverse	Minor adverse	Minor adverse	**No greater than individually assessed impact** Only four species have potential for both impacts (*Impact 1 habitat loss and Impact 2 disturbance*). There are no pathways for interaction for other species. Of the four species potentially impacted, habitat will be reinstated post-construction and permanent loss at the onshore substation and NGET is not relevant given the distribution of the species.	**No greater than individually assessed impact** Infrastructure is only installed during construction, therefore habitat loss will only take place during the construction phase. There will be limited disturbance during the operational phase at the landfall and onshore cable route (if maintenance works are required) and no greater than minor adverse at the onshore substation and National Grid infrastructure.

23.10 Summary

414. A summary of the findings of the ES for onshore ornithology is presented in ***Table 23.25***. This table demonstrates that, post mitigation, there are no impacts with a maximum residual impact greater than minor adverse. There will therefore be no impacts on onshore ornithological interests resulting from the proposed East Anglia ONE North development that are considered to be significant in EIA terms (i.e. moderate or major adverse).

Table 23.25 Potential Impacts Identified for Onshore Ornithology

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation Measures	Residual Impact
Construction						
Impact 1: Habitat loss	Nightjar	High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Woodlark	High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Turtle dove	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse Significant (SSSI)	No habitat loss within Leiston-Aldeburgh SSSI Supplementary feeding area Post-construction habitat restoration	**Minor adverse** **Not Significant**
	Nightingale	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse Significant (SSSI)	Habitat management where onshore development area and SPA/SSSI overlap. Post-construction habitat restoration	**Minor adverse** **Not Significant**
	Marsh harrier	Medium-High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Barn owl	Low-Medium	Negligible	Minor adverse Not Significant	New nest boxes to replace any losses	**Minor adverse** **Not Significant**
	Cetti's warbler	Low-Medium	Negligible	Minor adverse Not Significant	Post-construction habitat restoration	**Minor adverse** **Not Significant**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation Measures	Residual Impact
	Dartford warbler	Low-Medium	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Marsh warbler	High	Negligible	Minor adverse Not significant	None required	**Minor adverse** **Not Significant**
	Yellow wagtail	Medium	Low	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
	Bewick's swan	High	No impact	No impact	None required	**No impact**
Impact 2: Disturbance	Nightjar	High	Negligible	Minor adverse and Not Significant	BBPP	**Minor adverse** **Not Significant**
	Woodlark	High	Negligible	Minor adverse and Not Significant	BBPP	**Minor adverse** **Not Significant**
	Turtle dove	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse Significant (SSSI)	BBPP	**Minor adverse** **Not Significant**
	Nightingale	High	Negligible Medium (SSSI)	Minor adverse Not Significant Major adverse Significant (SSSI)	BBPP	**Minor adverse** **Not Significant**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation Measures	Residual Impact
	Marsh harrier	Medium-High	Negligible	Minor adverse Not Significant	BBPP	**Negligible** **Not Significant**
	Barn owl	Low-Medium	Negligible	Minor adverse Not Significant	BBPP	**Negligible** **Not Significant**
	Cetti's warbler	Low-Medium	Negligible	Minor adverse Not Significant	BBPP	**Negligible** **Not Significant**
	Dartford warbler	Low-Medium	Negligible	Minor adverse Not Significant	BBPP	**Negligible** **Not Significant**
	Marsh warbler	High	Medium (national)	Major adverse Significant (national)	BBPP	**Minor adverse** **Not Significant (national)**
	Yellow wagtail	Medium	Low	Minor adverse Not Significant	BBPP	**Minor adverse** **Not Significant**
	Bewick's swan	High	Medium	Moderate adverse Significant (SSSI and regional)	During-construction surveys to determine requirement for screening	**Minor adverse** **Not Significant**
Operation						
Impact 1: Disturbance	All IOFs	Medium-High	Negligible	Minor adverse Not Significant	None required	**Minor adverse** **Not Significant**
Impact 2: Lighting	All IOFs	Medium-High	Negligible	Minor adverse	None required	**Minor adverse**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation Measures	Residual Impact
				Not Significant		**Not Significant**
Decommissioning						
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.						
Cumulative Construction Impacts with other Developments						
Impact 1: Habitat loss	Marsh harrier	Medium-High	Unchanged	Minor adverse Not Significant	No additional mitigation required	**Unchanged** **Not Significant**
	Barn owl	Low-Medium	Unchanged	Minor adverse Not Significant	No additional mitigation required	**Unchanged** **Not Significant**
	Cetti's warbler	Low-Medium	Unchanged	Minor adverse Not Significant	No additional mitigation required	**Unchanged** **Not Significant**
	All other IOFs	Low-High	Unchanged	Unchanged Not Significant	No additional mitigation required	**Unchanged** **Not Significant**
Impact 2: Disturbance	Marsh harrier	Medium-High	Unchanged	Minor adverse Not Significant	No additional mitigation required	**Unchanged** **Not Significant**
	Barn owl	Low-Medium	Unchanged	Minor adverse Not Significant	No additional mitigation required	**Unchanged** **Not Significant**

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation Measures	Residual Impact
	Cetti's warbler	Low-Medium	Unchanged	Minor adverse Not Significant	No additional mitigation required	**Unchanged** **Not Significant**
	All other IOFs	Low-High	Unchanged	Unchanged Not Significant	No additional mitigation required	**Unchanged** **Not Significant**
Cumulative Operation Impacts with other Developments						
No cumulative operational impacts are predicted due to the lack of impacts during the operational phase, on all IOFs, associated with the proposed East Anglia ONE North project alone.						
Cumulative Decommissioning Impacts with other Developments						
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.						

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