

# East Anglia TWO Offshore Windfarm

## Chapter 22 Onshore Ecology

### Environmental Statement Volume 1

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Appendix number	Title
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Appendix 22.4	eDNA Survey Report
Appendix 22.5	Water vole and otter Survey Report
Appendix 22.6	Bat Survey Report

## Glossary of Acronyms

AIS	Air Insulated Switchgear
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
CCS	Construction Consolidation Sites
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute for Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CMS	Construction Method Statement
CRoW	Countryside and Rights of Way Act
CWS	County Wildlife Site
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
ECOW	Environmental Clerk of Works
EclA	Ecological impact Assessment
EEC	European Economic Community
EIA	Environmental Impact Assessment
EMP	Ecological Management Plan
EPS	European Protected Species
ES	Environmental Statement
ESC	East Suffolk Council
ETG	Expert Topic Group
EU	European Union
GIS	Gas Insulated Switchgear
ha	Hectares
HDD	Horizontal Directional Drilling
HSI	Habitat Suitability Index
ICZM	Integrated Coastal Zone Management
ILE	Institute of Lighting Engineers
IPC	Infrastructure Planning Commission
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LMP	Landscape Mitigation Plan
LNR	Local Nature Reserve
m	Metres
MAGIC	Multi-Agency Geographic Information for the Countryside
NERC Act	Natural Environment and Rural Communities Act
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OCocP	Outline Code of Construction Practice
OLEMS	Outline Landscape and Ecological Management Strategy

PEIR	Preliminary Environmental Information Report
PID	Public Information Day
pSPA	Potential Special Protection Area
SAC	Special Area of Conservation
SBIS	Suffolk Biodiversity Information Service
SCC	Suffolk County Council
SCDC	Suffolk Coastal District Council
SoS	Secretary of State
SPA	Special Protection Area
SPR	ScottishPower Renewables
SSSI	Site of Special Scientific Interest
TN	Target Note
TPO	Tree Preservation Order
UK BAP	UK Biodiversity Action Plan
UKHPI	UK Habitat of Principal Importance
WDC	Waveney District Council

## Glossary of Terminology

Applicant	East Anglia TWO 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 TWO project	The proposed project consisting of up to 75 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 TWO 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 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 onshore 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 TWO 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 TWO project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO 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.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia TWO 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 TWO 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 TWO project.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

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## 22 Onshore Ecology

### 22.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the impacts of the proposed East Anglia TWO project upon onshore ecological receptors. Potential impacts on birds are considered separately in **Chapter 23 Onshore Ornithology**.
2. This chapter provides an overview of the existing baseline environment in respect to onshore ecology in relation to the proposed East Anglia TWO project. This chapter also provides an Ecological Impact Assessment (EclA) of the potential impacts of construction, operation and decommissioning of the proposed East Anglia TWO project upon this baseline environment. The EclA also considers the cumulative impacts of existing and proposed projects in respect to onshore ecological receptors. The chapter was produced by Royal HaskoningDHV.
3. This ES chapter refers to the following onshore chapters, where relevant:
  - **Chapter 19 Air Quality;**
  - **Chapter 20 Water Resources and Flood Risk;**
  - **Chapter 23 Onshore Ornithology;**
  - **Chapter 25 Noise and Vibration;** and
  - **Chapter 29 Landscape and Visual Impact Assessment.**
4. It should be noted that the East Anglia ONE North offshore windfarm project (the proposed East Anglia ONE North project) is also in the application stage. The proposed East Anglia ONE North project has a separate Development Consent Order (DCO) process which has been submitted at the same time as the proposed East Anglia TWO project. This assessment considers the cumulative impact of the proposed East Anglia TWO project with the proposed East Anglia ONE North project (**Appendix 22.2**) and subsequently with other proposed developments (**section 22.7**).
5. Due to a history of badger persecution, locations of badger setts and badger sightings are kept 'confidential'. Data regarding the location of badger records is presented in **Confidential Figure 22.6** and **Confidential Annex 2 of Appendix 22.3**, which will be made accessible to the Planning Inspectorate, Local Planning Authority and Natural England.

## 22.2 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 ecology has been undertaken via Expert Topic Group (ETG) meetings, described within **Chapter 5 EIA Methodology**, with meetings held in February 2018, April 2018, November 2018, January 2019 and May 2019 and through the East Anglia TWO Scoping Report (ScottishPower Renewables (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 Development Consent Order (DCO) application. The responses received from stakeholders with regards to the Scoping Report, PEIR, as well as feedback to date from the Onshore Ecology ETG, are summarised in **Appendix 22.1**, including details of how these have been taken account of within this chapter.
8. 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**.
9. **Table 22.1** shows public consultation feedback pertaining to onshore ecology. Full details of the proposed East Anglia TWO project consultation process are presented in the Consultation Report (document reference 5.1), which is provided as part of the DCO application.

**Table 22.1 Public Consultation Responses relevant to Onshore Ecology**

Topic	Response / where addressed in the ES
<b>Phase 1</b>	
<ul style="list-style-type: none"> <li>Impacts on wildlife</li> </ul>	Impacts to protected and notable wildlife species are assessed in <b>section 22.5.3</b> .
<b>Phase 2</b>	
<ul style="list-style-type: none"> <li>Impacts on wildlife</li> <li>Impact on woodland and ancient woodland</li> <li>How can ecological impacts be mitigated</li> <li>Substations in operation should be maintained in a way to encourage biodiversity</li> </ul>	<p>Impacts to protected and notable wildlife species are assessed in <b>section 22.5.3</b>.</p> <p>Mitigation measures are given in <b>section 22.3.3</b></p>

Topic	Response / where addressed in the ES
<b>Phase 3</b>	
<ul style="list-style-type: none"> <li>Wildlife impacts (otter, badger, hedgehog, fox, shrew, adder, grass snake, slow worms, bats and bees)</li> <li>Impact through cable routeing</li> <li>Impact on great crested newts along the cable route (far more than in the reptile mitigation land at Sizewell)</li> <li>Supporting habitats of a diverse insect population within the onshore development area</li> <li>Impact on woodland and hedgerows (substation and cable corridor)</li> <li>Avoid ancient oak tree in field adjacent to east of River Hundred</li> <li>Horizontal Directional Drilling (HDD) around shrubland</li> <li>Impacts of EMF on bats</li> <li>HDD under ancient woodland near Aldringham Court</li> <li>Avoid Thorpeness Common</li> <li>Suggest replanting along the cable corridor</li> <li>Protect Grove Wood and Laurel Covert Wood</li> </ul>	<p>Impacts to protected and notable wildlife species are assessed in <b>section 22.5.3</b>.</p> <p>Mitigation measures are given in <b>section 22.3.3</b></p> <p>Impacts to Thorpeness Common are assessed in <b>Chapter 21 Land Use</b></p> <p><b>Chapter 4 Site Selection and Assessment of Alternatives</b> details the process of onshore cable corridor refinement to avoid sensitive habitats where appropriate.</p>
<b>Phase 3.5</b>	
<ul style="list-style-type: none"> <li>Ecosystem disruption</li> <li>Impact on woodland and ancient woodland</li> <li>Should not disrupt Grove Wood</li> <li>Impact on hedgerows from road widening and cable route</li> <li>This project will result in unacceptable removal of vegetation</li> <li>Wildlife impact on badgers, bats, newts, adders, foxes, hares, butterflies, hedgehogs, grass snakes, frogs and toads</li> <li>Impacts on habitats</li> <li>Ancient woodland at Aldeburgh Road</li> <li>Biodiversity should be considered</li> <li>Concern over impact on Laurel Covert Wood</li> <li>Ecological impact of cable route</li> </ul>	<p>Potential impacts on woodland are assessed in <b>section 22.6.1.4</b>. This includes reference to Grove Wood, Aldeburgh Road and Laurel Covert.</p> <p>Impacts on hedgerows are assessed in <b>section 22.6.1.5</b>.</p> <p>Wildlife impacts (and potential impacts to their habitats) have been assessed in respect to protected or notable species through <b>section 22.6</b>.</p> <p>Ecological surveys have been conducted to inform this chapter. These are detailed further in <b>Appendices 22.3-22.6</b>.</p>

Topic	Response / where addressed in the ES
<ul style="list-style-type: none"> <li>Impact on wildlife crossing roads with increased traffic</li> <li>Scattering of wildlife</li> <li>Impact on heathland</li> <li>Full ecological survey needed for loss of woodland within the Area of Outstanding Natural Beauty (AONB) and of Grove Wood</li> </ul>	
<b>Phase 4</b>	
<ul style="list-style-type: none"> <li>Concern over bats impacted by construction of substation</li> <li>Impact on reptiles – no plans to carry out specific reptile surveys</li> <li>Impacts on Site of Special Scientific Interest (SSSI) habitats</li> <li>Impact on AONB</li> <li>Impacts on biodiversity due to hedgerow removal</li> </ul>	<p>Potential impacts on bats, including those at the onshore substation site, are detailed in <b>section 22.6.1.9</b>. Operational impacts to bat populations are given separately in <b>section 22.6.2.2</b>.</p> <p>Impacts in relation to reptiles are given in <b>section 22.6.1.11</b>, Reptile surveys will be conducted pre-construction.</p> <p>Impacts on designated sites, including the SSSI and AONB, are considered in <b>section 22.6.1.1</b></p> <p>Impacts on hedgerows are assessed in <b>section 22.6.1.5</b>.</p>

## 22.3 Scope

### 22.3.1 Study Area

10. The onshore infrastructure includes the following elements:

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

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

12. The study areas for specific onshore ecological receptors used in this EclA are provided in **Table 22.2**. Different study areas have been used for different receptors depending on their sensitivity and on their habitat preferences. These study areas were selected in accordance with industry accepted guidance and/or professional judgement and subsequently agreed with stakeholders (Natural England, Environment Agency and Suffolk Wildlife Trust) via the Onshore Ecology and Onshore Ornithology Method Statement at the ETG meeting in April 2018.

13. It should be noted that at the time of undertaking the initial desk based assessment, and following field surveys, the onshore development area was yet to be finalised, and therefore survey and reporting was completed on the wider indicative onshore development area. The information presented in the survey appendices associated with this chapter are therefore described in terms of the indicative onshore development area boundary. The indicative onshore development area is shown on figures associated with the appendices for context. In comparison, the information provided in this ES chapter is relevant to the onshore development area only (the onshore development area being within the indicative onshore development area), which is shown on figures associated with this ES chapter. The habitat and species specific survey results, gathered on the considerably wider indicative onshore development area, has been used to inform the definition of the final onshore development area.

#### 22.3.1.1 Offsite Highway Improvements

14. 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 22.6**. 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**.
15. 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.
16. The offsite highway improvements will have a small footprint, largely within the existing highway boundary. Given the footprint and temporary nature of these works, along with adherence to the best practice detailed in **section 22.3.3**, it is considered that the offsite highway improvements will not give rise to any impacts on onshore ecology receptors.
17. The exception is the A1094/B1096 junction offsite highway improvement where relevant impacts on habitat loss through the potential footprint of the works extending beyond the highway boundary are included in the assessment presented in **section 22.6.1.4**. 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. The OLEMS outlines the requirement for landscape and ecological (including ornithological) mitigation measures.

**Table 22.2 Study Areas<sup>1</sup> for Different Onshore Ecological Receptors Used for This EclA**

Data/Survey	Study Area
Statutory designated sites	Within and up to 2km of the onshore development area
Non-statutory designated sites	Within and up to 2km of the onshore development area
UK Habitats of Principle Importance (UKHPI) and Suffolk Local Biodiversity Action Plan (BAP)	Within and up to 50m of the onshore development area
Protected and notable species (excluding great crested newts and bats)	Within and up to 50m of the onshore development area
Great crested newts	Within and up to 250m of the onshore development area (Note: Although great crested newts can use suitable terrestrial habitat up to 500m from a breeding pond (Great crested newt mitigation guidelines, English Nature 2001), research suggests that newts are unlikely to travel more than 250m from ponds where suitable habitats for foraging and hibernation exist).
Bats	Within and up to 5km of the onshore development area (desk based data)  Within and up to 50m of the onshore development area (field survey data)

### 22.3.2 Worst Case Scenarios

18. This section identifies the realistic worst case parameters associated with the proposed East Anglia TWO project alone. This includes all onshore infrastructure for the proposed East Anglia TWO project and the National Grid infrastructure required for ultimate connection to national electricity grid. Areas provided for onshore infrastructure are maximum footprints with indicative dimensions provided in brackets.
19. **Chapter 6 Project Description** details the project parameters using the Rochdale Envelope approach for the ES.

<sup>1</sup> Study areas are based on standard best practice guidance and professional judgement based on the zone of influence for individual features (CIEEM 2018).

20. **Table 22.3** identifies those realistic worst case parameters of the onshore infrastructure that are relevant to potential impacts on onshore ecology during construction, operation and decommissioning phases of the proposed East Anglia TWO project. Please refer to **Chapter 6 Project Description** for more detail regarding specific activities, and their durations, which fall within the construction phase.
21. As described in **Chapter 5 EIA Methodology**, there are two co-located onshore substation locations for either the proposed East Anglia TWO project or the proposed East Anglia ONE North project. It should be noted that the draft DCOs for both the proposed East Anglia TWO and East Anglia ONE North 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 22.6**, and associated chapter figures, have been presented on the intended development strategy of the proposed East Anglia TWO project using the eastern onshore substation location.

**Table 22.3 Realistic Worst Case Scenarios**

Impact	Parameter	Notes
<b>Construction</b>		
Impacts related to the landfall	HDD temporary working area: 7,000m <sup>2</sup> (70m x 100m) Transition bay temporary working area (for 2 transition bays): 1,554m <sup>2</sup> (37m x 42m) Landfall Construction Consolidation Site (CCS) (x1): 7,040m <sup>2</sup> (88m x 80m)	
Impacts related to the onshore cable route	Onshore cable route: 290,912m <sup>2</sup> (9,091m x 32m) Jointing bay temporary working area: 570m <sup>2</sup> (30.6m x 18.6m). Total for 38 jointing bays: 21,660m <sup>2</sup> (570m <sup>2</sup> x 38) HDD (retained as an option to cross Special Protection Area (SPA) / SSSI): Entrance pit temporary working area (x1): 6,300m <sup>2</sup> (90m x 70m) Exit pit temporary working area (x1): 2,700m <sup>2</sup> (90m x 30m) Onshore cable route large CCS (1): 16,500m <sup>2</sup> (165m x 100m). Onshore cable route medium CCS (2): 14,080m <sup>2</sup> total (88m x 80m per each medium CCS)	Refer to <b>section 22.3.3</b> for instances of onshore cable route adopting a narrower width

Impact	Parameter	Notes
	<p>Onshore cable route small CCS (2): 6,000m<sup>2</sup> total (60m x 50m per each small CCS)</p> <p>Total footprint of all onshore cable route CCS: 36,580m<sup>2</sup></p> <p>Onshore cable route laydown area: 1,000m<sup>2</sup></p> <p>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<sup>2</sup></p> <p>Onshore cable route and substation access haul road (1,570m in length x 9m wide): 14,130m<sup>2</sup></p> <p>Temporary access roads (957m in length x 4.5m wide with additional 4m for passing places at approximately 90m intervals): 5,231m<sup>2</sup></p>	
Impacts related to the onshore substation	<p>Onshore substation CCS: 17,100m<sup>2</sup> (190m x 90m)</p> <p>Permanent footprint (used as CCS during construction): 36,100m<sup>2</sup> (190m x 190m)</p> <p>Substation operational access road: 13,600m<sup>2</sup> (1,700m x 8m)</p>	
Impacts related to the National Grid Infrastructure	<p>National Grid CCS: 23,350m<sup>2</sup></p> <p>National Grid operational substation (Air Insulated Switchgear (AIS) technology) (used as a CCS during construction): 44,950m<sup>2</sup> (310m x 145m)</p> <p>Temporary pylon/mast temporary working area (x4): 10,000m<sup>2</sup> (2,500m<sup>2</sup> per each temporary pylon)</p> <p>Permanent pylon permanent footprint (x4): 1,600m<sup>2</sup> (400m<sup>2</sup> per each permanent pylon)</p> <p>Permanent pylon temporary working area (x4): 8,400m<sup>2</sup> (2,100m<sup>2</sup> per each permanent pylon)</p> <p>Overhead line realignment temporary working area: 5,000m<sup>2</sup></p> <p>Cable sealing end/Cable sealing end (with circuit breaker) compounds permanent footprint: 10,000 m<sup>2</sup> (total for three compounds)</p>	<p>AIS technology is assessed as the worst case due to a larger footprint. Further detail regarding Gas Insulated Switchgear (GIS) technology is provided in <b>Chapter 6 Project Description</b>.</p>

Impact	Parameter	Notes
	<p>Cable sealing end/Cable sealing end (with circuit breaker) compounds temporary working area: 30,000m<sup>2</sup> (for three compounds)</p> <p>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<sup>2</sup></p> <p>Permanent access road to sealing end compound: 1,850m<sup>2</sup> (500m x 3.7m)</p>	
<b>Operation</b>		
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	<p>Operational footprint: 36,100m<sup>2</sup> (190m x 190m)</p> <p>Substation operational access road: 13,600m<sup>2</sup> (1,700m x 8m)</p>	The operational footprint does not include the additional landscaping footprint.
Impacts related to the National Grid Infrastructure	<p>National Grid operational substation (AIS technology): 44,950m<sup>2</sup> (310m x 145m)</p> <p>Pylon operational footprint (x4): 1,600m<sup>2</sup> (20m x 20m per each permanent pylon)</p> <p>Cable sealing end compound operational footprint: 10,000m<sup>2</sup> (for three sealing end compounds)</p> <p>Permanent access road to sealing end compound: 1,850m<sup>2</sup> (500m x 3.7m)</p>	<p>Four permanent pylons include up to three reconstructed/ relocated pylons and up to one additional new pylon.</p> <p>The operational footprint does not include the additional landscaping footprint.</p> <p>AIS technology is assessed as the worst case due to a larger footprint. Further detail regarding GIS technology is provided in <b>Chapter 6 Project Description</b>.</p>
<b>Decommissioning</b>		
<p>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 overtime. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left <i>in situ</i> 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 worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.</p>		

### 22.3.3 Embedded Mitigation and Best Practice

22. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process. The following sections outline the key embedded mitigation relevant for this assessment. Where embedded mitigation measures have been developed into the design of the proposed East Anglia TWO project with specific regard to onshore ecology, these are described in **Table 22.4**. Any further mitigation measures suggested within this chapter are therefore considered to be additional mitigation.

**Table 22.4 Embedded Mitigation and Best Practice Measures for Onshore Ecology**

Parameter	Mitigation Measures Embedded into the Project Design
<b>General</b>	
Outline Landscape and Ecological Management Strategy	<p>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 TWO project.</p> <p>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 TWO 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.</p>
Onshore development area	<p>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 ecologically sensitive areas, for example designated sites, habitats and supporting sites for protected or notable habitats and species.</p> <p>For further details please refer to <b>Chapter 4 Site Selection and Assessment of Alternatives</b>.</p>
Designated sites	<p>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, within habitat where no records of ornithological target species were found. The crossing point of the Sandlings SPA was further chosen as it is currently being used as a horse paddock and not considered optimal habitat compared to the wider Sandlings SPA which is avoided.</p> <p>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</p>

Parameter	Mitigation Measures Embedded into the Project Design
<b>General</b>	
	<p>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.</p> <p>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.</p> <p>Landscaping works such as hedgerow replanting may be undertaken outside these periods to ensure optimal planting conditions are achieved.</p>
HDD at landfall	<p>The landfall location was influenced from the onset of the project design process by the presence of designated sites, specifically Leiston-Aldeburgh SSSI. Further detail is provided in <b>Chapter 4 Site Selection and Assessment of Alternatives</b>.</p> <p>The project has committed to the use of HDD (refer to <b>Chapter 6 Project Description</b>) at the landfall to minimise potential impacts. Furthermore, the landfall HDD temporary working area is located inland from the SSSI boundary and the HDD exit pit will be at sea. There will also be no requirement for vehicular access onto the beach at this location. Therefore, there will be no potential for any interaction with this site through the use of the HDD technique at the landfall. The final landfall construction methodology will be detailed within the Landfall Construction Method Statement (CMS) produced post-consent to discharge the requirements of the draft DCO.</p>
Construction of onshore cable corridor	<p>The onshore cables will be installed underground to minimise operational impacts to ecological receptors and landscape and visual impacts.</p> <p>Where appropriate, construction work areas would be accessed using existing tracks and road (to be developed as part of the Construction Traffic Management Plan). An Outline Construction Traffic Management Plan has been submitted with this DCO application, as secured under the requirements of the draft DCO.</p> <p>When using an open cut methodology, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) when crossing important hedgerows and north of Fitches Land woodland.</p> <p>Reinstatement of all temporary working areas to agreed specifications.</p>

Parameter	Mitigation Measures Embedded into the Project Design
<b>General</b>	
Maintenance and operational measures	<p>Suitable maintenance of any newly planted sections of hedgerow, shelterbelts and woodlands following construction would have an aftercare period of ten years. One for one replacement planting of failed plants would only be required for the first five years.</p> <p>Lighting sensitive to bats would be incorporated according to guidance in Bats and Artificial Lighting in the UK (Bat Conservation Trust (BCT) and Institute of Lighting Engineers (ILE) 2018).</p>

#### 22.3.4 Monitoring

23. Post-consent, the final detailed design of the proposed East Anglia TWO 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 ecology, this is described in the Outline Code of Construction Practice (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.

### 22.4 Assessment Methodology

#### 22.4.1 Guidance

##### 22.4.1.1 Legislation and Policy

24. The following sections provide detail on key pieces of International and UK legislation which are relevant to this chapter.
25. Further detail is provided in **Chapter 3 Policy and Legislative Context**.

##### 22.4.1.2 The Conservation of Habitats and Species Regulations 2017 (or ‘the Habitats Regulations 2017’)

26. The Conservation of Habitats and Species Regulations 2017 (the “Habitats Regulations 2017”) revoke and replace the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations 2010”).
27. The Habitats Regulations 2017 are the principal means by which Council Directive 92/43/European Economic Community (EEC) on the conservation of natural habitats of wild fauna and flora (the “Habitats Directive”) is transposed in England and Wales and the adjacent territorial seas. They also transpose elements of the European Union (EU) Wild Birds Directive (Council Directive 2009/147/EC) in England and Wales.

28. These Regulations provide protection for specific habitats listed in Annex I and species listed in Annex II of the Habitats Directive. The Directive sets out decision making procedures for the protection of Special Areas of Conservation (SAC) and Special Protection Areas (SPA), implemented in the UK through The Conservation of Habitats and Species Regulations 2017.
29. The Regulations make it an offence (subject to exceptions) to deliberately capture, injure, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4.
30. 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.

#### 22.4.1.3 Wildlife and Countryside Act 1981 (as amended)

31. This Act makes it an offence (subject to 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.
32. The Act makes it an offence to intentionally kill, injure or take any animal listed in Schedule 5 of the act and protects occupied and unoccupied places used for shelter or protection by such animals.
33. The Act makes it an offence (subject to exceptions) to intentionally pick, uproot or destroy any wild plant listed in Schedule 8 of the Act.
34. The Act makes it an offence to plant or otherwise cause to grow any non-native, invasive species listed under Part 2 of Schedule 9 of the Act.
35. The Act makes provision for the notification and confirmation of Sites of Special Scientific Interest (SSSI).

#### 22.4.1.4 The Protection of Badgers Act 1992

36. The Act makes it an offence to wilfully kill, injure or take, or attempt to kill, injure or take a badger *Meles meles*; and to cruelly ill-treat a badger.
37. The Act makes it an offence to intentionally or recklessly damage, destroy or obstruct a badger sett, or to disturb a badger whilst in a sett.

#### 22.4.1.5 Natural Environment and Rural Communities (NERC) Act 2006

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

39. 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.

#### 22.4.1.6 The Hedgerows Regulations 1997

40. The Regulations make it an offence to remove or destroy certain hedgerows without permission from the Local Planning Authority and the Local Planning Authority is the enforcement body for such offences.

#### 22.4.1.7 Marine and Coastal Access Act 2009

41. 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.

#### 22.4.1.8 The Commons Act 2006

42. The Act aims to protect areas of common land, in a sustainable manner delivering benefits for farming, public access and biodiversity (Department for Environment, Food and Rural Affairs (Defra) 2017).

#### 22.4.1.9 Countryside and Rights of Way Act 2000 (CRoW)

43. The Act amends the law relating to public rights of way 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.

#### 22.4.1.10 National Planning Policy Framework (NPPF)

44. The NPPF, published in 2012 and revised in 2019 replaces the former series of Planning Policy Statements. From its outset, the document makes plain that it is concerned with sustainable development, making particular mention of foci such as adapting to climate change and improving biodiversity, and paragraph 8 states that there are three dimensions to sustainable development: economic, social and environmental, and that all three are mutually dependent and gains for all should be sought jointly and simultaneously through the planning system. The environmental dimension is defined (as per the framework document) below:

*“an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.”*

#### 22.4.1.11 Natural Environment White Paper 2011

45. The paper was the first White Paper produced by the Government in 20 years. The paper contains plans to reconnect nature, connect people and nature for better quality of life and capture and improve the value of nature.

#### 22.4.1.12 Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services

46. The Strategy sets out how England will implement the 2010 Aichi Biodiversity Targets, European Commission's 2011 EU Biodiversity Strategy and the recommendations of the 2011 Natural Environment White Paper. It contains the following relevant targets:

- Better wildlife habitats with 90% of priority habitats in favourable or recovering condition and at least 50% of SSSIs in favourable condition, while maintaining at least 95% in favourable or recovering condition;
- More, bigger and less fragmented areas for wildlife, with no net loss of priority habitat and an increase in the overall extent of priority habitats by at least 200,000ha;
- By 2020, at least 17% of land and inland water in England, especially areas of particular importance for biodiversity and ecosystem services, conserved through effective, integrated and joined up approaches to safeguard biodiversity and ecosystem services including through management of our existing systems of protected areas and the establishment of nature improvement areas;
- Restoring at least 15% of degraded ecosystems as a contribution to climate change mitigation and adaptation;
- By 2020, we will see an overall improvement in the status of our wildlife and will have prevented further human-induced extinctions of known threatened species; and
- By 2020, significantly more people will be engaged in biodiversity issues, aware of its value and taking positive action.

#### 22.4.1.13 National Policy Statements

47. The assessment of potential impacts upon onshore ecology 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 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).

48. The specific assessment requirements for onshore ecology, as detailed in the NPS, are summarised in **Table 22.5** together with an indication of the section of the ES chapter where each is addressed.

**Table 22.5 NPS Assessment Requirements with Relevance to Onshore Ecology**

NPS Requirement	NPS Reference	ES Reference
<b>EN-1 Overarching NPS for Energy</b>		
<i>'Where the development is subject to EIA the applicant should ensure that the ES [Environmental Statement] 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) [now the Planning Inspectorate] consider thoroughly the potential effects of a proposed project.'</i>	Section 5.3.3	Existing environment is presented in <b>section 22.5</b> , the EclA is set out in <b>section 22.6.1</b> .
<i>'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'</i>	Section 5.3.4	Embedded mitigation measures are provided in <b>section 22.3.3</b> and where applicable, further mitigation measures are outlined in <b>section 22.6</b> and <b>section 22.7</b> .
<i>'When considering the application, the IPC will have regard to the Government's biodiversity strategy as (sic) 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.</i>  <i>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 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.</i>	Section 5.3.5 – Section 5.3.8	Site selection decisions and embedded mitigation measures have sought to minimise impacts to features of biodiversity and geological interest.  Embedded mitigation measures are provided in <b>section 22.3.3</b> and where applicable, further mitigation measures are outlined in <b>section 22.6</b> and <b>section 22.7</b> .

NPS Requirement	NPS Reference	ES Reference
<i>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.'</i>		
<i>'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'.</i>	Section 5.3.9	Designated sites are presented in <b>section 22.5</b> . Site selection decisions have been made to minimise impacts to interest features within designated sites.
<i>'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.'</i>	Section 5.3.10	Designated sites are presented in <b>section 22.5</b> . Site selection decisions have been made to minimise impacts to interest features within designated sites.
<i>'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.</i>  <i>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.'</i>	Section 5.3.11	Designated sites are presented in <b>section 22.5</b> . Site selection decisions have been made to minimise impacts to interest features within designated sites.
<i>"Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites, have a fundamental role to play in meeting overall national biodiversity targets; contributing to the quality of life and the well-being of the community; and in supporting research and education. The IPC should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent."</i>	Section 5.3.13	Designated sites are presented in <b>section 22.5</b> . Site selection decisions have been made to minimise impacts to interest features within designated sites.

NPS Requirement	NPS Reference	ES Reference
<p><i>'Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated.</i></p> <p><i>The IPC should not grant development consent for any development that would result in its loss or deterioration unless the benefits (including need) of the development, in that location outweigh the loss of the woodland habitat.</i></p> <p><i>Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided.</i></p> <p><i>Where such trees would be affected by development proposals the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons why.'</i></p>	Section 5.3.14	Impacts to ancient woodlands are presented in <b>section 22.5.2</b> .
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	Enhancement measures will be considered and discussed with stakeholders in a process separate to this EIA and DCO application.
<p>The IPC shall have regard to the protection of legally protected species and habitats and species of principal importance for nature conservation.</p> <p><i>'The IPC should 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.'</i></p>	Sections 5.3.16 – 5.3.17	Information on protected species and habitats is provided in <b>section 22.5.3</b> and the outcome of the assessment process is provided in <b>section 22.6.1</b> .
<p>The applicant should include appropriate mitigation measures as an integral part of the proposed development and demonstrate that:</p> <ul style="list-style-type: none"> <li>• During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;</li> <li>• 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;</li> </ul>	Section 5.3.18	Embedded mitigation measures are presented in <b>section 22.3.3</b> . Mitigation measures associated with potential impacts are presented in <b>section 22.6</b> .

NPS Requirement	NPS Reference	ES Reference
<ul style="list-style-type: none"> <li>Habitats will, where practicable, be restored after construction works have finished; and</li> <li>Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.</li> </ul>		
<i>'The IPC will need to take account of what mitigation measures may have been agreed between the applicant and whether Natural England has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'</i>	Section 5.3.20	Embedded mitigation measures are presented in <b>section 22.3.3</b> . Mitigation measures associated with potential impacts are presented in <b>section 22.6</b> .
<b>EN-3 NPS for Renewable Energy Infrastructure</b>		
<i>'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.'</i>	Section 2.4.2	Project design has been an iterative process that has sought to avoid sensitive features wherever possible. Embedded mitigation measures are presented in <b>section 22.3.3</b> .
<i>'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.'</i>	Section 2.6.71	Monitoring is discussed, where relevant, in <b>section 22.6.1 and section 22.6.1.2</b> .
<i>'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.'</i>	Section 2.7.15	Decommissioning is provided in <b>section 22.6.3</b> .
<b>EN-5 NPS for Electricity Networks Infrastructure</b>		
<p><i>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.'</i></p> <p><i>"The IPC should ensure that this issue has been considered in the ES and that appropriate mitigation measures will be taken where necessary."</i></p>	Section 2.7.2 - 2.7.3.	Embedded mitigation measures are presented in <b>section 22.3.3</b> and further mitigation measures are set out in <b>section 22.6</b> .

#### 22.4.1.14 Local Planning Policy

49. EN-1 states that the Planning Inspectorate will also consider Development Plan Documents or other documents in the Local Development Framework to be relevant to its decision making.
50. The onshore development area falls within the administrative area of Suffolk County Council (SCC) and East Suffolk Council. East Suffolk Council (ESC) is the merger of Suffolk Coastal District Council (SCDC) and Waveney District Council (WDC), which became effective from 1<sup>st</sup> April 2019 ESC published their Suffolk Coastal Final Draft Local Plan for a final stage of consultation in January 2019 (ESC 2019a). This plan sets out strategic planning policies within East Suffolk and how the Local Planning Authority address the NPPF on a local basis. **Table 22.6** details Objectives, Strategic Policies and Development Management Policies that are relevant to onshore ecology. A number of policies which primarily relate to the management of water resources and flood risk, and which are inter-linked with onshore ecology are discussed in **Chapter 20 Water Resources and Flood Risk** and have not been repeated here.

**Table 22.6 Relevant Local Planning Policies**

Document	Policy	Policy/Guidance Purpose
<b>Suffolk County Council</b>		
There is no county level planning policy that requires consideration for the development. Planning policy is provided at the local district and borough levels.		
<b>ESC</b>		
ESC (2019) Suffolk Coastal Final Draft Local Plan	SP1	Central to the Core Strategy for the future of the Suffolk Coastal district is the achievement of sustainable development. The Strategy in this respect will be to... conserve and enhance the areas natural historic and built environment.
	SP14	<p>Biodiversity and geodiversity will be protected and enhanced using a framework based on a network of:</p> <ul style="list-style-type: none"> <li>• Designated sites;</li> <li>• Wildlife corridors and links;</li> <li>• The rivers, estuaries and coast;</li> <li>• Identified habitats and geodiversity features</li> <li>• Landscape character areas; and</li> <li>• Protected species.</li> </ul> <p>Sites of European importance, which include Special Areas of Conservation and Special Protection Areas are statutorily protected under the Conservation of Habitats and Species Regulations 2017 (based on European Union (EU) directives), and wetlands of global importance (Ramsar sites) are protected by Government policy to apply the same level of protection as to</p>

Document	Policy	Policy/Guidance Purpose
		European sites. More generally, the policy approach to development on sites designated for their biodiversity or geodiversity interest is set out in Policy DM27. The Suffolk BAP and Suffolk Local Geodiversity Action Plan will be implemented. The Strategy will also be to contribute to county targets through the restoration, creation and on-going management of new priority habitats as identified in those documents.
	DM27	<p><i>'All development proposals should:</i></p> <p><i>(a) Protect the biodiversity and geodiversity value of land and buildings and minimise fragmentation of habitats;</i></p> <p><i>(b) Maximise opportunities for restoration, enhancement and connection of natural habitats; and</i></p> <p><i>(c) incorporate beneficial biodiversity conservation features where appropriate.</i></p> <p><i>Development proposals that would cause a direct or indirect adverse effect (alone or combined with other plans or projects) to the integrity of internationally and nationally designated environmental sites or other designated areas, priority habitats or protected / priority species will not be permitted unless:</i></p> <p><i>(i) Prevention, mitigation and, where appropriate, compensation measures are provided such that net impacts are reduced to a level below which the impacts no longer outweigh the benefits of the development or</i></p> <p><i>(ii) With regard to internationally designated sites that the exceptional requirements of reg. 62 of the Conservation of Habitats and Species regulations 2010 (as amended) relating to the absence of alternative solutions and Imperative reasons of overriding Public Interest have been met.</i></p> <p><i>Improved site management and increased public access to sites will be encouraged where appropriate.'</i></p>

#### 22.4.1.15 Assessment Guidance

51. This EclA has been undertaken in accordance with the following guidance and standards:

- Chartered Institute of Ecology and Environmental Management (CIEEM) (2016a) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2<sup>nd</sup> Edition;
- British Standard 42020:2013 – Biodiversity. Code of Practice for planning and development;
- Construction Industry Research and Information Association (CIRIA) C648 (2006) Control of water pollution from linear construction projects; and
- CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd Edition).

52. The following species-specific guidance and standards have been used during the assessment process:
- Natural England (2015) Standing advice on protected species (bats (all species), great crested newt *Triturus cristatus*, badger, water vole *Arvicola amphibius*, otter *Lutra lutra*, reptiles, protected plants, invertebrates, white-clawed crayfish *Austropotamobius pallipes*, ancient woodlands and veteran trees);
  - British Standard 5837: 2012 – Trees in relation to design, demolition and construction;
  - Bat Conservation Trust and Institute of Lighting Engineers (2018) Bats and Artificial Lighting in the UK;
  - Dean et al. (2016) The Water Vole Mitigation Handbook (The Mammal Society Guidance Series);
  - Edgar et al. (2010). Reptile Habitat Management Handbook;
  - English Nature (2001) Great Crested Newt Mitigation Guidelines;
  - Joint Nature Conservation Committee (JNCC) (2003) Herpetofauna Worker's Manual;
  - Natural England (2014) Otters: surveys and mitigation for development projects. Natural England Standing Advice;
  - Natural England (2015) Badgers: surveys and mitigation for development projects. Natural England Standing Advice;
  - Natural England (2015) Bats: surveys and mitigation for development projects. Natural England Standing Advice;
  - Natural England (2015) Great crested newts: surveys and mitigation for development projects. Natural England Standing Advice;
  - Natural England (2015) Invertebrates: surveys and mitigation for development projects. Natural England Standing Advice;
  - Natural England (2015) Reptiles: surveys and mitigation for development projects. Natural England Standing Advice;
  - Natural England (2015) Water voles: surveys and mitigation for development projects. Natural England Standing Advice;
  - Strachan and Moorhouse (2011) Water Vole Conservation Handbook, 3<sup>rd</sup> Edition; and
  - GB Non-native Species Secretariat (2015) Species Information.

## 22.4.2 Data Sources

53. This EclA has been informed by the findings from a desk-based exercise and field survey data which has been obtained between 2017 and 2019. Results of this desk-based assessment are shown in **Figures 22.1, 22.2** and **22.3**. These data sets have been collected for different study areas depending on the receptor concerned and upon the proposed East Anglia TWO project information available at the time of collection. The majority of ecological surveys were conducted in 2018. However, in March 2019, an additional Phase 1 survey (Phase 1 addendum – see Annex 1 of **Appendix 22.3**) was conducted in response to Section 42 consultation. The purpose of this additional survey was to gather habitat information from the small western portion of the onshore development area which was not obtained during the initial 2018 survey.
54. The field survey programme commenced in April 2018 and some surveys (e.g. monthly bat activity surveys) were ongoing at the time of writing the PEIR chapter (SPR 2019). However, these surveys and their findings have been completed and final survey results were presented in the May 2019 ETG meeting, therefore they fully inform the EclA presented in this ES.
55. The field survey methodology and programme is outlined in the Onshore Ecology and Onshore Ornithology Method Statement (which has informed the methodology outlined in **section 22.4.3**) (SPR 2018) and was agreed with stakeholders (Natural England, Environment Agency, RPSB and Suffolk Wildlife Trust) at the ETG meeting held in April 2018.
56. The desk-based data sources used to inform the EclA are summarised in **Table 22.7** and have been obtained to cover the study areas referred to in **Table 22.2**.

**Table 22.7 Desk-Based Data Sources to Inform the EclA**

Data	Data Source
Internationally designated nature conservation sites (i.e. Ramsar sites)	Joint Nature Conservation Committee (JNCC). Multi-Agency Geographic Information for the Countryside (MAGIC) website
European designated nature conservation sites (i.e. Special Protection Area (SPA), Special Area of Conservation (SAC)).	JNCC. MAGIC website.
Nationally designated nature conservation sites (i.e. SSSI, National Nature Reserves (NNR), Local Nature Reserves (LNR)).	JNCC. MAGIC website.
UKHPI	JNCC
Locally designated nature conservation sites (i.e. County Wildlife Sites (CWS), Local Wildlife Sites (LWS))	Suffolk Biodiversity Information Service (SBIS)

Data	Data Source
Protected Species records	SBIS
Priority Species Data (Hundred River)	Environment Agency

#### 22.4.2.1 Assumptions and Limitations

57. Biological records data provided by SBIS includes records collected by members of the public and volunteers, and therefore these are not necessarily subject to quality control or necessarily contain full details of, or spatially accurate information for, the species recorded. The absence of records alone does not imply any species or habitat is absent from the search area. Nor does recorded presence imply current, continuing or breeding presence. Despite these caveats, biological records provide very useful supporting data to provide context when field survey data is not available.
58. Field surveys have been undertaken during their optimum surveying windows, where access has been possible. Approximately 15.2% of the onshore development area was inaccessible during the survey periods, predominantly due to landowner permissions. In these instances, an assessment of the habitat/likelihood of species being present has been made using the findings from the Extended Phase 1 Habitat Survey to inform the impact assessment and subsequently any necessary mitigation. The data gaps encountered due to the lack of full landowner access will be subject to full surveys post-consent when landowner access is available.
59. Some habitats could not be fully accessed during the field surveys due to physical barriers preventing entry, for example complex field drain networks or dense scrub. However, these areas were encountered infrequently and, where they were, they were recorded and it was noted that the presence of field signs within these areas could not be ruled out.
60. The Extended Phase 1 Habitat Survey, and additional Phase 1 addendum, were undertaken in April 2018 and March 2019 respectively, which is within the optimal survey period for identifying ground flora species and habitat communities (**Appendix 22.3**).
61. Despite the survey limitations described above, the data collected is considered to be sufficient to identify the nature and scale of impacts likely to arise as a result of the onshore development area in order to conduct a robust EclA. The additional use of desk based data means that the data sources used to inform this EclA are considered comprehensive in terms of their coverage of the onshore development area.

### 22.4.3 Impact Assessment Methodology

#### 22.4.3.1 EclA Overview

62. The EclA methodology proposed in relation to onshore ecology is based on the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (2<sup>nd</sup> Ed.) (CIEEM 2016a). This approach was agreed with stakeholders at the ETG meeting held in April 2018 and through the Onshore Ecology and Onshore Ornithology Method Statement (which has informed the methodology outlined in **section 22.4.3**) (SPR 2018). These guidelines aim to predict the residual impacts on important ecological features affected, either directly or indirectly by a development, once all the appropriate mitigation has been implemented.
63. The approach to determining the significance of an impact follows a systematic process for all impacts. This involves identifying, qualifying and, where possible, quantifying the sensitivity and value of all ecological receptors (giving the importance of each receptor) and magnitude of effects which have been scoped into this assessment. Using this information on importance and magnitude of effect, the significance of each potential impact has been determined. Each of these steps is set out in the remainder of this section.
64. The EclA has used professional judgement to ensure the assessed significance level is appropriate for each individual receptor, taking account of local values for biodiversity to avoid a subjective assessment wherever possible as per the CIEEM guidelines. As a result, the assessed significance level may not always be directly attributed to the guidance matrix detailed below.

#### 22.4.3.2 Importance

65. The first stage of an EclA is determining the ‘importance’ of ecological features or ‘receptors’. CIEEM identifies the important ecological features as those key sites, habitats and species which have been identified by European, national and local Governments and specialist organisations as a key focus for biodiversity conservation in the UK. These include:
- Statutory and non-statutory designated sites for nature conservation;
  - Species occurring on national biodiversity lists;
  - UK Habitats of Principal Importance; and
  - Red listed, rare or legally protected species.
66. Importance is also qualified by the geographic context of an ecological receptor, i.e. a species which may be not recognised on a national biodiversity list may be locally in decline, and therefore its local importance is greater than its national importance.

67. For this EclA, the guidelines outlined in **Table 22.8** will be followed to provide the relative importance of different ecological features.

**Table 22.8 Definitions of Importance Levels for Onshore Ecology**

Importance	Definition
High	<p>An internationally designated site or candidate site or an area which the statutory nature conservation organisation has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified;</p> <p>A nationally designated site or a discrete area, including ancient woodlands, which the statutory nature conservation organisation has determined meets the published selection criteria for national designation (e.g. Site of Special Scientific Interest (SSSI) selection guidelines) irrespective of whether or not it has yet been notified;</p> <p>A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole;</p> <p>A viable area of a UK Habitat of Principal Importance or smaller areas of such habitat which are essential to maintain the viability of a larger whole (such as some hedgerows);</p> <p>A European protected species (EPS) listed in The Conservation of Habitats and Species Regulations 2017; or</p> <p>A regularly occurring, nationally significant population / number of any internationally important species.</p>
Medium	<p>County Council / Unitary Authority designated sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on defined ecological criteria and Wildlife Trust sites;</p> <p>Viable areas of habitat identified in a Local Biodiversity Action Plan (LBAP);</p> <p>Semi-natural woodland greater than 0.5 hectares (ha) which is considered to be in 'good condition'.</p> <p>Any regularly occurring population of a nationally important species which is threatened or rare in the region; or</p> <p>A regularly occurring, locally significant number of a species identified as important on a regional basis.</p>
Low	<p>Semi-natural woodland greater than 0.25ha which is considered to be in 'good condition' or greater than 0.5ha in unfavourable condition;</p> <p>Network of inter-connected hedgerows including some species-rich hedgerows;</p> <p>Individual Important hedgerows or other ancient-countryside linear features;</p> <p>Viable areas of habitat identified in a sub-county (District / Borough) BAP;</p> <p>Any regularly occurring population of a nationally important species which is not threatened or rare in the region or county;</p> <p>Sites / features that are scarce within the District / Borough or which appreciably enrich the District / Borough habitat resource; or</p> <p>Other features identified as wildlife corridors or migration routes.</p>
Negligible	Features of value to the immediate area only e.g. within the site.

68. In addition to the features listed in **Table 22.8**, ecological features which play a key functional role in the landscape or are locally rare have been considered. The importance of such features has been determined by professional judgement.
69. CIEEM places the emphasis on using professional judgement when considering importance of ecological receptors, based on available guidance, information and expert advice (CIEEM 2016). Various aspects of ecological importance should be taken into account, including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features.

#### 22.4.3.3 Magnitude

70. The magnitude of the impact is assessed according to:
- The extent of the area subject to a predicted impact;
  - The duration the impact is expected to last prior to recovery or replacement of the resource or feature;
  - Whether the impact is reversible, with recovery through natural or spontaneous regeneration, or through the implementation of mitigation measures or irreversible, when no recovery is possible within a reasonable timescale or there is no intention to reverse the impact; and
  - The timing and frequency of the impact, i.e. conflicting with critical seasons or increasing impact through repetition.
71. **Table 22.9** summarises the definitions of magnitude that have been used for the onshore ecological receptors.

**Table 22.9 Definitions of Magnitude Levels for Onshore Ecology**

Magnitude	Definition
High	Major impacts on the feature / population, which would have a sufficient effect to alter the nature of the feature in the short to long term and affect its long-term viability. For example, more than 20% habitat loss or damage.
Medium	Impacts that are detectable in short and long-term, but which should not alter the long-term viability of the feature / population. For example, between 10 - 20% habitat loss or damage.
Low	Minor impacts, either of sufficiently small-scale or of short duration to cause no long-term harm to the feature / population. For example, less than 10% habitat loss or damage.
Negligible / No change	A potential impact that is not expected to affect the feature / population in any way, therefore no effects are predicted.

#### 22.4.3.4 Duration

72. The definitions of duration used within this EclA are dependent on the individual ecological receptor, and how sensitive it is to effects over different timescales. However, in general terms the following definitions have been used:

- Short term – effects which at most occur over a part of – or over a part of a key period of – a species' active season or a habitat's growing season, i.e. typically impacts which occur over a matter of days or weeks;
- Medium term – effects which occur over the full duration of a species' active season or a habitat's growing season, i.e. typically impacts which occur over a matter of months or one year; and
- Long term – effects which occur over the multiple active or growing seasons, i.e. typically impacts which occur over more than one year.

73. Where deviations from these definitions are used, this is explained within the text.

#### 22.4.3.5 Impact Significance

74. Following the identification of receptor importance and magnitude of the effect, it is possible to determine the significance of the impact.

75. Ecologically significant impacts are defined as:

*'...impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)' (CIEEM 2016a).*

76. Impacts are unlikely to be significant where features of low importance are subject to small scale or short-term effects. If an impact is not significant at the level at which the resource or feature has been valued, it may be significant at a more local level.

77. CIEEM recommend that the following factors are taken into account when determining significance for selected ecological receptors:

- Designated sites – is the project and associated activities likely to undermine the site's conservation objectives, or positively or negatively affect the conservation status of species or habitats for which the site is designated, or may it have positive or negative effects on the condition of the site or its interest/qualifying features?
- Ecosystems – is the project likely to result in a change in ecosystem structure and function?

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area (CIEEM 2016a).

78. Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in **Table 22.10** below and knowledge of the ecological features affected.
79. The assessment of potential impacts has been undertaken assuming implementation of embedded mitigation and project commitments made as part of the design process. Where, following this assessment, significant impacts (moderate or major) are identified, additional mitigation measures are then proposed. A final assessment of the residual impacts remaining following implementation of these additional mitigation measures is then made.

**Table 22.10 Impact Significance Matrix**

		Negative Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Importance	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

80. The impact significance categories are defined as shown in **Table 22.11**.

**Table 22.11 Impact Significance Definitions**

Impact Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore no change in receptor condition.

81. Note that for the purposes of the EIA, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions.
82. Embedded mitigation has been referred to and included in the initial assessment of impacts. If the impact does not require mitigation (or none is possible) the residual impact remains the same. If, however, mitigation is required an assessment of the post-mitigation residual impact is provided.

#### 22.4.4 Cumulative Impact Assessment

83. The proposed East Anglia TWO project Cumulative Impact Assessment (CIA) will initially consider the cumulative impact with only the proposed East Anglia ONE North project against two different construction scenarios (i.e. construction of the two projects simultaneously 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.
84. For a general introduction to the methodology used for the CIA please refer to **Chapter 5 EIA Methodology**.
85. In terms of onshore ecology, the key consideration used in relation to linear development is whether there is spatial or temporal overlap of effects from projects on the same receptors. Therefore, for habitats and non-mobile species there is no pathway for cumulative impact between spatially separated projects. There is however the potential for a cumulative impact upon the overall habitat

resource at a regional or national level. Where potential regional or national level impacts are identified and considered to be relevant they are included in the CIA.

86. For mobile species, there is only a pathway for cumulative impact if there is spatial overlap of potential receptor ranges in addition to temporal overlap with the activity or its resultant impact i.e. where developments follow on from one another before the species has recovered from displacement or other impacts. In addition, whilst it is assumed that any consented development would be subject to mitigation and management measures which would reduce impacts to non-significant unless there were exceptional circumstances, it is accepted that such projects may contribute to a wider cumulative impact.
87. Finally, in cases where this project has negligible or no change on a receptor (through, for example, avoidance of impact through routeing or construction methodology) it is considered that there is no pathway for a cumulative impact.
88. Further details of the methods used for the CIA for onshore ecology are provided in **section .**

#### 22.4.5 Transboundary Impact Assessment

89. There are no transboundary impacts with regards to onshore ecology as the onshore development area is not located in proximity to any international boundaries.

### 22.5 Existing Environment

90. As discussed above, at the time of undertaking the initial desk based assessment and following field surveys, which inform this section, the onshore development area was yet to be finalised, and therefore survey and reporting was completed on the indicative onshore development area. The information presented in the survey appendices associated with this ES chapter are therefore described in terms of the indicative onshore development area boundary and the indicative onshore development area is shown on figures associated with the appendices for context.
91. In comparison, the information provided in this section is relevant to the onshore development area only, which is shown on figures associated with this ES chapter.

#### 22.5.1 Designated Sites

92. Designated sites that are located within, and up to 2km from, the onshore development area, are listed in **Table 22.12** and shown on **Figure 22.1** and **Figure 22.2**. **Table 22.12** also provides a summary of the qualifying features/reasons for notification of these designated sites. The legislation

underpinning designated sites is provided in **Chapter 3 Policy and Legislative Context**.

**Table 22.12 Designated Sites within 2km of the Onshore Development Area**

Designated site	Key features	Proximity to onshore development area
<b>Statutory Designated Sites</b>		
Sandlings SPA	Breeding populations of nightjar and woodlark.  Acid grassland, heath, scrub, woodland (including commercial forest), fen, open water and vegetated shingle.	Within onshore development area
Minsmere to Walberswick Ramsar, SPA and SAC	Nationally important numbers of breeding and wintering birds.  Annual vegetation of drift lines (vegetated shingle).  European dry heath.  Perennial vegetation of stony banks	1.98km
Alde-Ore Estuary Ramsar, SPA, SSSI and Alde-Ore and Butley Estuaries SAC	Nationally important numbers of breeding and wintering birds.  Estuaries.  Atlantic salt meadows.  Mudflats and sandflats.	1.9km
Leiston to Aldeburgh SSSI	Acid grassland, heath, scrub, woodland, fen, open water and vegetated shingle.	Within onshore development area
Sizewell Marshes SSSI	Lowland unimproved wet meadow	0.34km
Minsmere to Walberswick Heath and Marshes SSSI	Mudflats, shingle beach, reed beds, heathland and grazing marsh.	1.98km
<b>Non-statutory Designated Sites – County Wildlife Sites (CWS) (listed east to west)</b>		
Suffolk Shingle Beaches	Vegetated shingle	On the boundary of the onshore development area (at the landfall)
Dower House	Acid grassland	0.06km
The Haven, Aldeburgh	Lagoons and reedbeds	1.83km
Sizewell Levels and Associated Areas	Habitat mosaic	1.26km
Reckham Pits Wood	Habitat mosaic	0.95km
Leiston Common	Habitat mosaic	0.8km

Designated site	Key features	Proximity to onshore development area
Aldringham to Aldeburgh Disused Railway Line	Species rich grassland	On the boundary of the onshore development area
Aldeburgh Golf Course	Cultivated grassland	1.5km
Great Wood	Ancient woodland	0.44km
Knodishall Common	Acid grassland	0.14km
Buckle's Wood	Ancient woodland	1.75km
Grove Wood	Ancient woodland	On the boundary of the onshore development area
Knodishall Whin	Habitat mosaic	0.53km
Benhall Green Meadows	Wet species rich grassland	1.1km
Church Common	Heathland mosaic	1.17km

93. All statutory designated sites for nature conservation are considered to be of high importance, in accordance with the criteria set out in **Table 22.8**.
94. All non-statutory designated sites are considered to be of medium importance, in accordance with the criteria set out in **Table 22.8**.

## 22.5.2 Terrestrial Habitats

95. The information presented in this section is based on field survey data collected during the 2018 Extended Phase 1 Habitat Survey, and the subsequent 2019 Phase 1 addendum. Habitat codes are provided in brackets throughout this section, assigned using JNCC Phase 1 Guidance (JNCC 2010). Full details of the habitats present are provided in **Appendix 22.3**. Features of interest are described using Target Notes (TN), which are referenced using a numbering system. The locations of the TNs are shown on **Figure 22.4**, and further details are provided within the Extended Phase 1 Habitat Survey Report (**Appendix 22.3**).

### 22.5.2.1 Arable Land

96. The largest habitat by area (239.5ha) within the onshore development area is arable land (J1.1). At the time of the survey these ranged from fields that were either in crop (including beetroot, potato and oilseed rape) or had been ploughed. The 239.5ha of arable land equates to approximately 89% of the habitat within the onshore development area.

97. All areas of arable land are considered to be of low importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.2 Boundary Features

98. Field boundaries consisted primarily of hedgerows (76 of 84 boundary features recorded), of which the majority (24) are species-poor hedgerows with trees (J2.3.2). However, species-poor intact hedgerows (22) (J2.1.2), species-poor defunct hedgerows (21) (J2.2.2), species-rich hedgerows with trees (8) (J2.3.1) and species-rich defunct hedgerows (1) (J2.2.1) were also recorded. Occasionally fields were bordered by dry ditches (J2.6).
99. Species rich hedgerows (J2.2.1 and J2.3.1) typically consisted of shrub and tree species including hawthorn *Crataegus monogyna*, oak *Quercus robur*, ash *Fraxinus excelsior*, hornbeam *Carpinus betulus*, willow *Salix spp.*, ivy *Hedera helix*, dog rose *Rosa canina*, holly *Ilex aquifolium*, with ground flora typically consisting of common nettle *Urtica dioica*, bramble *Rubus fruticosus*, cow parsley *Anthriscus sylvestris*, red-dead nettle *Lamium purpureum*, cleavers *Galium aparine*, common hogweed *Heracleum sphondylium*, lords and ladies *Arum maculatum*, broad leaf dock *Rumex obtusifolius*, wild clary *Salvia verbenaca*, hedgerow crane's-bill *Geranium pyrenaicum* and herb robert *Geranium robertianum*. Species poor hedgerows (J2.1.2, J2.2.2 and J2.3.2) were characterised by fewer than five species within a 30m stretch and were typically dominated by hawthorn.
100. As a UKHPI and Suffolk Biodiversity Action Plan (BAP) hedgerow habitat, the local hedgerow resource is of high importance based on the criteria defined in **Table 22.8**. None of the hedgerows identified were assessed as important hedgerows in terms of ecological criteria (species rich and intact hedge or with one recorded barbastelle pass). Further detail is given in **section 22.6.1.5**.

#### 22.5.2.3 Semi-natural Woodland

101. Areas of semi-natural woodland (A1.1.1 and A1.3.1) were recorded in 14 locations within the onshore development area, these ranged from large areas of woodland through to small isolated pockets at field margins. These areas of woodland represent a coverage of approximately 7ha, which in turn represents approximately 2.6% of the habitat within the onshore development area.
102. Broadleaved woodland typically consisted of a mix of ash, sycamore *Acer pseudoplatanus*, oak and silver birch *Betula pendula* with typical understorey and ground flora species including hawthorn, bramble, common nettle, lords and ladies, primrose *Primula vulgaris*, golden saxifrage *Chrysosplenium oppositifolium*, creeping willow *Salix repens* and ground ivy *Glechoma*

*hederacea*. Coniferous woodland species typically included Scots pine *Pinus sylvestris* and juniper *Juniperus communis*.

103. The onshore cable route passes through an area of trees designated with a Tree Preservation Order (TPO) immediately west of the B1122 south of Aldringham (TPO Number SCDC/87/00030, ESC 2019b), north of Fitches Lane. This area is described as several mixed deciduous and coniferous species consisting mainly of silver birch, oak, beech *Fagus sylvatica*, sycamore *Acer pseudoplatanus*, horse chestnut *Aesculus hippocastanum*, cherry *Prunus spp.*, Scot's pine, Corsican pine *Pinus nigra*, mixed ornamental conifers and evergreen oak *Quercus ilex*.
104. Areas of semi-natural woodland (including those trees which have been afforded TPOs) are considered to be of medium importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.4 Plantation Woodland

105. Plantation woodland (A1.1.2 and A1.3.2) was recorded in 4 locations within the onshore development area and typically included oak, silver birch, beech *Fagus sylvatica*, sweet chestnut *Castanea sativa* and Scots pine. Pheasant feeders and enclosures were observed within several areas of plantation woodland, with limited understorey and ground flora species consisting mainly of bramble, common nettle and lords and ladies. These areas of woodland represent a coverage of approximately 1.6ha, which in turn represents approximately 0.6% of the habitat within the onshore development area.
106. Areas of plantation woodland are considered to be of medium importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.5 Scrub

107. A total of 8 areas of scrub (A2.1) were recorded within the onshore development area and in total covers an area of 5.3ha (representing approximately 2% of the habitat within the onshore development area). These areas represented a range of habitat sub-types including transitional habitat between woodland and grassland, boundary features, waste ground, field margins and watercourse margins. Species present included bramble, gorse *Ulex spp.*, bracken *Pteridium spp.*, common nettle, common hogweed, cow parsley and cleavers.
108. Areas of scrub are considered to be of medium importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.6 Scattered Trees

109. Scattered trees are present throughout the onshore development area. Species recorded included Scots pine, sweet chestnut, bird cherry *Prunus padus*, beech and silver birch.
110. All scattered trees are considered to be of high importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.7 Improved Grassland

111. Improved grassland (B4) was recorded in 4 locations within the onshore development area and in total covers an area of 6.4ha (representing approximately 2.4% of the habitat within the onshore development area). This habitat typically represents an area being used for either grazing or paddocks and is formed of short sward grasses with areas of scrub vegetation.
112. Areas of improved grassland are considered to be of medium importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.8 Poor Semi-Improved Grassland

113. Poor semi-improved grassland (B6) was recorded in seven locations within the onshore development area, which in total covers an area of 9.4ha (representing approximately 3.5% of the habitat across the onshore development area). These areas were comprised of coarse ruderal grass and herb species such as cock's foot *Dactylis glomerata*, common couch *Elymus repens*, rough meadowgrass *Poa trivialis*, broad leaf dock, red dead nettle and white clover *Trifolium repens*.
114. Areas of poor semi-improved grassland are considered to be of medium importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.9 Water Bodies

115. A total of 11 standing water bodies (such as ponds and standing water in ditches) are within the onshore development area. The locations of which are shown on **Figure 22.5**.
116. **Figure 22.5** also shows that two rivers, the Hundred River (**Figure 22.5c**) and Friston Beck<sup>2</sup> (**Figure 22.5f**) cross the onshore development area. Friston Beck is not considered further within this assessment as it is not considered to be of ecological value (due to it being shallow and narrow).

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<sup>2</sup> Friston Beck is part of the Friston Watercourse. Further detail is provided in **Chapter 20 Water Resources and Flood Risk**

117. Areas of standing water and rivers are considered to be of high importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.10 Coastal Grassland

118. Coastal grassland (H8.4) was recorded along the coastline, running adjacent to the eastern edge of the onshore development area (is not within the onshore development area) and comprised gorse, bracken, and marram grass *Ammophila arenaria*. Areas of coastal grassland are considered to be of high importance, in accordance with the criteria set out in **Table 22.8**.

#### 22.5.2.11 Coastal Vegetated Shingle

119. Coastal vegetated shingle is considered rare globally and is listed on Annex I of the EU Habitats Directive ('perennial vegetation of stony banks'). It supports a unique range of flora and fauna that are adapted to the harsh conditions that are present at such locations. This is a feature of the Leiston - Aldeburgh SSSI at the landfall. Landfall will be made using HDD and therefore, there will be no direct or indirect impacts on the intertidal zone and so impacts on coastal vegetated shingle are not considered further.

#### 22.5.2.12 Summary

120. **Table 22.13** shows the key habitats within the onshore development area.

**Table 22.13 JNCC Phase 1 Habitat Areas and Boundaries Recorded During the Field Survey**

JNCC Phase 1 Habitat Survey Code	JNCC Phase 1 Habitat Survey Description	Area (ha)	Percentage of habitat type within onshore development area
A1.1.1	Broadleaved woodland – semi-natural	7	2.6%
A1.1.2	Broadleaved woodland – plantation	0.1	<0.01
A1.3.1	Mixed woodland – semi-natural	1.6	0.6%
A1.3.2	Mixed woodland - plantation	1.5	0.5%
A2.1	Scrub – dense/continuous	5.3	2%
B4	Improved grassland	6.4	2.4%
B6	Poor semi-improved grassland	9.4	3.5%
J1.1	Cultivated/disturbed land – arable	239.5	89%
H8.4	Coastal grassland	-	0%

JNCC Phase 1 Habitat Survey Code	JNCC Phase 1 Habitat Survey Description	Area (ha)	Percentage of habitat type within onshore development area
			Adjacent to the onshore development area
J2.1.2	Intact hedge – species poor		3,182m
J2.2.1	Defunct hedge – species rich		172m
J2.2.2	Defunct hedge – species poor		3,802m
J2.3.1	Hedge with trees – species rich		722m
J2.3.2	Hedge with trees – species poor		3,297m

### 22.5.3 Protected, Notable and Invasive Species

121. This section provides a summary of the key species recorded within the onshore development area, drawing on the information obtained from both the desk study and the 2018 and 2019 ecological field surveys. Results from the desk based study are shown in **Figure 22.3**.

#### 22.5.3.1 Birds

122. All baseline information, and impact assessment, with regard to onshore ornithology is covered in **Chapter 23 Onshore Ornithology** of this ES.

#### 22.5.3.2 Badger

123. Badgers have been recorded within the onshore development area and the required 50m buffer, as shown on **Confidential Figure 22.6**.

124. Five active badger setts have been identified within the onshore development area, one within the onshore cable corridor (**Confidential Figure 22.6b**) and four active setts in the vicinity of the onshore substation site. Additional signs of badgers were identified in the vicinity of the onshore substation site, consisting of one disused set, two latrines and seven further signs of badger presence such as pathways or snuffle holes (**Confidential Figure 22.6f**).

125. Badgers are protected under the Protection of Badgers Act 1992.

126. As a regularly occurring population of a nationally important species which is not threatened or rare in the country, badgers are considered to be of low importance.

### 22.5.3.3 Bats

127. All features (i.e. trees, buildings, structures) noted during the Extended Phase 1 Habitat Survey, and subsequent Phase 1 addendum, identified to be within the onshore development area, and required 50m buffer, were assessed from the ground using binoculars (in accordance with the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> Edition 2016) for their suitability to support roosting bats.
128. A total of 33 features in total were identified within the onshore development area and 50m buffer. Of these 33 features, 28 were assessed as having moderate or high suitability. **Figure 22.7** shows the locations of all 33 features.
129. **Table 22.14** below provides details of each of the 28 features assessed as being as of moderate or high roosting suitability.

**Table 22.14 Bat Roosting Habitat Features of Moderate or High Suitability within the Onshore Development Area and 50m buffer (should be read in conjunction with Figure 22.7)**

Target Note number	Feature and description	Bat Potential
<b>Identified during the Extended Phase 1 Habitat Survey (2018)</b>		
TN3b	Scattered scots pine with peeling bark/split limbs	Moderate
TN4b	Dead tree trunk with large holes	Moderate
TN10b	Mature oak trees	Moderate
TN11b	Alder woodland	Moderate
TN29b	Four mature ash	Moderate
TN223a	Mixed plantation woodland	Moderate
TN226a	Semi natural broadleaved woodland	Moderate
TN230a	Species poor hedge with moderate bat commuting/foraging potential	Moderate
TN236a	Trees within hedge	Moderate
TN250a	Row of 5 trees 4 low, 1 moderate	Moderate
TN254a	Trees within woodland	High
TN261a	Mature ivy clad oak within hedge (TN260a)	Moderate
TN266a	Mature ivy clad oak in hedge (TN265a)	Moderate
TN306a	Trees within woodland	Moderate
TN311a	Mature ivy clad oak in hedge (TN309)	Moderate

Target Note number	Feature and description	Bat Potential
<b>Identified during the Phase 1 Addendum (2019)</b>		
TN317a	Mature oak with some ivy cladding, low bat roost potential due to lack of visible PRFs	Moderate
TN362a	Mainly defunct hedge between trees. 8 mature trees, potentially veteran.	Moderate
TN365a	Mostly hawthorn with scattered semi mature oak	Moderate
TN366a	Large mature oak in hedge, potentially veteran	Moderate
TN367a	Hawthorn hedge, recently flailed, scattered oak, one potentially veteran	Moderate
TN368a	Boundary formed of scattered semi mature oak	Moderate
TN371a	Large ash with visible PRFs	Moderate
TN372a	Large ash with visible PRFs	Moderate
TN373a	Large ash with visible PRFs	Moderate
TN374a	Large ash with rot holes and fractured limbs	Moderate
TN375a	Large ash next to dry ditch with large holes visible	Moderate
TN376a	Hazel, elder, selfheal, bramble, nettle, field maple	Moderate
TN377a	Continuation of connected hedge with several mature oak.	Moderate

130. Features assessed during the initial 2018 Extended Phase 1 Habitat Survey as having either moderate or high potential to support roosting bats have been subject to bat emergence/re-entry surveys during 2018 to confirm the presence/absence of roosting bats. In accordance with the BCT guidance, no further surveys for those features assessed as having low potential to support roosting bats have been undertaken. The emergence/re-entry surveys for the features having moderate or high potential were undertaken between June and October 2018. Results from the bat activity surveys can be found in **Appendix 22.6** and on **Figure 22.8**.
131. Roosting features identified in the subsequent 2019 Phase 1 Addendum as having either moderate or high potential to support roosting bats have not been subject to bat emergence/re-entry surveys to confirm the presence/absence of roosting bats. Further survey of these features is not required as they will not require removal in order to facilitate the proposed East Anglia TWO project. Therefore, these features are not shown on **Figure 22.8** alongside the 2018 bat survey results. Survey data from the 2018 surveys is sufficient to undertake the assessment of potential impacts on bats from the proposed East Anglia TWO project.

132. In addition to trees and structures, all linear features (e.g. watercourses, hedgerows) were categorised in terms of their suitability to support commuting or foraging bats, in accordance with the BCT guidance. This categorisation was based on the habitat type, qualified by how well connected to surrounding habitat the habitat feature was. The categorisation used was as follows:
- Defunct hedgerows and field drains typically provided low suitability for commuting and foraging bats;
  - Intact species-rich hedgerows, areas of scrub and small watercourses typically provided moderate suitability for commuting and foraging bats; and
  - Species-rich hedgerows with trees and large watercourses well connected to the wider landscape typically provided high suitability for commuting and foraging bats.
133. A total of 89 commuting or foraging features were identified during the 2018 Extended Phase 1 Habitat Survey and the 2019 Phase 1 Survey Addendum.
134. All of those commuting or foraging features identified during the initial 2018 Extended Phase 1 Habitat Survey have been assessed using bat activity transect surveys between June and October 2018 (**Appendix 22.6**) (a total of 81 features). Those commuting and foraging features identified in the subsequent 2019 Phase 1 Addendum (8 features) have not been subject to further survey. It is considered that the foraging support given to bat species in additional area surveyed in the 2019 Phase 1 Addendum is the same as that provided by the area covered by the 2018 bat activity surveys, and therefore the results of the 2018 bat activity surveys are representative of the onshore development area as a whole.
135. The locations of the commuting/foraging features are shown on **Figure 22.7**.
136. Results from the bat activity surveys can be found in **Appendix 22.6** and on **Figure 22.8**.
137. All bats are EPS and a Suffolk priority species. Therefore, all bat species are of high importance.

#### 22.5.3.4 Water Vole and Otter

138. A total of 23 standing water bodies (such as ponds and standing water in ditches) and one ecologically suitable river (the Hundred River) fall within the onshore development area and the required 50m buffer and provide potential suitable habitat for either water vole or otter. These were identified during the initial 2018 Extended Phase 1 Habitat Survey, and no further water bodies were identified during the subsequent 2019 Phase 1 Addendum (**Appendix 22.3**).

139. Habitat suitability surveys were conducted in 2018 and the 24 water bodies were assessed for their suitability to support water voles and otters.
140. The habitat suitability surveys identified 6 water bodies as providing optimal water vole habitat, and 17 water bodies were assessed as providing sub-optimal habitat for water voles within the onshore development area and 50m buffer. Those waterbodies assessed as sub-optimal were primarily due to the watercourse having very little bank for burrowing, very poor water quality observed, very shallow banks, low flows, evidence of regular channel maintenance or isolation from any connecting habitat.
141. A single water body (the Hundred River) was assessed as being suitable to support otter. All remaining 23 water bodies were assessed as sub-optimal habitat for otters, primarily due insufficient size and depth to support otters as well as not being functionally connected to the wider river network (these were typically agricultural field drains).
142. **Figure 22.9** shows the locations of these water bodies and the results of the habitat suitability survey.
143. The detailed findings of the 2018 habitat suitability surveys are provided in **Appendix 22.5**. No evidence of water vole or otter has been recorded during the surveys completed to date or provided by SBIS during the desk study, therefore they are assumed to be absent (as two surveys have been undertaken to confirm no evidence) and are not considered further in this assessment. It should be noted that given the mobility of both water voles and otters, in combination with the presence of optimal habitat for these species being present, prior to works commencing, a pre-construction survey (within the optimal survey window) for both species may be undertaken to confirm that both species remain absent, i.e. no changes to the findings of the 2018 survey. This should be undertaken by a suitably qualified ecologist.
144. Water vole and otter are EPS and Suffolk priority species, therefore both species are of high importance.

#### 22.5.3.5 Great Crested Newt

145. A total of 27 water bodies identified as being of optimal habitat to support great crested newts fall within the onshore development area and the required 250m buffer (**Table 22.7**). These were identified during the initial 2018 Extended Phase 1 Habitat Survey, and no further water bodies were identified during the subsequent 2019 Phase 1 Addendum (**Appendix 22.3**).

146. All of these 27 water bodies were assessed for their potential to support great crested newts using the Habitat Suitability Index (HSI) assessment. Suitable terrestrial habitat for supporting foraging and hibernating great crested newts was observed throughout the onshore development area. Part of the HSI assessment includes an assessment of the habitat surrounding a potential breeding pond for its suitability to support foraging and hibernating newts. Full details of these water body assessments are provided in **Appendix 22.4**.
147. Of the 27 water bodies within the onshore development area and required 250m buffer subject to the HSI assessment, 9 were noted to be dry and therefore scoped out from any further survey and/or consideration. The remaining 18 water bodies were subject to an eDNA test which was undertaken in accordance with approved field and laboratory protocols (Briggs et al. 2014), in May and June 2018. This is an approved valid method for great crested newt presence/absence survey and this approach was agreed with stakeholders at the ETG meeting in April 2018. Of the 18 water bodies surveyed, three ponds returned a positive result and the remaining 15 water bodies returned a negative result. Results of eDNA surveys can be found on **Figure 22.10**. Full details of these eDNA surveys is provided in **Appendix 22.4**. Population size assessment surveys will be undertaken for these three waterbodies prior to the commencement of construction works. The findings of which will be used to inform and develop any appropriate mitigation measures where required. Further details of these pre-construction surveys are provided in the OLEMS, submitted with this DCO application and secured under the requirements of the draft DCO.
148. Great crested newts are an EPS and a Suffolk Local Biodiversity Action Plan (LBAP) priority species. As an EPS, great crested newts are considered to be of high importance.

#### 22.5.3.6 Reptiles

149. A total of seven areas of suitable reptile habitat have been recorded within the onshore development area. Six of these areas were identified during the initial 2018 Extended Phase 1 Habitat Survey, and a further one habitat area was identified during the subsequent 2019 Phase 1 Addendum (**Appendix 22.3**).
150. These areas comprise habitat mosaics and potential refugia locations which could potentially support common reptile species. **Table 22.15** contains the details of these areas.

**Table 22.15 Areas of Suitable Reptile Habitat or Potential Refugia within the Onshore Development Area (to be read in conjunction with *Figure 22.4*)**

Target Note Number	Description
<b>Identified during the Extended Phase 1 Habitat Survey (2018)</b>	
TN40b	Large vegetated mound – optimal feeding/basking area for reptiles
TN162a	Habitat mosaic within woodland area
TN185a	Habitat mosaic within hedgerow and field margin
TN198a	Habitat mosaic within grassland area
TN283a	Habitat mosaic within scrub vegetation
TN310a	Habitat mosaic within grassland area
<b>Identified during the Phase 1 Addendum (2019)</b>	
TN369a	Wide field margin with moderate mosaic for reptiles

151. The locations of these habitat mosaics and potential refugia are shown on **Figure 22.4**, with the corresponding Target Note numbers provided in **Appendix 22.3**. These mosaics contain a range of habitats including scrub, woodland edges, heath and grassland.
152. No further reptile surveys have been undertaken as the areas of suitable habitat identified are considered to be of an inappropriate size to support large populations of reptiles presented. This approach was presented in the ETG meeting April 2018. Appropriate mitigation measures (i.e. habitat manipulation works) to ensure compliance with the legislation afforded to reptiles will be developed and adhered to during construction related activities where required.
153. All reptile species are protected under the under the Wildlife and Countryside Act 1981 (as amended). Reptile species are considered to be nationally important and are rare in the region. Therefore, reptiles are considered to be of medium importance.

#### 22.5.3.7 Dormice

154. Although Dormice have been recorded within the wider area of Suffolk, no records were returned during the desk study to be within the onshore development area. Furthermore, no suitable habitat (extensive hedgerow and woodland areas with a high proportion of hazel) was recorded within the onshore development area during the 2018 Extended Phase 1 Habitat Survey, and subsequent 2019 Phase 1 Addendum. Consequently, this species is considered to be absent and has not been considered further in this ES chapter.

#### 22.5.3.8 Invertebrates

155. No evidence of suitable habitat to support significant populations of invertebrates was noted during the 2018 Extended Phase 1 Habitat Survey, and subsequent 2019 Phase 1 Addendum, within the onshore development area. Furthermore, through the implementation of the embedded mitigation measures regarding species, such areas where invertebrates have been recorded (predominately around the habitats along the coastline) will be avoided wherever possible. Consequently, these species have not been considered further in this ES chapter.

#### 22.5.3.9 Invasive Non-Native Species

156. During the 2018 Extended Phase 1 Habitat Survey, and subsequent 2019 Phase 1 Addendum, Himalayan balsam was noted along the Hundred River 123m upstream of, but not within, of the onshore development area (**Appendix 22.3**). This is an invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). No other invasive non-native species were noted during the survey.
157. As the risk posed by this species is of national importance, the risk posed by this species is considered to be of medium importance.

#### 22.5.4 Anticipated Trends in Baseline Condition

158. The ecological baseline described in the preceding sections provides a summary of the habitats and species present within the onshore development area. In broad terms, the onshore development area includes typical lowland UK habitat types comprising largely arable farmland with hedgerows, pockets of woodland, standing and flowing water. The key areas for notable species and habitats are typically designated sites and parcels of woodland and wetland, with species in other areas relying strongly on ecological corridors such as watercourses and hedgerows for connectivity across arable farmland.
159. The overall trend in the UK shows a decline in priority species since the 1970s, although the gradient of this decline has lessened since 2000 (Defra 2017). This overall trend is driven by certain species groups, with moths in particular declining by approximately 80% over this period (Defra 2017). Habitat connectivity has remained static since 1990, and indicators of ecosystems services provision (pollinators) have also remained static over the short term. Perhaps most relevant to the onshore development area, species associated with farmland have declined over the short and long term, with farmland birds and butterflies both declining, whilst mammal (bats) numbers increased from 1999-2015, but the increase has levelled out from the period 2010-2015 (Defra 2017).
160. Attempts to manage trends in biodiversity are delivered through EU, UK and local legislation and policies. The UK has transposed protection for European

protected species and habitats into UK law, and also provides domestic legislation for species and sites not covered by European protection. The UK's approach to managing Biodiversity Loss is set by *Biodiversity 2020: a strategy for England's wildlife and ecosystem services* (Defra 2011). The policies set out under this strategy seek to reverse these declining trends. Data are still being gathered to determine success of these measures, however for the time being it appears that declining trends in biodiversity for the habitats and species present within the study area may continue. As a consequence, it is assumed that the ecological baseline within the study area will continue to change over time as measures to try and manage the decline in protected species and habitats continue.

## 22.6 Potential Impacts

161. The following sections describe the impacts upon those ecological receptors described in **section 22.5** that have the potential to arise as a result of the construction, operation and decommissioning phases of the proposed East Anglia TWO project. The assessment follows the methodology set out in **section 22.3.3**. The assessments are based on the worst-case scenarios set out in **section 22.3.2** and include the incorporation of embedded mitigation and project commitments set out in **section 22.3.3**.
162. Given that the exact locations of infrastructure (i.e. haul road, jointing bays and CCS) cannot be determined at this time (and will be developed post-consent during the detailed design phase), a precautionary approach to the assessment has been taken in the sections below, i.e. assuming that each habitat type within the onshore development area may be impacted by the total footprint of the onshore construction works and onshore operational infrastructure associated with the proposed East Anglia TWO project.

### 22.6.1 Potential Impacts during Construction

#### 22.6.1.1 Impact 1: Impacts to Designated Sites

##### 22.6.1.1.1 Impacts Associated with the Landfall

163. There is one statutory designated site overlapping with the part of the coastline where landfall works are expected, namely Leiston-Aldeburgh SSSI. In addition, there are two designated sites within 2km of the landfall works: Sandlings SPA (0.69km to the west); and Sizewell Marshes SSSI (approximately 1.98km north). There are no non-statutory designated sites within the landfall area.
164. The landfall works comprise HDD drilling activities that will launch from an onshore HDD entry pit temporary working area (located outside the Leiston and Aldeburgh SSSI) out to an exit point out at sea (refer to **Chapter 6 Project Description**). The proposed East Anglia TWO project has committed to HDD at the landfall, which avoids any interaction with Leiston-Aldeburgh SSSI, i.e. no

requirement for vehicular beach access. As such, the intertidal features of the Leiston-Aldeburgh SSSI would not be affected directly by landfall construction. Following assessment of the proposed East Anglia TWO project traffic flows, impacts associated with nutrient nitrogen deposition caused by construction traffic are below the 1% Critical Load range at all transect locations, including those closest to the road network at the Leiston-Aldeburgh SSSI. Further detail is provided in **Chapter 19 Air Quality**. As such, the intertidal features of the Leiston-Aldeburgh SSSI would not be affected directly or indirectly by landfall construction activities. As such, no change to Leiston-Aldeburgh SSSI is predicted during the landfall construction works.

165. Sizewell Marshes SSSI comprises water dependent habitats and associated bird assemblages, located 2.4km north of the landfall area. There is no direct overlap with the onshore development area and therefore no direct impacts associated with the landfall construction. Following assessment of the proposed East Anglia TWO project traffic flows, impacts associated with nutrient nitrogen deposition caused by construction traffic are below the 1% Critical Load range at all transect locations, including those closest to the road network at the Sizewell Marshes SSSI. Further detail is provided in **Chapter 19 Air Quality**. Therefore, there is no mechanism for indirect impacts to this site. As such, no changes to Sizewell Marshes SSSI are predicted during the landfall construction works.
166. Sandlings SPA does not overlap with the landfall area but is located 0.69km to the west. There is the potential for indirect (disturbance) impacts to bird species (e.g. nightjar and woodlark) associated with this site during landfall construction works over the medium term. Further information on these species and the detailed impact assessment is provided in **Chapter 23 Onshore Ornithology**. Following assessment of the proposed East Anglia TWO project traffic flows, impacts associated with nutrient nitrogen deposition caused by construction traffic are below the 1% Critical Load range at all transect locations, including those closest to the road network at the Sandlings SPA. Further detail is provided in **Chapter 19 Air Quality**. Therefore, no change to the Sandlings SPA is predicted during the landfall construction works in relation to nutrient nitrogen deposition.

#### 22.6.1.1.2 Impacts Associated with the Onshore Cable Corridor

167. There is one statutory Natura 2000 designated site with the potential for direct interaction with the onshore cable corridor, namely Sandlings SPA (and the component nationally designated Leiston-Aldeburgh SSSI). The following assessment considers impacts on the Leiston-Aldeburgh SSSI as part of the assessment of the Sandlings SPA.). In addition, there are two nationally designated sites within 2km of the onshore development area identified for qualifying bird species (i.e. with the potential for indirect disturbance impacts):

Minsmere to Walberswick Ramsar and SPA (1.98km north); and Alde-Ore Estuary Ramsar and SPA (approximately 1.98km south). There are a number of other designated sites within 2km (refer to **Table 22.12**), however, these are all designated for habitats alone and there is no mechanism for indirect disturbance impacts associated with the installation of the onshore cables.

168. Non-statutory designated sites which fall within the onshore development area are listed in **Table 22.12**.
169. The onshore cable route will cross Sandlings SPA at its narrowest point, towards the north of the SPA. Where the onshore cable corridor crosses these designated sites, HDD or open cut crossing techniques may be employed.
170. For an open cut technique, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) within Sandlings SPA for a length up to 300m depending on the exact alignment chosen to cross the SPA. The implications of this embedded mitigation mean that the area potentially affected within Sandlings SPA would be reduced from 0.957ha (adopting a 32m onshore cable route) to 0.483ha (adopting a reduced 16.1m onshore cable route), which represents a reduction from 0.028% to 0.014% of the SPA (total area of Sandlings SPA is 3,406ha).
171. 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 of mid-February to end of August, unless otherwise agreed with Natural England that (based on monitoring information provided by the Ecological Clerk of Works (ECoW)) bird breeding activities within 200m of the SPA/SSSI crossing works area have ceased.
172. 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.
173. The above phases may be undertaken over a number of years to comply with the seasonal restriction associated with crossing the SPA/SSSI. Landscaping works such as hedgerow replanting may be undertaken outside these periods to ensure optimal planting conditions are achieved.

174. Based on the criteria defined in **Table 22.9** this is assessed as an effect of low magnitude (considerably less than 10% of the site affected and impacts are detectable in the short-term and are seasonally restricted on a high importance receptor, and without further mitigation represents a temporary impact of moderate adverse significance.
175. There is the potential for indirect (disturbance) impacts to bird species associated with Minsmere to Walberswick Ramsar and SPA, and Alde-Ore Estuary Ramsar and SPA during onshore cable route construction works. However, cable installation construction noise and human presence at these distances (1.98km and 1.98km respectively) are not considered to represent any disturbance risk to qualifying species using those sites. As noted in **section 22.6.1.1.1**, there will be no impact from nitrogen deposition on designated sites caused by construction traffic. Overall no changes are predicted at these two sites.

#### 22.6.1.1.3 Impacts Associated with the Onshore Substation and National Grid Infrastructure

176. There are no statutory designated sites within 2km of the onshore substation and National Grid infrastructure.
177. Grove Wood is on the boundary of the onshore development area and is a non-statutory designated site, designated as ancient woodland. This woodland will be retained and therefore, there will be no change to this non-statutory designated site.

#### 22.6.1.1.4 Mitigation

178. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed (see also **Chapter 23 Onshore Ornithology**):
- For works inside or within 200m of the SPA and SSSI boundary, a Breeding Bird Protection Plan (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, such construction works (excluding vehicle and personnel movements) 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.

#### 22.6.1.1.5 Impacts following Mitigation

179. Following the implementation of the mitigation measures considered necessary (examples outlined above), there will be a reduction in the magnitude of effect from low to negligible on a high importance receptor, representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.2 Impact 2: Impacts to Arable Habitats

180. The largest habitat by area within the onshore development area is arable land. Arable land is typically of low ecological value due to the homogeneity of the habitat as well as farming practises and the presence of insecticides and herbicides within the crops. Arable field margins are a UK BAP and Suffolk LBAP Priority Habitat but the examples here do not qualify, as they are species-poor and heavily affected by agricultural inputs. As such, this arable habitat is of negligible ecological importance.
181. Given that the exact locations of infrastructure (i.e. haul road, jointing bays and CCS) cannot be determined at this time and given that the majority of the onshore development area is arable land, as a precautionary approach to the assessment the total footprint of construction works (approximately 73.7ha, see **Table 22.3**) has been assumed to affect arable land (see **Table 22.16**). This represents a temporary loss of 62.9ha of arable land and permanent loss of 10.8ha of arable land (due to the operational onshore substation, National Grid infrastructure and permanent access).
182. Further to the construction works footprint, the Applicant has identified four potential ecological mitigation areas along the onshore cable route (shown on

**Chapter 6 Project Description, Figure 6.6)**, and has developed an Outline Landscape Mitigation Plan (LMP), submitted with this DCO application as part of the OLEMS, which proposes planting and landscaping proposals surrounding the above ground operational infrastructure at the onshore substation and National grid substation. The potential ecological mitigation areas and landscaping areas (6.12 ha and 22.78 ha respectively) will be sited on arable land and will not be reinstated following the construction phase. These areas will therefore represent a further permanent loss of arable land of 28.9ha.

183. Therefore, the proposed East Anglia TWO project represents a temporary loss of 62.9ha of arable land and permanent loss of 39.7ha of arable land.
184. Impacts would be medium term, temporary and reversible (due to reinstatement upon completion of construction) and, given the extent of arable land in the surrounding area, it is considered that the magnitude of effect will be negligible. Operational impacts associated with the loss of arable habitat will not be assessed with regard to those ecologically sensitive receptors considered within this ES chapter because receptors are not reliant on this area as habitat and the landscaping proposals are likely to provide areas of suitable habitat to several protected species, discussed in **section 22.6.1.13**.

**Table 22.16 Potential area of Arable land affected by Construction**

Habitat type	Area within onshore development area (ha)	Total area of arable potentially affected
Arable	239.5	102.6

185. Given the low ecological value of the habitat, this receptor is of low importance. Given the negligible magnitude of effect the impact will be **negligible**. Given the significance of the impact no additional mitigation is proposed.

### 22.6.1.3 Impact 3: Impacts to Grassland Habitats

186. **Table 22.17** summarises the potential area of each type of grassland that could be affected by construction. As a precautionary approach to the assessment the total area of each habitat type within the onshore development area is assumed to be affected. The actual areas affected would be smaller than this. Only two grassland types are present in the onshore development area – improved grassland and semi-improved grassland. Both habitat types are classed as receptors of low ecological value and are therefore low importance receptors.

**Table 22.17 Potential area of Grassland affected by Construction**

Grassland type	Area within onshore development area (ha)	Total area of grassland potentially affected
Improved grassland	6.4	6.4
Poor semi-improved grassland	9.4	9.4

187. Construction works will lead to a medium term temporary loss of these grassland habitats for the duration of the construction phase. Given the extent of these grassland types within the surrounding area, the magnitude of effect is negligible.

188. Without mitigation, the greatest magnitude arising is negligible magnitude on a low importance receptor, results in an impact of **negligible** significance. Given the significance of the impact no additional mitigation is proposed.

#### 22.6.1.4 Impact 4: Impacts to Woodland and Trees

189. **Table 22.18** summarises the area of each type of woodland present within the onshore development area and the realistic worst case tree removal anticipated. All the woodland types identified below are considered to be of medium ecological importance based on the criteria defined in **Table 22.8**.

190. As part of embedded mitigation, the onshore infrastructure will avoid areas of woodland where practicable. As such, the assessment presented here is based on an understanding of the areas where tree loss will be unavoidable, rather than assume that all woodland present within the onshore development area will be lost. The area of woodland that will be lost will be very low (1.1ha of semi-natural broadleaved woodland as shown in **Table 22.8**) and at least an equivalent area of lost woodland will be replanted. However, there are three locations where woodland losses will be unavoidable:

- Onshore cable corridor crossing north of Fitches Lane in the vicinity of the TPO designated trees (approximately 0.9ha<sup>3</sup>) (**Figure 22.4c**);
- A1094/B1096 junction highway improvement (approximately 0.1ha<sup>4</sup>); and
- Onshore substation in proximity to Laurel Covert (approximately 0.1ha<sup>5</sup>) (**Figure 22.4e**).

<sup>3</sup> This is based on a precautionary calculation of an onshore cable route length of 550m and a working width of 16.1m (and rounded to the nearest decimal).

<sup>4</sup> Based on the removal of trees to aid visibility swathe

<sup>5</sup> Based on onshore substation location as shown on figures associated with this chapter. Substation siting will be refined following detailed design where appropriate.

**Table 22.18 Potential area of Woodland Affected by Construction**

Woodland type	Approximate Area of woodland within onshore development area (ha)	Approximate Total area potentially affected (ha)	Approximate Percentage of woodland within the onshore development area affected (%)
Broadleaved woodland – semi-natural	7.9	1.1	2.5
Broadleaved woodland – plantation	0.1	0	0
Mixed woodland – plantation	1.5	0	0

191. There is the potential to lose no more than 1.1ha of semi-natural broad-leaved woodland during the construction phase across the entire onshore development area. As a result, the magnitude of effect is considered to be low for long term duration.

#### 22.6.1.4.1 Impact without Mitigation

192. Without mitigation, the greatest effect arising is low magnitude on a medium importance receptor, resulting in an impact of at worst minor adverse significance.

#### 22.6.1.4.2 Mitigation

193. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- Pre-construction assessment of all trees to be removed by a suitably qualified arboriculturalist. This will include identification of mitigation of potential impacts to TPOs, which will be agreed with the Local Planning Authority post-consent;
- Ensuring that at least an equivalent area of lost woodland is replanted following completion of the works (trees cannot be replanted directly above the buried cables);
- To avoid creating a wind tunnel effect, replacement planting in the form of woodland edge habitat to allow future formation of primary, secondary and tertiary succession to ensure there is a sufficient amount of scrub, small trees/shrubs and woodland understorey as well as trees being replanted. This will ensure that woodland is not thinned too extensively and that there is enough vegetation to avoid the wind tunnel effect. The OLEMS provides further detail on the feasibility of planting above the onshore cables;

- Root protection areas to be fenced off during construction for trees in proximity to the works in that area to be retained;
- Introduce biosecurity measures, including cleaning of vehicles, equipment and personnel upon leaving infected areas, during construction to minimise the spread of ash dieback; and
- A mitigation plan will be produced and agreed with Natural England and included as part of the EMP, as secured under the requirements of the draft DCO.

#### 22.6.1.4.3 Impact following Mitigation

194. Following the implementation of the agreed mitigation measures considered necessary, there should be no net loss of trees; however, there remains a temporary loss of trees and the magnitude of the effect remains low, on a medium importance receptor. Representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.5 Impact 5: Hedgerows

195. There were 76 hedgerows identified within the onshore development area (**section 22.5.2.2**). **Table 22.19** summarises the length of each hedgerow type present. As a UKHPI and Suffolk BAP hedgerow habitat, the local hedgerow resource is of high importance based on the criteria defined in **Table 22.8**. None of the hedgerows identified were assessed as important hedgerows (as defined under the Hedgerows Regulations (1997)) in terms of ecological criteria (species rich and intact hedge or with one recorded barbastelle pass). Hedgerows in relation to bats are discussed in **section 22.6.1.9**.

**Table 22.19 Hedgerows Identified within the Onshore Development Area**

Hedgerow type	Length within onshore development area (m)
Intact hedge – species poor	3,182.3
Defunct hedge – species rich	172.9
Defunct hedge – species poor	3,802.3
Hedge with trees – species rich	722.1
Hedge with trees – species poor	3,297.4

196. As part of embedded mitigation, hedgerow losses will be minimised where practicable. Where the onshore cable corridor crosses an important hedgerow, the onshore cable corridor will be reduced to the minimal working width (16.1m where possible) thus minimising the total length of hedgerow removed. Important hedgerows have been defined in the DCO application. The OLEMS, as secured

under the requirements of the draft DCO, provides a detailed hedgerow schedule. As a worst case scenario, it is assumed that the construction phase could result in the majority of the hedgerow identified above being temporarily lost in the medium to long term whilst they become re-established. The scale of that loss would represent an effect of medium magnitude.

197. Without mitigation, this would represent an effect of medium magnitude on a high importance receptor, resulting in an impact of at worst major adverse significance. Therefore, the following mitigation is proposed.

#### 22.6.1.5.1 Mitigation

198. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- Temporarily lost hedgerows will be reinstated post-construction;
- Hedgerows will be reinstated as soon as possible in the construction programme;
- A mitigation plan will be produced and agreed with Natural England prior to the removal of hedgerows and included as part of the EMP, as secured under the requirements of the draft DCO;
- Protection against grazing animals will be provided;
- Improvement of hedgerows immediately adjacent to the removed sections where possible;
- Pre-construction assessment of all trees (in hedges) to be removed by a suitably qualified arboriculturalist; and
- Hedgerow root protection areas to be fenced off during construction, where relevant.

#### 22.6.1.5.2 Impact following Mitigation

199. Following the implementation of the agreed mitigation measures considered necessary, there should be significant reduction in the potential impact on hedgerows. Where hedgerows are temporarily removed these will be replaced following the completion of works. As such, the magnitude of effect is expected to reduce from medium to negligible on a high importance receptor, representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.6 Impact 6: Coastal Habitats

200. The proposed East Anglia TWO project has committed to HDD at the landfall, which avoids any interaction with coastal habitats, i.e. no requirement for vehicular beach access. As such, coastal habitats would not be affected directly

or indirectly by construction. As such **no change** upon coastal habitats is anticipated as a result of the proposed East Anglia TWO project.

#### 22.6.1.7 Impact 7: Watercourses and Ponds

201. A total of 11 standing water bodies and one ecologically suitable river (the Hundred River), are located within the onshore development area.
202. Ponds and rivers are UKHPI and a Suffolk LBAP habitats, and as such are of high importance. The potential for these habitats to support protected or notable species is considered in **section 22.5**. Also refer to **Chapter 20 Water Resources and Flood Risk** for further details on impacts to hydrology, geomorphology and physical habitat.
203. The Hundred River is extensively modified (typically related to land drainage) and relatively narrow (up to approximately 5m wide). Further detail on the characteristics of the Hundred River is provided in **Appendix 20.5 to Chapter 20 Water Resources and Flood Risk** which details a geomorphological survey of the Hundred River. Priority species data<sup>6</sup> shows low fish populations. Species data recorded only ten and three spined stickleback, neither of which are priority species. The onshore cable corridor will need to cross the Hundred River and, given its narrow width, the preferred crossing technique would be open cut trenching. This would result in temporary impacts to the bed and bank habitats which would represent an effect of medium term low magnitude on a high importance receptor, representing an impact of moderate adverse significance.
204. No ponds are expected to be directly impacted as a result of the proposed East Anglia TWO project.

##### 22.6.1.7.1 Mitigation

205. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:
- In order to ensure that there are no adverse impacts resulting from the installation of temporary dams, the amount of time that temporary dams are in place would be restricted to a reduced programme where possible, and flumes or pumps would be adequately sized to maintain flows downstream of the obstruction whilst minimising upstream impoundment. Furthermore, a fish rescue would be undertaken in the area between the temporary dams prior to dewatering;
  - The temporary bridge or culvert for the haul road would be adequately sized to avoid impounding flows. If a culvert is used, the invert level of the structure

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<sup>6</sup> Obtained from the Environment Agency in August 2018.

will be installed below the natural bed of the channel so that sediment transport and the movement of fish and aquatic invertebrates can be maintained; and

- Bed and bank habitats will be reinstated and where possible improved following the completion of the works.

#### 22.6.1.7.2 Impact following Mitigation

206. Following the implementation of the agreed mitigation measures considered necessary, the magnitude of effect is expected to reduce from low to negligible on a high importance receptor representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.8 Impact 8: Badgers

##### 22.6.1.8.1 Impact Associated with the Landfall

207. No badger setts or field signs have been identified within the onshore development area, and required 50m buffer, in proximity to the landfall. Construction at the landfall would represent the temporary loss of arable and hedgerow foraging habitat. This is sub-optimal foraging habitat, but in the context of the available foraging resource surrounding the onshore development area, this is relatively small in scale. Overall the magnitude of effect is low in the medium to long term.

##### 22.6.1.8.2 Impact Associated with the Onshore Cable Corridor, Onshore Substation and National Grid Infrastructure

208. Five active badger setts are within the onshore development area, one within the onshore cable corridor and four active setts within the onshore substation and National Grid infrastructure site. Additional signs of badgers were identified in the vicinity of the onshore substation site, consisting of one disused sett, two latrines and seven further signs of badger presence such as pathways or snuffle holes. These are shown on **Confidential Figure 22.6**.

209. The known sett within the onshore cable corridor will be avoided as the onshore cable route is defined; however, as a worst-case scenario it is assumed that this sett and the four active setts within the onshore substation and National Grid infrastructure site would need to be destroyed. Furthermore, the installation of onshore cables would represent the temporary loss of a substantial area of arable and hedgerow foraging habitat. This is sub-optimal foraging habitat, but in the context of the available foraging resource surrounding the onshore cable corridor, onshore substation and National Grid infrastructure, this is relatively small in scale. Overall the magnitude of effect is high.

#### 22.6.1.8.3 Impact without Mitigation

210. Without mitigation, the greatest magnitude arising is high magnitude on a low importance receptor, which represents an impact of at worst moderate adverse significance. Therefore, the following mitigation is proposed.

#### 22.6.1.8.4 Mitigation

211. Pre-construction surveys would be conducted to confirm the presence of badgers. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- Sett closure (under licence) for setts identified within onshore construction footprint, and creation of artificial setts;
- Protection buffer zone of 30m around all setts outside of the onshore infrastructure (including appropriate noise, vibration and lighting minimisation such as directional task lighting, low vibration plant, acoustic panels and, where possible, working outside of the buffer zone to ensure decreased impact upon badgers); and
- Precautionary methods of working to minimise harm to badgers during construction, including trenches deeper than 1m must be covered at the end of each working day.

#### 22.6.1.8.5 Impact following Mitigation

212. Following the implementation of the agreed mitigation measures considered necessary, the magnitude of effect is expected to reduce from high to low on a low importance receptor, representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.9 Impact 9: Bats

213. As outlined in **section 22.5.3.3**, a total of 33 bat roosting survey features were identified during the 2018 Extended Phase 1 Habitat Survey and the 2019 Phase 1 Survey Addendum. Of these 33, 28 potential bat roosting sites were identified as having moderate to high bat roosting potential (**Figure 22.7**).

214. Features assessed during the initial 2018 Extended Phase 1 Habitat Survey as having either moderate or high potential to support roosting bats have been subject to bat emergence/re-entry surveys during 2018 to confirm the presence/absence of roosting bats. Results of this survey are detailed in **Appendix 22.6**. Those roosting features which were identified in the subsequent 2019 Phase 1 Addendum as having either moderate or high potential to support roosting bats have not been subject to bat emergence/re-entry surveys. Further

survey of these features is not required to inform the assessment of potential impact on bat roosting habitat as the roosting features within the additional area surveyed in the 2019 Phase 1 Addendum will not require removal in order to facilitate the proposed East Anglia TWO project.

215. In addition to bat roosting features, all linear features (e.g. watercourses, hedgerows) were categorised in terms of their suitability to support commuting or foraging bats. As outlined in **section 22.5.3.3**, a total of 89 commuting or foraging features were identified during the 2018 Extended Phase 1 Habitat Survey and the 2019 Phase 1 Survey Addendum.
216. All of those commuting or foraging features identified during the initial 2018 Extended Phase 1 Habitat Survey have been assessed using bat activity transect surveys in 2018 (**Appendix 22.6**) (81 features). Those commuting and foraging features identified in the subsequent 2019 Phase 1 Addendum (8 features) have not been subject to further survey. It is considered that the foraging support given to bat species in additional area surveyed in the 2019 Phase 1 Addendum is the same as that provided by the area covered by the 2018 bat activity surveys, and therefore the results of the 2018 bat activity surveys are representative of the onshore development area as a whole.
217. The findings from the suite of 2018 activity transect surveys have identified that the areas of woodland, hedgerows and areas of scrub (as well as other habitats) throughout the onshore development area also provide and support a diverse population of foraging/commuting bats within Suffolk.
218. The 2018 activity transects show that there is a higher density of bats using the transect areas within the western portion of the onshore development area. However, foraging/commuting bats were observed albeit in lower densities within the transect areas near to the coastline. Given the sensitivity of this receptor there is the potential for significant impacts during construction without mitigation.
219. There are potential impacts to commuting/foraging bats as a result of vegetation clearance and construction within the onshore development area. Consequently, the reduction in available foraging habitat, would in turn reduce the insect biomass of the area and therefore reduce the foraging habitat available to bats within the working width. The Hedgerow Regulations 1997 provides for the conservation of 'important' hedgerows, including constituent trees, as defined in the Regulations. One criteria of 'important' hedgerows is that it contains protected species listed in the Wildlife and Countryside Act 1981. This list includes bat species. Hedgerows which have been recorded as having a high level of bat activity (usage) are considered to be 'important' for bats. In addition, due to the rarity of the bat species, any hedgerow with at least one barbastelle pass should

also be considered as an 'important' hedgerow. The 2018 surveys indicate that transect area 3 and 4 recorded at least one barbastelle pass (**Appendix 22.6**).

220. Bats are known to use hedgerows to commute along in order to navigate around the landscape and some species are potentially sensitive to gaps in hedgerows such as species in the genera *Myotis* and *Plecotus* due to the nature of their flight pattern. Species from the genera *Nyctalus* and *Eptesicus*, and *Nathusius*' pipistrelle bats are known to fly high and in open habitats and therefore are unlikely to be impacted by hedgerow severance. Common pipistrelle and soprano pipistrelle bats are generalist species and would tolerate gaps in hedgerows. There is very limited research regarding whether gaps actually negatively affect *Myotis* / *Plecotus* species. The gaps in hedgerows also have the potential to increase the risk of predation of bats. Bats would be more visible to potential predators while they fly across the gaps as they would have no cover. A record of a lesser horseshoe bat *Rhinolophus hipposideros* was noted during the 2018 bat activity surveys. There is only one other known location of this species within Suffolk, located to the western extent of the county. Prior to this record of a single individual, there was one other recording of this species within the county in the last 100 years.

221. The construction works have the potential to give rise to the following effects:

- Risk of killing or injuring roosting bats within potential roosting sites;
- Permanent habitat loss of suitable commuting / foraging habitat;
- Habitat fragmentation; and
- Temporary disturbance to commuting / foraging bats and bat roosts during the construction phase (for example via increased noise and light).

222. If bats are found to be using roosting, commuting or foraging features identified within the onshore development area, this would represent an effect of high magnitude.

#### 22.6.1.9.1 Impact without Mitigation

223. Without mitigation, the greatest magnitude arising is high magnitude on a high importance receptor in the medium to long term, which would represent an impact of at worst major adverse significance. Although it should be noted that the onshore infrastructure is subject to detailed design and therefore this assessment is based on worst case assumptions.

#### 22.6.1.9.2 Mitigation

224. Pre-construction surveys will be conducted to confirm the presence of bats. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- Replanting of hedgerows (or use of hazel hurdles or similar where practical) temporarily lost during construction works as soon as practically possible and restoration of adjacent habitat where possible for bats (hedgerows typically take 3-7 years to fully recover following replanting);
- Improvement of hedgerows immediately adjacent to the removed sections where possible;
- Replacement habitat will be managed and maintained to ensure the bat population will persist and monitoring of the population will be undertaken to assess the success of any mitigation where possible, as detailed in the OLEMS;
- Bat boxes will be considered within the onshore development area, where possible, and detailed further within the EMP that will be produced post-consent to discharge a requirement of the draft DCO;
- Onshore cable route refinement to avoid identified bat roosts, where appropriate and feasible;
- All temporary lighting to be designed in line with the BCT Bats and Artificial Lighting in the UK guidance (2018). This to include the use of directional lighting during construction (further detailed within the OCoCP submitted with this DCO application);
- Construction phase lighting will be limited to permitted construction times in low light conditions, with lower-level security lighting at selected locations outside of these times; Provide dark corridors during the construction phase where possible; and
- Precautionary methods of working when removing trees with bat potential but no presence observed (soft-felling).

#### 22.6.1.9.3 Impact following Mitigation

225. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from high to low on a high importance receptor. This temporary magnitude of effect will further reduce (to negligible) over time as hedgerows fully recover. As such, this represents a temporary residual impact of **moderate adverse** significance, reducing to **minor adverse** significance within 3-7 years once hedgerows have fully recovered.

#### 22.6.1.10 Impact 10: Great Crested Newts

226. Presence of great crested newts has been confirmed within three ponds (Pond 117, Pond 135 and Pond 152 shown on **Figure 22.10**) within the onshore development area and the required 250m buffer.
227. All ponds will be avoided by the onshore infrastructure, however temporary impacts to the surrounding terrestrial habitat could potentially occur and these could include:
- Risk of killing or injuring foraging newts during the construction phase;
  - Temporary habitat loss (including grassland foraging habitat, woodland edges for hibernation, areas of scrub and other marginal habitats) for the duration of the construction phase; and
  - Temporary habitat fragmentation for the duration of the construction phase.
228. The temporary loss of habitat and habitat fragmentation at locations known to support great crested newts represents an effect of high magnitude in accordance with criteria outlined in **Table 22.9**.

##### 22.6.1.10.1 Impact without Mitigation

229. Without mitigation, the greatest magnitude arising is high magnitude on a high importance receptor in the medium to long term, which would represent an impact of at worst major adverse significance.

##### 22.6.1.10.2 Mitigation

230. Pre-construction surveys would be conducted to confirm the presence of great crested newts. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:
- Pre-construction survey to confirm the presence of great crested newts;
  - Trapping and translocation of affected newts (under a proposed East Anglia TWO project mitigation licence);
  - Onshore cable route refinement to avoid great crested newt terrestrial habitat, where practicable and feasible; and
  - Precautionary methods of working during construction, including tool box talk and supervision.

#### 22.6.1.10.3 Impact following Mitigation

231. Following the implementation of the agreed mitigation measures considered necessary, the magnitude of effect is expected to reduce from high to negligible on a high importance receptor, representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.11 Impact 11: Reptiles

232. Suitable habitats for supporting common reptile species have been identified at seven locations along the onshore cable corridor and in the vicinity of the onshore substation and National Grid infrastructure site. No specific reptile survey of these areas will be required. However, without mitigation the following effects may occur during the construction phase:

- Temporary loss of suitable reptile habitat;
- A risk of killing or injuring reptiles which are active within these locations; and
- A risk of habitat degradation due to pollutant release during the construction phase.

233. These risks would be present in the long term for the duration of the construction period (up to a maximum of 24 months along the onshore cable corridor, a maximum of 30 months at the onshore substation and a maximum of 48 months for the National Grid infrastructure)). However, the suitable areas of reptile habitat within the onshore development area are small and therefore this impact would not be large scale in terms of locally available habitat. As such, the magnitude of effect is anticipated to be medium.

##### 22.6.1.11.1 Impact without Mitigation

234. Without mitigation, the greatest magnitude arising is medium magnitude on a medium importance receptor, resulting in an impact of at worst moderate adverse significance.

##### 22.6.1.11.2 Mitigation

235. The following mitigation measure, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- Pre-cautionary methods of working during construction are detailed in the OLEMS submitted with this DCO application, and will be managed by an ECoW. These will include tool box talks, habitat manipulation and ecological supervision.

#### 22.6.1.11.3 Impact following Mitigation

236. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from moderate to low on a medium importance receptor, representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.12 Impact 12: Invasive Non-Native Species

237. During the 2018 Extended Phase 1 Habitat Survey, and subsequent 2019 Phase 1 Addendum, Himalayan balsam was noted along the Hundred River upstream of, but not within, of the onshore development area. The risk of the construction phase works in this area leading to the spread of Himalayan balsam to other areas along this and other watercourses is therefore reduced. The risk of introducing and/or spreading of non-native species over the long term is anticipated to have an effect of low magnitude on a medium importance receptor. This represents an impact of minor adverse significance.

238. There are no invasive non-native species recorded within the onshore development area.

#### 22.6.1.12.1 Mitigation

239. Pre-construction surveys would be conducted to confirm whether invasive species are present. Due to the proximity of Himalayan Balsam to the onshore development area, precautionary working methodologies should be employed. The following mitigation measures, as secured within the EMP and detailed within the OLEMS submitted with this DCO application, may be employed:

- Production of an EMP, as secured under the requirements of the draft DCO will incorporate management measures for Himalayan Balsam;
- Marking out contaminated areas, where possible, should any be present; and
- Good site practice measures for managing the spread of invasive species during works at watercourses.

#### 22.6.1.12.2 Impact following Mitigation

240. Following the implementation of the agreed mitigation measures considered necessary the magnitude of effect is expected to reduce from medium to negligible on a medium importance receptor, representing a temporary residual impact of **minor adverse** significance.

#### 22.6.1.13 Ecological Features of Reinstatement

241. Following the construction phase, habitats will be fully reinstated as far as possible.
242. Where full reinstatement is not possible surrounding the above ground operational infrastructure (onshore substation and National Grid infrastructure), planting and landscaping has been proposed which seeks to, among other objectives, benefit ecological species surrounding the onshore substation and National Grid infrastructure. The details of the planting and landscaping proposed are given within the OLEMS submitted with this DCO application. Post-consent a final Landscape Mitigation Plan (LMP) will be produced and agreed with the Local Planning Authority.
243. The planting of hedgerows will provide wildlife corridors, most notably commuting and foraging habitat for bats which are a European Protected Species. Planting of woodland blocks will provide habitat for local wildlife, including protected species such as badgers. These areas of woodland may also provide roosts for bat species as individual trees mature. The wetland habitat provided by around the establishment of the SuDS ponds will be beneficial to local wildlife species, for example protected newt species such as great crested newts. Verge and hedgerow habitat would provide wildlife corridors between existing ponds and the proposed SuDS ponds. Verge habitat will additionally provide refuge for local reptile species.

#### 22.6.2 Potential Impacts during Operation

##### 22.6.2.1 Impact 1: Disturbance Effects associated with Maintenance Activities

244. The onshore substation and National Grid substation will be unmanned but will require regular visits from staff for routine maintenance. This has the potential to disturb protected species in proximity to the operational substations, related to noise and/or physical presence of people. For the purposes of this assessment this is assumed to be up to one visit per week requiring a single vehicle, and staff visiting the sites during daylight hours.
245. Given the low frequency of the visits, disturbance from human presence is predicted to be of negligible magnitude and only affecting receptors within the immediate vicinity of the area(s) being visited.
246. There are no requirements for regular visits (routine maintenance) to any other part of the onshore infrastructure.
247. Without mitigation, the greatest effect arising from maintenance activities within the onshore development area is negligible magnitude in the long term on at worst high importance receptors, resulting in an impact of at worst **minor adverse** significance.

248. No mitigation is proposed given that the magnitude of effect is reduced as low as possible.

#### 22.6.2.2 Impact 2: Disturbance to Fauna from Operational Lighting and Noise

249. The onshore substation will be unmanned and operational lighting will be limited to routine maintenance activities to meet health and safety requirements (lighting will be motion sensor). Outside of these periods the onshore substation and National Grid substation will not require permanent lighting. Operational noise will be restricted to 34dBA at the nearest noise sensitive receptors (NSRs). Furthermore, the baseline ornithology survey results (refer to **Chapter 23 Onshore Ornithology**) as well as the 2018 Phase 1 Extended Habitat Survey and 2019 Phase 1 Addendum results suggest that the onshore substation and National Grid substation are located within an area of low ecological value.
250. As a consequence, disturbance from lighting and noise is predicted to be of minor adverse and therefore not significant and only have the potential to affect ecological receptors in the immediate vicinity of the onshore substation and National Grid substation locations.
251. Without mitigation, the greatest effect arising from operational noise and lighting is negligible magnitude in the long term on at worst high importance receptors, resulting in an impact of at worst **minor adverse** significance.
252. An Operational 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 and be designed in line with the 'Bats and Artificial Lighting in the UK' guidance (BCT 2018).
253. Following implementation of the Artificial Light Emissions Management Plan as part of the detailed design of the onshore substation and National Grid infrastructure, the magnitude of effect will remain negligible. As a consequence, a residual impact of **minor adverse** significance is expected to remain following mitigation.

#### 22.6.3 Potential Impacts during Decommissioning

254. 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 overtime. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and 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 worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

## 22.7 Cumulative Impacts

### 22.7.1 Cumulative Impacts with the Proposed East Anglia ONE North Project

255. The East Anglia ONE North offshore windfarm project (the proposed East Anglia ONE North project) is also in the application phase. The proposed East Anglia ONE North project has a separate DCO application which has been submitted at the same time as the proposed East Anglia TWO 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.
256. The proposed East Anglia TWO project CIA will therefore initially consider the cumulative impact with only the East Anglia ONE North project.
257. The CIA considers the proposed East Anglia TWO project and the proposed East Anglia ONE North project under two construction scenarios:
- Scenario 1 - the proposed East Anglia TWO project and proposed East Anglia ONE North project are built simultaneously; and
  - Scenario 2 - the proposed East Anglia TWO project and the proposed East Anglia ONE North project are constructed sequentially.
258. 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 other developments which have been screened into the CIA. (**section 22.7.2**). 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**.
259. Full assessment of scenario 1 and scenario 2 can be found in **Appendix 22.2**. This assessment found that scenario 2 represented the worst case impacts for onshore ecology, as while the cumulative footprint will be the same under both construction scenarios, the period of impact will be longer under scenario 2. It should also be noted that the cumulative impact with the proposed East Anglia ONE North project will be no greater than those impacts presented in **section 22.5** for the proposed East Anglia TWO project alone. A summary of those impacts can be found in **Table 22.20**.

**Table 22.20 Summary of Potential Cumulative Impacts Identified for Onshore Ecology under Construction Scenario 2**

Potential Impact	Receptor	Importance	Magnitude	Significance	Mitigation Measures	Residual Impact
<b>Cumulative Construction Impacts with the proposed East Anglia ONE North project</b>						
Impact 1: Impacts to Designated Sites	Sandlings SPA	High	Low	Moderate adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Minor adverse</b>
Impact 2: Impacts to Arable Habitat	Arable land	Low	Negligible	Negligible	-	<b>Negligible</b>
Impact 3: Impacts to Grassland Habitat	Improved and Semi-improved grassland	Low	Negligible	Negligible	-	<b>Negligible</b>
Impact 4: Impacts to Woodland and Trees	Woodland and trees	Medium	Low	Minor adverse	-	<b>Minor adverse</b>
Impact 5: Hedgerows	Hedgerows	High	Negligible	Minor adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Minor adverse</b>
Impact 6: Coastal Habitats	Coastal habitats	High	No change	-	-	<b>No change</b>
Impact 7: Watercourses and Ponds	Watercourse and ponds	High	Negligible	Minor adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Minor adverse</b>

Potential Impact	Receptor	Importance	Magnitude	Significance	Mitigation Measures	Residual Impact
Impact 8: Badgers	Badgers and suitable foraging habitat	Low	Medium	Minor adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Minor adverse</b>
Impact 9: Bats	Roosting, Commuting and foraging bats	High	High (short term) Negligible (long term)	Major adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Moderate adverse</b> (short term) <b>Minor Adverse</b> (long term)
Impact 10: Great Crested Newts	Aquatic and terrestrial habitats	High	Low	Moderate adverse	Habitat manipulation within the construction footprint between construction phases	<b>Minor adverse</b>
Impact 11: Reptiles	Common reptile species and suitable habitats	Medium	Medium	Moderate adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Minor adverse</b>
Impact 12: Invasive Non-Native Species	Invasive non-native species	Medium	Negligible	Minor adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Minor adverse</b>
<b>Cumulative Operational Impacts with the proposed East Anglia ONE North project</b>						
Impact 1: Disturbance effects associated	Disturbance to Habitats and Species from	High	Negligible	Minor adverse	-	<b>Minor adverse</b>

Potential Impact	Receptor	Importance	Magnitude	Significance	Mitigation Measures	Residual Impact
Maintenance Activities	Maintenance Activities					
Impact 2: Disturbance to Fauna from Operational Lighting and Noise	Disturbance to Fauna from Operational Lighting and Noise	High	Negligible	Minor adverse	Mitigation as per that proposed for the proposed East Anglia TWO project alone	<b>Minor adverse</b>
<b>Cumulative Decommissioning Impacts with the proposed East Anglia ONE North project</b>						
<p>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 overtime. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left <i>in situ</i> 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 worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.</p>						

## 22.7.2 Cumulative Impact Assessment with Other Developments

260. The assessment of cumulative impacts has been undertaken here as a two stage process. Firstly, all impacts considered in **section 22.6** have been assessed for the potential to act cumulatively with other projects. Potential cumulative impacts are set out in **Table 22.21**.

**Table 22.21 Potential Cumulative Impacts**

Impact	Potential for Cumulative Impact	Rationale
<b>Construction</b>		
Designated sites (statutory and non-statutory)	Yes	Cumulative direct impacts arising from two or more projects are possible on statutory and non-statutory designated sites. Such impacts have the potential to affect the qualifying features (habitats/species) associated with these sites
Habitat loss and fragmentation	Yes	Cumulative direct habitat loss impacts arising from two or more projects are possible. Impacts may occur where project boundaries or mitigation areas overlap. Such impacts have the potential to result in loss of habitat and/or habitat fragmentation for which legally protected species may use for shelter, breeding and/or foraging/commuting purposes.
Construction disturbance	Yes	Cumulative disturbance may arise when the construction periods of two or more projects overlap temporally, within suitable habitats that may be used by legally protected species and/or habitat features.
<b>Operation</b>		
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 legally protected species.
Disturbance from operational lighting and noise	No	Impacts are likely to be restricted to around the East Anglia TWO Onshore Substation and National Grid Substations.
<b>Decommissioning</b>		
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 overtime. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left <i>in situ</i> 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 worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.		

261. The second stage of the CIA is an assessment of whether there is spatial or temporal overlap between the extent of potential effects of the onshore

infrastructure and the potential effects of other projects scoped into the CIA upon the same receptors. To identify whether this may occur, the potential nature and extent of effects arising from all projects scoped into the CIA have been identified and any overlaps between these and the effects identified in **section 22.6**. Where there is an overlap, an assessment of the cumulative magnitude of effect is provided.

262. Following a review of projects which have the potential to overlap temporally or spatially with the proposed East Anglia TWO project, two developments have been scoped into the CIA.
263. **Table 22.22** provides detail regarding the projects.
264. 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 22.22 Summary of Projects Considered for the CIA in Relation to Onshore Ecology**

Project Name	Status	Development Period	<sup>7</sup> 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.	Application expected in 2020. Construction expected to commence in 2021.	1.4km	<p>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).</p> <p>Full PEIR available:  <a href="https://www.edfenergy.com/download-centre?keys=&amp;tid=1380&amp;year%5Bvalue%5D%5Byear%5D=">https://www.edfenergy.com/download-centre?keys=&amp;tid=1380&amp;year%5Bvalue%5D%5Byear%5D=</a> </p>	Tier 5 <sup>8</sup>	Yes	<p>Sizewell Gap will be used for construction vehicles by both the Sizewell C New Nuclear Power Station project and the proposed East Anglia TWO project. Works from the Sizewell C New Nuclear Power Station project would be as follows: increased construction traffic and the creation of a new off-road combined bridleway, cycleway and footpath which would lead from Sizewell Gap, south. No direct footprint with this work and the onshore</p>

<sup>7</sup> Shortest distance between the considered project and East Anglia TWO– unless specified otherwise

<sup>8</sup> Based on criteria set out in **section 5.7.2 of Chapter 5 EIA Methodology**

Project Name	Status	Development Period	<sup>7</sup> Distance from East Anglia TWO Onshore Development Area	Project Definition	Level of Information Available	Included in CIA	Rationale
							development area is expected.  However, there the increased traffic at Sizewell Gap as a result of work proposed by the Sizewell C New Nuclear Power Station project could result in increases in dust, noise, vibration and artificial light.
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 is expected in 2022, completion of construction	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.	Tier 4 <sup>9</sup>	Yes	Sizewell Gap will be used for construction and demolition vehicles of both the Sizewell B Power Station Complex and the proposed East Anglia TWO project. Sizewell B Power Station Complex works will include an amended junction at Sizewell Gap.

<sup>9</sup> Based on the definition of Tier 4 outlined in **section 5.7.2 of Chapter 5 EIA Methodology**

Project Name	Status	Development Period	<sup>7</sup> Distance from East Anglia TWO Onshore Development Area	Project Definition	Level of Information Available	Included in CIA	Rationale
		expected in 2027.		Full planning application available: <a href="https://publicaccess.eastsuffolk.gov.uk/online-applications/applicationDetails.do?activeTab=summary&amp;keyVal=PQ5NVGQXJJ100">https://publicaccess.eastsuffolk.gov.uk/online-applications/applicationDetails.do?activeTab=summary&amp;keyVal=PQ5NVGQXJJ100</a>			No direct footprint with this work and the onshore development area is expected.  However, there the increased traffic at Sizewell Gap as a result of work proposed by the Sizewell B Power Station Complex could result in increases in dust, noise, vibration and artificial light.

#### 22.7.2.1 Cumulative Impacts during Construction

265. There is potential for a temporal overlap as the proposed construction period for the Sizewell C New Nuclear Power Station is expected to be a ten-year period, with peak construction expected in 2023. Construction works for Sizewell C New Nuclear Power Station have proposed to use Sizewell Gap which will overlap with the proposed East Anglia TWO project's use of Sizewell Gap during the construction phase. This overlap will result in an increase in traffic on Sizewell Gap.
266. Sizewell B Power Station Complex construction and demolition works will also use Sizewell Gap, particularly as an outage carpark with amended junction at Sizewell Gap will be required as part of the proposed East Anglia TWO project. This will further increase the construction and vehicular traffic along Sizewell Gap.
267. Increased disturbance and potential increases in nitrogen deposition (**Chapter 19 Air Quality**) are expected as a result of this increased construction traffic on Sizewell Gap in the long term. However, through the implementation of mitigation detailed within this ES chapter, and with similar mitigation measures anticipated for Sizewell C New Nuclear Power Station and Sizewell B Power Station Complex, no cumulative impacts of greater significance than those anticipated for the proposed East Anglia TWO project and proposed East Anglia ONE North project are expected. Should nitrogen deposition exceed the 1% Critical Load for nitrogen deposition from Sizewell Gap, the exceedance would be at a road link which borders an area of the SSSI which is lowland neutral grassland, a habitat which is less sensitive to nitrogen deposition than other features of the designation and therefore is not likely to be impacted by this potential exceedance. The most sensitive designated feature of the Sizewell Marshes SSSI to nitrogen deposition is the lowland fen marsh and swamp. This area of habitat is approximately 700m from the road link which has may experience this exceedance and therefore would not be affected by a marginal exceedance of the critical load.
268. The Sizewell C New Nuclear Power Station and Sizewell B Power Station Complex construction and demolition footprints do not overlap with the onshore development area, therefore direct impacts on habitats and species will not be of greater significance than those anticipated for the proposed East Anglia TWO project and proposed East Anglia ONE North project, detailed in **Table 22.20**.

#### 22.7.2.2 Cumulative Impacts during Operation

269. As outlined in **Table 22.21** no cumulative operational impacts are predicted due to the lack of impacts during the operational phase, associated with the proposed East Anglia TWO project alone.

### 22.7.3 Cumulative Impacts during Decommissioning

270. 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 overtime. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and 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 worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

## 22.8 Inter-relationships

271. A summary of the likely inter-related effects arising from the proposed East Anglia TWO project on onshore ecology are presented in **Table 22.23**.

**Table 22.23 Inter-Relationships for Onshore Ecology**

Inter-relationship all Phases and Linked Chapter	Section where Addressed	Rationale
<b>Chapter 19 Air Quality</b>	<b>Sections 22.6 and 254.</b>	Air quality impacts to protected species
<b>Chapter 20 Water Resources and Flood Risk</b>	<b>Sections 22.6 and 254.</b>	Potential for habitats to support protected species and management of water resources and flood risk in relation to onshore ecology
<b>Chapter 23 Onshore Ornithology</b>	<b>Sections 22.6 and 254.</b>	Habitats which support onshore ornithology
<b>Chapter 25 Noise and Vibration</b>	<b>Sections 22.6 and 254.</b>	Noise disturbance on protected species
<b>Chapter 29 Landscape and Visual Impact</b>	<b>Sections 22.6 and 254.</b>	Lighting impacts to protected species

## 22.9 Interactions

272. 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. The areas of interaction between impacts are presented in **Table 22.24** along with an indication as to whether the interaction may give rise to synergistic impacts. This provides a screening tool for which impacts have the potential to interact. **Table 22.25** then 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.

273. The receptors considered in the onshore ecology assessment are:

- Designated sites;
- Habitats;
- Species (excluding bats); and
- Bats.

**Table 22.24 Interactions Between Impacts on Onshore Ecology**

Anticipated Interactions between Impacts												
Construction Impacts												
	Impact 1: Impacts to Designated Sites	Impact 2: Impacts to Arable Habitat	Impact 3: Impacts to Grassland Habitats	Impact 4: Impacts to Woodland and Trees	Impact 5: Hedgerows	Impact 6: Coastal Habitats	Impact 7: Watercourses and Ponds	Impact 8: Badgers	Impact 9: Bats	Impact 10: Great Crested Newts	Impact 11: Reptiles	Impact 12: Invasive Non- Native Species
Impact 1: Impacts to Designated Sites	-	No	No	Yes	No	No	Yes	No	No	No	No	Yes
Impact 2: Impacts to Arable Habitat	No	-	No	No	No	No	No	No	No	No	No	No
Impact 3: Impacts to Grassland Habitats	No	No	-	No	No	No	No	No	No	Yes	Yes	No
Impact 4: Impacts to Woodland and Trees	No	No	No	-	Yes	No	No	No	Yes	No	Yes	Yes
Impact 5: Hedgerows	No	No	No	No	-	No	No	Yes	Yes	No	Yes	No

Anticipated Interactions between Impacts												
Impact 6: Coastal Habitats	No	No	No	No	No	-	No	No	No	No	No	No
Impact 7: Watercourses and Ponds	No	No	No	No	No	No	-	No	Yes	Yes	Yes	Yes
Impact 8: Badgers	No	No	No	No	No	No	No	-	No	No	No	No
Impact 9: Bats	No	No	No	No	No	No	No	No	-	No	No	No
Impact 10: Great Crested Newts	No	No	Yes	Yes	Yes	No	Yes	No	No	-	No	No
Impact 11: Reptiles	No	No	Yes	Yes	Yes	No	Yes	No	No	No	-	No
Impact 12: Invasive Non- Native Species	No	No	No	No	No	No	Yes	No	No	No	No	-

## Anticipated Interactions between Impacts

### Operation Impacts

	Impact 1: Habitat and species during maintenance	Impact 2: Fauna during operational lighting and noise
Impact 1: Disturbance effects associated Maintenance Activities	-	No
Impact 2: Disturbance to Fauna from Operational Lighting and Noise	No	-

### Decommissioning impacts

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 overtime. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and 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 worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

**Table 22.25 Potential Interactions between Impacts on Onshore Ecology**

Receptor	Construction	Operational	Decommissioning	Phase Assessment	Lifetime Assessment
<b>Designated sites</b>	Minor adverse (Sandlings SPA only, no impact to other sites)	Minor adverse (Sandlings SPA only, no impact to other sites)	Minor adverse (Sandlings SPA only, no impact to other sites)	n/a There is only a single impact ( <i>Impact 1 impact to designated sites</i> ) for the receptor, therefore no potential interactions	<b>No greater than individually assessed impact</b>  Infrastructure is only installed during construction, therefore there is no greater footprint taken as part of the operational phase.  There will be limited disturbance during the operational phase for the onshore cable route (if maintenance works are required).
<b>Habitats</b>	Minor adverse	Minor adverse	Minor adverse	n/a There is only a single impact for each habitat receptor ( <i>Impacts 2-7 habitat loss</i> ), therefore no potential interactions	<b>No greater than individually assessed impact</b>  Infrastructure is only installed during construction, therefore there is no greater footprint taken as part of the operational phase.  There will be limited disturbance during the operational phase at the landfall and onshore cable route (if maintenance works are required). No greater than minor adverse at the onshore substation and National Grid infrastructure for the operational phase
<b>Species (excluding bats)</b>	Minor adverse	Minor adverse	Minor adverse	n/a There is only a single impact for each species receptor ( <i>Impacts 8, 10-12</i> ), therefore no potential interactions. This impact takes	<b>No greater than individually assessed impact</b>  Infrastructure is only installed during construction, therefore there is no

Receptor	Construction	Operational	Decommissioning	Phase Assessment	Lifetime Assessment
				into account any habitat impacts, so interaction is already accounted for.	greater footprint taken as part of the operational phase.  There will be limited disturbance during the operational phase at the landfall and onshore cable route (if maintenance works are required). No greater than minor adverse at the onshore substation and National Grid infrastructure for the operational phase
<b>Bats</b>	Moderate adverse (short term)  Minor adverse (long term)	Minor adverse	Moderate adverse (short term)  Minor adverse (long term)	n/a  There is only a single impact for the receptor ( <i>Impact 9 impact to bats</i> ), therefore no potential interactions. This impact takes into account any habitat impacts (e.g. upon trees or hedgerows), so interaction is already accounted for.	<b>No greater than individually assessed impact</b>  Infrastructure is only installed during construction, therefore there is no greater footprint taken as part of the operational phase.  There will be limited disturbance during the operational phase at the landfall and onshore cable route (if maintenance works are required). No greater than minor adverse at the onshore substation and National Grid infrastructure for the operational phase

## 22.10 Summary

274. A summary of the findings of the ES for onshore ecology is presented in **Table 22.26**.

**Table 22.26 Summary of Potential Impacts Identified for Onshore Ecology**

Potential Impact	Receptor	Importance	Magnitude	Significance	Mitigation Measures	Residual Impact
<b>Construction</b>						
Impact 1: Impacts to Designated Sites	Sandlings SPA	High	Low	Moderate adverse	Mitigation as per that presented in <b>section 22.6.1.1</b>	<b>Minor adverse</b>
	Other Designated Sites	High	No change	-	-	<b>No change</b>
Impact 2: Impacts to Arable Habitat	Arable land	Low	Negligible	Negligible	-	<b>Negligible</b>
Impact 3: Impacts to Grassland Habitat	Improved and Semi-improved grassland	Low	Negligible	Negligible	-	<b>Negligible</b>
Impact 4: Impacts to Woodland and Trees	Woodland and trees	Medium	Low	Minor adverse	Replant an equivalent area of lost woodland following completion of works; Utilise root protection areas for tree to be retained; Use of biosecurity measures.	<b>Minor adverse</b>
Impact 5: Hedgerows	Hedgerows	High	Medium	Major adverse	Hedgerows re-instated post construction; Hedgerow root protection areas to be fenced off during construction, where relevant.	<b>Minor adverse</b>
Impact 6: Coastal Habitats	Coastal habitats	High	No change	-	-	<b>No change</b>
Impact 7: Watercourses and Ponds	Watercourse and ponds	High	Low	Moderate adverse	Temporary dams in place for a minimal a duration, where practicable, and flumes or pumps would be adequately sized to maintain flows downstream of	<b>Minor adverse</b>

Potential Impact	Receptor	Importance	Magnitude	Significance	Mitigation Measures	Residual Impact
					<p>the obstruction whilst minimising upstream impoundment. Fish rescue would be undertaken in the area between the temporary dams prior to dewatering;</p> <p>The temporary bridge or culvert for the haul road would be adequately sized to avoid impounding flows. If a culvert is used, the invert level of the structure will be installed below the natural bed of the channel so that sediment transport and the movement of fish and aquatic invertebrates can be maintained; and</p> <p>Bed and bank habitats will be reinstated following the completion of the works.</p>	
Impact 8: Badgers	Badgers and suitable foraging habitat	Low	High	Moderate adverse	<p>Protection buffer zone around setts where practicable;</p> <p>Sett closure (under licence) where required.</p>	<b>Minor adverse</b>
Impact 9: Bats	Roosting, Commuting and foraging bats	High	High (short term) Negligible (long term)	Major adverse	<p>Onshore cable route refinement to avoid identified bat roosts, where appropriate and feasible;</p> <p>Replanting of hedgerows (or use of hazel hurdles or similar where practical) temporarily lost during construction works as soon as practically possible and restoration of adjacent habitat where possible for bats (hedgerows typically take 3-7 years to fully recover following replanting);</p> <p>Improvement of hedgerows immediately adjacent to the removed sections where possible; All temporary lighting to be designed in line with the BCT Bats and Artificial Lighting in the UK guidance</p>	<p><b>Moderate adverse</b> (short term)</p> <p>Minor Adverse (long term)</p>

Potential Impact	Receptor	Importance	Magnitude	Significance	Mitigation Measures	Residual Impact
					<p>(2018). This to include the use of directional lighting during construction;</p> <p>Construction phase lighting will be limited to permitted construction times in low light conditions, with lower-level security lighting at selected locations outside of these times;</p> <p>Provide dark corridors during the construction phase where possible; and</p> <p>Pre-cautionary methods when removing trees with bat potential but no presence observed (soft-felling).</p>	
Impact 10: Great Crested Newts	Aquatic and terrestrial habitats	High	High	Major adverse	<p>Trapping and translocation of affected newts (under a project mitigation licence); and</p> <p>Pre-cautionary methods of working during construction, including tool box talk and supervision.</p>	<b>Minor adverse</b>
Impact 11: Reptiles	Common reptile species and suitable habitats	Medium	Medium	Moderate adverse	Pre-cautionary methods of working during construction, including tool box talk, habitat manipulation and ecological supervision.	<b>Minor adverse</b>
Impact 12: Invasive Non-Native Species	Invasive non-native species	Medium	Low	Minor adverse	Good site practice measures for managing the spread of invasive species during works at watercourses.	<b>Minor adverse</b>

Potential Impact	Receptor	Importance	Magnitude	Significance	Mitigation Measures	Residual Impact
<b>Operation</b>						
Impact 1: Disturbance effects associated Maintenance Activities	Disturbance to Habitats and Species from Maintenance Activities	High	Negligible	Minor adverse	-	<b>Minor adverse</b>
Impact 2: Disturbance to Fauna from Operational Lighting and Noise	Disturbance to Fauna from Operational Lighting and Noise	High	Negligible	Minor adverse	Production and implementation of Operational Artificial Light Emissions Management Plan	<b>Minor adverse</b>
<b>Decommissioning</b>						
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 overtime. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left <i>in situ</i> 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 worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.						
<b>Cumulative Impacts with Other Developments</b>						
Impacts are considered no greater than the proposed East Anglia Two project due to appropriate mitigation and management plans.						

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