Hornsea Project Four: Environmental Statement (ES)

PINS Document Reference: A3.3
APFP Regulation 5(2)(a)

Volume A3,
Chapter 3: Ecology and Nature Conservation

Prepared	Royal HaskoningDHV, July 2021
Checked	Ant Sahota, Orsted, July 2021
Accepted	Thomas Watts, Orsted, August 2021
Approved	Julian Carolan, Orsted, September 2021

A3.3
Version B

Table of Contents

List of Tables

List of Figures

Annexes

Annex	Title
3.1	Extended Phase 1 Habitat Survey Report (Part A)
3.2	Extended Phase 1 Target Note Tables (Part B)
3.3	Onshore Ornithology - Wintering and Migratory Birds Survey Report
3.4	Breeding Bird Survey Report
3.5	Great Crested Newt Environmental DNA (eDNA) Survey Report
3.6	Water Vole Survey Report
3.7	Otter Survey Report (confidential)
3.8	Bat Static Detector Report Part A
3.9	Bat Static Detector Report Part B

Annex	Title
3.10	Bat Activity Transect Survey Report Part A
3.11	Bat Activity Transect Survey Report Part B
3.12	Bat Emergence and Re-entry Survey Report Part A
3.13	Bat Emergence and Re-entry Survey Report Part B
3.14	Hedgerow and Arboricultural Survey Report
3.15	Badger Survey Report (confidential)

Glossary

Term	Definition
Code of Construction Practice (CoCP)	A document detailing the overarching principles of construction, contractor protocols, construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes
Commitment	A term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or Environmental Statement (ES). Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Cumulative effects	The combined effect of Hornsea Four in combination with the effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Project Four.
Design Envelope	A description of the range of possible elements that make up the Hornsea Four design options under consideration, as set out in detail in the Project Description. This envelope is used to define Hornsea Four for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
EIA Directive	European Union Directive 85/337/EEC, as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC and then codified by Directive 2011/92/EU of 13 December 2011 (as amended in 2014 by Directive 2014/52/EU).
EIA Regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Term	Definition
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
Export cable corridor (ECC) corridor	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
Habitats Regulations Assessment (HRA)	A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European conservation sites and Ramsar sites. The process consists of up to four stages of assessment: screening, appropriate assessment, assessment of alternative solutions and assessment of imperative reasons of over-riding public interest (IROPI) and compensatory measures.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
Maximum design scenario	The maximum design parameters of each Hornsea Four asset (both on and offshore) considered to be a worst case for any given assessment.
Mitigation	A term used interchangeably with Commitment(s) by the Applicant. Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, PEIR or ES).
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four.
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The limits within which Hornsea Four (the 'authorised project') may be carried out.

Term	Definition
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Trenchless Techniques	Also referred to as trenchless crossing techniques or trenchless methods. These techniques include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.

Acronyms

Acronym	Definition
BAP	Biodiversity Action Plan
BoCC	Birds of Conservation Concern
BCT	Bat Conservation Trust
BS	British Standards
CEA	Cumulative Affect Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice
CRoW	Countryside and Rights of Way Act
DCO	Development Consent Order
EcIA	Ecological Impact Assessment
EBI	Energy Balancing Infrastructure
ECoW	Ecological Clerk of Works
ECC	Export Cable Corridor
eDNA	Environmental DNA
EEC	European Economic Community
EEA	European Economic Area
EIA	Environmental Impact Assessment
EP1HS	Extended Phase 1 Habitat Survey
ERYC	East Riding of Yorkshire Council
ES	Environmental Statement
EU	European Union
GB	Great Britain
HDD	Horizontal Directional Drilling
HSI	Habitat Suitability Index
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAQM	Institute of Air Quality Management
IMEA	Institute of Environmental Assessment

IPC	Infrastructure Planning Commission
IRZ	Impact Risk Zones
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
LNR	Local Nature Reserve
LSE	Likely Significant Effect
LWS	Local Wildlife Site
MDS	Maximum Design Scenarios
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
NE	Natural England
NERC	Natural Environment and Rural Communities
NEYEDC	North and East Yorkshire Ecological Data Centre
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OnSS	Onshore Substation
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SoS	Secretary of State
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest
TN	Target Notes
TP	Technical Panel
TPO	Tree Preservation Orders
UKHPI	UK Habitats of Principal Importance
VP	Vantage Point

Units

Unit	Definition
ha	hectares
km	kilometre
kV	kilovolt
m	metres

3.1 Introduction

3.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and on to an onshore substation (OnSS) with energy balancing infrastructure (EBI), and connection to the electricity transmission network.

3.1.1.2 This chapter of the Environmental Statement (ES) presents the results of the Environmental Impact Assessment (EIA) for the potential impacts of Hornsea Four on ecology and nature conservation. Specifically, this chapter considers the potential impact of Hornsea Four landward of Mean High-Water Springs (MHWS) during its construction, operation and maintenance, and decommissioning phases. Details of impacts below MHWS on ecology are included within **Volume A2, Chapter 2: Benthic and Intertidal Ecology**.

3.1.1.3 This chapter summarises information contained within the following technical reports, which are included in **Volume A6**:

- **Annex 3.1: Extended Phase 1 Habitat Survey Report Part A & 2021 Addendum**;
- **Annex 3.2: Extended Phase 1 Target Note Tables Part B & 2021 Addendum**;
- **Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report**;
- **Annex 3.4: Breeding Bird Survey Report**;
- **Annex 3.5: Great Crested Newt Environmental DNA (eDNA) Survey Report**;
- **Annex 3.6: Water Vole Survey Report**;
- **Annex 3.7: Otter Survey Report (Confidential)**;
- **Annex 3.8: Bat Static Detector Survey Report Part A**;
- **Annex 3.9: Bat Static Detector Survey Report Part B**;
- **Annex 3.10: Bat Activity Transect Survey Report Part A**;
- **Annex 3.11: Bat Activity Transect Survey Report Part B**;
- **Annex 3.12: Bat Emergence and Re-entry Survey Report Part A**;
- **Annex 3.13: Bat Emergence and Re-entry Survey Report Part B**;
- **Annex 3.14: Hedgerow and Arboricultural Survey Report**; and
- **Annex 3.15: Badger Survey Report (Confidential)**.

3.2 Purpose

3.2.1.1 The primary purpose of the ES is to support the Development Consent Order (DCO) application for Hornsea Four under the Planning Act 2008 (the 2008 Act). This ES constitutes the environmental information for Hornsea Four and sets out the findings of the EIA.

3.2.1.2 The ES has been finalised following completion of pre-application consultation (see **Volume B1, Chapter 1: Consultation Report** and **Table 3.4**) and the ES will accompany the application to the Planning Inspectorate (PINS) for Development Consent.

3.2.1.3 This ES chapter:

- Presents the existing environmental baseline established from desk studies, baseline data collection surveys, and consultation;
- Presents the potential environmental effects on Ecology and Nature Conservation receptors arising from Hornsea Four, based on the information gathered and the analysis and assessments undertaken;
- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

3.3 Planning and Policy Context

3.3.1 National Policy Statement (NPS)

3.3.1.1 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to Ecology and Nature Conservation, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a) and the NPS for Renewable Energy Infrastructure (EN-3, DECC 2011b).

3.3.1.2 NPS EN-1 and NPS EN-3 includes guidance on what matters are to be considered in the assessment. These are summarised in **Table 3.1**.

3.3.1.3 The UK planning and policy context for Hornsea Four is set out in **Volume A1, Chapter 2: Planning and Policy Context**. The potential effects in relation to sites of importance for nature conservation are considered within this chapter. Note that potential effects on sites of geological conservation importance (such as geological Sites of Scientific Special Interest (SSSI)) are considered separately in **Chapter 1: Geology and Ground Conditions**.

Table 3.1: Summary of NPS EN-1 and EN3 provisions relevance to ecology and nature conservation.

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
"Prior to granting a development consent order, the IPC [hereafter referred to as Secretary of State (SoS)] *must, under the Habitats and Species Regulations, (which implement the relevant parts of the Habitats Directive and the Birds Directive in England and Wales) consider whether the project may have a significant effect on a European site, or on any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects."* (EN-1, paragraph 4.3.1)	Hornsea Four are submitting a Report to Inform Appropriate Assessment (RIAA) including a Habitats Regulations Assessment (HRA) Screening Report as part of the Projects' DCO application (**Volume B2, Chapter 2: Report to Inform Appropriate Assessment** and **Volume B2, Annex 2.1: RIAA Annex 1 - HRA Screening Report**). This is reported separately to this ecology and nature conservation ES chapter, however all relevant onshore aspects are covered within this chapter.

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
"Where the development is subject to EIA [Environmental Impact Assessment] *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 SoS consider thoroughly the potential effects of a proposed project."* (EN-1, paragraph 5.3.3)	Impacts on designed sites and protected species during the construction phase of the landfall, onshore ECC and OnSS is presented in **Section 3.11**. Impacts on non-designated sites during the construction phase of the landfall, onshore ECC and OnSS have not been assessed as set out in **Table 3.13**. Impacts on habitats and protected species during the operational phase of the OnSS is presented in **Section 3.11**. Impacts on habitats and protected species during the operational phase of the onshore ECC have not been assessed as set out in **Table 3.13**. Impacts on habitats during the decommissioning phase of the onshore ECC and OnSS have not been assessed as set out in **Table 3.13**.
"The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests." (EN-1, paragraph 5.3.4)	Hornsea Four has committed to a suite of embedded mitigation measures to conserve and enhance biodiversity including the avoidance of sensitive sites (where practical) (Co2, **Volume A4, Annex 5.2**) through a robust Route and Site Selection Process (RPSS) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). Further ecological enhancement opportunities are provided in **Volume F2, Chapter 14: Outline Enhancement Strategy**.
"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." (EN-1, paragraph 5.3.7)	Hornsea Four has committed to the avoidance of sensitive sites (where practical) (Co2) through a robust RPSS Process (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**), alongside commitments to the crossing of main watercourses by Horizontal Directional Drilling (HDD) methods (Co1) and the avoidance of ponds through micro-siting during the detailed design process (Co78). Hornsea Four has also committed to undertaking a hydrogeological risk assessment to inform site specific crossing method statements for particularly sensitive sites such as SSSIs which will be agreed with the relevant authorities prior to construction (Co18). Full details on these commitments are presented in **Table 3.14**.
"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	Hornsea Four has avoided sensitive and protected sites (where possible) through the RPSS process (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). Where unavoidable (e.g. River Hull

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
degree of protection. All National Nature Reserves are notified as SSSIs". (EN-1, paragraph 5.3.10)	Headwaters SSSI), Hornsea Four have committed to the use of HDD methodologies (Co1), as well as undertaking a hydrogeological risk assessment to inform site specific crossing method statements for particularly sensitive sites such SSSIs (Co18). Designated sites are further discussed in **Section 3.7** with impacts assessed in **Section 3.11**.
"The applicant should include appropriate mitigation measures as an integral part of the proposed development. In particular, the applicant should demonstrate that: - *During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;* - *during construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements;* - *Habitats will, where practicable, be restored after construction works have finished; and* - *Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals."* (EN-1, paragraph 5.3.18)	Hornsea Four has committed to adhere to the projects' Outline Code of Construction Practice (CoCP) (Co124) (**Volume F2, Chapter 2**), Outline Ecological Management Plan (OEMP) (Co168) (**Volume F2, Chapter 3**) and a contaminated land and groundwater scheme (Co77) to prevent and control spillage of harmful material and ensure any damage to protected species or habitats is minimised. Further details on embedded mitigation measures are presented in **Section 3.8.2.**
"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." (EN-3, paragraph 2.4.2)	Project design has avoided sensitive features were possible (Co2). In addition, **Volume A4, Annex 4.6: Design Vision Statement** provides the onshore 'vision' for Hornsea Four, setting out the landscape elements of the project design and ecological mitigation, and how they might interact. The OEMP (**Volume F2, Chapter 3**), Outline Landscape Management Plan (**Volume F2, Chapter 8**) and the Outline Design Plan (**Volume F2, Chapter 13**) contain the mitigation measures identified for ecological receptors and the outline approach and key embedded mitigations at the OnSS and EBI which will inform the detailed design, respectively. Further details on project commitments are presented in **Table 3.14**.
"Ecological monitoring is likely to be appropriate during the construction and operational phases to identify the actual impact so that, where appropriate, adverse	The requirement to undertake ecological monitoring during construction and operation has been determined following completion of baseline data collection and the

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
effects can then be mitigated and to enable further useful information to be published relevant to future projects." (EN-3, paragraph 2.6.71)	assessment process. This has been agreed with stakeholders and detailed within the OEMP (Co168) (**Volume F2, Chapter 3**).
"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." (EN-3, paragraph 2.7.15)	Current plans for the decommissioning of Hornsea Four is in line with NPS EN-3 and includes leaving the underground cable in situ (securely) alongside the removal of any above ground electrical equipment and buildings. Jointing pits and link boxes will only be removed if is feasible with minimal environmental disturbance. Further details on decommissioning can be found in **Volume A1, Chapter 4: Project Description**.

3.3.1.4 NPS EN-1 and NPS EN-3 also highlight several factors relating to the determination of an application and in relation to mitigation. These are summarised in **Table 3.2**.

Table 3.2: Summary of NPS EN-1 and EN-3 policy on decision making relevant to ecology and nature conservation.

NPS Requirement	ES Reference
"In having regard to the aim of the Government's biodiversity strategy the SoS should take account of the context of the challenge of climate change: failure to address this challenge will result in significant adverse impacts to biodiversity. The policy set out in the following sections recognises the need to protect the most important biodiversity and geological conservation interests. The benefits of nationally significant low carbon energy infrastructure development may include benefits for biodiversity and geological conservation interests and these benefits may outweigh harm to these interests. The SoS may take account of any such net benefit in cases where it can be demonstrated." (EN-1, paragraph 5.3.6)	Hornsea Four has committed to the avoidance of features of sensitive sites interest (where practical) through a robust RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**), alongside commitments to the crossing of Environment Agency (EA) main rivers by HDD methods (Co1) and the avoidance of ponds through micro-siting during the detailed design process (Co78). Full details on these commitments are presented in **Table 3.14**. Consideration of climate change is included in the evolution of the baseline, presented in **Section 3.7.6**.
"In taking decisions, the SoS 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." (EN-1, paragraph 5.3.8)	Hornsea Four has committed to the avoidance of features of sensitive sites interest (where practical) through a robust RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**), alongside commitments to the crossing of EA main rivers by HDD methods (Co1) and the avoidance of ponds through micro-siting during the detailed design process (Co78). In addition, Hornsea Four has actively re-routed parts of the onshore ECC to avoid two known badger setts (see **Volume A4, Annex 3.3: Selection and Refinement of the Onshore Infrastructure** for further details). Further details on the baseline environment is presented in **Section 3.7** and

NPS Requirement	ES Reference
	details of commitments relevant to ecological receptors is presented in **Table 3.14**.
"For the purposes of considering development proposals affecting them, as a matter of policy the Government wishes Special Protection Areas (SPAs) 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" (EN-1, paraph 5.3.9)	Hornsea Four has committed to the avoidance of SPAs and Ramsar sites through a robust RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). Further information on commitments are presented in **Table 3.14**.
"Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted. *Where an adverse effect, after mitigation, on the site's notified special interest features are 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. The SoS should use requirements and/or planning obligations to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest."* (EN-1, paragraph 5.3.10)	Hornsea Four has avoided sensitive and protected sites (where practical) through the RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). Where unavoidable (e.g. River Hull Headwaters SSSI), Hornsea Four have committed to the use of HDD methodologies (Co1), with sensitive placement of HDD entry/exit pits outside the riparian vegetation associated with the SSSI (Co18). Designated sites are further discussed in **Section 3.7** with impacts assessed in **Section 3.11**.
"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 SoS 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." (EN-1, paragraph 5.3.13)	Hornsea Four has avoided sensitive and protected sites (where practical) through the RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). Where unavoidable (i.e. Bryan Mills Beck Local Wildlife Site (LWS), Beale's Beck, Lockington LWS, Raventhorpe Embankment LWS, Newbald Road LWS, Moor Lane LWS and Jillywood Lane LWS), Hornsea Four will undertake further consultation with relevant stakeholders including East Riding of Yorkshire Council (ERYC) prior to construction in regard to sensitive crossing measures to avoid adverse impacts to these locally sensitive sites. Furthermore, Hornsea Four has committed to adherence to the Outline CoCP (Co124), Outline EMP (Co168), Site Waste Management Plan (SWMP) (Co65), and prepare a contaminated land and groundwater scheme (Co77) to avoid and/or mitigate potential contamination.

NPS Requirement	ES Reference
	Further information on these commitments are presented in **Table 3.14**. Designated sites are further discussed in **Section 3.7** with impacts assessed in **Section 3.11**.
"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. *The SoS 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. Aged or 'veteran' trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided.* *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."* (EN-1, paragraph 5.3.14)	Hornsea Four has avoided sensitive and protected sites (where practical) through the RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). This includes areas of woodland alongside aged or 'veteran' trees, and ancient woodland that may be particularly valuable for biodiversity. Hornsea Four has consulted with and agreed the approach to Birkhill Wood ancient woodland through an Evidence Plan Technical Panel meeting on 1st April 2020 (ON-ECO-3.16). Impacts on designated sites are assessed in **Section 3.11.** Veteran trees identified during baseline surveys are provided in **Volume A6, Annex 3.14: Hedgerow and Arboricultural Survey Report**, and **Volume A4, Annex 4.2: Onshore Crossing Schedule**, with relevant management measures being provided in the OEMP (**Volume F2, Chapter 3**). Further information on these commitments are presented in **Section 3.8.2**. Existing environment is set out in **Section 3.7**.
"Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, the SoS should maximise such opportunities in and around developments, using requirements or planning obligations where appropriate". (EN-1, paragraph 5.3.15)	Project design has avoided sensitive features were possible (Co2). In addition, Hornsea Four has committed to replacing hedgerows with more diverse and locally native species where there is agreement from landowners (Co194) and has produced an Outline Enhancement Strategy (**Volume F2, Chapter 14**) (Co198) which will include the design of a biodiverse attenuation feature at the OnSS (Co196), along with other enhancement measures onshore.
"Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and thereby requiring conservation action. The SoS should ensure that these species and habitats are protected from the adverse effects of development by using requirements or planning obligations. The SoS should refuse consent	Hornsea Four has avoided sensitive and protected sites (where practical) through the RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). This includes areas of woodland alongside aged or 'veteran' trees that may be particularly valuable for biodiversity.

NPS Requirement	ES Reference
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 SoS 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." (EN-1, paragraph 5.3.17)	Further information on these commitments are presented in **Section 3.8.2**. Existing environment is set out in **Section 3.7**.
"Where the applicant cannot demonstrate that appropriate mitigation measures will be put in place the SoS should consider what appropriate requirements should be attached to any consent and/or planning obligations entered into." (EN-1, paragraph 5.3.19)	Primary, tertiary and secondary mitigation measures are presented in **Table 3.14**, with the identification for additional mitigation outlined in **Section 3.11**.
"*The SoS will need to take account of what mitigation measures may have been agreed between the applicant and Natural England (or the Countryside Council for Wales) or the Marine Management Organisation (MMO), and whether Natural England (or the Countryside Council for Wales) or the MMO has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences*". (EN-1, paragraph 5.3.20)	Primary, tertiary and secondary mitigation measures are presented in **Table 3.14**, with the. the requirement for additional mitigation outlined in **Section 3.11**. Mitigation has been discussed with Natural England through the ecology Evidence Plan Technical Panel meetings held on the 8th April 2019, 9th July 2019, 13th November 2019, 1st April 2020 and 1st July 2020. A record of key agreements and disagreements can be found in **Volume B1, Annex 1.1: Consultation Report Annex 1 Evidence Plan**.
In sites with nationally recognised designations (Sites of Special Scientific Interest, National Nature Reserves, National Parks, the Broads, Areas of *"Outstanding Natural Beauty and Registered Parks and Gardens), consent for renewable energy projects should only be granted where it can be demonstrated that the objectives of designation of the area will not be compromised by the development, and any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by the environmental, social and economic benefits."* (EN-3, paragraph 2.5.33)	Hornsea Four has avoided sensitive and protected sites (where practical) through the RPSS process (Co2) (**Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**). Where unavoidable (e.g. River Hull Headwaters SSSI), Hornsea Four have committed to the use of HDD methodologies (Co1), with sensitive placement of HDD entry/exit pits outside the riparian vegetation associated with the SSSI (Co18). Designated sites are further discussed in **Section 3.7** with impacts assessed in **Section 3.11**.

3.3.2 National Planning Policy Framework

3.3.2.1 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government updated 2019) is the primary source of national planning guidance in England. Whilst the NPPF is not directly applicable to NSIPs, as Government policy it may be considered relevant and important.

3.3.2.2 Paragraph 8 of the NPPF 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.

3.3.2.3 The environmental dimension is defined as "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."

3.3.3 Natural Environment White Paper (2011)

3.3.3.1 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.

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

3.3.4.1 The Strategy sets out how England will implement the 2010 Aichi Biodiversity Targets, the 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 200,000 ha;
- By 2020, at least 17% of land and inland water in England, especially areas of 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.

3.3.5 Local Planning Policy

3.3.5.1 NPS EN-1 states, in paragraph 4.1.5 that "Other matters that the IPC [now the SoS] may consider important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict between these or any other documents and an NPS, the NPS prevails for the purposes of SoS decision making given the national significance of the infrastructure."

3.3.5.2 The onshore Hornsea Four Order Limits fall within the jurisdiction of ERYC.

3.3.5.3 ERYC planning policy relevant to Hornsea Four states that the local authority is "committed to the creation and maintenance of maintenance of a sustainable built and natural environment through appropriate planning and development management measures."

3.3.6 Legislation

3.3.6.1 Table 3.3: provides detail on key pieces of International and UK legislation which are relevant to Ecology and Nature Conservation.

3.3.6.2 Further overarching information on legislation is provided in **Volume A1, Chapter 2: Planning and Policy Context**.

Table 3.3: Key International and UK legislation relevant to ecology and nature conservation.

Legislation	Relevance
The Conservation of Habitats and Species Regulations 2017 (or 'The Habitats Regulations 2017') (Conservation of Habitats and Species Regulations, 2017)	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. 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 5. 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.
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.	Makes changes to the Conservation of Habitats and Species Regulations 2017 following the UK's exit from the European Union (EU).

Legislation	Relevance
Wildlife and Countryside Act 1981 (as amended) (WCA, 1981)	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. 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. 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. 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. The Act makes provision for the notification and confirmation of SSSI.
The Protection of Badgers Act 1992 (Protection of Badgers Act, 1992)	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. 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.
Natural Environment and Rural Communities (NERC) Act 2006 (NERC, 2006)	Section 41 of the Act requires the SoS to compile a list of habitats and species of principal importance for the conservation of biodiversity in England (herein 'S41 species'). 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.
The Hedgerow Regulations 1997 (Hedgerow Regulations, 1997)	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.
Countryside and Rights of Way Act (CRoW)2000 (CRoW, 2000)	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.

3.3.7 Guidance

3.3.7.1 The impact assessment has been based upon the following guidance and standards:

- Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM 2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal;
- British Standard (BS) 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 (CIRIA 2006); and
- CIRIA Guidance note C692 Environmental Good Practice on Site Guide (3rd Edition – CIRIA 2010).

3.3.7.2 The following species-specific guidance and standards have been used during the assessment process:

- Standing advice on protected species (bats (all species), great crested newts *Triturus cristatus*, badgers, water voles *Arvicola amphibius*, otters *Lutra lutra*, reptiles, protected plants, invertebrates, white-clawed crayfish *Austropotamobius pallipes*, ancient woodlands and veteran trees) (Natural England 2015);
- BS 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 (ILE 2018);
- The Water Vole Mitigation Handbook (The Mammal Society Guidance Series) (Dean et al 2016);
- Reptile Habitat Management Handbook (Edgar et al 2010);
- Great Crested Newt Mitigation Guidelines (English Nature 2001);
- Herpetofauna Worker's Manual (Joint Nature Conservation Committee (JNCC) 2003);
- Otters: surveys and mitigation for development projects. Natural England Standing Advice (Natural England 2014);
- 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 (Natural England 2015);
- Water Vole Conservation Handbook, 3rd Edition (Strachan and Moorhouse 2011); and
- Great Britain (GB) Non-native Species Information (GB Non-native secretariat 2015).

3.4 Consultation

3.4.1.1 Consultation is a key part of the DCO application process. Consultation regarding Ecology and Nature Conservation has been conducted through Hornsea Four Evidence Plan Meetings, the EIA scoping process (Orsted 2018) and formal consultation on the Preliminary Environmental Information Report (PEIR) under section 42 of the 2008 Act. An overview of the project consultation process is presented within **Volume A1, Chapter 6: Consultation**. Agreements made with consultees within the Evidence Plan process are set out in the topic specific Evidence Plan Logs which are appendices to the Hornsea Four Evidence Plan (**Volume B1, Annex 1.1: Evidence Plan**), an annex of the Hornsea Four Consultation Report (**Volume B1, Chapter 1: Consultation Report**). All agreements within the Evidence Plan Logs have unique identifier codes which have been used throughout this document to signpost to the specific agreements made (e.g. ON-ECO-1.1).

3.4.1.2 A summary of the key issues raised during consultation specific to Ecology and Nature Conservation is outlined below in **Table 3.4**, together with how these issues have been considered in the production of this ES.

Table 3.4: Consultation Responses.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
Natural England	23 November 2018, Scoping Opinion	**Internationally designated sites** The onshore scoping document does not include reference to internationally designated sites (Ramsar, SAC, SPA). NE advises that sites of international importance are scoped into the assessment in order to allow consideration of alone and in-combination effects. In particular the Greater Wash SPA, which overlaps with the potential landfall corridor, should be within the scope.	Existing environment in relation to internationally designated sites is set out in **Section 3.7**, and an impact assessment is set out in **Section 3.11**. As a part of the route planning and site selection process the Greater Wash SPA has been avoided as outlined in **Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**.
PINS	23 November 2018, Scoping Opinion	**Direct impacts on designated sites: Construction phase** The Inspectorate notes the caveat of 'where technically practical' in Co1 regarding trenchless techniques and 'where practical/possible' and 'permanent	Updated wording in relation to Co1 and Co2 has been provided in **Table 3.14** Designated sites are discussed in **Section 3.7**, and an assessment is set out in **Section 3.11**.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		project footprint' in Co2, the commitments on which the scoping assessment is based. The Inspectorate also notes the information on Figures 7.7 and 7.8 which indicates a number of designated sites within the vicinity or overlapping the indicative cable route. It is also acknowledged in the Scoping Report that the Proposed Development will be subject to further refinements, including to the cable route and location of the landfall and substation. It is not clear if the impacts of temporary construction areas are considered against the embedded mitigation. It is also not clear if the word 'degradation' in Table 7.10 includes effects that can arise from indirect impacts, e.g. hydrological changes elsewhere. Uncertainty therefore remains as to the successful avoidance of impacts on designated sites. The Inspectorate considers that a risk of significant effects exists and that this matter should be assessed in the ES. The Inspectorate advises that all potential impacts on designated sites, both direct and indirect, should be assessed in the ES.	
PINS	23 November 2018, Scoping Opinion	**Impacts on white clawed crayfish and fish: Construction phase** Given the information regarding baseline conditions regarding white clawed crayfish and their likely absence from the study area, the Inspectorate agrees that significant	No baseline data has been collected to identify the presence/likely absence of fish species in watercourses within the Hornsea Four Order Limits, as agreed with Natural England, YWT, ERYC and the EA as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Therefore, no

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		effects are unlikely, and the Inspectorate agrees that this species can be scoped out of the ES. The assumption that the embedded mitigation measures proposed will avoid impacts on fish is undermined by the uncertainties remaining about the implementation and effectiveness of the mitigation. No baseline data for freshwater fish, including species of conservation interest, is presented in the scoping report. The Inspectorate cannot agree to scope this matter out of the ES and advises that impacts on watercourses should be assessed where significant effects on freshwater fish could occur.	impact assessment has been undertaken, as agreed with Natural England, the EA and YWT at the meeting held on the 13th November 2019 (ON-ECO-3.9). Potential impacts and mitigation measures regarding fish (including migratory lamprey) that will be adhered to by Hornsea Four are included within the OEMP (**Volume F2, Chapter 3**) and further discussed in **Chapter 2: Hydrology and Flood Risk**. Impacts related to white-clawed crayfish and fish (ENC-C-7) have not been addressed in detail in the ES. This was discussed and agreed with ERYC, NE, YWT and the EA at the Ecology and Nature Conservation Technical Panel meeting held on the 8th April 2019 and 9th July 2019 (ON-ECO-3.2 and ON-ECO-3.5). Embedded mitigation measures are presented in **Section 3.8.2**
PINS	23 November 2018, Scoping Opinion	**Internationally designated sites** The study area applied to the designated site search should be coordinated with the approach used in the proposed Habitats Regulations Screening Report in the case of internationally designated sites (terrestrial, and coastal/marine in the appropriate ES chapters), and effort should be made to agree with relevant consultation bodies. The ES should assess impacts to internationally designated sites where significant effects are likely.	All designated sites study areas were discussed and agreed This was discussed and agreed with ERYC, NE, YWT and the EA at the Ecology and Nature Conservation Technical Panel meeting held on the 8th April 2019 and 9th July 2019 (ON-ECO-3.1 and ON-ECO-3.6). Further discussion on designated sites is included in **Section 3.7**. The 2 km study area used for designated sites in this Chapter is consistent with the study area used to inform the Hornsea Four Report to Inform Appropriate Assessment (RIAA) (**Volume B2, Chapter 3: Report to Inform Appropriate Assessment**), submitted separately to this Chapter. Assessment related to designated sites is set out in **Section 3.11**.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
Forestry Commission	23 November 2018, Scoping Opinion	We do note that in reference to Ancient Woodland in this section the scoping report only refers to: "Where practical the following sensitive sites (inclusive of Ancient Woodland) will be avoided by the permanent project footprint" without specific reference to mitigation or compensation for potential impact on ancient woodland. Also, throughout the scoping report there appears to be no mention of Ancient Woodland or Veteran Trees being "Irreplaceable Habitats" as per the National Planning Policy Framework. If there isn't any ancient woodland impacted, we would expect this to be referenced. Figure 4.3 – Shows Ancient Woodland but no other woodland we would like to see all woodland assessed for value and impact, and to be considered within mitigation/compensation provisions to avoid net deforestation of the project.	In line with Co2, and through the robust RPSS process, Hornsea Four has avoided all Ancient Woodland and provided mitigation measures, due to it being "irreplaceable habitat", where required. Further information on this process is provided in **Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**. All UK Habitats of Principal Importance, including the National Forestry Commission dataset are shown on **Figure 3.11** to **Figure 3.15**. Existing environment is set out in **Section 3.7**. Further information on these commitments are presented in **Section 3.8.2**.
Natural England	23 November 2018, Scoping Opinion	**General** Co2 Primary: Where practical the following sensitive sites will be avoided by the permanent project footprint: SSSI Units (dependent upon condition), Ancient woodland, areas of consented development, areas of historic landfill and other known areas of potential contamination'. Sites should be avoided by the permanent and the temporary construction footprint, where	Hornsea Four has avoided sensitive and protected sites (where possible) (Co2) through the robust RPSS process and micro-siting to avoid unprotected woodland, mature, and protected trees during the detailed design process (Co2). Where statutory designated sites were unavoidable (River Hull Headwaters SSSI), Hornsea Four have committed to the use of HDD methodologies (Co1), with sensitive placement of HDD entry/exit pits outside the riparian vegetation associated with the SSSI (Co18).

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		possible. Natural England also advise that the temporary footprint of the project should also avoid impacts to designated sites wherever possible."	Where non-statutory designated sites were unavoidable (e.g. Bryan Mills Beck LWS, Beale's Beck, Lockington LWS, Raventhorpe Embankment LWS, Newbald Road LWS, Moor Lane LWS and Jillywood Lane LWS), Hornsea Four will undertake further consultation with relevant stakeholders (including ERYC) prior to consultation, in regard to sensitive crossing measures to avoid adverse impacts to these locally sensitive sites. Further information on these commitments are presented in **Table 3.14.** Designated sites are further discussed in **Section 3.7** and the impact assessment is set out in **Section 3.11**.
Natural England	23 November 2018, Scoping Opinion	We note that the study area has been delineated by a 2 km buffer around the indicative landfall area, cable route and substation search area. NE advise that the buffer should incorporate Impact Risk Zones (IRZ) for SSSIs. We would advise that the buffer is extended in order to include Internationally designated sites which may be affected by alone and in combination impacts.	The study areas implemented with respect to Hornsea Four are presented in **Section 3.5.** Consideration of SSSI Impact Risk Zones is discussed in **Section 3.10.**
Natural England	23 November 2018, Scoping Opinion	'Impact on great crested newt populations. The proposed cable route crosses areas known to support high numbers of great crested newt. NE welcomes the commitment to survey within the project footprint plus 250 m. The surveys should identify any newt populations and areas of good or connecting newt habitat, within the potential corridor to allow for	Details relating to the baseline survey study area for great crested newts are summarised in **Section 3.7** and provided in full in **Volume A6, Annex 3.5: Great Crested Newt eDNA Survey Report**.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		micro-siting and site connectivity at the landscape scale.	
Natural England	23 November 2018, Scoping Opinion	"Impacts on protected species: Operation phase Operation and maintenance activities of the onshore cable route could cause disturbance to protected species and merits further consideration."	All operational activities would be undertaken following the same guiding principles and commitments to working methodologies as those undertaken during construction activities, where relevant. Further information on baseline environment is presented in **Section 3.7** and the mitigation measures that Hornsea Four have committed to are presented in **Table 3.14.** Operational impacts for the onshore ECC have been scoped out. This was agreed with NE, YWT and the EA at the onshore Ecology Technical Panel Meeting held on the 13th November 2019 (ON-ECO-3.13).
Natural England	23 November 2018, Scoping Opinion	"Impacts on habitats: Decommissioning phase "Decommissioning of the onshore substation could lead to temporary habitat loss or degradation." NE is unclear if a 250 m buffer will be sufficient to provide space for a decommissioning area.	All decommissioning activities will be undertaken following the management and mitigation measures (as per **Volume F2, Chapter 3: Outline Ecological Management Plan** and **Volume F2, Chapter 2: Outline Code of Construction Practice**) and commitments to working methodologies as those to be undertaken during construction. The effects of decommissioning will be equal to or less than those at construction (**Volume A1, Chapter 4: Project Description**). This was discussed and agreed with ERYC, NE, YWT and the EA at the Ecology and Nature Conservation Technical Panel meeting held on the 8th April 2019 (ON-ECO-3.3) and with NE, YWT and the EA on the 13th November 2019 (ON-ECO-3.16). An Onshore Decommissioning Plan will also be developed and will include provisions for the removal of all onshore above and below ground infrastructure in line with the latest relevant guidance (Co127).

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
Natural England	23 November 2018, Scoping Opinion	NE welcome that suitable opportunities to enhance the nature conservation interest of the site will be developed. We would wish to see a commitment to net gain incorporated in the project design, in line with NPPF.	Applying the mitigation hierarchy, Hornsea Four will prioritise avoidance of biodiversity loss before attempting to provide gains which contribute toward onsite, local and strategic environmental priorities. The project endeavours to leave the environment in a better state than it was found, by working with ERYC, wildlife groups, landowners and local stakeholders to support their priorities for the local environment. Details of these plans are set out in **Volume F2, Chapter 14: Outline Enhancement Strategy** and **Volume F2, Chapter 16: Outline Net Gain Strategy.**
ERYC	Technical Panel Meeting – April 2019	Raised that Hornsea Four should be mindful of crossing techniques used for Moor Lane Local Wildlife Site (LWS). The LWS requires a site integrity survey to be undertaken in order to inform any discussions on crossing techniques. It was also raised that various LWS status had changed in status more recently, and that this information should be obtained from ERYC and incorporated in to the relevant assessments. Additionally, ERYC supported the use of a separate management plan to address embedded mitigation measures related to construction, as otherwise this information can be lost within the PEIR and ES.	Hornsea Four will continue to consult with all relevant stakeholders with regard to sensitive crossings that may be required, prior to construction of Hornsea Four. Hornsea Four obtained the updated LWS citations from ERYC which are listed in detail in **Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report** and summarised in **Table 3.8**. A habitats assessment based on this information has been provided in **Section 3.11**. An Outline EMP (**Volume F2, Chapter 3: Outline Ecological Management Plan**) has been produced to support this chapter and details all onshore ecological survey and mitigation requirements that will be undertaken pre, during and post construction.
Natural England	Technical Panel Meeting – July 2019	Natural England requested further information in relation to how Hornsea Four proposes to cross the River Hull Headwaters SSSI.	Hornsea Four has committed to using HDD or other trenchless technologies (Co1) to cross the River Hull Headwater SSSI. Additionally, no access will be taken across it as evidenced in **Volume A4, Annex 4.2: Onshore Crossing Schedule**.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
			Hornsea has also committed to carrying out a pre-construction hydrogeological risk assessment on particularly sensitive sites to information a detailed crossing method statement which will be agreed with the relevant authorities (Co18).
Natural England	Section 42 (2019)	Access road design has not yet finalised, two of the access roads are close to River Hull Headwaters and Bryan Mills Field SSSI. One access road is directly next to an ancient woodland. The design of these access roads could impact the SSSIs and the ancient woodland.	Hornsea Four has applied a number of commitments specific to the River Hull Headwaters and Bryan Mills Field SSSIs, as outlined in Table 3.15 and Table 3.14. This was discussed and agreed with Natural England at a meeting held on the 13th November 2019 (ON-ECO-3.7). Appropriate buffers for ancient woodland were discussed and agreed with Natural England at a meeting held on the 1st April 2020 (ON-ECO-3.16). The impact assessment for designated sites is presented in Section 3.11.
Natural England	Section 42 (2019)	One of the access roads passes next to ancient woodland (Birkhill Wood). Method will strip topsoil and there are plans to make it a permanent road. It is likely that it will damage the ancient woodland (an irreplaceable habitat) and it contravenes Natural England's standing advice on ancient woodland.	Hornsea Four has ensured that there is a 15 m buffer between the proposed permanent access road to the OnSS and Birkhill Wood ancient woodland, in accordance with Natural England's standing advice and as agreed with Natural England at the Technical Panel Meeting held on the 1st April 2020 (ON-ECO-3.16).
Natural England	Section 42 (2019)	The only impacts considered are: • Degradation of key habitats and species for which the sites are cited for (Table 3.8); and • Direct contamination of watercourses from construction spills. This does not fully consider all of the impacts to the SSSIs and ancient woodland.	The Hydrology and Flood Risk Chapter (Chapter 2: Hydrology and Flood Risk) considers direct impacts on the hydrology and geomorphology of surface watercourses, including the River Hull Headwaters SSSI, resulting from temporary watercourses crossings. Impact assessment relating to breeding birds is provided in Section 3.11.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		NER: Consider all of the impacts, for example (not exhaustive): • Dust (where construction is less than 200 m away from a SSSI/ancient woodland); • Air quality; • Water quality; • Hydrology; • Geo-morphology; • Eco-hydrology; • Breeding birds; • Invasive non-native species; Where taken into account elsewhere, please reference.	A check for invasive non-native species was undertaken concurrently with the Extended Phase 1 Habitat Survey. Measures to protect against the introduction and spread of non-native species have been provided in **Volume F2, Chapter 2: Outline Code of Construction Practice**. Pre-construction surveys will be undertaken and the details of which are provided in the Outline EMP (**Volume F2, Chapter 3: Outline Ecological Management Plan**). The impact assessment presented in **Section 3.11** contains an account with regard to potential air quality impacts on the SSSIs, with a cross reference to the full air quality assessment in **Chapter 9: Air Quality**.
Natural England	Section 42 (2019)	The citation for the River Hull Headwaters SSSI states: The river valley supports a diverse breeding bird community, including several waders such as lapwing, snipe and redshank, wildfowl, particularly mallard and mute swan, together with yellow wagtail, sedge warbler, reed warbler, reed bunting and many more widely occurring species. The impacts to this assemblage of breeding birds need to be assessed and mitigation proposed if necessary.	A breeding bird survey was undertaken in 2019 and the findings of this survey have been used to inform the impact assessment, presented in **Section 3.11.** A summary of the survey results is provided in **Section 3.7.**
Natural England	Section 42 (2019)	Survey carried out in February; this is not an appropriate time to carry out a survey. The survey could have missed key species and led to an incorrect assessment of condition. This could affect the assessment of significance of	A further survey effort was undertaken in September 2019, which is within the optimal period for identifying flora. This approach was agreed with Natural England at the Technical Panel Meeting held on the 1st April 2020 (ON-ECO-1.18).

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		impacts and it means no habitats have been identified for a phase 2 survey (those identified in table 9).	
Natural England	30 April 2021 Onshore Ecology Position Paper – Data Validity and Next Steps	A position paper was issued to Natural England which set out the findings of a review of the validity of baseline data used in the assessment, in light of the decision to delay the DCO submission until September 2021 and DCO examination into 2022. The position paper also presented the proposed updates to the onshore ecology baseline survey data where landowner access was being sought and where gaps in baseline data had been identified, for example eDNA surveys of ponds that were not granted access in 2019. The Position Paper was agreed by Natural England (ON-ECO-1.23).	A further survey effort where landowner access was obtained in 2021 was undertaken in June 2021. Where relevant, the findings of these surveys are presented in Section 3.7 and Section 3.11.

3.5 Study area

3.5.1.1 The study areas for onshore ecological receptors are provided in Table 3.5. Different study areas have been used for different receptors depending on their sensitivity and their habitat preferences. These study areas were selected according to standard industry guidance (CIEEM 2018) which is presented in Section 3.3, as well as using professional judgement and experience. These study areas were agreed with stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8).

3.5.1.2 The study areas include the Hornsea Four Order Limits, including the associated onshore infrastructure for the following components, alongside an additional 'buffer' as highlighted in Table 3.5, but specifically:

- The landfall (including logistics compounds and connection works areas);
- Onshore ECC (including permanent and temporary works areas); and
- OnSS site (including permanent and temporary storage areas, EBI and 400 kV NGET connection area).

3.5.1.3 An overview of each study area used for ecological receptors is shown on Figure 3.1 to Figure 3.5.

Table 3.5: Study areas used for ecological receptors considered in this ES.

Data / Survey	Study area
Protected and notable species (excluding great crested newts, birds and bats) – herein referred to as the 'Data search study area'	Within and up to 2 km from the Hornsea Four Order Limits as shown on Figure 3.1 - Figure 3.5.
Great crested newts – herein referred to as the 'GCN study area'	Within and up to 250 m from the Hornsea Four Order Limits as shown on Figure 3.1 - Figure 3.5.
Bats and birds – herein referred to as the 'Bat and bird study area'	Within and up to 5 km from the Hornsea Four Order Limits as shown on Figure 3.1 - Figure 3.5.
Statutory and non-statutory designated sites – herein referred to as the 'Data search study area'	Within and up to 2 km from the Hornsea Four Order Limits as shown on Figure 3.1 - Figure 3.5.
UK Habitats of Principal Importance (UKHPI) and Forestry habitats – herein referred to as the 'Data search study area'	Within and up to 2 km from the Hornsea Four Order Limits as shown on Figure 3.1 - Figure 3.5.
Statutory Sites and Associated Impact Risk Zones (IRZ) – herein referred to as the 'Data search study area'	Within and up to 2 km from the Hornsea Four Order Limits as shown on Figure 3.1 - Figure 3.5.
Updated Extended Phase 1 Habitat Survey – herein referred to as the 'EP1HS survey area'	Within and up to 50 m from the Hornsea Four Order Limits as shown on Figure 3.1 - Figure 3.5.

Hornsea Four

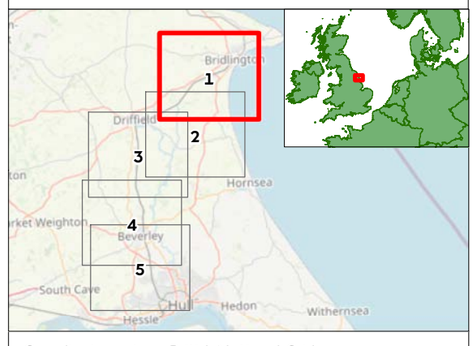
Figure 3.1

Study Areas Relevant to Ecology and Nature Conservation - Sheet 1 of 5

510000 520000 470000 460000

N
GRID NORTH

- Order Limits
- EP1HS Survey Area (50m Buffer)
- GCN Study Area (250m Buffer)
- Data Search Study Area (2km Buffer)
- Bat and Bird Study area (5km Buffer)



Coordinate system: British National Grid
Scale@A3: 1:50,000

0 1 2 Kilometres
0 1,000 2,000 3,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Study Areas
Document no: HOW04RH0033
Created by: AZ
Checked by: CC
Approved by: CS

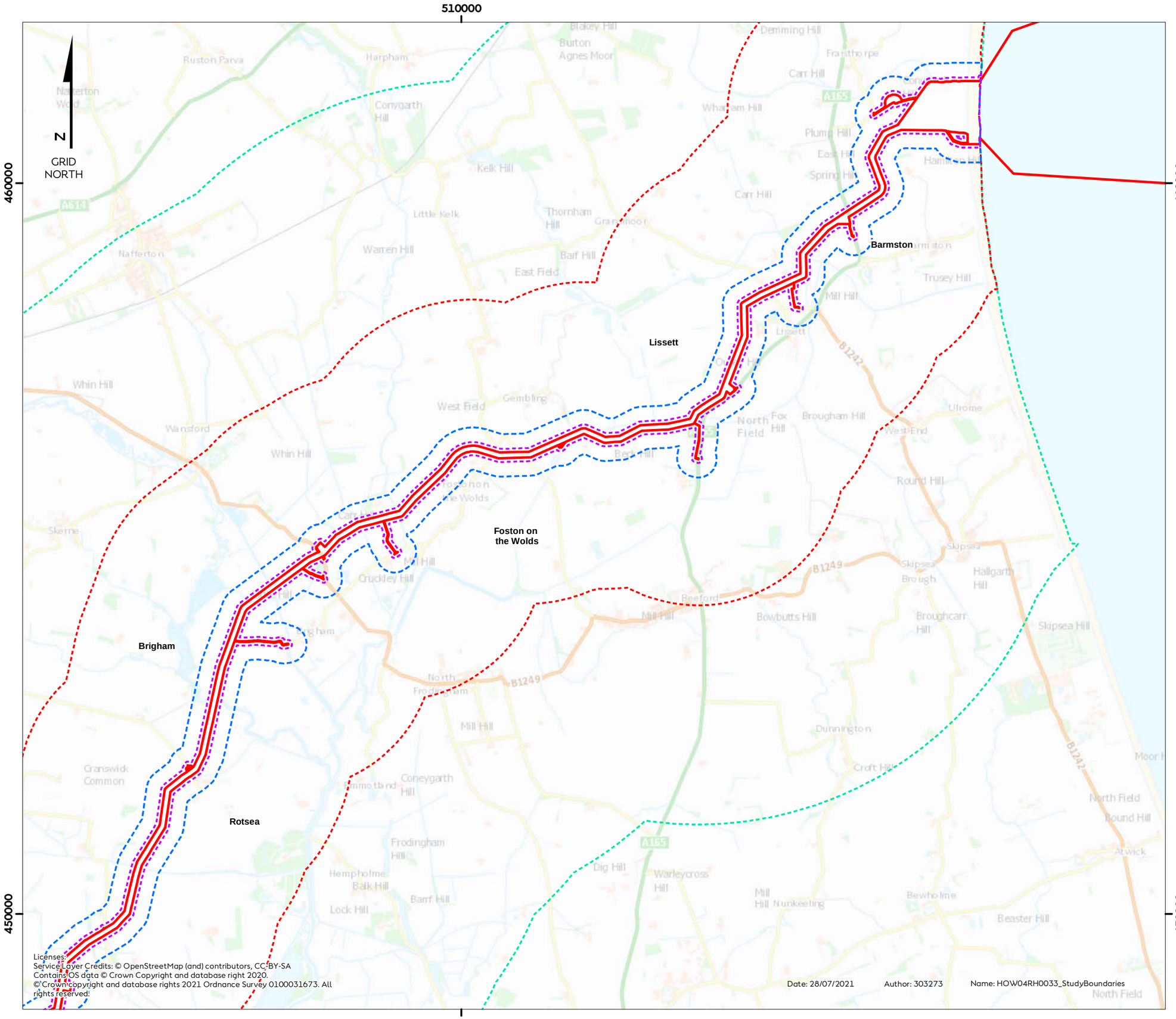
Royal HaskoningDHV
Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0033_StudyBoundaries

Hornsea Four

Figure 3.2

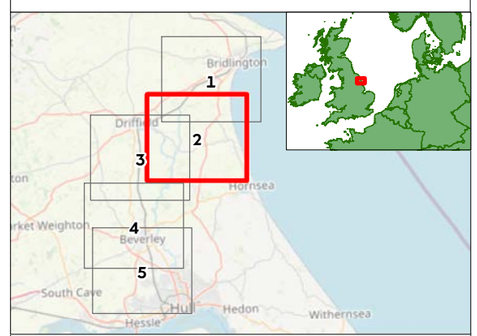
Study Areas Relevant to Ecology and Nature Conservation - Sheet 2 of 5



Licenses:
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Contains OS data © Crown Copyright and database right 2020.
©Crown copyright and database rights 2021 Ordnance Survey 0100031673. All rights reserved.

Date: 28/07/2021 Author: 303273 Name: HOW04RH0033_StudyBoundaries

- Order Limits
- EP1HS Survey Area (50m Buffer)
- GCN Study Area (250m Buffer)
- Data Search Study Area (2km Buffer)
- Bat and Bird Study area (5km Buffer)



Coordinate system: British National Grid
Scale@A3: 1:50,000

0 1 2 Kilometres

0 1,000 2,000 3,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Study Areas
Document no: HOW04RH0033
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

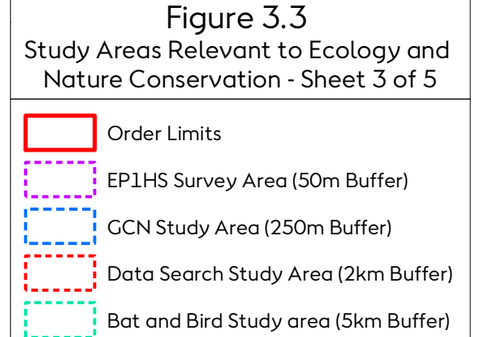
Ørsted

Hornsea Four

Figure 3.3

Study Areas Relevant to Ecology and Nature Conservation - Sheet 3 of 5

- Order Limits
- EP1HS Survey Area (50m Buffer)
- GCN Study Area (250m Buffer)
- Data Search Study Area (2km Buffer)
- Bat and Bird Study area (5km Buffer)



Coordinate system: British National Grid

Scale@A3: 1:50,000

0 1 2 Kilometres

0 1,000 2,000 3,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Study Areas
Document no: HOW04RH0033
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0033_StudyBoundaries

Hornsea Four

Figure 3.4

Study Areas Relevant to Ecology and Nature Conservation - Sheet 4 of 5

500000

440000

N

GRID NORTH

Scorborough

Leconfield

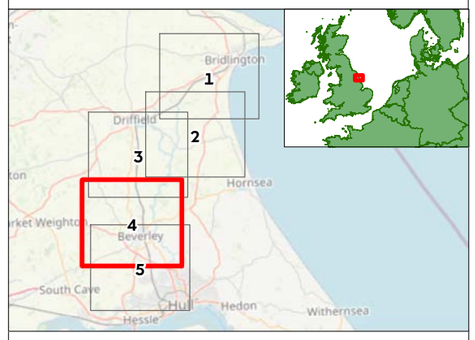
Cherry Burton

Bishop Burton

Beverley

Woodmansey

- Order Limits
- EP1HS Survey Area (50m Buffer)
- GCN Study Area (250m Buffer)
- Data Search Study Area (2km Buffer)
- Bat and Bird Study area (5km Buffer)



Coordinate system: British National Grid

Scale@A3: 1:50,000

0 1 2 Kilometres

0 1,000 2,000 3,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Study Areas
Document no: HOW04RH0033
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0033_StudyBoundaries

Hornsea Four

Figure 3.5

Study Areas Relevant to Ecology and Nature Conservation - Sheet 5 of 5

500000

510000

440000

430000

N

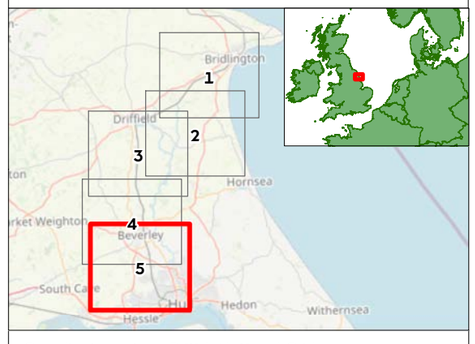
GRID NORTH

Bishop Burton

Beverley

Woodmansey

- Order Limits
- EP1HS Survey Area (50m Buffer)
- GCN Study Area (250m Buffer)
- Data Search Study Area (2km Buffer)
- Bat and Bird Study area (5km Buffer)



Coordinate system: British National Grid

Scale@A3: 1:50,000

0 1 2 Kilometres

0 1,000 2,000 3,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Study Areas
Document no: HOW04RH0033
Created by: AZ
Checked by: CC
Approved by: CS

Date: 28/07/2021 Author: 303273 Name: HOW04RH0033_StudyBoundaries

3.6 Methodology to inform baseline

3.6.1 Desktop Study

3.6.1.1 A desk study was undertaken to obtain information on ecology and nature conservation for the Hornsea Four Order Limits. Data has been acquired for the respective study areas defined in Section 3.5. A thorough and detailed desktop review of existing studies and datasets has been undertaken to inform this chapter. This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8).

3.6.1.2 The data sources that have been collected and used to inform this Ecological Impact Assessment (EcIA) are summarised in Table 3.6. A data refresh was conducted in April 2020 to ensure that the most up to date data was used to inform the EcIA presented in this Chapter.

Table 3.6: Summary of data sources used to inform this EcIA.

Data source	Date reviewed	Data contents	Coverage
Desk study data			
Joint Nature Conservation Committee (JNCC)	April 2020	European designated sites (SPA, SAC, Ramsar sites)	Data search study area
JNCC / MAGIC Natural England	April 2020	UK designated sites (SSSI, National Nature Reserve (NNR), LNR)	Data search study area
JNCC / MAGIC Forestry Commission	April 2020	UK Habitats of Principal Importance Ancient Woodland, Woodland categories	Data search study area
North and East Yorkshire Ecological Data Centre (NEYEDC)	April 2020	Locally designated sites (LWS) Protected and notable species records including: - Wildlife and Countryside Act 1981 Schedules 1, 5, 8 & 9; - The Conservation of Habitats & Species Regulations 2010 Schedules 2 & 5; - Protection of Badgers Act 1992; - Bonn Convention Appendix 1 & 2; - Bern Convention Annex 2, 4, & 5; - Habitats Directive Annex 2, 4 & 5; - NERC Act 2006 Section 41 species; - UK BAP (Biodiversity Action Plan) species (both local and national); - IUCN (International Union for Conservation of Nature), Red List Species; - Nationally Notable species; - Locally rare species	Data search study area and Bat and bird study area

Data source	Date reviewed	Data contents	Coverage
Ordnance Survey (OS)	April 2020	Large-scale mapping to determine the presence of ponds that may be suitable for great crested newts	GCN study area
APEM Ltd	July 2018	High-resolution (3 cm) aerial photography data collected during scoping.	Data search study area

3.6.2 Site Specific Surveys

3.6.2.1 An updated EP1HS was undertaken in February and September 2019 and June 2021 to expand on the details of habitat types gathered during an EP1HS undertaken in June 2018 and to determine the scope of phase 2 species specific surveys that would be required. The findings from the updated EP1HS are provided in full within (including associated addendums, which are appended) **Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report Part A**; and **Volume A6, Annex 3.2: Extended Phase 1 Target Note Tables**.

3.6.2.2 Further species specific phase 2 surveys have also been undertaken and, in combination with the findings from the updated EP1HS, have been used to establish the baseline conditions presented in **Section 3.7** and in turn used to inform the relevant EcIA that has been undertaken in **Section 3.11**. This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Refer to **Section 3.4** for further details.

3.6.2.3 All ecological surveys that have been undertaken in relation to Hornsea Four are summarised in **Table 3.7**.

Table 3.7: Summary and status of ecological field surveys.

Title, year and reference	Scope	Coverage of Hornsea Four	Survey status
EP1HS February and September 2019 and June 2021 **Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report & 2021 Addendum** and **Volume A6, Annex 3.2: Extended Phase 1 Target Note Tables & 2021 Addendum.**	An EP1HS following 'Extended Phase 1' methodology as set out in Guidelines for Baseline Ecological Assessment (Institute of Environmental Assessment (IEMA), 1995). Habitats were classified and mapped following JNCC's Handbook for Phase 1 habitat survey: A technique for environmental audit (2010). Included a search for: - Field signs of badgers; - Assessment of roost suitable of trees and structures for bats; - Assessment of commuting / foraging suitability of all linear features for bats; - Field signs of otter; - Assessment of suitability of watercourse to support water voles; - Habitats suitability assessment of all standing water bodies for ability to support great crested newts; - Assessment of suitability of habitats to support reptiles; - Assessment of suitability of habitats to notable invertebrates; and Evidence of non-native invasive species.	100% of EP1HS survey area (i.e. the Hornsea Four Order Limits plus 50 m) plus all ponds within and up to 250 m of the Hornsea Four Order Limits.	Complete
Hornsea Four Over-wintering Bird Survey November 2018 – March 2019 (inclusive).	A suite of monthly surveys utilising a combination of Vantage Point (VP) counts and walkover surveys to determine the presence and utilisation of over-wintering birds.	Within, and up to 250 m of the Hornsea Four Order Limits at the OnSS, and within 250 m of VPs along the landfall and onshore ECC.	Complete

Title, year and reference	Scope	Coverage of Hornsea Four	Survey status
Volume A6, Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report			
Hornsea Four Breeding Bird survey April – June 2019 (inclusive). **Volume A6, Annex 3.4: Breeding Bird Survey Report**	A suite of monthly surveys utilising a combination of VP counts and walkover surveys to determine the presence and utilisation of breeding birds, designed to follow on from the over-wintering bird survey.	Within, and up to 250 m of the Hornsea Four Order Limits	Complete
Hornsea Four Great crested newt eDNA survey April and June 2019. **Volume A6, Annex 3.5: Great Crested Newt eDNA Survey Report**	A great crested newt environmental DNA (eDNA) survey of ponds.	Hornsea Four Order Limits plus a 250 m buffer	Surveys of all ponds where landowner access was obtained have been completed. A total of 62 ponds are situated within and up to a 250 m buffer of the Hornsea Four Order Limits, of which one pond remains to be surveyed.
Hornsea Four Water vole survey May and August 2019. **Volume A6, Annex 3.6: Watervole Survey Report**	A water vole presence/absence survey and population estimate of watercourses identified as suitable to support water voles during the updated Extended Phase 1 Habitat Survey. Undertaken concurrently with the Otter survey.	Hornsea Four Order Limits plus a 50 m buffer	Complete
Hornsea Four Otter survey May and August 2019.	An otter presence/absence survey of watercourses identified as suitable to support water voles during the updated Extended Phase 1 Habitat Survey. Undertaken concurrently with the Water vole survey.	Hornsea Four Order Limits plus a 50 m buffer	Complete

Title, year and reference	Scope	Coverage of Hornsea Four	Survey status
Volume A6, Annex 3.7: Otter Survey Report (confidential)			
Hornsea Four Bat static detector survey, monthly surveys between May and October 2019 (inclusive) **Volume A6, Annex 3.8: Bat Static Detector Survey Report Part A** and **Volume A6, Annex 3.9: Bat Static Detector Survey Report Part B.**,	Bat static detector surveys of linear features (i.e. hedgerows, watercourse and woodland edges) identified during the updated EP1HS as providing moderate or high suitability for commuting/foraging bats. Static detectors were deployed in suitable locations within activity transects and within isolated features not subject to the activity transect survey. The static detector survey was undertaken concurrently with the bat activity transect survey.	Hornsea Four Order Limits plus a 50 m buffer	Complete.
Hornsea Four Bat activity survey, monthly surveys between May and October 2019 (inclusive) **Volume A6, Annex 3.10 Bat Activity Transect Survey Report Part A** and **Volume A6, Annex 3.11 Bat Activity Transect Survey Report Part B**	Bat activity surveys of all linear features (i.e. hedgerows, watercourses, scrub and woodland edges) identified during the updated Extended Phase 1 Habitat Survey as providing moderate or high suitability for commuting/foraging bats.	Hornsea Four Order Limits plus a 50 m buffer	Complete.
Hornsea Four Bat emergence/re-entry surveys June – September 2019 (inclusive)	Bat emergence/re-entry surveys of all trees and structures identified during the updated Extended Phase 1 Habitat Survey as providing moderate or high suitability for roosting bats.	Hornsea Four Order Limits plus a 50 m buffer	Complete

Title, year and reference	Scope	Coverage of Hornsea Four	Survey status
Volume A6, Annex 3.12: Bat Emergence and Re-entry Survey Report Part A and **Volume A6, Annex 3.13 Bat Emergence and Re-entry Survey Report Part B**			
Hornsea Four Hedgerow and arboricultural survey August 2019 **Volume A6, Annex 3.14: Hedgerow and Arboricultural Survey Report**.	Tree and hedgerow survey (to BS5837:2012) to enable the production of a tree (including veteran trees) constraints plan including location of root protection areas. Survey also included recording hedgerow features such as composition, height and width.	Hornsea Four Order Limits plus a 50 m buffer	Complete
Hornsea Four Badger presence/absence survey, February and September 2019 **Volume A6, Annex 3.15: Badger Survey Report (confidential)**	A badger presence/absence survey of all suitable habitats (including field margins, dry drain systems, woodland edges).	Hornsea Four Order Limits plus a 50 m buffer	Complete

3.7 Baseline environment

3.7.1 Existing baseline -Designated sites

3.7.1.1 There are four statutory designated sites within the data search study area (as explained in Table 3.5). One of these, the River Hull Headwaters SSSI, is crossed by the Hornsea Four Order Limits.

3.7.1.2 There are six non-statutory designated sites within the Hornsea Four onshore Order Limits and an additional 33 within the data search study area.

3.7.1.3 The designated and non-designated sites are shown on Figure 3.6 to Figure 3.10 and described in Table 3.8.

3.7.1.4 All statutory designated sites for nature conservation are considered to be of high importance and all non-statutory designated sites for nature conservation are considered to be of medium importance.

Table 3.8: Statutory and non-statutory sites within the data search study area.

Designated site	Distance from Hornsea Four Order Limits (at closest point)	Reason for designated status
Statutory designated sites		
River Hull Headwaters SSSI	Inside Hornsea Four Order Limits	Chalk stream, characteristic riverside grassland, woodland and fen habitats. The river valley supports a diverse breeding bird community including lapwing (*Vanellus vanellus*), snipe (*Gallinago gallinago*), redshank (*Tringa totanus*) alongside mallard (*Anas platyrhynchos*) and mute swan (*Cygnus olor*), yellow wagtail (*Motacilla flava*), sedge warbler (*Acrocephalus schoenobaenus*), reed warbler (*Acrocephalus scirpaceus*), reed bunting (*Emberiza schoeniclus)* and many more widely occurring species.
Bryan Mills Field SSSI	150 m	Site comprises a tall fen community which occupies the centre of a small ungrazed field, the surrounding drier areas of which have been planted with trees. Species present include lesser pond sedge (*Carex acutiformis*) and greater tussock sedge (*Carex paniculata*), common reed (*Phragmites australis*), reed sweet-grass (*Glyceria maxima*), meadowsweet (*Filipendula ulmaria*), great willowherb (*Epilobium hirsutum*), common valerian (*Valeriana officinalis)* and blunt flowered rush (*Juncus subnodulosus*).
Burton Bushes SSSI	300 m	Oak woodland over 200 years old of suggested natural origins, considered a good example of the woodland characteristics of Holderness Till soils. The undisturbed nature of the soil profile is an important feature of the site. Woodland canopy consists of mainly oak (*Quercus robur*) alongside birch (*Betula spp.*), field maple (*Acer campestre*) and Wych elm (*Ulmus glabra*). The understorey is well developed and

Designated site	Distance from Hornsea Four Order Limits (at closest point)	Reason for designated status
		dominated by holly (*Ilex aquifolium*). Remnants of a rich herb flora woodland floor exist including wood anemone (*Anemone nemorosa),* enchanter's nightshade (*Circaea lutetiana*), bluebell (*Hyacinthoides non-scripta*) and wood sorrel (*Oxalis acetosella*).
Greater Wash SPA	1 km	Marine habitats (intertidal mudflats and sandflats, subtidal sandbanks and biogenic reef). Red throated diver (*Gavia stellata*), common scoter (*Melanitta nigra*), little gull (*Hydrocoloeus minutus*), breeding sandwich tern (*Thalasseus sandvicensis*), common tern (*Sterna hirundo*) and little tern (*Sternula albifrons*).
Non-statutory designated sites (LWS)		
Moor Lane	Inside Hornsea Four Order Limits	Intact ancient/species-rich hedge with a total of six woody species per 30 m section.
Newbald Road	Inside Hornsea Four Order Limits	Intact, species-rich hedgerow with seven woody species per 30 m section.
Raventhorpe Embankment	Inside Hornsea Four Order Limits	Mosaic habitat of dense and scattered scrub alongside tall ruderal vegetation with widespread shrub and tree species.
Bryan Mills Beck	Inside Hornsea Four Order Limits	Roughly 3.5 km length stream that meanders through mostly arable landscapes. Bankside dominated by tall herbs, characterise by Great willowherb and creeping thistle (*Cirsium arvense*). Wooded areas also present, dominated by Great horsetail (*Equisetum telmateia*). Watercourse consists of patches of vegetation dominated by Water-cress (*Rorippa nasturtium-aqaticum*) and Branched bur-reed (*Sparganium erectum*) or Common reed. A number of veteran White willow (*Salix alba*) and Crack willow (*Salix fragilis*) also present.
Bealey's Beck, Lockington	Inside Hornsea Four Order Limits	Dense/continuous scrub, tall ruderal, running water. Plant species of note including water starworts (*Callitriche spp.*), branched bur-reed and water figwort (*Scrophularia auriculate*).
Jillywood Lane	Inside Hornsea Four Order Limits	Intact ancient species-rich hedgerow and medieval track/boundary with a total of six woody species within a 30 m section.
Old Lane, Leconfield	< 100 m	Species-rich ancient hedgerow with a total of six woody species per 30 m section, alongside neutral unimproved grassland.
Lake's Wood	< 100 m	Large plantation woodland which is mixed with patches of exotic conifers, Norway spruce (*Picea abies*), Pedunculate oak, ash (*Fraxinus excelsior*), European larch (*Larix decidua*) and elder (*Sambucus nigra*). Ground flora composed of bramble, bushes and fern. The site retains characteristics, including some ground flora species, of ancient semi-natural woodland.
Bygot Wood Lane, Leconfield	< 100 m	Section of verge approximately 300 m long, bordered by an arable field and a narrow, relatively shallow ditch. Vegetation dominated by a mix of tall grasses, weeds, ruderals and umbellifers.
Woodhill Path, Cottingham	< 100 m	Intact, species-rich hedgerow with a total of six woody species within a 30 m section.

Designated site	Distance from Hornsea Four Order Limits (at closest point)	Reason for designated status
Fishpond Wood, Risby Estate	< 100 m	Broadleaved plantation woodland with an associated fishpond now used by a local angling club. Woodland dominated by ash and sycamore (*Platanus occidentalis*) with an elder understorey. Also present is hybrid poplar and Norway spruce. Ground vegetation sparse in some areas, dominated by bracken (*Pteridium spp.*) and nettle (*Urtica dioica*) with bluebell within the mixed broadleaved sections.
Birkhill Wood	15 m	Largely a mixed plantation woodland with one section wholly broadleaved. Abundant sycamore, pedunculate oak and red oak (*Quercus rubra*), occasional ash and downy birch (*Betula pubescens*) and rare field maple (Acer campestre). European larch, Norway spruce and Lawson's cypress (Chamaecyparis lawsoniana) also present. Bracken, bluebell, bramble, rough meadow grass (*Poa trivialis*), creeping soft grass (*Holcus mollis*), wood millet (*Milium effusum*), wood sorrel (*Oxalis acetosella*) and ground ivy (*Glechoma hederacea*) present.
Drove Road	150 m	This site is a candidate LWS and as such has not been subject to a survey so there is no citation information available.
Gembling Common	200 m	Grassland with streams that add diversity as they create a variable water table, allowing the development of a complex mosaic of neutral grassland, marshy grassland and fen habitats.
Burton Bushes Veteran Trees	300 m	This site is a candidate LWS and as such has not been subject to a survey so there is no citation information available.
Cranswick Common	300 m	Deciduous woodland dominated by ash, sycamore, with occasional mature crack willow. The plantation is semi-mature, even-aged and structure poor with areas of young elder shrub and patches of bramble (*Rubus fruticosus*) scrub. Ground flora dominated by red campion (*Silene dioica*).
Bealey's Lane	350 m	Site consists of species rich intact hedge, neutral grassland and marsh/marshy grassland. Hedgerow consists of 14 woody species whilst majority of verges comprise drier neutral grassland with one marshy enclave. Species recorded include hazel (*Corylus avellane*), field maple, ash and pedunculate oak , dogwood (*Cornus sanguinea*), sweet vernal grass (*Anthoxanthun odoratum*), red fescue (*Festuca rubra*), common sedge.
Shorthill Hag	450 m	This site is a candidate LWS and as such has not been subject to a survey so there is no citation information available.
Bentley Moor Wood	450 m	Plantation broadleaved woodland containing frequent ash and sycamore alongside occasional pedunculate oak, rowan (*Sorbus aucuparia*), field maple and silver birch (*Betula pendula*).
Risby Park	500 m	Consists of arable land with some areas of scattered broadleaved trees alongside plantation woodland and calcareous grassland. There are also a number of lakes along the southern site boundary that are used for commercial fishing. Woodlands comprise mainly of Norway spruce with

Designated site	Distance from Hornsea Four Order Limits (at closest point)	Reason for designated status
		ash and elm. Woodland areas appear to be used for game so limited ground flora present.
Mill Beck and Fields	600 m	Site comprises of good semi-improved neutral grassland, marshy grassland, tall ruderal vegetation and dense and scattered scrub around the boundary. Grassland species include smooth-stalked meadow-grass, red fescue and sweet vernal-grass.
Lockington	600 m	Semi-natural broad-leaved woodland, consisting of mature beech, sycamore, sweet chestnut (*Castanea sativa*) and pedunculate oak. Hedges and tall ruderal vegetation alongside marshy grassland are also present as the variety of topography provides a variety of different habitats that are unusual in East Yorkshire.
Newbald Road, Beverley	700 m	Intact, species-rich hedgerow with seven woody species per 30 m section, including hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), pedunculate oak, hazel, holly, dogwood and bramble.
Corpslanding Road	800 m	Site comprises approximately 4 to5 m wide verges on both the north and south sides of the road with some interesting species present including crane's bill hawkbits (*Geranium sanguineum*)and buttercups (*Ranunculus spp.*) and certainly supports a range of birds and invertebrates.
Foston Fox Covert Heronry	800 m	No citation information available.
Barff Hill Causeway	800 m	A verge, hedgerow and ditch complex running eastwards along a minor road. Species of interest include fool's water-cress (*Apium nodiflorum*) and hemp agrimony (*Eupatorium cannabinum*) and reed sweet-grass dominating much of the ditch.
Scorborough Lane	800 m	Good quality roadside verges back by species-rich hedgerows with a total of 10 woody species recorded.
Beverley Westwood Waxcaps	1 km	Neutral, semi-improved grassland that supports grassland fungi such as Waxcaps that are characteristic of unimproved grasslands with low fertility and relatively rare in the East Riding of Yorkshire. This site supports an assemblage of eight or more species of waxcaps (*Hygrocybe spp.*).
Gravel Pit, North Frodingham	1 km	Site containing a variety of habitats, including small patches of calcareous grassland characterised by mouse-ear hawkweed (*Pilosella officinarum*) and lady's bedstraw (*Galium verum*), common restharrow (*Ononis repens*) also frequent within the sward. Standing water present with a few patches of white water-lily (*Nymphaea alba*) and emergence species dominated by reed sweet-grass and reed canary-grass (*Phalaris arundinacea*).
Beverley Limekilns	1 km	An area of calcareous grassland and scrub considered to be species-rich due to being less heavily stock grazed than the rest of the common land. Species include quaking grass (*Briza media*), dwarf thistle (*Cirsium acaule*),

Designated site	Distance from Hornsea Four Order Limits (at closest point)	Reason for designated status
		pignut (*Conopodium majus*), lady's bedstraw, hoary plantain (*Plantago media*) and common milkwort (*Polygala vulgaris*).
Driffield Road	1 km	Site consists of a species-rich hedgerow with a total of six woody species observed within a 30 m sample.
Copper Hall Wood	1.5 km	This site is a candidate LWS and as such has not been subject to a survey so there is no citation information available.
Leman Road Corner - Moorbeck Road (b)	1.5 km	Good quality established semi-natural verge, dominated by common wayside grasses and herbs, notably, false-oat grass (*Arrhenatherum elatius*), perennial rye-grass (*Lolium perenne*) and Yorkshire fog (*Holcus lanatus*). More notable species include giant bellflower (*Campanula latifolia*) and betony (*Betonica officinalis*) which are present in small numbers.
Leman Wood	1.5 km	Mixed plantation woodland currently used as a pheasant covert. Species include ash, pedunculate oak, beech and sweet chestnut alongside scattered European larch and Scots pine (*Pinus sylvestris*).
Emmotland Soak Drain	1.5 km	Site comprises a species-rich drain at the base of the eastern levee along Frodingham Beck. Species present include water parsnip (*Sium suave*), common water starwort (*Callitriche stagnalis*), branched bur-reed (*Sparganium erectum*) and blue and pink water speedwell (*Veronica anagallis-aquatica* and *Veronica catenate*).
Leman Road Corner - Moorbeck Road (a)	1.5 km	Good quality established semi-natural verge with moderate ecological interest due to the presence of a variety of tree species including veteran pedunculate oak.
Mill Dam Beswick	1.5 km	The small site includes an old mill pond, dam and surrounding broad-leaved woodland. The large pond is open, shallow water with numerous emergent species although aquatic flora are few. Around the pond there is dense wet woodland dominated by a number of old white willow.
Sheepman Lane	1.7 km	Although the site is disturbed in places, it still contains evidence of non-improvement and in general is a remnant of species-rich calcareous grassland with reasonable floristic diversity.
Watton Carr	1.9 km	Watton Carr is a large site with a number of habitats within, the most important being the open water on account of its ornithological interest.

Hornsea Four

Figure 3.6

Statutory and Non Statutory Environmental Designations - (Landfall 1) - Sheet 1 of 5

510000 515000 520000

465000

460000

N

GRID NORTH

BRIDLINGTON

CARNABY CP

BURTON AGNES CP

BARMSTON CP

KELK CP

Bridlington Bay

Barmston

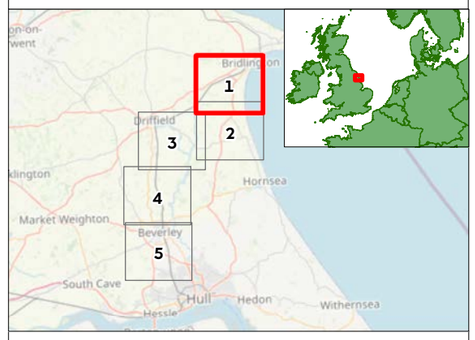
River Hull Headwaters SSSI

Greater Wash SPA

- Order Limits
- Data search study area
- EPH1S survey area

Statutory Designations

- Sites of Special Scientific Interest (SSSI)
- Special Protection Areas (SPA)



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 0.5 1 1.5 Kilometres

0 500 1,000 1,500 2,000 Yards

REV	REMARK	DATE
	First Issue	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Statutory and Non Statutory Environmental Designations
Document no: HOW04RH0021
Created by: AZ
Checked by: CC
Approved by: CS

Date: 28/07/2021 Author: 303273 Name: HOW04RH0021_EnvDesignations

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.7

Statutory and Non Statutory Environmental Designations - (Landfall 2) - Sheet 2 of 5

510000 515000 520000

460000

455000

N

GRID NORTH

Greater Wash SPA

Barmston

Lissett

Gembling Common LWS

River Hull Headwaters SSSI

Foston on the Wolds

KELK CP

ULROME CP

BEEFORD CP

SKIPSEA CP

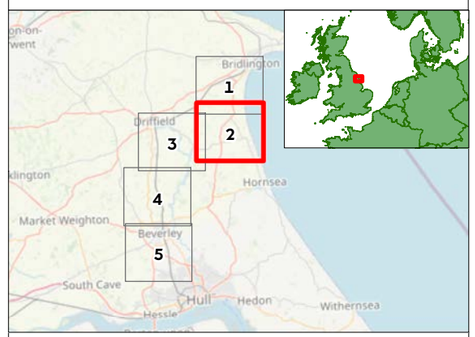
- Order Limits
- Data search study area
- EPH1S survey area

Non Statutory Designations

- Local Wildlife Sites (LWS)

Statutory Designations

- Sites of Special Scientific Interest (SSSI)
- Special Protection Areas (SPA)



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 0.5 1 1.5 Kilometres

0 500 1,000 1,500 2,000 Yards

REV	REMARK	DATE
	First Issue	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Statutory and Non Statutory Environmental Designations
Document no: HOW04RH0021
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

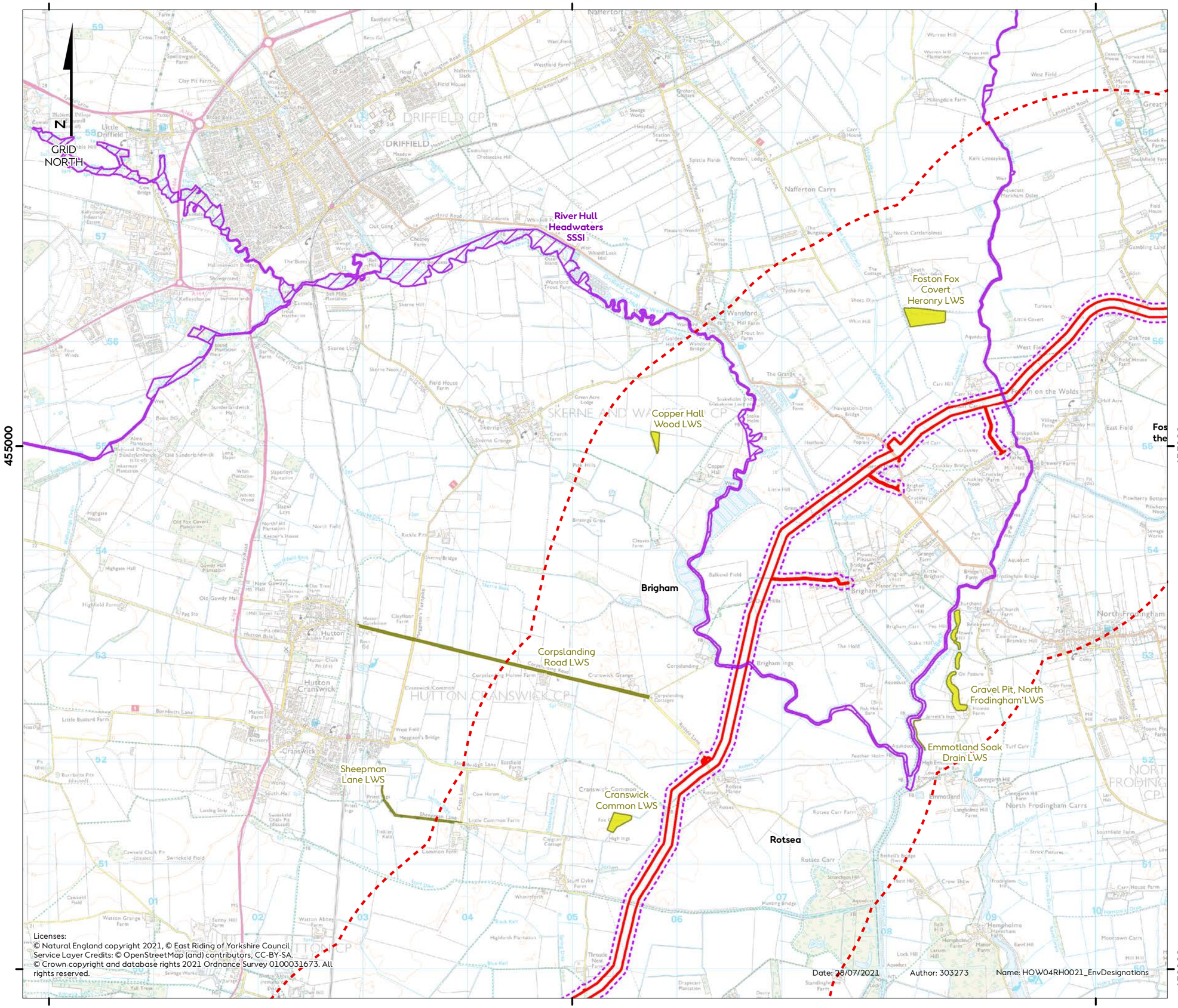
Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0021_EnvDesignations

Hornsea Four

Figure 3.8

Statutory and Non Statutory Environmental Designations - (ECC 1) - Sheet 3 of 5



Order Limits

Data search study area

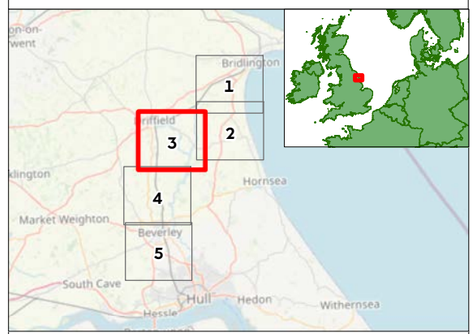
EPH1S survey area

Non Statutory Designations

Local Wildlife Sites (LWS)

Statutory Designations

Sites of Special Scientific Interest (SSSI)



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 0.5 1 1.5 Kilometres

0 500 1,000 1,500 2,000 Yards

REV	REMARK	DATE
	First Issue	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Statutory and Non Statutory Environmental Designations
Document no: HOW04RH0021
Created by: AZ
Checked by: CC
Approved by: CS

Date: 28/07/2021 Author: 303273 Name: HOW04RH0021_EnvDesignations

Hornsea Four

Figure 3.9

Statutory and Non Statutory Environmental Designations - (ECC 2) - Sheet 4 of 5

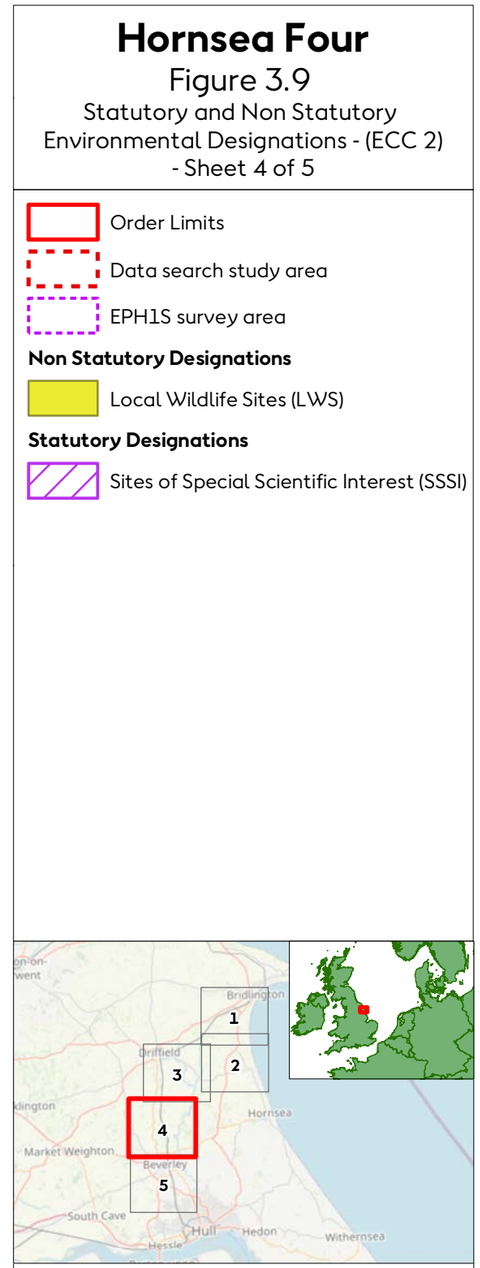
- Order Limits
- Data search study area
- EPH1S survey area

Non Statutory Designations

- Local Wildlife Sites (LWS)

Statutory Designations

- Sites of Special Scientific Interest (SSSI)



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 0.5 1 1.5 Kilometres

0 500 1,000 1,500 2,000 Yards

REV	REMARK	DATE
	First Issue	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Statutory and Non Statutory Environmental Designations
Document no: HOW04RH0021
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0021_EnvDesignations

500000 505000 450000 445000

N GRID NORTH

Mill Dam Beswick LWS
Watton Carr LWS
Barff Hill Causeway LWS
Lockington LWS
Bryan Mills Beck LWS
Bryan Mills Field SSSI
Scorborough Lane LWS
Lake's Wood LWS
Bealey's Beck, Lockington LWS
Scorborough
Leman Road Corner - Moorbeck Road (b) LWS
Bealey's Lane LWS
Old Lane, Leconfield LWS
Leman Road Corner - Moorbeck Road (a) LWS
Leman Wood LWS
Leconfield
Bygot Wood Lane, Leconfield LWS
Driffield Road LWS
Raventhorpe Embankment LWS
Cherry Burton

Hornsea Four

Figure 3.10

Statutory and Non Statutory Environmental Designations - (OnSS) - Sheet 5 of 5

500000

505000

440000

435000

N

GRID NORTH

Raventhorpe Embankment LWS

Burton Bushes SSSI

Burton Bushes Veteran Trees LWS

Bishop Burton

Beverley

Newbald Road, Beverley LWS

Beverley Limekilns LWS

Shorthill Hag LWS

Newbald Road LWS

Beverley Westwood Waxcaps LWS

Woodmansey

Beverley Parks LNR

Moor Lane LWS

Bentley Moor Wood LWS

Risby Park LWS

Birkhill Wood LWS

Jillywood Lane LWS

Fishpond Wood, Risby Estate LWS

Drove Road LWS

Woodhill Path, Cottingham LWS

Mill Beck and Fields LWS

Order Limits

Data search study area

EPH1S survey area

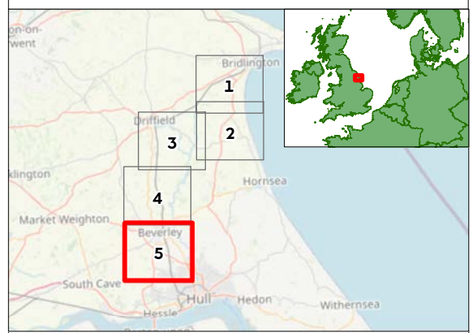
Non Statutory Designations

Local Wildlife Sites (LWS)

Statutory Designations

Sites of Special Scientific Interest (SSSI)

Local Nature Reserves (LNR)



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 0.5 1 1.5 Kilometres

0 500 1,000 1,500 2,000 Yards

REV	REMARK	DATE
	First Issue	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Statutory and Non Statutory Environmental Designations
Document no: HOW04RH0021
Created by: AZ
Checked by: CC
Approved by: CS

Date: 28/07/2021 Author: 303273 Name: HOW04RH0021_EnvDesignations

3.7.2 UK Habitats of Principal Importance

3.7.2.1 The following UKHPI are present within the Hornsea Four Order Limits:

- Coastal and Floodplain Grazing Marsh;
- Maritime Cliff and Slope; and
- Reedbeds.

3.7.2.2 All UKHPI are shown on **Figure 3.11** to **Figure 3.15** These figures also include the habitat data collated from the National Forestry Commission dataset. Key woodland habitat types that are present within the Hornsea Four Order Limits are as follows:

- Assumed Woodland; and
- Broadleaved.

3.7.2.3 In accordance with a request from stakeholders to consider Natural England's SSSI IRZ, **Figure 3.16** shows those IRZs relevant to the designated sites that have been identified, namely the River Hull Headwaters SSSI, Bryan Mills Field SSSI and Burton Bushes SSSI.

3.7.2.4 The IRZs are a tool developed by Natural England in order to assist in identifying potential risks on designated sites. The IRZs define zones around each SSSI which reflect the sensitivities of the features for which it is notified and indicates the types of development proposal which could potentially have adverse impacts (Natural England 2019).

Hornsea Four

Figure 3.11

UK Habitats of Principal Importance

Landfall 1 - (Sheet 1 of 5)

510000 515000 520000

465000 460000

N

GRID NORTH

BRIDLINGTON

BURTON AGNES CP

BARMSTON CP

KELK CP

CARNABY CP

Bridlington Bay

Barmston

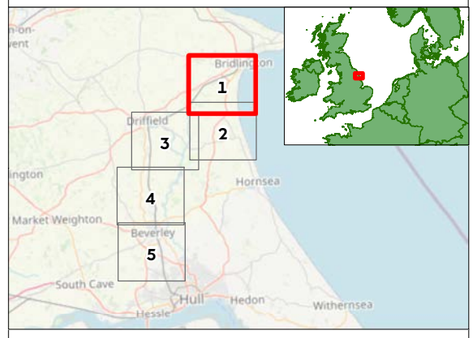
- Order Limits
- Data search study area
- EP1HS survey area

National Forest Inventory

- Assumed Woodland
- Broadleaved
- Conifer
- Felled
- Mixed - predominantly Conifer
- Mixed- predominantly Broadleaved
- Young Trees

Priority Habitat Inventory

- Deciduous woodland
- Maritime cliff and slope



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 1 2 Kilometres

0 1,000 2,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: UK Habitats of Principal Importance

Document no: HOW04RH0023

Created by: AZ

Checked by: CC

Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0023_HPIForestry

Hornsea Four

Figure 3.12

UK Habitats of Principal Importance
Landfall 2 - (Sheet 2 of 5)

510000 515000 520000

460000

455000

N

GRID NORTH

Barmston

Lissett

Foston on the Wolds

Licenses:
© Natural England copyright 2021,
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673. All rights reserved.

Date: 28/07/2021 Author: 303273 Name: HOW04RH0023_HPIForestry

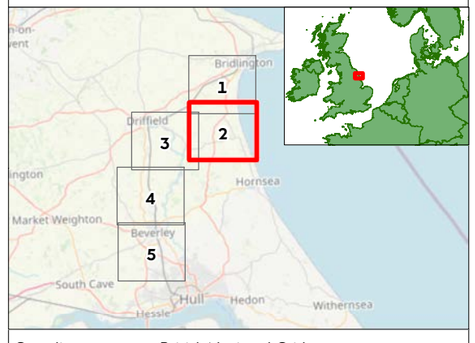
- Order Limits
- Data search study area
- EP1HS survey area

National Forest Inventory

- Assumed Woodland
- Broadleaved
- Conifer
- Felled
- Mixed - predominantly Conifer
- Mixed- predominantly Broadleaved
- Young Trees

Priority Habitat Inventory

- Coastal and floodplain grazing marsh
- Deciduous woodland
- Good quality semi-improved grassland
- Maritime cliff and slope
- No main habitat but additional habitats present
- Traditional orchard



Coordinate system: British National Grid
Scale@A3: 1:35,000

0 1 2 Kilometres

0 1,000 2,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: UK Habitats of Principal Importance
Document no: HOW04RH0023
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.13

UK Habitats of Principal Importance

ECC 1 - (Sheet 3 of 5)

500000 505000 510000

455000

450000

N

GRID NORTH

DRIFFIELD CP

SKERNE AND WANSFORD CP

HUTTON CRANSWICK CP

Brigham

Rotsea

Nafferton Carrs

North Frodingham Carrs

Cranswick Common

Licenses:
© Natural England copyright 2021,
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673. All rights reserved.

Date: 28/07/2021 Author: 303273 Name: HOW04RH0023_HPIForestry

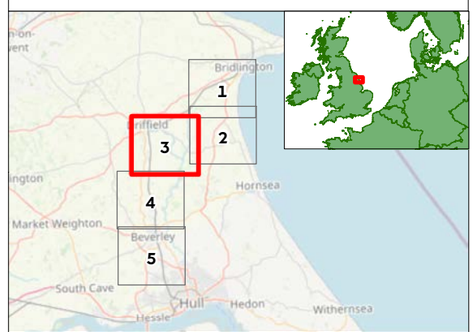
- Order Limits
- Data search study area
- EP1HS survey area

National Forest Inventory

- Assumed Woodland
- Broadleaved
- Conifer
- Felled
- Interpreted Open Area
- Mixed - predominantly Conifer
- Mixed- predominantly Broadleaved
- Young Trees

Priority Habitat Inventory

- Coastal and floodplain grazing marsh
- Deciduous woodland
- Good quality semi-improved grassland
- No main habitat but additional habitats present
- Reedbeds
- Traditional orchard



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 1 2 Kilometres

0 1,000 2,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: UK Habitats of Principal Importance
Document no: HOW04RH0023
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.14

UK Habitats of Principal Importance

ECC 2 - (Sheet 4 of 5)

500000

505000

450000

445000

N

GRID NORTH

Scorborough

Leconfield

Cherry Burton

EAST RIDING OF YORKSHIRE

BESWICK CP

LOCKINGTON CP

LECONFIELD CP

BURTON CP

MOLESCROFT CP

TICKTON CP

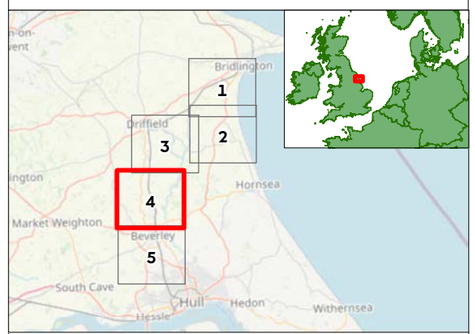
- Order Limits
- Data search study area
- EP1HS survey area

National Forest Inventory

- Assumed Woodland
- Broadleaved
- Conifer
- Felled
- Ground Prepared for Planting
- Interpreted Open Area
- Mixed - predominantly Conifer
- Mixed- predominantly Broadleaved
- Young Trees

Priority Habitat Inventory

- Coastal and floodplain grazing marsh
- Deciduous woodland
- Good quality semi-improved grassland
- Lowland fens
- No main habitat but additional habitats present
- Reedbeds
- Traditional orchard



Coordinate system: British National Grid

Scale@A3: 1:35,000

0 1 2 Kilometres

0 1,000 2,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: UK Habitats of Principal Importance
Document no: HOW04RH0023
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0023_HPIForestry

Hornsea Four

Figure 3.15

UK Habitats of Principal Importance

OnSS - (Sheet 5 of 5)

500000

505000

440000

435000

N

GRID NORTH

Bishop Burton

Beverley

Woodmansey

Walkington

Beverley Parks

Cottingham Parks

Westwood

Figham

Weel Carr

Stone Carr

Morris Carr

Hornsea

Market Weighton

Driffield

Bridlington

Hull

Withernsea

- Order Limits
- Data search study area
- EP1HS survey area

National Forest Inventory

- Assumed Woodland
- Broadleaved
- Conifer
- Ground Prepared for Planting
- Interpreted Open Area
- Mixed - predominantly Conifer
- Mixed- predominantly Broadleaved
- Shrub Land
- Young Trees

Priority Habitat Inventory

- Coastal and floodplain grazing marsh
- Deciduous woodland
- Good quality semi-improved grassland
- No main habitat but additional habitats present
- Traditional orchard

Coordinate system: British National Grid

Scale@A3: 1:35,000

0 1 2 Kilometres

0 1,000 2,000 Yards

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: UK Habitats of Principal Importance
Document no: HOW04RH0023
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0023_HPIForestry

Hornsea Four

Figure 3.16

SSSI Impact Risk Zones (IRZ)

500000

520000

460000

440000

N

GRID NORTH

River Hull Headwaters SSSI

Barmston

Lissett

Foston on the Wolds

Brigham

Rotsea

Bryan Mills Field SSSI

Scorborough

Leconfield

Cherry Burton

Bishop Burton

Beverley

Burton Bushes SSSI

Woodmansey

Beverley Parks LNR

Bridlington Bay

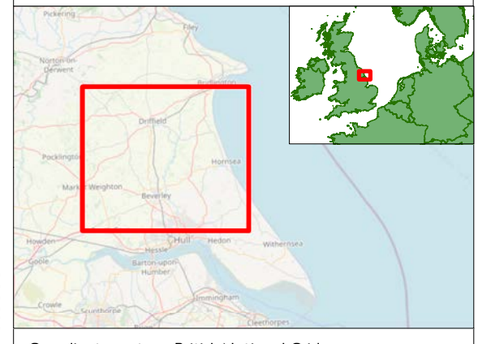
Hornsea

Holderness

Yorkshire Wolds

Market Weighton

- Order Limits
- Data search study area
- Impact Risk Zones
- Sites of Special Scientific Interest (SSSI)
- Local Nature Reserves (LNR)



Coordinate system: British National Grid

Scale@A3: 1:130,000

0 1.5 3 6 Kilometres

0 0.75 1.5 3 Miles

REV	REMARK	DATE
	First Issue for PEIR	11/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: SSSI Impact Risk Zones (IRZ)
Document no: HOW04RH0022
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0022_StatImpactZones

3.7.3 Terrestrial habitats

3.7.3.1 The baseline presented below has been informed by the data gathered during the 2019 and 2021 EP1HS. The EP1HS was undertaken in February and September 2019 and also in June 2021 with 100% survey coverage obtained (as described in **Table 3.5**).

3.7.3.2 The survey methodology and scope was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Agreement was subsequently obtained from Natural England via the Hornsea Four onshore ecology Evidence Plan Technical Panel meeting held on the 1st April 2020 (ON-ECO-1.18).

3.7.3.3 Features of interest noted during the EP1HS are described using target notes, which are referenced using a numbering system. The locations of the habitats described below and the target notes (TN) are shown on **Figure 3.17** to **Figure 3.47** and full details of the habitats present are provided within **Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report & 2021 Addendum** and **Volume A6, Annex 3.2: Extended Phase 1 Target Note Tables & 2021 Addendum**. Cross-reference between crossings, TNs (including associated ditch/ watercourse and hedgerow numbers) has also been provided in the onshore crossing schedule (**Volume A4, Annex 4.2: Onshore Crossing Schedule**).

Woodland

3.7.3.4 There is approximately 6.9 ha of woodland within the EP1HS survey area, consisting of broadleaved semi-natural woodland and broadleaved or coniferous plantation woodland. A total of 36 areas of broadleaved semi-natural woodland, and 14 areas of plantation woodland were recorded. These ranged from large areas of woodland through to small isolated pockets at field margins and along roads.

3.7.3.5 Broadleaved woodland typically consisted a mix of ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus* and oak *Quercus robur* with typical understorey and ground flora species including thistle *Cirsium vulgare*, hawthorn *Crataegus monogyna*, bramble *Rubus fruticosus* and common nettle *Urtica dioica*. Coniferous woodland species typically included Scots pine *Pinus sylvestris*.

3.7.3.6 Plantation woodland typically included sweet chestnut *Castanea sativa*, oak, Scots pine and hazel *Corylus avellana* with understorey and ground flora species consisting mainly of bramble and common nettle.

Scrub

3.7.3.7 Approximately 19 ha of scrub was recorded within the EP1HS survey area during the 2019 survey, covering a total of 108 areas. 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., common nettle, common hogweed *Heraclium sphondylium*, cow parsley *Anthriscus sylvestris* and cleavers *Galium aparine*.

3.7.3.8 Areas of scrub are considered to be of medium importance, in accordance with the criteria set out in **Table 3.10**.

Hedgerows

3.7.3.9 A total of 151 hedgerows were recorded within the EP1HS survey area, totalling approximately 35 km in length of hedgerow. Of the 151 hedgerows recorded during the EP1HS, the majority (81) are species-poor intact hedgerows (J2.1.2). However, 28 are species-poor hedgerows with trees (J2.3.2), 30 are species-poor defunct hedgerows (J2.2.2), 10 are species-rich hedgerows with trees (J2.3.1) and two are species-rich intact hedgerows (J2.1.1.).

3.7.3.10 Species rich hedgerows typically consisted of shrub and tree species including hawthorn, oak, ash, sycamore, beech *Fagus sylvatica*, goat willow *Salix caprea*, hazel, field maple *Acer campestre*, ivy *Hedera helix*, holly *Ilex aquifolium*, with ground flora typically consisting of common nettle, bramble, cow parsley, red-dead nettle *Lamium purpureum*, cleavers, common hogweed, broad leaf dock *Rumex obtusifolius*. Species poor hedgerows were characterised by fewer than five woody species within a 30 m stretch and were typically dominated by hawthorn.

3.7.3.11 Hedgerows are a UKHPI.

Improved grassland

3.7.3.12 Improved grassland was recorded in 52 locations within the Hornsea Four EP1HS survey area, approximating to a total of 35 ha. This habitat was formed of short sward grasses with areas of scrub vegetation typically being used for either grazing or paddocks.

3.7.3.13 Areas of improved grassland are considered to be of medium importance, in accordance with the criteria set out in **Table 3.10**.

Poor semi-improved grassland

3.7.3.14 Poor semi-improved grassland was recorded in 21 locations within the EP1HS survey area, approximating to a total of 14 ha. These areas were comprised of coarse ruderal grass and herb species such as cock's foot *Dactylis glomerata*, broadleaf dock and white clover *Trifolium repens*.

3.7.3.15 Areas of poor semi-improved grassland are considered to be of medium importance, in accordance with the criteria set out in **Table 3.10**.

Standing and running water

3.7.3.16 There are a total of 80 watercourses (i.e. ditches and rivers) within the EP1HS survey area, these included both field margin ditches and running water.

3.7.3.17 Furthermore, a total of 85 ponds were identified to be present within the great crested newt study area.

3.7.3.18 Ponds and rivers are UKHPI.

Arable land

3.7.3.19 The largest habitat within the EP1HS survey area by area is arable land (820 ha). At the time of the February 2019, September 2019 and June 2021 EP1HS survey these ranged from fields that were in arable crop (such as *brassica spp.*), those which were ploughed and those that remained to have a winter cover.

3.7.4 Summary

3.7.4.1 Table 3.9 summarises the key habitats which were recorded within the EP1HS survey area during the February and September 2019 and the June 2021 EP1HS.

Table 3.9: Habitat footprints within the updated EP1HS survey area.

JNCC Habitat Code	Habitat type	Area (ha) within EP1HS survey area	Percentage (%) of habitat type within the total Hornsea Four Order Limits
A1.1.1	Broadleaved woodland – semi-natural	4.24	0.09
A1.1.2	Broadleaved woodland – plantation	2.24	0.03
A1.3.2	Mixed woodland – plantation	0.20	0.00
A2.1	Scrub – dense/continuous	15.41	0.79
B6	Poor semi-improved grassland	35.09	1.18
B4	Improved grassland	13.50	2.83
J1.1	Cultivated/disturbed land – arable	820.69	87.95
J3.6	Building / hardstanding	19.89	1.81
J4	Bare ground	1.36	0.00

JNCC Habitat Code	Habitat type	Total Length (m) within EP1HS survey area	Percentage (%) of habitat type within the total onshore Hornsea Four Order Limits
J2.1.1	Intact hedge – species-rich	556.54	1.17
J2.1.2	Intact hedge – species-poor	18,401.69	30.79
J2.2.1	Defunct hedge – species-rich	5,775.19	12.93
J2.3.1	Hedge with trees – species-rich	2,699.86	3.34
J2.3.2	Hedge with trees – species-poor	7,624.41	18.03
J2.6	Dry ditch	11,733.12	17.6
G1	Standing water	6,932.74	11.92
G2	Running water	2,077.21	3.16

Table 3.10: Definitions of importance of habitats.

Importance	Definition
High	• A viable area of a UKHPI or smaller areas of such habitat which are essential to maintain the viability of a larger whole.
Medium	• Viable areas of habitat identified in a County BAP; and • Semi-natural woodland greater than 0.5 ha which is considered to be in 'good condition'.
Low	• Semi-natural woodland greater than 0.25 ha which is considered to be in 'good' condition or greater than 0.5 ha in unfavourable condition; • Network of inter-connected hedgerows including some species-rich hedgerows; • Individual important hedgerows or other ancient countryside linear features; • Viable areas of habitat identified in a sub-county (District/Borough) BAP; • Sites/features that are scarce within the District/Borough or which appreciably enrich the District/Borough habitat resource (e.g. veteran trees); and • Other features identified as wildlife corridors or migration routes.
Negligible	• Features of value to the immediate area only e.g. within the site.

3.7.5 Protected, Notable and Invasive Species

3.7.5.1 This section provides a summary of the key species recorded within the EP1HS survey area, drawing on the information obtained from the following data sources:

- NEYEDC Biological Records;
- Environment Agency fish data;
- **Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report & 2021 Addendum**;
- **Volume A6, Annex 3.2: Extended Phase 1 Target Note Tables & 2021 Addendum**;
- **Volume A6, Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report**;
- **Volume A6, Annex 3.4: Breeding Bird Survey Report**;
- **Volume A6, Annex 3.5: Great Crested Newt Environmental DNA (eDNA) Survey Report**;

- **Volume A6, Annex 3.6: Watervole Survey Report**;
- **Volume A6, Annex 3.7: Otter Survey Report (confidential)**;
- **Volume A6, Annex 3.8: Bat Static Detector Survey Report Part A**;
- **Volume A6, Annex 3.9: Bat Static Detector Survey Report Part B**;
- **Volume A6, Annex 3.10: Bat Activity Transect Survey Report Part A**;
- **Volume A6, Annex 3.11: Bat Activity Transect Survey Report Part B**;
- **Volume A6, Annex 3.12: Bat Emergence and Re-entry Survey Report Part A**;
- **Volume A6, Annex 3.13: Bat Emergence and Re-entry Survey Report Part B**; and
- **Volume A6, Annex 3.15: Badger Survey Report (confidential)**.

3.7.5.2 The EP1HS data is shown in **Figure 3.17** to **Figure 3.47**.

Badgers

3.7.5.3 Badgers are protected under the Protection of Badgers Act 1992 (Protection of Badgers Act, 1992). 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.

3.7.5.4 No records of badgers were returned from the biological records data search from NEYEDC. A total of 15 badger field signs were recorded within the EP1HS survey area, consisting of two main setts, one disused main sett, three outlier setts plus additional field signs such as latrines, snuffle holes and tracks. Further details of the survey findings are provided in **Volume A6, Annex 3.15: Badger Survey Report (confidential)**.

3.7.5.5 Two of the main setts are located outside the Hornsea Four Order Limits and outside of the 30 m badger disturbance buffer and therefore no further mitigations for these two main setts are proposed. The disused main sett is located on the Hornsea Four Order Limits and will be subject to a further survey effort prior to construction in order to determine whether it remains to be disused. Therefore, at this time there is no proposal to submit a badger mitigation licence with regard to the disused sett.

3.7.5.6 The three outlier setts, recorded during the 2021 survey, are all located within the Hornsea Four Order Limits and therefore will require works to be undertaken under a badger mitigation licence from Natural England. Once the pre-construction surveys have been undertaken to fully understand the use of these areas by badgers, and further information becomes available with regards to the proposed works at these locations, in combination with the potential for micro-siting, a formal badger licence application will be submitted to Natural England.

3.7.5.7 Further details of the survey findings are provided in **Volume A6, Annex 3.15: Badger Survey Report (confidential)** with additional information regarding mitigation measures and procedures pertaining to badger mitigation licences provided within **Volume F2.3: Outline Ecological Management Plan**.

Birds

3.7.5.8 The NEYEDC records returned data of a total of 223 bird species within the bat and bird study area. Of those records, a total of 11 were recorded within the EP1HS survey area. Of the 11 records within the EP1HS survey area, none are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), four are listed on the 'red list' of threatened species in the Birds of Conservation Concern (BoCC) 4 analysis (Eaton et al 2015), and one is listed on the BoCC4 'amber list' of threatened species.

3.7.5.9 One BoCC4 'red list' bird was observed during the EP1HS, a skylark *Alauda arvensis*, in song flight (**Figure 3.19**).

3.7.5.10 All hedgerows, isolated trees, grassland, scrub and woodland habitats identified during the updated EP1HS provide suitable nesting habitat for protected, notable and common species birds.

Over-wintering birds

3.7.5.11 The over-wintering bird survey consisted of a series of counts at 35 VP locations within the landfall and along the onshore ECC plus three transect walkover surveys within the habitats surrounding the OnSS. The VPs and walkover survey were designed to include habitats characteristic of the area and its associated function delivery for over-wintering birds. Due to a lack of landowner access, not all VPs were subject to a full survey effort, however it should be noted that an indication of the usage of these habitats by over-wintering birds was still possible. Full details on the survey schedule and completion rates can be found in **Volume A6, Annex 3.3: Onshore Ornithology – Wintering and Migratory Birds Survey Report**.

3.7.5.12 The survey methodology and scope was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1st April 2020 (ON-ECO-1.13).

3.7.5.13 Results from the over-wintering survey show assemblages of birds that are expected within the habitats found in the Hornsea Four over-wintering bird survey area. Taking into consideration the wider area of Holderness and the River Hull valley, these included a number of farmland passerines, ducks, geese, waders and migratory thrushes. Bird assemblages recorded included a number of BoCC4 'red list' and BoCC4 'amber list' species, with some noted as being of regional value, with the caveat that such wintering bird assemblages are reflective and characteristic of the wider area.

3.7.5.14 The presence of a flock of 66 Corn bunting *Emberiza calandra* is of some note, given the decline of the species within the UK. However, it should be noted that Holderness is one of the strongholds of the species in the UK (Balmer et al 2013). Recordings of numerous numbers of Fieldfare *Turdus pilaris* and Redwing *Turdus iliacus* throughout the survey period

is to be expected during the winter, with the arrival of large wintering flocks of these species and thrushes from Scandinavia.

3.7.5.15 The presence of Lapwing *Vanellus vanellus,* a BoCC4 (Eaton et al 2015) 'red list' species, is to be expected as this species will utilise arable fields during the autumn and winter. Given the distance (approximately 9 km at its closest point) from the Hornsea Four over-wintering bird survey area to the Humber Estuary SPA it is not considered that the occurrence of this species has significant linkage to the populations found within the SPA.

3.7.5.16 In addition to the above, the over-wintering bird survey noted the presence of a number of species that are specifically protected under Schedule 1 of the Wildlife and Countryside Act, 1981 (see **Section 3.3.2**). **Table 3.11** lists the Schedule 1 species birds that have been recorded during the over-wintering bird survey effort.

Table 3.11: Schedule 1 (WCA, 1981) species recorded during the 2018/2019 over-wintering bird survey.

Species	Breeding presence
Red Kite *Milvus milvus*	Potential breeder (possible but not known to breed locally to the onshore ECC/OnSS search area)
Green Sandpiper *Tringa ochropus*	Over-wintering / passage only
Barn Owl *Tyto alba*	Potential breeder (likely but over 500 m from the onshore ECC and not within the OnSS search area)
Kingfisher *Alcedo atthis*	Potential breeder (likely but not necessarily within the onshore ECC/OnSS search area)
Merlin *Falco columbarius*	Potential breeder (possible but unlikely)
Peregrine Falcon *Falco peregrinus*	Potential breeder (very likely with active pair in the OnSS search area)
Firecrest *Regulus ignicapilla*	Potential breeder (extremely unlikely)
Fieldfare *Turdus pilaris*	Over-wintering only
Redwing *Turdus iliacus*	Over-wintering only
Brambling *Fringilla montifringilla*	Over-wintering only

Breeding birds

3.7.5.17 The breeding bird survey was designed to follow the same methodology and approach as the over-wintering bird survey; however, consideration was given to potential access issues and as such, a number of VPs were moved to within adjacent areas that were fully accessible Public Rights of Way (PRoW). This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8).

3.7.5.18 Further details with regard to full survey results and coverage can be found in **Volume A6, Annex 3.4: Breeding Bird Survey Report.**

3.7.5.19 Results from the breeding bird survey consisted of assemblages generally characteristic of the area and habitats present. These assemblages included a number of farmland

passerines, many of which are included on the red or amber BoCC4 lists (Eaton et al., 2015), as well as a number of ducks, geese and waders.

3.7.5.20 Within the red listed species, Linnet *Linaria cannabina*, Skylark and Yellowhammer *Emberiza citronella* were the most abundant species. The abundance of Linnet was in part due to large flocks still being encountered. Particularly towards the end of the survey programme and towards the end of the breeding period when it is more likely that family flocks were amalgamating and foraging together. Skylark were present throughout the Hornsea Four EP1HS survey area, with most survey records consisting of singing birds on territory above open farmland in good densities. Yellowhammer, more typically, were associated with hedgerows, adjacent to arable farmland and again were recorded throughout the Hornsea Four EP1HS survey area.

3.7.5.21 Yellow Wagtail *Motacilla flava*, Corn Bunting *Emberiza calandra*, and Tree Sparrow *Passer montanus* have shown significant declines nationally (Balmer et al, 2013). A total of 84 Yellow Wagtail individuals were present in over half of all VPs. Tree Sparrows, now absent from some southern counties completely, were present sporadically throughout the Hornsea Four EP1HS survey area. Corn Bunting were largely more confined to sections of the onshore ECC.

3.7.5.22 Woodland areas were shown to support more common species, predominantly of either amber or green BoCC4 status. This is with the exception of Marsh Tit *Poecile palustris* which is of red status and was encountered at the southern and north-east end sections of the onshore ECC. The most abundant woodland species, other than the ubiquitous Woodpigeon *Columba palumbus*, were Goldfinch *Carduelis carduelis*, Chaffinch *Fringilla coelebs* and Blackbird *Turdus merula*, with a good assemblage of other common species also present.

3.7.5.23 In addition to the above, the breeding bird survey noted the presence of a number of species that are specifically protected under Schedule 1 of the Wildlife and Countryside Act, 1981 (see **Section 3.3.2**). **Table 3.12** lists the Schedule 1 species birds that have been recorded during the breeding bird survey effort.

Table 3.12: Schedule 1 (WCA, 1981) species recorded during the 2019 breeding bird survey.

Species	Breeding status and evidence
Barn Owl *Tyto alba*	Confirmed breeding (adult carrying food to nest site).
Peregrine Falcon *Falco peregrinus*	Probable breeder (permanent territory presumed in suitable habitat).
Hobby *Falco subbeteo*	Non breeding (single observation of 1st year male flying over).
Marsh Harrier *Circus aeruginosus*	Non breeding (single observations of an adult male individual flying over).
Greenshank *Tringa nebularia*	Non breeding (single observation of an individual flying, suspected to be on migration to Northern breeding grounds).

Bats

3.7.5.24 A total of 104 records of bats within the bat and bird study area was returned from NEYEDC. Of those records, one result was recorded within the Hornsea Four EP1HS survey area. Records of bats returned from NEYEDC were spread across five species of bats, with common pipistrelle *Pipistrellus pipistrellus* being the most frequently encountered.

Roosting bats

3.7.5.25 All features (i.e. trees, buildings, structures) noted during the updated EP1HS were assessed in accordance with Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins 2016), from ground level and using binoculars, for their suitability to support roosting bats. In total, 74 features were assessed for their suitability to support roosting bats:

- Negligible – 23;
- Low – 24;
- Moderate – 25; and
- High – three.

3.7.5.26 Full details of the roost assessments are provided in **Volume A6, Annex 3.1: Extended Phase 1 Habitat Survey Report** and **Volume A6, Annex 3.2: Extended Phase 1 Target Note Tables**. Emergence/re-entry surveys were undertaken between June and September 2019 (inclusive) and results are provided in full in **Volume A6, Annex 3.12 Bat Emergence and Re-entry Survey Report Part A** and **Volume A6, Annex 3.13: Bat Emergence and Re-entry Survey Part B**.

3.7.5.27 In accordance with BCT guidance (Collins, 2016), all features assessed as providing low suitability for roosting bats were trees and therefore were not subject to the 2019 survey effort. However appropriate mitigation has been considered and outlined in **Volume F2, Chapter 3: Outline Ecological Management Plan**.

3.7.5.28 Each feature (trees and one building) assessed as providing moderate suitability was subject to two separate survey visits and each feature (i.e. tree) assessed as providing high suitability was subject to three separate survey visits. Each survey was undertaken between June and September 2019, with at least two weeks between each visit.

3.7.5.29 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Subsequent agreement from Natural England was obtained during the meeting held on the 1st April 2020 (ON-ECO-1.16).

3.7.5.30 No confirmed bat roosts were recorded during the 2019 survey effort. However, a total of two features (trees) had a potential bat emergence during one of the survey visits. No bat emergence or activity was recorded at either feature during the additional survey visit.

3.7.5.31 Although a full suite of bat emergence/re-entry surveys were undertaken, it should be noted that these surveys were undertaken between June and September 2019 (inclusive) and therefore were not undertaken during the optimal survey window for transitional and/or hibernating bat roosts. The BCT guidance states that transitional and/or hibernating bat roost surveys should be undertaken in March and October. However, the conclusions drawn at this time have been informed from the survey results obtained to date, i.e. no bat roosts have been identified (ON-ECO-1.16).

3.7.5.32 All suitable trees and/or features identified within, and up to a 50 m buffer of the Hornsea Four Order Limits will be subject to a further pre-construction survey effort and will include further surveys to ascertain the presence or likely absence of transitional/hibernating/roosting bats. These will be undertaken during the appropriate part of the active bat season, as outlined in **Volume F2, Chapter 3: Outline Ecological Management Plan**.

Commuting and foraging bats

3.7.5.33 In addition to trees and structures, all linear features (e.g. watercourses, hedgerows) were assessed in terms of their suitability to support commuting or foraging bats, in accordance with BCT guidelines (Collins 2016). In total, 98 features were assessed for their suitability to support commuting or foraging bats:

- Negligible – 13;
- Low – 41;
- Moderate – 43; and
- High – one.

3.7.5.34 This assessment was based on the use of professional judgement and the habitat type present, as well as the habitat's connectivity to the surrounding habitat the habitat feature was:

- 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.

3.7.5.35 This approach was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Agreement was subsequently obtained from Natural England via the Hornsea Four onshore ecology Evidence Plan Technical Panel meeting held on the 1st April 2020 (ON-ECO-1.18).

3.7.5.36 A total of 10 activity transects were designed to incorporate the features identified as providing moderate or high suitability for commuting and foraging bats. In line with BCT

guidance (Collins 2016), all features assessed as providing low suitability for commuting and foraging bats were not subject to the 2019 survey effort. However appropriate mitigation has been considered and is outlined in **Volume F2, Chapter 3: Outline Ecological Management Plan**.

3.7.5.37 The bat activity transect survey was undertaken concurrently with the Hornsea Four bat static detector survey, with a maximum of 20 static detectors deployed throughout the Hornsea Four bat activity transect survey area. Full results for both surveys are presented in **Volume A6, Annex 3.8: Bat Static Detector Survey Report Part A**, **Volume A6, Annex 3.9: Bat Static Detector Survey Report Part B**, **Volume A6, Annex 3.10: Bat Activity Transect Survey Report Part A** and **Volume A6, Annex 3.11: Bat Activity Transect Survey Report Part B**.

3.7.5.38 Bats were recorded utilising features within all transect locations throughout the survey period. A total of six different species of bats were recorded with varying frequency, the most frequently observed being Common pipistrelle. Nathusias' pipistrelle *Pipistrellus nathusii* and Noctule *Nyctalus noctula* were recorded within five of the ten transects and Soprano pipistrelle *Pipistrellus pygmaeus* was recorded within four of the ten transects. Recorded with less frequency were *Myotis spp.,* (i.e. Daubenton's *Myotis daubentonii*) and Brown long eared *Plecotus auritus*.

3.7.5.39 All bats are European Protected Species (EPS), furthermore Soprano pipistrelle, noctule and brown long eared bats are noted as Species of Principal Importance (NERC 2006), therefore all bat species are of high importance.

Water voles

3.7.5.40 A total of 126 records of water vole within the data search study area were returned from NEYEDC. Of those records, a total of 17 results were recorded within Hornsea Four EP1HS survey area.

3.7.5.41 All watercourses were identified during the updated EP1HS and only dry watercourses were scoped out of the water vole presence/absence survey. This methodology was agreed with stakeholders (i.e. Natural England, EA, YWT and ERYC) during the Evidence Plan Technical Panel Meeting held on the 8th April 2019 (**Section 3.4**) (ON-ECO-1.8).

3.7.5.42 Each watercourse present within the EP1HS was visited twice, one within the first half of the water vole breeding season (April to June) and one within the second half of the breeding season (July to September). Full survey results and methodology is provided within **Volume A6, Annex 3.6: Watervole Survey Report**.

3.7.5.43 Water vole field signs, consisting of a burrow, latrine, pathway and feeding remains were recorded at six watercourses within the Hornsea Four EP1HS survey area. A population density assessment was undertaken, and results indicate a low population of water vole within those six watercourses.

3.7.5.44 Water voles are EPS and therefore are of high importance.

Otters

3.7.5.45 All 44 records of otters returned from NEYEDC were situated outside of the Hornsea Four EP1HS survey area, but within the wider data search study area. The records returned from NEYEDC are noted to be within watercourses that flow through the Hornsea Four EP1HS survey area.

3.7.5.46 A total of 14 watercourses were noted during the updated EP1HS as potentially providing suitable habitat for otters within the Hornsea Four EP1HS survey area. The survey methodology and scope was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1st April 2020 (ON-ECO-1.12).

3.7.5.47 No signs of otter activity were recorded during the EP1HS. The Hornsea Four otter survey was undertaken concurrently with the water vole survey and consisted of two separate visits to each watercourse. Full survey results are provided in **Volume A6, Annex 3.7: Otter Survey Report (confidential)**.

3.7.5.48 No evidence of otter was recorded during the 2019 otter survey, anecdotal evidence of historic otter presence was communicated to field surveyors by two landowners. It should be noted that given the mobility of otters, in combination with the presence of optimal habitat for this species being present, prior to works commencing, a pre-construction survey (within the optimal survey window) will be undertaken to confirm that the species has remained absent, i.e. no changes to the findings of the 2019 survey. This will be undertaken by a suitably qualified ecologist. Further details are provided in **Volume F2, Chapter 3: Outline Ecological Management Plan**. This approach was agreed with Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1st April 2020 (ON-ECO-1.12).

3.7.5.49 Otters are EPS and therefore are of high importance.

Great crested newts

3.7.5.50 A total of 18 records of great crested newts were returned from NEYEDC, all of which were outside of the Hornsea Four EP1HS survey area but within the Hornsea Four great crested newt study area.

3.7.5.51 Ordnance Survey (OS) mapping was reviewed and a total of 62 ponds were identified to be within, and up to 250 m from the onshore Order Limits. These 62 ponds formed the basis of the GCN eDNA survey, that was undertaken in April and June 2019. The survey methodology and scope was agreed with relevant stakeholders (i.e. Natural England, EA, YWT and ERYC) as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on

the 8th April 2019 (ON-ECO-1.8). Subsequent agreement was also obtained from Natural England at the onshore Ecology Evidence Plan Technical Panel meeting held on the 1st April 2020 (ON-ECO-1.15).

3.7.5.52 Access was granted to a total of 55 ponds (out of the 62 ponds identified) in April and June 2019. Of those ponds, a total of 29 were sampled for eDNA, 24 ponds were dry or no longer present, and two ponds were inaccessible due to electric fencing and locked gates, however these were noted as being large fishing ponds with high concentrations of geese, swans and ducks present within the surrounding grassland. Consequently, these two ponds were assessed as being unsuitable for great crested newts and have been scoped out of any further consideration and/or survey.

3.7.5.53 The results of the eDNA survey completed showed that one pond returned a positive result for the presence of great crested newt DNA and one pond returned an inconclusive result. The remaining 27 ponds returned a negative result.

3.7.5.54 Ongoing consultation with landowners has been undertaken by the Applicant's land agents since the 2019 survey and consequently access to six of the seven previously unsurveyed ponds was granted in June 2021. An additional eDNA survey effort was undertaken of those six previously unsurveyed ponds, all with a negative eDNA result. One pond remains to be surveyed following the 2019 and 2021 survey effort. This pond is expected to be surveyed as part of the pre-construction survey efforts as set out in **Volume F2, Chapter 3: Outline Ecological Management Plan**. This approach has been agreed with Natural England (ON-ECO-1.24).

3.7.5.55 It should be noted that no known ponds are predicted to be lost during the construction of Hornsea Four. The pond (Pond_A32) with confirmed great crested newt presence is an ornamental pond in the grounds of a bottling factory situated approximately 200 m from the onshore ECC. An appropriate and robust mitigation strategy with regard to great crested newts is outlined in **Volume F2, Chapter 3: Outline Ecological Management Plan**.

3.7.5.56 All of the ponds located within 250 m of the Hornsea Four Order Limits that have not been surveyed or have been surveyed more than two years prior to the commencement of construction, will be re-surveyed prior to the commencement of construction in order to determine the presence or likely absence of GCN. This will likely be done in two stages as follows:

- eDNA re-survey of all ponds within 250 m of the Hornsea Four Order Limits, to determine any changes in GCN distribution since the 2019 surveys; and
- A full presence/absence survey on all/any ponds with confirmed GCN presence to accurately record population sizes in order to update the draft GCN licence that has been submitted to Natural England prior to submitting the DCO application.

3.7.5.57 Great crested newts are EPS and therefore are considered to be of high importance.

Reptiles

3.7.5.58 During the updated EP1HS, all habitats suitable for reptiles were noted. This included habitat mosaics offering hibernation, basking and foraging opportunities as well as discrete locations of rank grassland and scrub.

3.7.5.59 One reptile record was returned from NEYEDC, a grass snake *Natrix natrix* that was recorded outside the Hornsea Four EP1HS survey area but within the data search study area. Additionally, no substantial areas of habitat suitable for reptiles was recorded during the updated EP1HS. Therefore, in contrast to the Scoping Report (Orsted 2018), no reptile surveys have been undertaken. This was agreed with Natural England, YWT, ERYC and the Royal Society for the Protection of Birds (RSPB) via an evidence plan meeting on 8th April 2019 (ON-ECO-1.8).

Fish

3.7.5.60 Records from the Environment Agency between 2004 and 2018 (Environment Agency, 2020) have recorded species such as perch *Perca fluviatilis*, pike *Esox Lucius*, roach *Rutilus rutilus*, lamprey *Petromyzontidae*, 3-spined stickleback *Gasterosteus aculeatus*, silver bream *Abramis bjoerkna*, stone loach *Barbatula barbatula*, European eel *Anguilla Anguilla* and bullhead *Cottus gobio* within the Hull and Humber catchment. Of these species none of these have been recorded in waterbodies that are within the Hornsea Four Order Limits.

3.7.5.61 As a result, no baseline data has been collected to identify the presence/likely absence of fish species in watercourses within the Hornsea Four Order Limits, as agreed with Natural England, YWT, ERYC and the EA as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 8th April 2019 (ON-ECO-1.8). Therefore, no impact assessment has been undertaken, as agreed with Natural England, the EA and YWT at the meeting held on the 13th November 2019 (ON-ECO-3.9). Further information is provided in **Table 3.13**.

3.7.5.62 The current baseline description presented in **Section 3.7.1** - **Section 3.7.5** provides an accurate reflection of the current state of the existing environment. The earliest possible date for the start of construction for the onshore elements of Hornsea Four is 2024 with an expected operational life of 35 years, and therefore there exists the potential for the baseline to evolve between the time of assessment and point of impact. Outside of short-term or seasonal fluctuations, changes to the baseline in relation to ecology and nature conservation usually occur over an extended period of time (considered in **Section 3.7.6**). Based on current information regarding reasonably foreseeable events over the next four years, the baseline environment is not anticipated to have fundamentally changed from its current state at the point in time when impacts occur).

3.7.6 Evolution of the Baseline

3.7.6.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require that "an outline of the likely evolution thereof without implementation of the development

as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge" is included within the ES (EIA Regulations, Schedule 4, Paragraph 3). From the point of assessment, over the course of the development and operational lifetime of the Hornsea Four (operational lifetime anticipated to be 35 years), long-term trends mean that the condition of the baseline environment is expected to evolve. This section provides a qualitative description of the evolution of the baseline environment, on the assumption that Hornsea Four is not constructed, using available information and specialist technical knowledge of ecology and nature conservation.

3.7.6.2 The ecological baseline described in the preceding sections provides a summary of the habitats and species present within a 2 km buffer (5 km for bird and bat species) of the Hornsea Four Order Limits, inclusive. In broad terms, the Hornsea Four Order Limits 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 poor semi-improved grassland, with species in other areas relying strongly on ecological corridors such as watercourses and hedgerows for connectivity across arable farmland.

3.7.6.3 The overall trend in the UK is for 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. Indicators of ecosystems services provision (pollinators) have also remained static over the short term. Perhaps most relevant to the onshore Hornsea Four Order Limits, is that species associated with farmland have declined over the short and long term, with farmland birds and butterflies both in decline. Where mammal (bat) numbers increased from 1999-2015 the increase has levelled out from the period 2010-2015 (Defra 2017).

3.7.6.4 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. These species will continue to be protected under the forthcoming EU Withdrawal Bill. 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 is 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 Hornsea Four Order Limits may continue. Climate change has had a relatively small impact on the UK's biodiversity to date, however impacts to species ranges, population sizes and the timing of biological events (such as hibernation, flowering plants etc.) are expected to become more significant over time, with further data required to inform those impacts (Defra 2011). Consequently, it is assumed that the ecological baseline within Hornsea Four Order Limits will continue to change over time as measures to try and manage the decline in protected species and habitats continue.

3.7.7 Data Limitations

3.7.7.1 The following data limitations have been summarised from the technical annexes (see **Paragraph 3.1.1.3**) supporting this Chapter. These limitations are not considered to be major constraints or to have adversely affected the results of the onshore ecology survey effort and the ensuing EcIA, however they are presented here for completeness. Furthermore, pre-construction surveys have been committed to for all features subject to the 2019 ecological survey effort, where relevant, and outlined in full in **Volume F2, Chapter 3: Outline Ecological Management Plan**.

3.7.7.2 Some habitats could not be fully accessed during the updated EP1HS (as detailed in Volume A6, **Annex 3.1: Extended Phase 1 Habitat Survey Report & 2021 Addendum** and **Volume A6, Annex 3.2: Extended Phase 1 Target Note Tables& 2021 Addendum**, due to physical barriers preventing entry, for example dense scrub. However, generally these areas were small, discrete locations (such as dense bramble covering ditches) and were encountered infrequently. In the few locations where they were encountered, they were recorded as potentially providing field signs which could not be picked up during the field survey (e.g. the noting of habitats suitable for reptile species as well as ensuring that all suitable watercourses for water vole and/or otter were scoped in for the subsequent water vole/otter presence/absence surveys).

3.7.7.3 The updated EP1HS was undertaken in February and September 2019 and June 2021. The majority of habitats encountered during the updated EP1HS was consistent with those expected of agricultural landscapes and colonised by identifiable species (i.e. scrub and hedgerows dominated by bramble and hawthorn). For areas of habitat such as 'poor semi-improved grassland' sufficient evidence of early flowering key indicator species (i.e. herbaceous species and some grasses) was found enabling the successful identification of habitat communities. It was therefore considered by the terrestrial ecology survey team that the survey was robust and suitable to characterise the site for the purposes of an EcIA. This was also agreed with Natural England at the onshore Ecology Technical Panel Meeting held on the 1st April 2020 (ON-ECO-1.18).

3.7.7.4 Several watercourses were largely inaccessible during the water vole/otter surveys, due to the presence of barriers limiting access/egress options (such as dense vegetation, steep banks or deep water). However, these watercourses were surveyed from the bank top with the use of binoculars. Furthermore, these watercourses consisted of larger rivers and/or IDB main drains and Hornsea Four has committed to crossing such watercourses via HDD (or other trenchless techniques), as outlined in Co1 (**Table 3.14**).

3.7.7.5 A number of data limitations are presented with the three bat related survey reports, consisting of technical malfunctions to survey equipment (i.e. static detectors), disrupted access to activity transect areas due to a lack of landowner access agreements and adverse weather conditions. These limitations were discussed and agreed with Natural England as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on

the 1st April 2020 (ON-ECO-1.17), and are addressed fully within the following bat survey reports:

- **Volume A6, Annex 3.8: Bat Static Detector Survey Report Part A**;
- **Volume A6, Annex 3.9: Bat Static Detector Survey Report Part B**;
- **Volume A6, Annex 3.10: Bat Activity Transect Survey Report Part A**;
- **Volume A6, Annex 3.11: Bat Activity Transect Survey Report Part B**;
- **Volume A6, Annex 3.12: Bat Emergence and Re-entry Survey Report Part A**; and
- **Volume A6, Annex 3.13: Bat Emergence and Re-entry Survey Report Part B**.

Hornsea Four

Figure 3.17

Updated EP1HS - Sheet 1 of 31

516000 516500 517000

462000 461500 461000

N

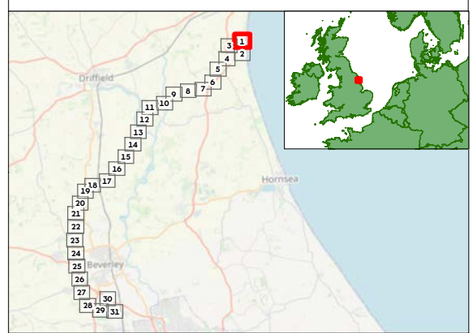
GRID NORTH

TN001 TN002 TN003 TN004 TN005 TN006 TN007 TN008 TN397 Pond_A01

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

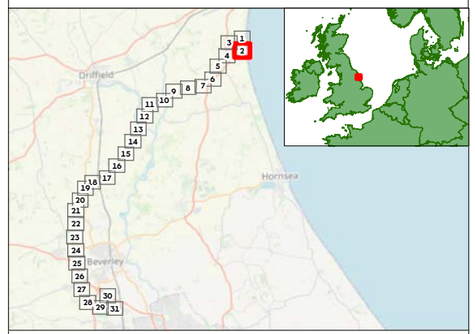
Figure 3.18

Updated EP1HS - Sheet 2 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.19

Updated EP1HS - Sheet 3 of 31

515000 515500 516000

461500 461000 460500

N

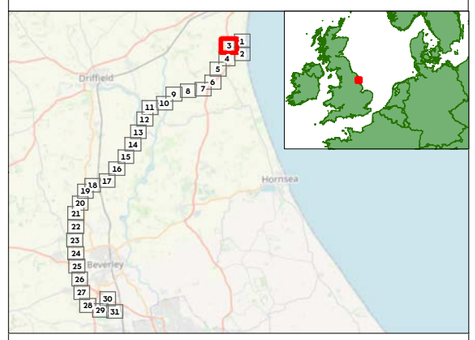
GRID NORTH

TN006 TN438 TN008 TN009 TN010

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

514500 515000 515500

460000 459500 459000

N
GRID NORTH

TN011
TN012
TN013
TN014
TN015
TN016
TN413

Pond_A02
Pond_A03
Pond_A04
Pond_A05

Barmston

Licenses:
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673. All rights reserved.

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

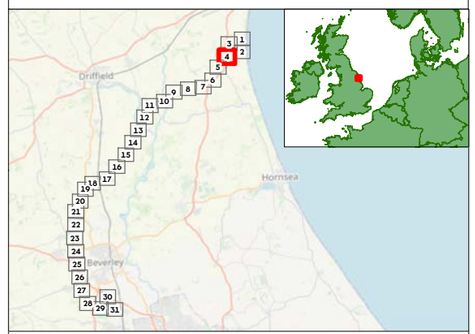
Figure 3.20

Updated EP1HS - Sheet 4 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Dry Ditch
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid
Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV
Ørsted

513500 514000 514500 515000

459000

458500

458000

N

GRID NORTH

Pond_A05

TN015

TN016

TN424

TN017

TN405

TN018

TN019

TN020

TN021

TN022

Licenses:
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

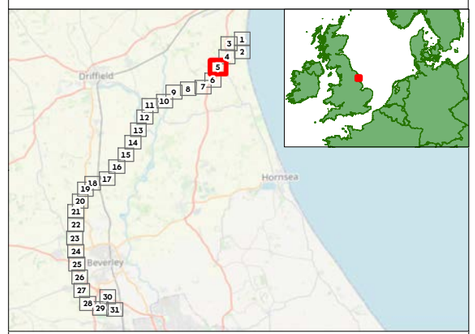
Figure 3.21

Updated EP1HS - Sheet 5 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Semi-improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

513000 513500 514000 514500

458000

457500

457000

N

GRID NORTH

TN023

TN024

TN025

Licenses:
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

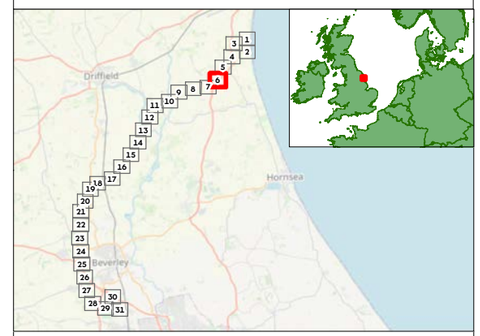
Figure 3.22

Updated EP1HS - Sheet 6 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Native species-rich
- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

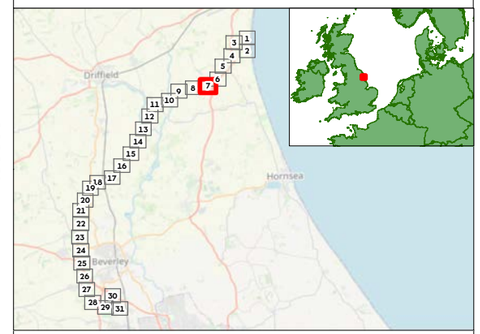
Figure 3.23

Updated EP1HS - Sheet 7 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.24

Updated EP1HS - Sheet 8 of 31

511000 511500 512000

457000 456500 456000

N

GRID NORTH

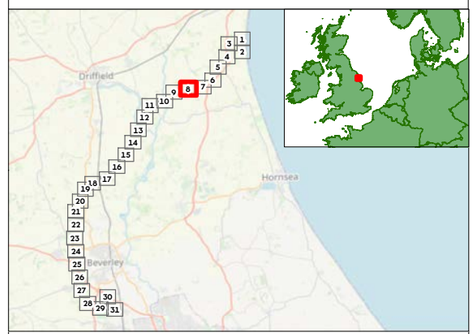
Pond_A08 Pond_A09 Pond_A10 Pond_A11 Pond_A12 Pond_A13 Pond_A14 Pond_A15 Pond_A16 Pond_A17 Pond_A18 Pond_A06 Pond_A07

TN029 TN030 TN031 TN032 TN033 TN034 TN035 TN036 TN037 TN039 TN040 TN041 TN042 TN043 TN044 TN046 TN047 TN048 TN049 TN050 TN051 TN052 TN383 TN412 TN414 TN415

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Hedge and Trees - species-poor
- Dry Ditch
- Boundary Removed
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Semi-improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.25

Updated EP1HS - Sheet 9 of 31

509500 510000 510500

456500 456000

N

GRID NORTH

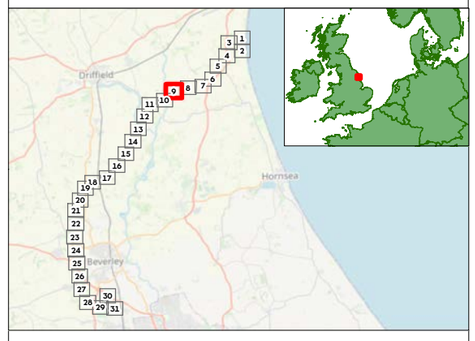
TN053 TN054 TN055 TN056 TN057 TN058 TN059 TN060 TN061 TN062 TN063 TN064 TN065 TN383

Pond_A19 Pond_A20

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Species-poor
- Dry Ditch
- Boundary Removed
- Semi-natural Broadleaved Woodland
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

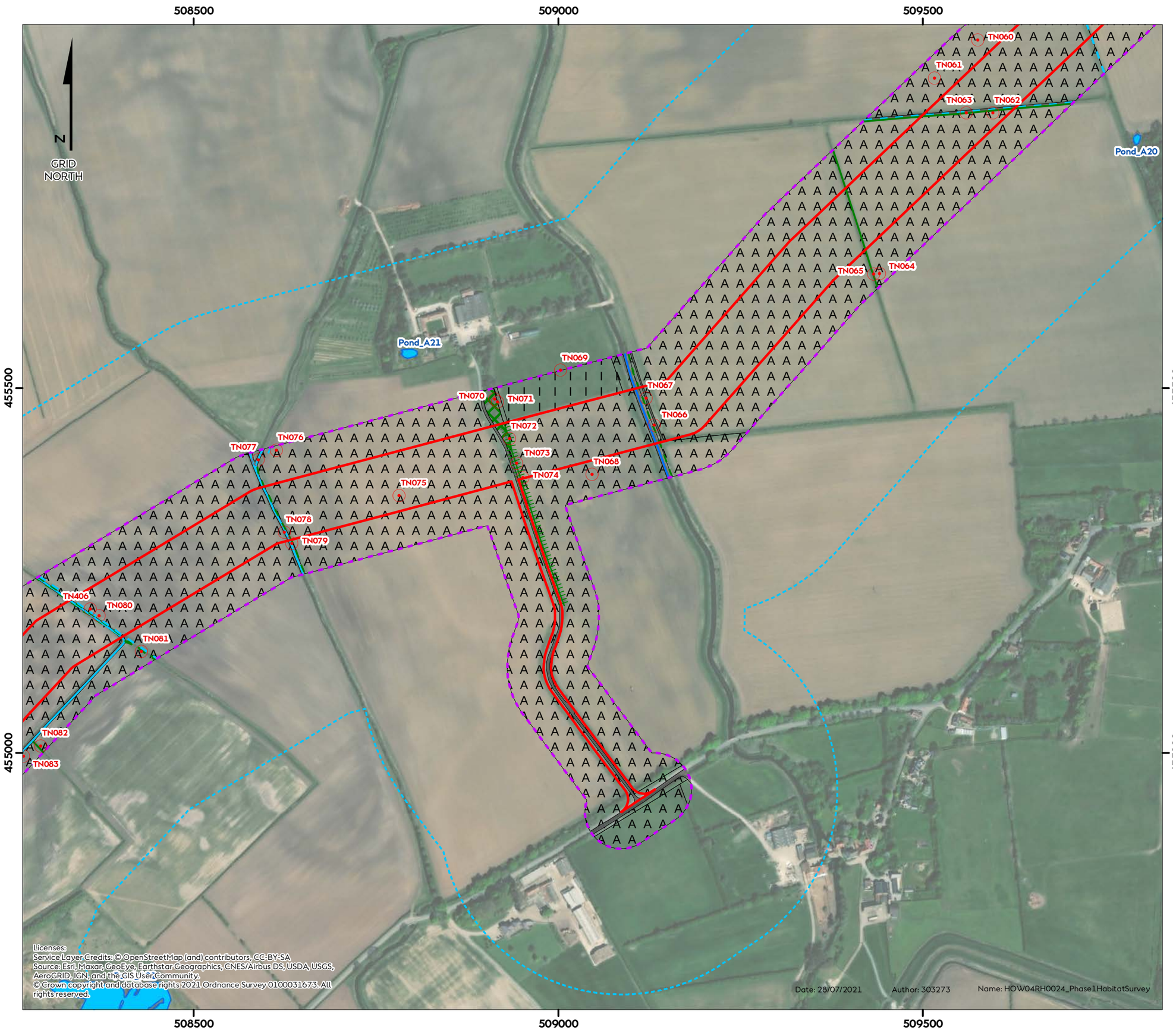
Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.26

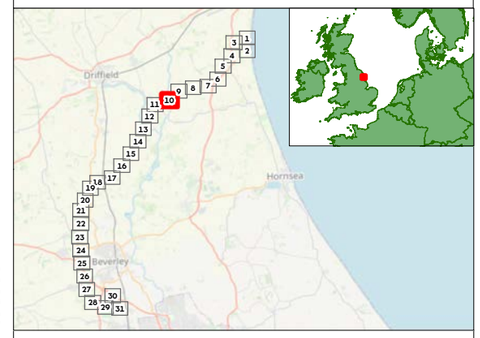
Updated EP1HS - Sheet 10 of 31



- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.27

Updated EP1HS - Sheet 11 of 31

507000 507500 508000

455500 455000 454500

N

GRID NORTH

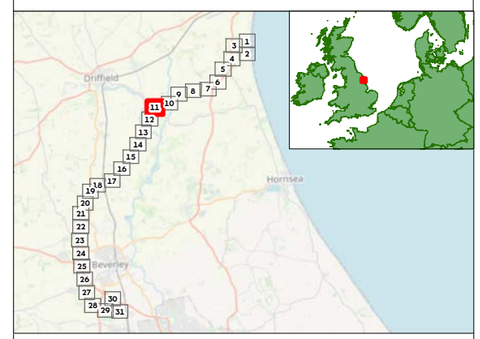
TN406 TN080 TN082 TN083 TN084 TN085 TN086 TN087 TN088 TN089 TN090 TN091 TN092 TN093 TN094 TN433 TN434 TN435 TN436 TN437

Pond_A22 Pond_A23 Pond_A24 Pond_A25 Pond_A26

Order Limits
Target Note
EPH1HS Survey Area
GCN Ponds
GCN Study Area

Phase 1 Habitat

Standing Water
Running Water
Intact Hedge - Species-poor
Defunct Hedge - Species-poor
Hedge and Trees - Native species-rich
Hedge and Trees - species-poor
Dry Ditch
Boundary Removed
Semi-natural Broadleaved Woodland
Planted Broadleaved Woodland
Improved Grassland
Semi-improved Grassland
Arable
Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

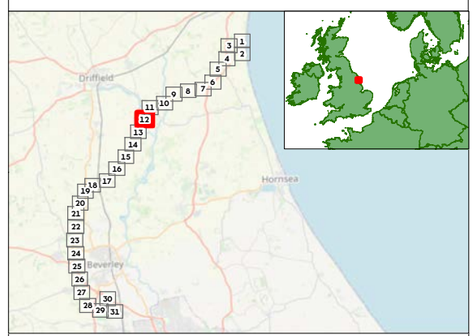
Figure 3.28

Updated EP1HS - Sheet 12 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Running Water
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Semi-improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.29

Updated EP1HS - Sheet 13 of 31

506000 506500 507000

453000 452500 452000

N

GRID NORTH

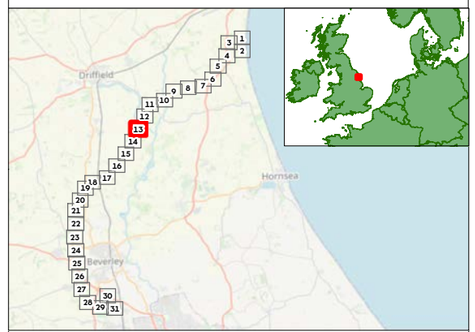
Pond_A28 Pond_A29 Pond_A27 Pond_A30 Pond_A31

TN102 TN103 TN104 TN105 TN106 TN107 TN108 TN109 TN110 TN111 TN112 TN113

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Running Water
- Defunct Hedge - Species-poor
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Semi-improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.30

Updated EP1HS - Sheet 14 of 31

505500 506000 506500

451500 451000

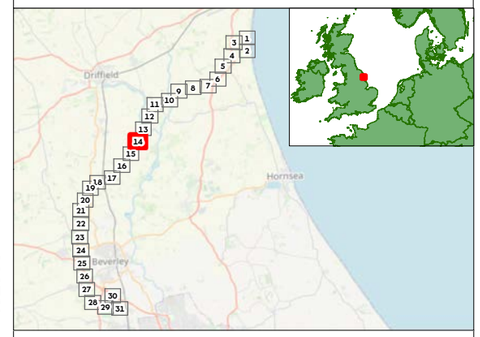
N
GRID NORTH

TN113 TN114 TN115 TN116 TN117 TN118 TN119 TN120 TN121 TN122

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Study Area

Phase 1 Habitat

- Running Water
- Defunct Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- A A A Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.31

Updated EP1HS - Sheet 15 of 31

505000 505500 506000

450500 450000 449500

N

GRID NORTH

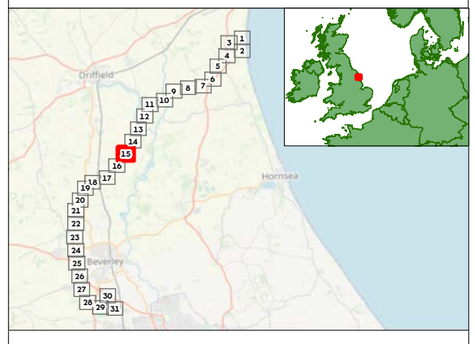
TN121 TN122 TN123 TN124 TN125 TN126 TN127 TN128 TN129 TN130 TN131 TN132 TN417

Pond_A32 Pond_A33 Pond_A33a

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Semi-improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.32

Updated EP1HS - Sheet 16 of 31

504000 504500 505000

449500 449000 448500

N

GRID NORTH

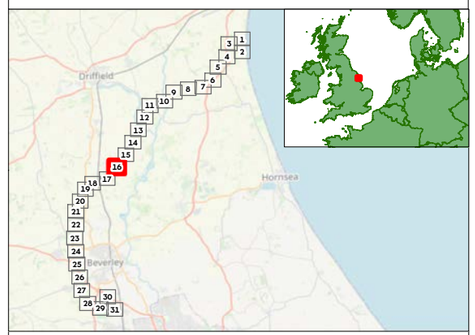
TN131 TN132 TN133 TN134 TN135 TN136 TN137 TN138 TN139 TN140 TN141 TN142 TN143 TN144 TN145 TN425

Pond_A33a Pond_A34 Pond_A35

Order Limits
Target Note
EPH1HS Survey Area
GCN Ponds
GCN Study Area

Phase 1 Habitat

Standing Water
Running Water
Intact Hedge - Species-poor
Defunct Hedge - Species-poor
Dry Ditch
Boundary Removed
Semi-natural Broadleaved Woodland
Dense / Continuous Scrub
Semi-improved Grassland
Arable
Bare Ground
Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.33

Updated EP1HS - Sheet 17 of 31

503000 503500 504000

448000

447500

N

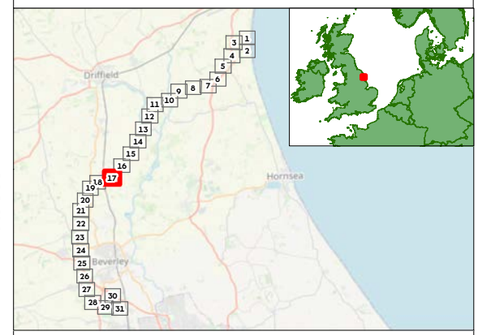
GRID NORTH

TN142 TN143 TN144 TN145 TN146 TN147 TN148 TN149 TN150 TN151 TN152 TN153 TN416

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Dry Ditch
- Boundary Removed
- Dense / Continuous Scrub
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

501500 502000 502500

447500 447000

N
GRID NORTH

TN154 TN155 TN156 TN157 TN158 TN159 TN160 TN161 TN162 TN384 TN407 TN408 TN420 TN421 TN422 TN423

Pond_A36

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

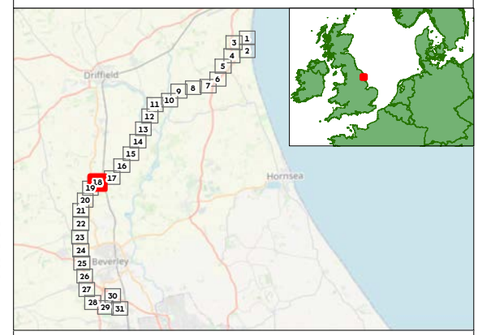
Figure 3.34

Updated EP1HS - Sheet 18 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid
Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV
Ørsted

Hornsea Four

Figure 3.35

Updated EP1HS - Sheet 19 of 31

501000 501500 502000

447000

446500

N

GRID NORTH

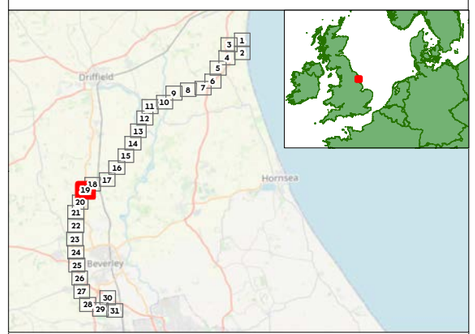
TN160 TN384 TN161 TN162 TN420 TN421 TN423 TN422 TN163 TN164 TN165

Pond_A37 Pond_A38 Pond_A39 Pond_A42 Pond_A40 Pond_A41

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.36

Updated EP1HS - Sheet 20 of 31

500500 501000 501500

446000 445500 445000

N

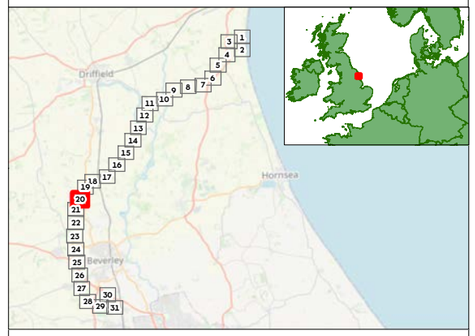
GRID NORTH

TN163 TN164 TN165 TN429 TN409 TN386 TN166 TN169 TN167 TN170 TN168 TN172 TN171 Pond_A43 TN173 TN174 Pond_A44 TN175 TN176 TN177

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Running Water
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Dry Ditch
- Planted Mixed Woodland
- Dense / Continuous Scrub
- Semi-improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

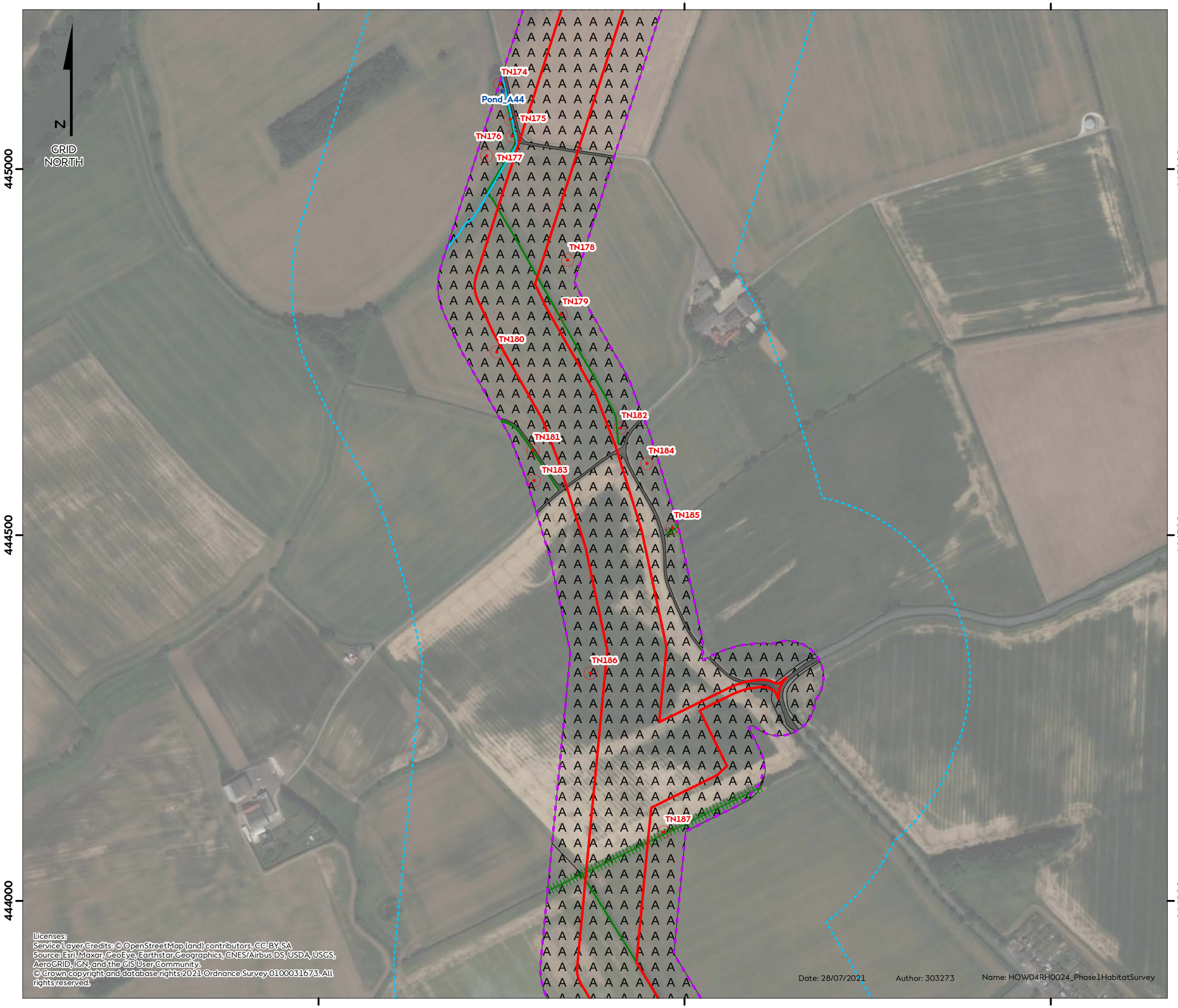
Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.37

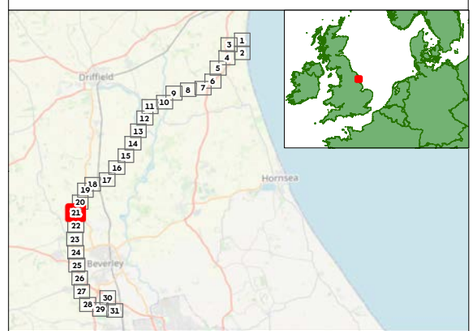
Updated EP1HS - Sheet 21 of 31



- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Standing Water
- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

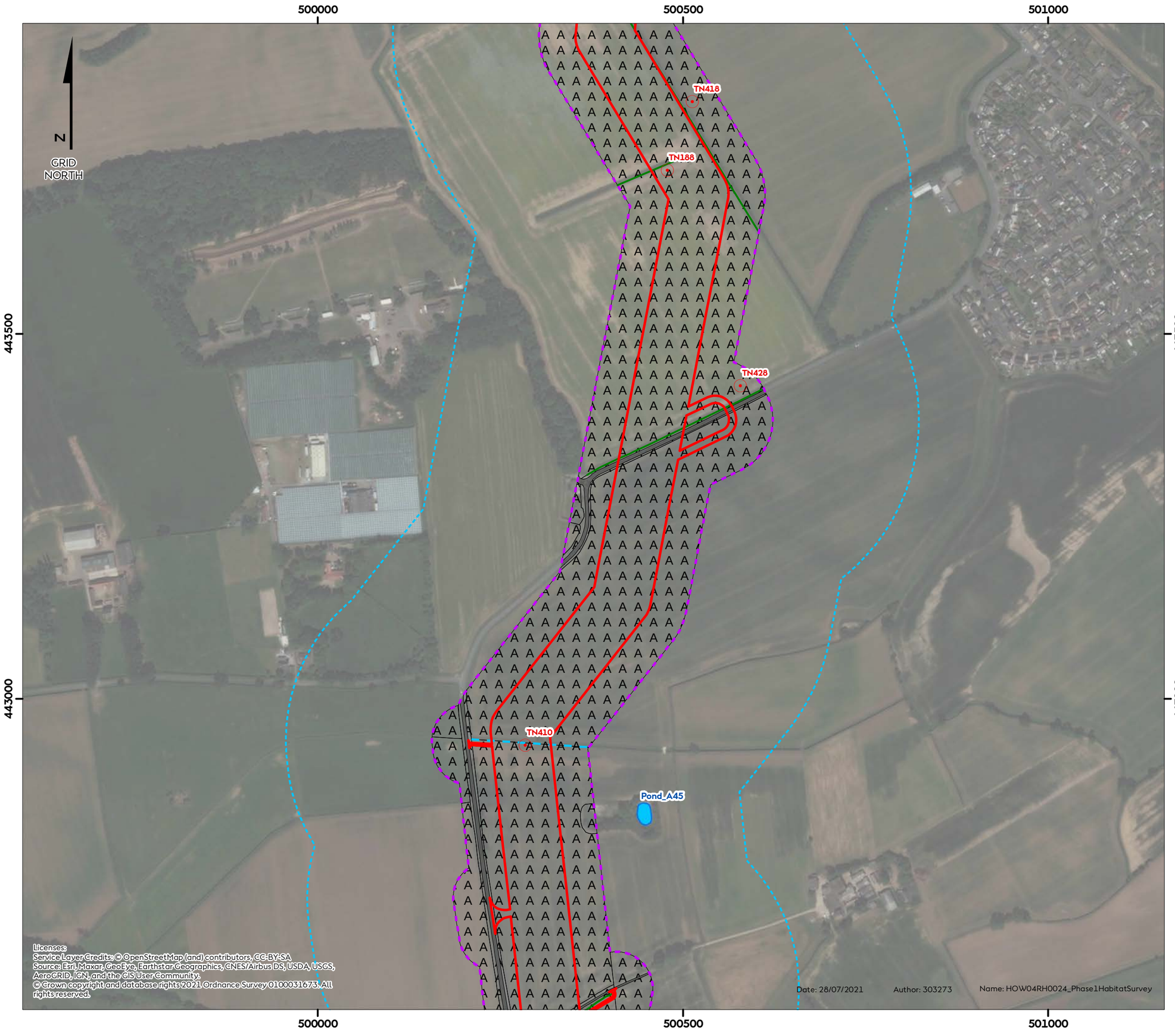
0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted



Hornsea Four

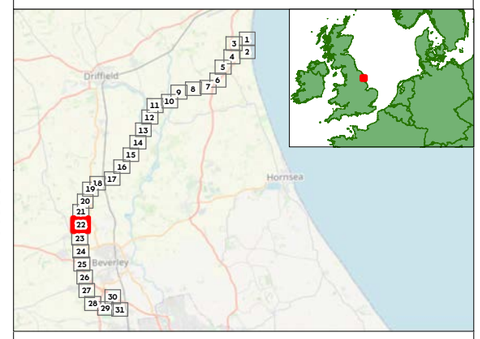
Figure 3.38

Updated EP1HS - Sheet 22 of 31

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Species-poor
- Dry Ditch
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.39

Updated EP1HS - Sheet 23 of 31

Order Limits

Target Note

EPH1HS Survey Area

GCN Study Area

Phase 1 Habitat

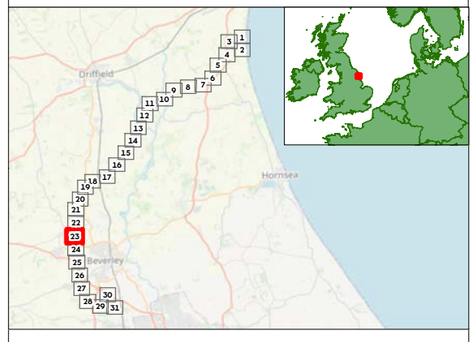
Standing Water

Intact Hedge - Species-poor

Semi-natural Broadleaved Woodland

Arable

Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Date: 28/07/2021 Author: 403273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.40

Updated EP1HS - Sheet 24 of 31

Order Limits

Target Note

EPH1HS Survey Area

GCN Ponds

GCN Study Area

Phase 1 Habitat

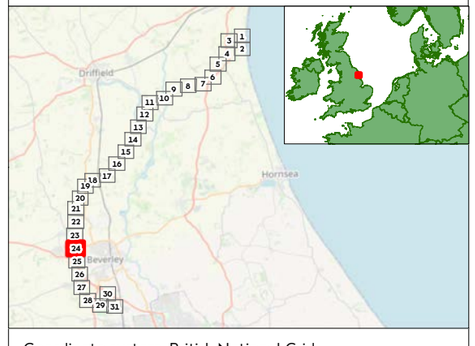
Intact Hedge - Species-poor

Defunct Hedge - Species-poor

Dense / Continuous Scrub

Arable

Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

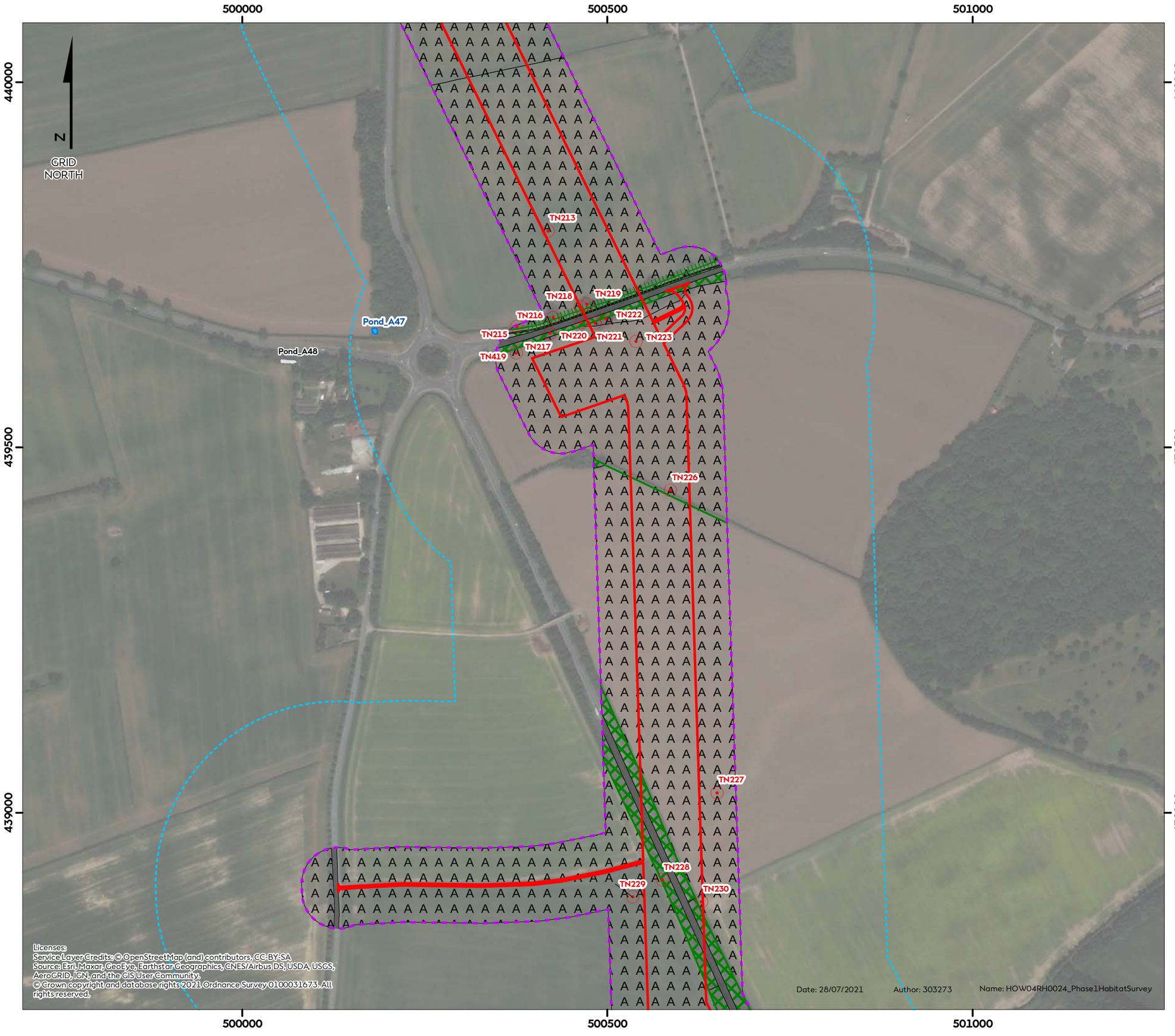
Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.41

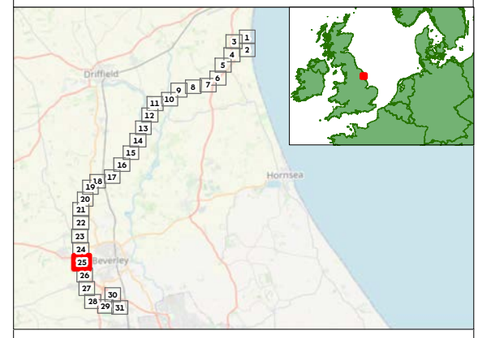
Updated EP1HS - Sheet 25 of 31



- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.42

Updated EP1HS - Sheet 26 of 31

500000 500500 501000 501500

438500 438000 437500

N

GRID NORTH

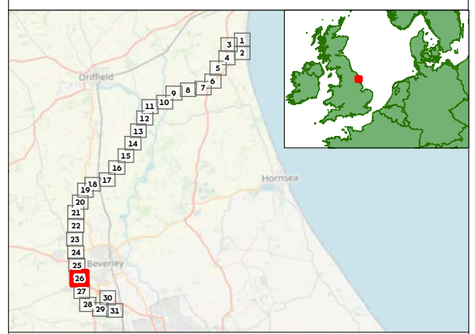
TN231 TN232 TN233 TN234 TN235 TN236 TN237 TN238 TN239 TN240 TN241 TN242 TN243 TN244 TN245 TN246 TN247 TN248

Pond_A49 Pond_A50

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Species-poor
- Hedge and Trees - species-poor
- Dry Ditch
- Planted Broadleaved Woodland
- Dense / Continuous Scrub
- Improved Grassland
- Semi-improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.43

Updated EP1HS - Sheet 27 of 31

500500 501000 501500

437000

436500

N
GRID NORTH

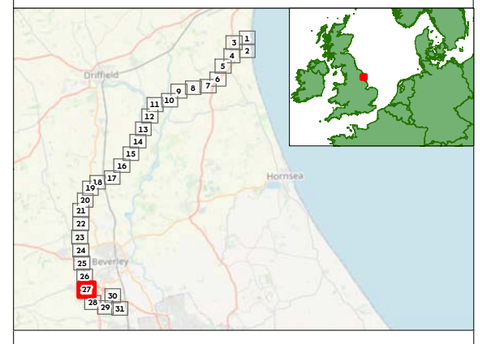
TN248 TN249 TN250 TN251 TN252 TN253 TN254 TN255 TN256 TN257 TN258 TN259 TN260 TN261 TN262 TN263 TN264 TN265 TN266 TN267 TN268 TN269

Pond_A51

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Hedge and Trees - species-poor
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.44

Updated EP1HS - Sheet 28 of 31

501000 501500 502000

436000 435500 435000

N

GRID NORTH

TN270 TN271 TN272 TN273 TN274 TN275 TN276 TN277 TN278 TN279 TN280 TN281 TN282 TN284 TN285 TN286 TN287 TN288 TN289 TN290 TN291 TN292 TN295

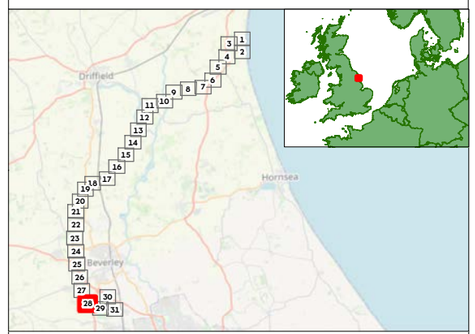
Pond_A53

Pond_A52

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Native species-rich
- Intact Hedge - Species-poor
- Defunct Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.45

Updated EP1HS - Sheet 29 of 31

502500 503000 503500

435500 435000 434500

N

GRID NORTH

TN289 TN290 TN291 TN292 TN293 TN294 TN295 TN296 TN297 TN298 TN299 TN300 TN301 TN302 TN303 TN304 TN305 TN306 TN307 TN308 TN309 TN310 TN311 TN312 TN313 TN314 TN315 TN316 TN317 TN318 TN319 TN320 TN321 TN322 TN323 TN324 TN347 TN348 TN349 TN350 TN391 TN392 TN393 TN394 TN395 TN396 TN404

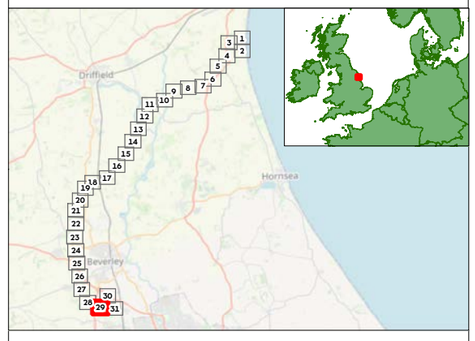
Pond_A61 Pond_A62 Pond_A84 Pond_A83 Pond_A82 Pond_A80 Pond_A78 Pond_A77 Pond_A76 Pond_A75 Pond_A73 Pond_A73

Licenses:
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.
© Crown copyright and database rights 2021 Ordnance Survey 0100031673. All rights reserved.

Date: 28/07/2021 Author: 303273 Map: HOW04RH0024_Phase1HabitatSurvey

Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat
- Intact Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Hedge and Trees - species-poor
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Improved Grassland
- Semi-improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Hornsea Four

Figure 3.46

Updated EP1HS - Sheet 30 of 31

503000 503500 504000

436500 436000

N

GRID NORTH

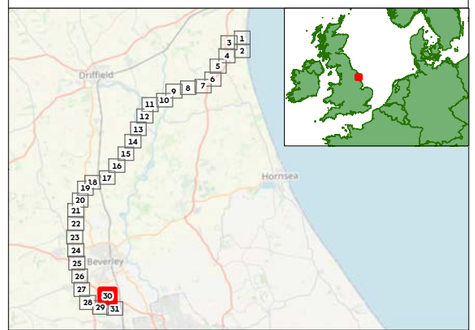
TN329 TN328 TN327 TN326 TN426 TN325 TN324 TN391 TN396

Pond_A55 Pond_A56 Pond_A57 Pond_A58 Pond_A59 Pond_A60 Pond_A61 Pond_A62

- Order Limits
- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat

- Hedge and Trees - species-poor
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- A A A Arable
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Hornsea Four

Figure 3.47

Updated EP1HS - Sheet 31 of 31

503500 504000 504500

435500 435000 434500

N

GRID NORTH

Pond_A65 Pond_A66 Pond_A67 Pond_A68 Pond_A63 Pond_A64 Pond_A69 Pond_A71 Pond_A72 Pond_A73 Pond_A74 Pond_A75 Pond_A76

TN323 TN330 TN331 TN332 TN333 TN334 TN335 TN336 TN337 TN338 TN339 TN340 TN341 TN342 TN343 TN344 TN345 TN346 TN349 TN350 TN351 TN352 TN353 TN354 TN355 TN357 TN358 TN359 TN360 TN361 TN362 TN363 TN364 TN365 TN366 TN367 TN368 TN369 TN370 TN371 TN372 TN373 TN374 TN375 TN376 TN377 TN378 TN379 TN380 TN381 TN398 TN399 TN400 TN401 TN402 TN403 TN427

Licenses:
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

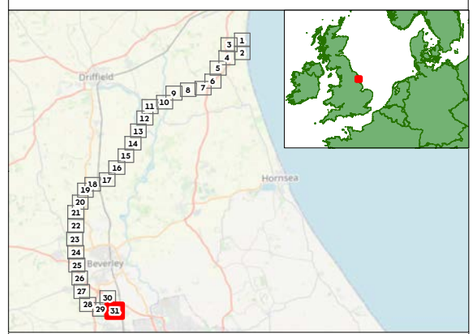
Date: 28/07/2021 Author: 303273 Name: HOW04RH0024_Phase1HabitatSurvey

Order Limits

- Target Note
- EPH1HS Survey Area
- GCN Ponds
- *Pond no longer within GCN Study Area*
- GCN Study Area

Phase 1 Habitat

- Intact Hedge - Species-poor
- Hedge and Trees - Native species-rich
- Hedge and Trees - species-poor
- Dry Ditch
- Semi-natural Broadleaved Woodland
- Dense / Continuous Scrub
- Improved Grassland
- Arable
- Bare Ground
- Building / Hardstanding



Coordinate system: British National Grid

Scale@A3: 1:5,000

0 100 200 Metres

0 100 200 300 Yards

REV	REMARK	DATE
	First Issue for PEIR	12/07/2019
A	Updated following PEIR consultations, for DCO	28/07/2021

Title: Updated EP1HS
Document no: HOW04RH0024
Created by: AZ
Checked by: CC
Approved by: CS

Royal HaskoningDHV

Ørsted

3.8 Project basis for assessment

3.8.1 Impact register and impacts "Not considered in detail in the ES"

3.8.1.1 Upon consideration of the baseline environment, the project description outlined in **Volume A1, Chapter 4: Project Description**, the Hornsea Four Commitments (**Volume A4**, **Annex 5.2: Commitments Register**) and response to formal consultation on the PEIR, several potential impacts upon ecology and nature conservation are "Not considered in detail in the ES". These impacts are outlined, together with a justification for why they are not considered further, in **Table 3.13**, which should be in conjunction with **Volume A4**, **Annex 5.1: Impacts Register**.

Table 3.13: Ecology and nature conservation impact register - Impacts not considered in detail in the ES.

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
Impacts on habitats or species: Operation phase (ENC-O-15) Operation and maintenance activities could cause damage to habitats or species from accidental release of pollutants	No likely significant effect	Scoped Out	Not required as agreement achieved during EIA Scoping (PINS Scoping Opinion, November 2018, ID:4.15.6). Management measures for onshore ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan**.
Impacts on habitats: Decommissioning phase for the ECC (ENC-D-16) Decommissioning of onshore cable could cause temporary loss or degradation to habitat	No likely significant effect	Scoped Out	Not required as agreement achieved during EIA Scoping (PINS Scoping Opinion, November 2018, ID:4.15.7). Management measures for onshore ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan** and **Volume F2, Chapter 2: Outline Code of Construction Practice**. The Hornsea Four decommissioning approach is outlined within **Volume A1, Chapter 4, Project Description**.
Impacts on habitats: Operation (ENC-O-12) Excavating a section of cable for maintenance	No likely significant effect	Scoped Out	Not required as agreement achieved during EIA Scoping (PINS Scoping Opinion, November 2018, ID:4.15.4).

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
or repair could cause temporary habitat loss or degradation			Management measures for onshore ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan**.
Impacts on protected species: Operation (ENC-O-13) Operation and maintenance activities of the onshore cable route could cause disturbance to protected species	No likely significant effect	Scoped Out	Not required as agreement achieved during EIA Scoping (PINS Scoping Opinion, November 2018, ID:4.15.5). Management measures for onshore ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan**.
Impacts on white-clawed crayfish and fish: Construction (ENC-C-7) Open cut trenching, used to cross watercourses could lead to loss of habitat, disturbance and / or connectivity severance on white-clawed crayfish and fish.	No likely significant effect	Not considered in detail in the ES	Management measures for onshore Ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan**, and **Volume F2, Chapter 2: Outline Code of Construction Practice**. This impact is not considered in detail in the ES chapter, as agreed through consultation with ERYC, NE, YWT and the EA at the Ecology and Nature Conservation Technical Panel Meeting on 8th April 2019 (ON-ECO-3.2 and ON-ECO-3.5). Further consultation was undertaken regarding this impact not being considered in detail in this ES chapter and was agreed with Natural England, the EA and YWT on 13th November 2019 (ON-ECO-3.9). The conclusion of No LSE as set out in the Scoping Report (Orsted, 2018) remain not significant in EIA terms. There is no evidence of white-clawed crayfish within the data search study area. All EA classified main rivers and IDB maintained drains will be crossed by HDD (Co1), mitigating any impacts on fish species that may be present. In addition, within smaller watercourses that are subject to open cut crossing methods, the following mitigations are proposed: In channel activities that prevent upstream migration will be limited to the duration of open-cut trenching works; and any temporary culverts required will be

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
			constructed to ensure there is no barrier to upstream fish passage (Co124, **Volume F2, Chapter 2: Outline Code of Construction Practice**). To mitigate and avoid any adverse impacts to fish species, the following measures will be adhered to (further information is provided within **Chapter 2: Hydrology and Flood Risk**): In-channel activities that prevent upstream migration (e.g. river and sea lamprey) will be limited to the duration of open-cut trenching works in any particular location; and Any temporary culverts will be constructed to ensure they do not create a barrier to upstream fish passage. This will be undertaken following the best guidance practice set out in CIRIA C689 (CIRIA, 2010) Culvert design and operation guide, culverts will be adequately sized to avoid impounding flows. Furthermore, the culvert bed will be installed below the active bed of the watercourse to ensure that sediment continuity and the movement of aquatic organisms can be maintained, and the likelihood of upstream sedimentation and downstream scour is minimised (Co124, **Volume F2, Chapter 2: Outline Code of Construction Practice**). Further information can be found within, **Chapter 2: Hydrology and Flood Risk.** Furthermore, stakeholders (Natural England, the EA and YWT) agreed for this impact to not be considered in the ES Chapter at the Ecology Technical Panel Evidence Plan Meeting held on the 13th November 2019 (ON-ECO-3.9).
Impacts on habitats or species: Construction (ENC-C-10) Construction could cause damage to habitats or	No likely significant effect	Not considered in detail in the ES	Management measures for onshore ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan** and **Volume F2, Chapter 2: Outline Code of Construction Practice**. This impact is not considered in detail in the ES chapter, as agreed through consultation with NE, YWT and the EA at Ecology Technical Panel Meeting

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
species from accidental release of pollutants			held on the 13th November 2019 (ON-ECO-3.11). The conclusion of No LSE as set out in the Scoping Report (Orsted, 2018) remains not significant in EIA terms. Further information on baseline environment is presented in Section 3.7 and the mitigations that Hornsea Four have committed to is presented in Table 3.14.
Impacts on habitats or species: Decommissioning phase for onshore substation (ENC-D-19) Decommissioning of the onshore substation could lead to damage to habitats or species from accidental release of pollutants	No likely significant effect	Not considered in detail in the ES	Management measures for onshore ecology are set out in Volume F2, Chapter 3: Outline Ecological Management Plan, and Volume F2, Chapter 2: Outline Code of Construction Practice. This impact is not considered in detail in the ES chapter, as agreed through consultation with NE, YWT and the EA at the Ecology and Nature Conservation Technical Panel Meeting on 13 November 2019 (ON-ECO-3.16). The conclusion of No LSE as set out in the Scoping Report (Orsted 2018), and with further justification in the PEIR (Orsted 2019), remain not significant in EIA terms.
Impacts on non-designated sites: Construction (ENC-C-2) Construction compounds, access roads and other infrastructure will temporarily occupy areas leading to loss and/or degradation of non-designated habitat.	No likely significant effect	Not considered in detail in the ES. No likely significant effect identified at PEIR.	The impact was assessed as part of the EIA, as set out in the PEIR (Orsted 2019) and confirmed in Volume A4, Annex 5.1: Impacts Register, and no likely significant effect was identified. As set out in Section 3.7.7, changes to the Order Limits since PEIR have not had a material impact on the assessment. Management measures for onshore Ecology are set out in Volume F2, Chapter 3: Outline Ecological Management Plan, Volume F2, Chapter 2: Outline Code of Construction Practice, and Volume F2, Chapter 8: Outline Landscape Management Plan. This impact is not considered in detail in the ES chapter, as agreed through consultation with NE, YWT and EA at the Ecology and Nature Conservation Technical Panel Meeting on 13 November 2019 (ON-ECO-3.8), as detailed in Section 3.4. The residual effects as set out in the PEIR (Orsted 2019) remain not significant in EIA terms.
Impacts on reptiles: Construction (ENC-C-8)	No likely significant effect	Not considered in detail in the	The impact was assessed as part of the EIA, as set out in the PEIR (Orsted 2019) and confirmed in Volume

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
Construction activities will temporarily occupy areas leading to loss and/or degradation of habitat, loss of habitat connectivity and harm or mortality of individual reptiles.		ES. No likely significant effect identified at PEIR	**A4, Annex 5.1: Impacts Register**, and no likely significant effect was identified. Management measures for onshore ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan** and **Volume F2, Chapter 2: Outline Code of Construction Practice**. This impact is not considered in detail in the ES chapter, as agreed through consultation with NE, YWT and the EA at Ecology Technical Panel Meeting held on the 13th November 2019 (ON-ECO-3.10). The residual effect as set out in the PEIR (Orsted 2019) remains not significant in EIA terms. Further information on baseline environment is presented in **Section 3.7** and the mitigations that Hornsea Four have committed to is presented in **Table 3.14**.
Impacts on habitats: Decommissioning phase for onshore substation (ENC-D-17) Decommissioning of the onshore substation could lead to temporary habitat loss or degradation	No likely significant effect	Not considered in detail in the ES. No likely significant effect identified at PEIR	Management measures for onshore ecology are set out in **Volume F2, Chapter 3: Outline Ecological Management Plan** and **Volume F2, Chapter 2 Outline Code of Construction Practice**. The Hornsea Four decommissioning approach is outlined within **Volume A1, Chapter 4, Project Description**. This impact is not considered in detail in the ES chapter, as agreed through consultation with NE, YWT and the EA at Ecology Technical Panel Meeting held on the 13th November 2019 (ON-ECO-3.16). The conclusion of No LSE as set out in the Scoping Report (Orsted 2018) remains not significant in EIA terms.

Notes:
Grey - Potential impact is scoped out at EIA Scoping and both PINS and Hornsea Four agree.
Red – Potential impact is not considered in detail in the ES with no consensus between PINS and Hornsea Four at EIA Scoping and further justification provided during the pre-application stage.
Purple - Not considered in detail in the ES. No likely significant effect identified at PEIR.

3.8.2 Commitments

3.8.2.1 Hornsea Four has adopted commitments (primary design principles inherent as part of Hornsea Four, installation techniques and engineering designs/modifications) as part of their pre-application phase, to eliminates and/or reduce the likely significant effect (LSE) of a number of impacts. These are outlined in **Volume A4, Annex 5.2 Commitments Register**. Further commitments (adoption of best practice guidance), referred to as tertiary commitments in **Table 3.14** below, are embedded as an inherent aspect of the EIA process. Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are reduced to environmentally acceptable levels.

3.8.2.2 The commitments adopted by Hornsea Four in relation to Ecology and Nature Conservation are presented in **Table 3.14**.

Table 3.14: Commitments relevant to Ecology and Nature Conservation.

Commitment ID	Measure Proposed	How the measure will be secured
Co1	Primary: All Environment Agency (EA) main rivers, Internal Drainage Board (IDB) maintained drains, main roads and railways will be crossed by HDD or other trenchless technology as set out in the Onshore Crossing Schedule. Where HDD technologies are not practical, the crossing of Ordinary watercourses may be undertaken by open cut methods. In such cases, temporary measures will be employed to maintain flow of water along the watercourse. Main rivers will not be temporarily dammed and/or rerouted.	DCO Requirement 17 (CoCP)
Co2	Primary: A range of sensitive historical, cultural and ecological conservation areas (including statutory and non-statutory designations) have been directly avoided by the permanent Hornsea Four footprint, at the point of Development Consent Order Submission (DCO). These include, but are not restricted to: Listed Buildings (564 sites); Scheduled Monuments (30 sites); Registered Parks and Gardens (Thwaite Hall and Risby Hall); Onshore Conservation Areas (18 sites); Onshore National Site Network (one site); Offshore National Site Network (three sites); Offshore Marine Conservation Zones (two sites); Sites of Special Scientific Interest (two sites); Local Nature Reserves (none have been identified); Local Wildlife sites (33 sites); Yorkshire Wildlife Trust Reserves (none have been identified); Royal Society for the Protection of Birds (RSPB) Reserves (none have been identified); Heritage Coast; National Trust land; Ancient Woodland (10 sites and known Tree Preservation Orders (TPOs)); non-designated built heritage assets (334 sites); and historic landfill (none have been identified). Where possible, unprotected areas of woodland, mature and protected trees (i.e. veteran trees) have and will also be avoided.	DCO Works Plan - Onshore
Co4	Tertiary: A Pollution Prevention Plan (PPP) will be developed in accordance with the outline PPP and will include details of emergency spill procedures. Good practice guidance detailed in the Environment Agency's Pollution	DCO Requirement 17 (CoCP)

Commitment ID	Measure Proposed	How the measure will be secured
	Prevention Guidance (PPG) notes (including PPG01, PPG05, PPG08 and PPG21) will be followed where appropriate, or the latest relevant available guidance.	
Co6	Tertiary: During construction of piled foundations, the following guidance will be used: Piling and Penetrative Ground Improvement Methods on land Affected by Contamination: Guidance on Pollution Prevention (Environment Agency, 2001), or latest relevant available guidance.	DCO Requirement 17 (CoCP)
Co7	Primary: The construction work area associated with onshore export cable corridor will be 80 m working width to minimise the construction footprint, except at the Network Rail Crossing near Beswick, the approach to landfall and the approach to the onshore substation. At the Network Rail Crossing the working width is extended up to 120 m to facilitate HDD of the railway line. The permanent onshore export cable corridor width will be 60 m except where obstacles are encountered such as the Network Rail Crossing near Beswick (where the permanent footprint may be extended up to 120 m to facilitate HDD of the railway line), and on the approach to the landfall and onshore substation.	DCO Works Plan - Onshore
Co18	Secondary: HDD entry and exit points will be located at least 9 m away from IDB and Ordinary surface watercourses and 20 m from EA surface water courses or the landward toe of the EA surface watercourse's flood defences. Where a surface watercourse is to be crossed by HDD, the onshore export cables will be installed at least 1.2 m beneath the hard bed of any watercourses and the optimal clearance depth beneath watercourses will be agreed with the relevant authorities prior to construction. Where EA flood defences are present a minimum 1.2 m vertical clearance will be maintained between the hard bed of the watercourse and the landward toe of those flood defences. Where Hornsea Four crosses sites of particular sensitivity (e.g. embanked EA watercourses, SSSIs or groundwater Inner Source Protection Zones (SPZs)) a hydrogeological risk assessment will be undertaken to inform a site specific crossing method statement which will also be agreed with the relevant authorities prior to construction.	DCO Requirement 17 (CoCP)
Co26	Primary: Where hedgerows and/or trees require removal, this will be undertaken prior to topsoil removal. Sections of hedgerows and trees which are removed will be replaced using like for like hedgerow species.	DCO Requirement 17 (Code of construction practice) DCO Requirement 10 (EMP)
Co27	Primary: Trees identified to be retained within the Onshore Crossing Schedule will be fenced off and worked around. Where works are required close to trees that will remain in situ, techniques will be used to safeguard the root protection zone	DCO Requirement 17 (CoCP) DCO Requirement 10 (EMP)

Commitment ID	Measure Proposed	How the measure will be secured
Co30	Secondary: A Landscape Management Plan will be developed in accordance with the Outline Landscape Management Plan. The Landscape Management Plan will include details of mitigation planting at the onshore substation site, including the number, location, species and details of management and maintenance of planting. Where practical, landscape mitigation planting will be established as early as reasonably practicable in the construction phase.	DCO Requirement 8 (Provision of landscaping)
Co33	Tertiary: All vegetation requiring removal will be undertaken outside of the bird breeding season. If this is not reasonably practicable, the vegetation requiring removal will be subject to a nesting bird check by a suitably qualified ECoW. If nesting birds are present, the vegetation will not be removed until the young have fledged or the nest failed.	DCO Requirement 10 (EMP) DCO Requirement 17 (CoCP);
Co35	Secondary: Where required, provision will be made for badger access in relevant construction areas, when work is not taking place in order to ensure normal movements as far as reasonably possible. Provision will be made to ensure avoiding the entrapment of any animals within relevant construction areas. Checks will be made prior to be made prior to the start of any works to ensure no animals are trapped and if any have fallen in. Appropriate checks will be made as required by the ECoW.	DCO Requirement 10 (EMP) DCO Requirement 17 (CoCP);
Co36	Primary: Core working hours for the construction of the onshore components of Hornsea Four will be as follows: • Monday to Friday: 07:00 - 18:00 hours; • Saturday: 07:00 - 13:00 hours; • Up to one hour before and after core working hours for mobilisation ("mobilisation period"), i.e. 06:00 to 19:00 weekdays and 06:00 to 14:00 Saturdays; and • Maintenance period 13:00 to 17:00 Saturdays. *Activities carried out during mobilisation and maintenance will not generate significant noise levels (such as piling, or other such noisy activities).* In circumstances, outside of core working practices, specific works may have to be undertaken outside the core working hours. ERYC will be informed in writing.	DCO Requirement 17 (CoCP)
Co41	Primary: All HDD crossings will be undertaken by non-impact methods in order to minimise construction vibration beyond the immediate location of works.	DCO Requirement 17 (CoCP)
Co65	Tertiary: A Site Waste Management Plan (SWMP) will be developed in accordance with the Outline Site Waste Management Plan, with consideration of the latest relevant available guidance.	DCO Requirement 17 (CoCP)
Co68	Secondary: All logistics compounds will be removed and sites will be reinstated when construction has been completed.	DCO Requirement 17 (CoCP)

Commitment ID	Measure Proposed	How the measure will be secured
		DCO Requirement 20 (Restoration of land used temporarily for construction)
Co69	Secondary: Construction site lighting will only operate when required and will be positioned and directed to avoid unnecessary illumination to residential properties, sensitive ecological receptors, footpath users, and minimise glare to users of adjoining public highways. Construction site lighting will be designed in accordance with latest relevant available guidance and legislation and the details of the location, height, design and luminance of lighting to be used will be detailed within the final Code of Construction Practice. The design of construction site lighting will accord with the details provided in the Outline Code of Construction Practice (Co124) and Outline Ecological Management Plan (Co168).	DCO Requirement 17 (CoCP) DCO Requirement 10 (EMP)
Co78	Primary: All ponds identified during the route planning and site selection process have been avoided where possible. During construction any newly identified ponds will be avoided through micro-siting of the onshore export cable where reasonably practicable.	DCO requirement 10 (EMP)
Co114	Tertiary: Good practice air quality management measures will be applied where human receptors reside within 350 m of works or ecological receptors are present within 200 m, as described in Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1, or latest relevant available guidance.	DCO Requirement 17 (CoCP)
Co119	Secondary: In areas of confirmed presence, or potential for great crested newt (i.e. within 250 m of an identified great crested newt pond) appropriate exclusion fencing will be erected and working areas 'trapped out' prior to the commencement of relevant onshore construction works, in line with Great crested newt mitigation guidelines, English Nature, 2001 or the latest available relevant guidance.	DCO Requirement 10 (EMP) DCO Requirement 17 (CoCP)
Co120	Secondary: Habitat manipulation will be undertaken in order to discourage reptiles from the working area(s). A qualified ecologist will undertake a search of all working areas identified as being suitable for reptiles. Any reptiles found within the working area will be relocated into suitable adjacent habitat.	DCO Requirement 10 (EMP) DCO Requirement 17 (CoCP)
Co122	Secondary: Prior to the commencement of construction activities, pre-construction surveys will be undertaken by the Ecological Clerk of Works (ECoW) where necessary, in accordance with the Outline Ecological Management Plan and latest available species specific guidance.	DCO Requirement 10 (EMP) DCO Requirement 17 (CoCP)

Commitment ID	Measure Proposed	How the measure will be secured
Co123	Tertiary: Based on noise modelling results, where noise has the potential to cause significant adverse effects, mufflers and acoustic barriers will be used where HDD is being undertaken.	DCO Requirement 17 (CoCP)
Co124	Tertiary: A Code of Construction Practice (CoCP) will be developed in accordance with the outline CoCP. The outline CoCP will include measures to reduce temporary disturbance to residential properties, recreational users and existing land users.	DCO Requirement 17 (CoCP)
Co127	Tertiary: An Onshore Decommissioning Plan will be developed prior to decommissioning in a timely manner. The Onshore Decommissioning Plan will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure and details relevant to flood risk, pollution prevention and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant available guidance.	DCO Requirement 24 (onshore decommissioning)
Co157	Secondary: Fences, walls, ditches and drainage outfalls will be retained along the onshore export cable corridor and landfall, where possible. Where it is not reasonably practicable to retain them, any damage will be repaired and reinstated as soon as reasonably practical. The Environment Agency must be notified if damage occurs to any EA Main river or related flood infrastructure.	DCO Requirement 17 (CoCP)
Co159	Secondary: Operational noise from the onshore substation will be at a noise level no greater than 5 dB above the representative background ($L_{A90,T}$) during the day time and night at the identified noise Sensitive Receptors, as stated within the onshore noise assessment (document reference A3.8).	DCO requirement 21 (Control of noise during operational phase)
Co168	Tertiary: An Ecological Management Plan (EMP) will be developed in accordance with the Outline Ecological Management Plan (OEMP). The OEMP includes but is not limited to pre-construction (Section 3), construction (Section 4) and post-mitigation measures (Section 5) relating to: habitats, hedgerows, birds, bats, badgers, otters, water voles, reptiles, great crested newts, terrestrial invertebrates, and other protected or notable species where relevant. The EMP will include details of any long-term mitigation and management measures relevant to onshore ecology and nature conservation. The EMP will be developed in consultation with the relevant responsible authorities.	DCO Requirement 10 (EMP)
Co170	Secondary: Joint bays and link boxes will be located a minimum of 20 m away from Environment Agency (EA) Main rivers.	DCO Requirement 17 (CoCP)
Co172	Secondary: The bed and banks of watercourses will be reinstated to their pre-construction condition following the removal of any temporary structures. Culverts will not be used for temporary access track crossings across EA Main Rivers. Where a temporary access track crossing across an EA Main River may be required, clear span/ bailey bridges will be used.	DCO Requirement 17 (CoCP)

Commitment ID	Measure Proposed	How the measure will be secured
	There will be no loss of cross-sectional area to Environment Agency (EA) Main rivers.	
Co175	Secondary: A pre and post construction condition survey will also be undertaken at each Environment Agency (EA) Main river crossings, including any flood defences to be crossed. The scope and methodology of the survey will be agreed in advance with the EA. On completion of the project, details of the surveys under each Main River and flood defence will be submitted to the EA.	DCO Requirement 17 (CoCP)
Co193	Secondary: Operational site lighting at the onshore substation will be designed in accordance with latest relevant available guidance and legislation and the details of the location, height, design and luminance of lighting to be used will be provided as part of detailed design for the onshore substation. The design of operation site lighting will accord with the details provided in the Outline Design Plan (Co195) and Outline Ecological Management Plan (Co168).	DCO Requirement 7 (Detailed design approval onshore)
Co195	Secondary: Detailed design will be developed for the Onshore Substation in accordance with the Outline Design Plan which will include details regarding design and access. Examples of such detailed design information includes (but are not limited to): building heights and form; site layout; external appearance and colours; vehicular and pedestrian access.	DCO Requirement 7 (Detailed design approval onshore)

3.9 Maximum Design Scenario

3.9.1.1 This section describes the parameters on which the ecology and nature conservation assessment has been based. These are the parameters which are judged to give rise to the maximum levels of effect for the assessment undertaken, as set out in **Volume A1, Chapter 4: Project Description**. Should Hornsea Four be constructed to different parameters within the design envelope, then impacts would not be any greater than those set out in this ES using the Maximum Design Scenario (MDS) presented in **Table 3.15**.

Table 3.15: Maximum design scenario for impacts on Ecology and Nature Conservation.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
Construction			
Direct impacts on designated sites (ENC-C-1): Temporary construction areas could occupy areas leading to loss and/or degradation of designated sites	Primary: Co1 Co2 Co7 Co41 Secondary: Co18 Co122 Co170 Co172 Co175 Tertiary: Co4 Co33 Co114 Co124 Co168	**Onshore Export Cable Corridor:** • Construction duration: 30 months; • Primary logistics compounds: Number: 1, Size: 140x140 m, Duration: 36 months; • Secondary Logistics compounds: Number: 7, Size: 90x90 m, Duration: 36 months; • ECC: Length: 39 km (approximate), Width: 80 m, Area: 3,120,000 m2; • Haul Road: Number: 1, Width: 6 m (with 7 m passing places), Length: 39 km, Maximum Depth: 1 m, Average Depth: 0.4 m; • Temporary access roads: Number: 36, Width: 6 m (with 7 m passing places), Maximum Depth: 1 m, Average Depth: 0.4 m; • Joint Bays: Number: 240, Depth 2.5 m, Area: 225 m^2 per Joint Bay, Joint Bay compounds: 240 40x40 m compounds; • Link Boxes: Number: 240, Depth: 2 m, Area: 9 m^2 per Link Box; and • HDDs: Number: 112, HDD compounds (entry and exit):224 70x70 m compounds, HDD compounds hardstanding: 46 50x50 m (at approximately 20% of all HDD locations). **400 kV ECC:** • Number of cable circuits: 4; • Cable trench depth: 1.5 m; • Approximate Length: 1 km; and • Width: 60 m.	These parameters represent maximum ground disturbance conditions both in terms of potential size of area affected and in terms of duration of expected disturbance.
Impacts on bat species (ENC-C-3): Construction activities will temporarily occupy	Primary: Co2 Co7 Co26 Co27	**Landfall:** • Construction duration: 32 months; • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months; and • Transition Joint Bays (located within Landfall compound area): Number: 8,	These parameters represent the maximum number of crossings, construction duration and building design parameters that could

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
areas leading to loss and / or degradation of habitat and loss of habitat connectivity used by bats for roosting, commuting and / or foraging.	Co36 Secondary: Co30 Co68 Co69 Co122 Tertiary: Co4 Co114 Co123 Co124 Co168	Depth: 6 m. **Onshore Export Cable Corridor:** • Construction duration: 30 months; • Primary logistics compounds: Number: 1, Size: 140x140 m, Duration: 36 months; • Secondary Logistics compounds: Number: 7, Size: 90x90 m, Duration: 36 months; • ECC: Length: 39 km (approximate), Width: 80 m, Area: 3,120,000 m^2; • Number of cable circuits (HVAC system): 6 • Cable trench: Depth: 1.5 m, Width at base: 1.5 m, Width at surface: 5 m; • Haul Road: Number: 1, Width: 6 m (with 7 m passing places), Length: 39 km, Maximum Depth: 1 m, Average Depth: 0.4 m; • Temporary access roads: Number: 36, Width: 6 m (with 7 m passing places), Maximum Depth: 1 m, Average Depth: 0.4 m; • Joint Bays: Number: 240, Depth 2.5 m, Area: 225 m^2 per Joint Bay, Joint Bay compounds: 240 40x40 m compounds; • Link Boxes: Number: 240, Depth: 2 m, Area: 9 m^2 per Link Box; and • HDDs: Number: 112, HDD compounds (entry and exit):224 70x70 m compounds, HDD compounds hardstanding: 46 50x50 m (at approximately 20 % of all HDD locations). **Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 43 months; • Permanent infrastructure area: 164,000 m^2; • Temporary works area: 130,000 m^2; • Temporary access road: Number: 1, Length: 1,800 m, Width: 15 m (7 m road, 8 m soil storage); and • Permanent access road: Number 1. Length 1, 800 m, Width: 10 m (7 m road, 3 m soil stabilisation and below ground utilities).	potentially disrupt bat commuting/foraging habitat and/or bat roosts. For further detail, see **Volume A4, Annex 4.2: Onshore Crossing Schedule**.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
		400 kV ECC: • Number of cable circuits: 4; • Cable trench depth: 1.5 m; • Approximate Length: 1 km; and • Width: 60 m.	
Impacts on breeding and / or wintering bird Species (ENC-C-4): Construction activities will temporarily occupy areas leading to loss and / or degradation of habitat and loss of habitat connectivity used by breeding and / or wintering birds.	Primary: Co2 Co7 Co26 Co27 Secondary: Co68 Co122 Tertiary: Co4 Co33 Co114 Co124 Co168	**Landfall:** • Construction duration: 32 months; • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months; and • Transition Joint Bays (located within Landfall compound area): Number: 8, Depth: 6 m. **Onshore Export Cable Corridor:** • Construction duration: 30 months; • Primary logistics compounds: Number: 1, Size: 140x140 m, Duration: 36 months; • Secondary Logistics compounds: Number: 7, Size: 90x90 m, Duration: 36 months; • ECC: Length: 39 km (approximate), Width: 80 m, Area: 3,120,000 m^2; • Number of cable circuits (HVAC system): 6; • Cable trench: Depth: 1.5 m, Width at base: 1.5 m, Width at surface: 5 m; • Haul Road: Number: 1, Width: 6 m (with 7 m passing places), Length: 39 km, Maximum Depth: 1 m, Average Depth: 0.4 m; • Temporary access roads: Number: 36, Width: 6 m (with 7 m passing places), Maximum Depth: 1 m, Average Depth: 0.4 m • Joint Bays: Number: 240, Depth 2.5 m, Area: 225 m^2 per Joint Bay, Joint Bay compounds: 240 40x40 m compounds; • Link Boxes: Number: 240, Depth: 2 m, Area: 9 m^2 per Link Box; and • HDDs: Number: 112, HDD compounds (entry and exit):224 70x70 m compounds, HDD compounds hardstanding: 46 50x50 m (at approximately 20	These parameters represent maximum ground disturbance conditions both in terms of potential size of area affected and in terms of duration of expected disturbance.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
		% of all HDD locations). **Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 43 months; • Permanent infrastructure area: 164,000 m^2; • Temporary works area: 130,000 m^2; • Temporary access road: Number: 1, Length: 1,800 m, Width: 15 m (7 m road, 8 m soil storage); and • Permanent access road: Number 1. Length 1.8 km, Width: 10 m (7 m road, 3 m soil stabilisation and below ground utilities). **400 kV ECC:** • Number of cable circuits: 4; • Cable trench depth: 1.5 m; • Approximate Length: 1 km; and • Width: 60 m.	
Impacts on otter and / or water vole (ENC-C-5): Open cut trenching and HDD used to cross watercourses with otter and / or water vole potential could lead to loss of habitat, disturbance and / or connectivity severance.	Primary: Co1 Co7 Co41 Secondary: Co18 Co69 Co122 Co157 Co170 Co172 Tertiary:	**Landfall:** • Construction duration: 32 months; • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months; and • Transition Joint Bays (located within Landfall compound area): Number: 8, Depth: 6 m. **Onshore Export Cable Corridor:** • Construction duration: 30 months; • ECC: Length: 39 km (approximate), Width: 80 m, Area: 3,120,000 m^2; • Number of cable circuits (HVAC system): 6; • Cable trench: Depth: 1.5 m, Width at base: 1.5 m, Width at surface: 5 m; • Temporary watercourse crossings: Number: 31, Width: 6 m, Length: 10 m; and • Crossings: Number: 58.	These parameters represent the maximum numbers of crossings that could potentially affect water vole and/or otter habitat.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
	Co4 Co114 Co123 Co124 Co168	**Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 43 months; • Permanent infrastructure area: 164,000 m^2; • Temporary works area: 130,000 m^2; • Temporary access road: Number: 1, Length: 1,800 m, Width: 15 m (7 m road, 8 m soil storage); and • Permanent access road: Number 1. Length 1.8 km, Width: 10 m (7 m road, 3 m soil stabilisation and below ground utilities). **400 kV ECC:** • Number of cable circuits: 4; • Cable trench depth: 1.5 m; • Approximate Length: 1 km; and • Width: 60 m.	
Impacts on great crested newt populations (ENC-C-6): Works in or within 250 m of water bodies with great crested newt potential could cause habitat loss, degradation, habitat severance and harm or kill individual animals.	Primary: Co2 Co4 Co7 Co26 Co36 Co78 Secondary: Co119 Co122 Tertiary: Co114 Co124 Co168	**Landfall:** • Construction duration: 32 months; • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months; • Transition Joint Bays (located within Landfall compound area): Number: 8, Depth: 6 m; **Onshore Export Cable Corridor:** • Construction duration: 30 months; • Primary logistics compounds: Number: 1, Size: 140x140 m, Duration: 36 months; • Secondary Logistics compounds: Number: 7, Size: 90x90 m, Duration: 36 months; • ECC: Length: 39 km (approximate), Width: 80 m, Area: 3,120,000 m^2; • Number of cable circuits (HVAC system): 6; • Cable trench: Depth: 1.5 m, Width at base: 1.5 m, Width at surface: 5 m; • Haul Road: Number: 1, Width: 6 m (with 7 m passing places), Length: 39 km,	These parameters represent maximum ground disturbance conditions both in terms of potential size of area affected and in terms of duration of expected disturbance.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
		Maximum Depth: 1 m, Average Depth: 0.4 m; • Temporary access roads: Number: 36, Width: 6 m (with 7 m passing places), Maximum Depth: 1m, Average Depth: 0.4 m; • Joint Bays: Number: 240, Depth 2.5 m, Area: 225 m2 per Joint Bay, Joint Bay compounds: 240 40x40 m compounds; • Link Boxes: Number: 240, Depth: 2 m, Area: 9 m2 per Link Box; and • HDDs: Number: 112, HDD compounds (entry and exit):224 70x70 m compounds, HDD compounds hardstanding: 46 50x50 m (at approximately 20 % of all HDD locations). **Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 43 months; • Permanent infrastructure area: 164,000 $m^{2;}$ • Temporary works area: 130,000 $m^{2;}$ • Temporary access road: Number: 1, Length: 1,800 m, Width: 15 m (7 m road, 8 m soil storage); and • Permanent access road: Number 1. Length 1.8 km, Width: 10 m (7 m road, 3 m soil stabilisation and below ground utilities). **400 kV ECC:** • Number of cable circuits: 4; • Cable trench depth: 1.5 m; • Approximate Length: 1 km; and • Width: 60 m.	
Impacts on badgers (ENC-C-9): Construction activities could disturb badger setts and / or lead to temporary severance of	Primary: Co2 Co7 Co26 Co35 Co36 Co41	**Landfall:** • Construction duration: 32 months; • Landfall compound: Number: 1, Total Area: 40,000 m^2, Duration: 32 months; and • Transition Joint Bays (located within Landfall compound area): Number: 8, Depth: 6 m.	These parameters represent maximum ground disturbance conditions both in terms of potential size of area affected and in terms of duration of expected disturbance.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
territories.	Secondary: Co68 Co69 Co122 Tertiary: Co114 Co123 Co124 Co168	**Onshore Export Cable Corridor:** • Construction duration: 30 months; • Primary logistics compounds: Number: 1, Size: 140x140 m, Duration: 36 months; • Secondary Logistics compounds: Number: 7, Size: 90x90 m, Duration: 36 months; • ECC: Length: 39 km (approximate), Width: 80 m, Area: 3,120,000 m^2; • Number of cable circuits (HVAC system): 6; • Cable trench: Depth: 1.5 m, Width at base: 1.5 m, Width at surface: 5 m; • Haul Road: Number: 1, Width: 6 m (with 7 m passing places), Length: 39 km, Maximum Depth: 1 m, Average Depth: 0.4 m; • Temporary access roads: Number: 36, Width: 6 m (with 7 m passing places), Maximum Depth: 1 m, Average Depth: 0.4 m; • Joint Bays: Number: 240, Depth 2.5 m, Area: 225 m^2 per Joint Bay, Joint Bay compounds: 240 40x40 m compounds; • Link Boxes: Number: 240, Depth: 2 m, Area: 9 m^2 per Link Box; and • HDDs: Number: 112, HDD compounds (entry and exit):224 70x70 m compounds, HDD compounds hardstanding: 46 50x50 m (at approximately 20 % of all HDD locations). **Onshore Substation and Energy Balancing Infrastructure:** • Construction duration: 43 months; • Permanent infrastructure area: 164,000 m^2; • Temporary works area: 130,000 m^2; • Temporary access road: Number: 1, Length: 1,800 m, Width: 15 m (7 m road, 8 m soil storage); and • Permanent access road: Number 1. Length 1.8 km, Width: 10 m (7 m road, 3 m soil stabilisation and below ground utilities).	

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
		400 kV ECC: • Number of cable circuits: 4; • Cable trench depth: 1.5 m; • Approximate Length: 1 km; and • Width: 60 m.	
Operation			
Impacts on habitats or species (ENC-O-11) Operation of the onshore substation will cause long-term habitat loss, degradation and potential displacement of protected species	Secondary: Co30 Co122 Co159 Co193 Co195 Tertiary: Co168	**Onshore Substation and Energy Balancing Infrastructure:** • Permanent infrastructure area: 164,000 m^2; • Temporary works area: 130,000 m^2; • Permanent access road: Number 1. Length 1.8 km, Width: 10 m (7 m road, 3 m soil stabilisation and below ground utilities); • Noise levels during operation (Power Convertors): 85 dB per unit; and • Power convertors: Number: 100.	These parameters represent maximum land take and operational activities relevant to the OnSS.
Impacts on protected species (ENC-O-14) Operation and maintenance activities of the onshore substation could cause disturbance to protected species	Tertiary: Co168 Secondary: Co122 Co159	**Onshore Substation and Energy Balancing Infrastructure:** • Permanent infrastructure area: 164,000 m^2; • Temporary works area: 130,000 m^2; • Permanent access road: Number 1. Length 1.8 km, Width: 10 m (7 m road, 3 m soil stabilisation and below ground utilities); • Noise levels during operation (Power Convertors): 85 dB per unit; and • Power convertors: Number: 100.	These parameters represent maximum land take and operational activities relevant to the OnSS.

Impact and Phase	Embedded Mitigation Measures	Maximum Design Scenario / Rochdale Envelope	Justification
Decommissioning			
Impacts on protected species (ENC-D-18): Decommissioning of the onshore substation could lead to temporary disturbance or displacement of protected species	Tertiary: Co127	**Decommissioning of the OnSS for Hornsea Four will comprise the following activities:** • The OnSS above ground electrical equipment and infrastructure will be removed, along with building foundations and security fencing. The site will be returned to its previous condition (see Section 4.13.2, **Volume A1, Chapter 4: Project Description**). Further details will be provided and secured within a Decommissioning Plan (Co127), agreed with stakeholders prior to decommissioning commencing. The construction of Hornsea Four presents the highest potential for significant environmental effects. Impacts during decommissioning would result in an effect of equal significance, at worst.	The parameters selected set out the worst case spatial and temporal envelope for ground disturbance during decommissioning of the OnSS.

3.10 Assessment methodology

3.10.1.1 The assessment methodology for Ecology and Nature Conservation is consistent with that presented in Annex C of the Scoping Report (Orsted 2018). There have been no deviations or variations to the assessment methodology since the scoping phase.

3.10.2 Ecology Impact Assessment (EcIA) overview

3.10.2.1 The EcIA methodology proposed in relation to Ecology and Nature Conservation is based on the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (CIEEM 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.

3.10.2.2 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 and magnitude of effects which have been scoped into this assessment. Using this information, the significance of each potential impact has been determined. Each of these steps is set out in the remainder of this section.

3.10.2.3 The EcIA 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.

3.10.3 Importance

3.10.3.1 The first stage of an EcIA 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 HPIs; and
- Red listed, rare or legally protected species.

3.10.3.2 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.

3.10.3.3 For this EcIA, the guidelines outlined in **Table 3.16** will be followed to provide the relative importance of different ecological features.

Table 3.16: Definition of terms relating to receptor value and/or importance.

Ranking	Habitats
Very High	• Habitats or species that form part of the cited interest within an internationally protected site, such as those designated under the Conservation of Habitats and Species Regulations (e.g. SPAs) or other international convention (e.g. Ramsar site). • A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in an international/national context, such that the site is likely to be designated as a site of European importance (e.g. SAC or SPA).
High	• Habitats or species that form part of the cited interest within a nationally designated site, such as a SSSI or NNR. • A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in a national context for which the site could potentially be designated a SSSI. • Species that are protected under the Wildlife and Countryside Act 1981 (as amended) or Conservation of Habitats and Species Regulations (2017). • Presence of habitats or where the action plan states that all areas of representative habitat or individuals of the species should be protected.
Medium	• A feature (e.g. habitat or population), which is either unique or sufficiently unusual to be considered as being of nature conservation value from a county to regional level. • Habitats or species that form part of the cited interest of an Local Nature Reserve (LNR), or some local-level designated sites, such as a LWS, also referred to as a non-statutory Site of Importance for Nature Conservation or the equivalent (e.g. Ancient Woodland). • Presence of habitats or species listed under Natural Environment and Rural Communities (2006) Schedule 41. • LBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.
Low	• A feature of importance at local level. • A feature (e.g. habitat or population) that is of nature conservation value in a local context only, with insufficient value to merit a formal nature conservation designation.
Negligible	• A feature of importance at a local level. • Commonplace feature of little or no habitat/historical significance. Loss of such a feature would not be seen as detrimental to the ecology of the area.

3.10.3.4 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.

3.10.4 Sensitivity

3.10.4.1 Sensitivity is not an inherent characteristic of a receptor or resource. Receptor or resource sensitivity is the degree to which it is tolerant of, adaptable to and able to recover from a change in its environment. Therefore, in addition to considering the importance/quality/value of the affected receptor or resource, its response (or sensitivity) to a particular impact is also considered. This is typically informed by literature review and the baseline environment evidence base. The definition of terms relating to sensitivity are shown in Table 3.17.

Table 3.17: Definition of terms relating to receptor sensitivity.

Ranking	Tolerance	Adaptability	Recoverability / Reversibility
High	Receptor unable to tolerate effect resulting in permanent change it its abundance or quality.	Receptor unable to avoid impact.	Receptor unable to recover resulting in permanent or long-term change (e.g. > 10 years).
Medium	Receptor has some ability to tolerate this effect but a detectable change (e.g. a change in distribution) will occur.	Receptor has some ability to avoid the most negative consequences of the impact or can partially adapt to it (e.g. by moving to other suitable areas).	Receptor recovers to an acceptable status over the short term to medium term (e.g. 1-10 years).
Low	Receptor unaffected.	Receptor can completely avoid the impact or adapt to it with no detectable changes.	Receptor recovers full within the short-term (e.g. 1 year).

3.10.5 Magnitude

3.10.5.1 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.

3.10.5.2 Table 3.18 summarises the definitions of magnitude that have been used for the onshore ecological receptors.

Table 3.18: Definition of terms relating to magnitude of an impact.

Ranking	Habitat	Environmental factors (e.g. presence, ambient air quality, noise)
High	Widespread and/or permanent disturbance or loss of a habitat, threatening the long-term viability or function of the habitat.	Change over a large area that lasts over the medium to long term, likely to cause secondary effects on ecology and/or routine exceedance of benchmark limits. A long-term physical change that affects a large area or introduces a permanent physical barrier.
Medium	Localised disturbance and/or loss of habitat that does not threaten the long-term viability or function of the habitat.	Temporary or localised change and/or occasional exceedance of benchmark limits. A physical change in the medium term over a relatively large area.
Low	Minimal disturbance and/or loss of habitat, such that there is no loss of viability or function of the habitat.	Slight change expected over a limited area and returning to background levels within a few metres or tens of metres. No exceedances of benchmark limits. A temporary and localised physical change/source of disturbance.
Negligible/No Change	Immeasurable, undetectable or within the range of normal natural variation change to the extent and condition of habitat.	Change is within the normal range of natural variation.

3.10.6 Duration

3.10.6.1 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 affects 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 affects 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 affects which occur over more than one year.

3.10.7 Impact Significance

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

3.10.7.2 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).

3.10.7.3 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.

3.10.7.4 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).

3.10.7.5 Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in **Table 3.19** below and knowledge of the ecological features affected.

3.10.7.6 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, likely significant impacts 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.

3.10.7.7 For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in terms of the EIA Regulations.

Table 3.19: Matrix used for the assessment of the significance of the effect.

		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

3.10.7.8 Following initial assessment, if the impact does not require additional mitigation (or none is possible) the residual impact will remain the same. If, however, additional mitigation is proposed there will be an assessment of the post-mitigation residual impact.

3.10.7.9 The Report to Inform Appropriate Assessment (RIAA) has been prepared in accordance with Advice Note Ten: Habitats Regulations Assessment Relevant to Nationally Significant Infrastructure Projects (PINS 2016) and has been submitted separately to this ES chapter.

3.11 Impact assessment

3.11.1 Construction

3.11.1.1 The impacts of the onshore construction of Hornsea Four have been assessed on Ecology and Nature Conservation receptors identified from the onshore ecological surveys undertaken to date. The environmental impacts arising from the construction of Hornsea Four assessed in this chapter are listed in **Table 3.15** along with the maximum design scenario against which each construction phase impact has been assessed.

3.11.1.2 A description of the potential effect on Ecology and Nature Conservation receptors caused by each identified impact is given below.

Direct impacts on designated sites during construction: temporary construction areas could occupy areas leading to loss and/or degradation of designated sites (ENC-C-1)

3.11.1.3 There are a total of four statutory designated sites within the Hornsea Four EP1HS survey area (i.e. within and up to 2 km from the Hornsea Four onshore Order Limits). Following embedded mitigation to avoid statutory designated sites during the route planning and selection process (Co2), only one designated site, the River Hull Headwaters SSSI, is located within the onshore ECC. One additional designated site, Bryan Mills Field SSSI, is located approximately 150 m from the onshore ECC and has therefore been considered further due to the potential for indirect effects to occur.

3.11.1.4 As part of the embedded mitigation (Co1), the River Hull Headwaters SSSI will be crossed using trenchless crossing techniques (e.g. HDD), in order to minimise direct impacts upon the site and the habitats or species for which it is designated (**Table 3.8**). The HDD entry and exit pits will be situated within agricultural fields at least 20 m away from the surface watercourse (Co18), outside of the riparian habitats immediately adjacent to the river (and SSSI). Therefore, potential direct effects upon the River Hull SSSI have been avoided. This is discussed further in **Chapter 2: Hydrology & Flood Risk**.

3.11.1.5 There is however the potential for indirect effects upon the qualifying features of both the River Hull Headwaters SSSI and Bryan Mills Field SSSI due to works on the land or within watercourses that are functionally connected to these designated sites. The following potential indirect effects have been identified:

- Potential indirect effects on local hydrological conditions within the River Hull channel due to buried cables;
- Potential indirect effects on water quality arising from accidental release of pollutants; and
- Potential indirect effects of increased traffic numbers on adjacent road networks.

3.11.1.6 The assessment of the potential indirect effects on the River Hull Headwaters SSSI arising from changes in hydrology is presented in the hydrology and flood risk tab of **Volume A4, Annex 5.1: Impacts Register**. Mitigation measures relating to the potential for indirect

effects on water quality due to the accidental release of pollutants are outlined within **Volume F2, Chapter 2: Outline Code of Construction Practice**.

3.11.1.7 Potential indirect effects as a result of increased traffic numbers as well as in-combination effects arising from other developments within a 5 km buffer of these two SSSI areas is discussed in detail within **Chapter 9: Air Quality**. However, a brief summary as well as an ecological interpretation of the air quality assessment results and an assessment of the significance of these impacts is provided below. The air quality assessment has been undertaken in transects of habitat associated to both the River Hull Headwaters and Bryan Mills Field SSSIs that are situated at the closest proximity of roads that will be utilised by Hornsea Four during construction.

3.11.1.8 It should be noted that background levels of nutrient nitrogen, ammonia and acid deposition are already in exceedance at both Bryan Mills Field SSSI and River Hull Headwaters SSSI, due to agricultural practices and regular traffic at locations where the air quality assessment was undertaken. Current Natural England SSSI conditions assessments conclude that both these SSSI habitats are currently listed as in 'favourable' condition.

Bryan Mills Field SSSI

3.11.1.9 At Bryan Mills Field SSSI, the impact of the project alone has concluded to not be significant in EIA terms on nutrient nitrogen deposition, NOx, acid deposition or ammonia concentrations, at 1 % of the highest critical load, 1.9 % of the critical level and 1.6 % of the critical level respectively.

River Hull Headwaters SSSI

3.11.1.10 The impact of the project alone has concluded to not be significant in EIA terms on nutrient nitrogen deposition (0.5 % of highest critical load), acid deposition (0.1 %), NOx (0.3 % of critical level) and ammonia concentrations (1 % of critical level).

3.11.1.11 The range of critical loads for acid used during the air quality assessment was based on the broad habitat type within their transect, consisting of broadleaved woodland. The range of critical loads for broadleaved woodland is quite large, and as such, as total deposition (i.e. including background deposition), the lowest critical load is exceeded. However, the mid and higher end of the critical load ranges are not.

3.11.1.12 The impacts associated with increased acid deposition, nutrient nitrogen deposition and ammonia within the air or the deposition of nitrogen on to the vegetation can result in the degradation of habitats through nutrification or direct toxicity. Increases could result in harmful effects and habitat changes and will potentially cover a 43-month maximum construction period. However, it should be noted that current background levels associated with existing traffic numbers and agricultural development projects in the wider area

already exceed critical load levels for both the River Hull Headwaters SSSI and Bryan Mills Field SSSI.

3.11.1.13 Embedded mitigation measures (as set out in **Volume F2, Chapter 2: Outline Code of Construction Practice** and secured through Co124) that will be incorporated within 200 m of the River Hull Headwaters SSSI and Bryan Mills Field SSSI in order to minimise air emissions will include (as agreed with Natural England at an evidence plan technical panel meeting on 13 November 2019 (ON-AQ-3.1) :

- Dust mitigation management measures as detailed within Institute of Air Quality Management (IAQM) guidance (IAQM 2014) will be adopted;
- All Hornsea Four site vehicles will comply with the requirements of the Construction Traffic Management Plan (CTMP) (an outline CTMP forms appendix F of **Volume F2, Chapter 2: Outline Code of Construction Practice**);
- Ensuring all vehicles switch off engines when stationary, no idling vehicles; and
- Avoidance of the use of diesel or petrol powered generators, where practicable.

Magnitude of impact

3.11.1.14 With the embedded mitigation as outlined in **Paragraph 3.11.1.13**, and taking into consideration the existing elevated levels of deposition within both SSSIs, the impact is predicted to be immeasurable, undetectable or within the range of normal natural variation change to the extent and condition of habitat with no exceedance of benchmark limits as a result of the project. The magnitude is therefore considered to be **negligible**.

Sensitivity of receptor

3.11.1.15 The sensitivity of both the River Hull Headwaters SSSI and Bryan Mills Field SSSI is considered to be **medium**, reflecting that there is some ability to tolerate this effect but a detectable change in distribution will occur, largely due to the current background levels of pollutant deposition that is already experienced at both sites.

Receptor importance

3.11.1.16 All statutory sites for nature conservation are considered to be of **high** importance.

Significance of effect

3.11.1.17 Overall, it is predicted that the importance of this receptor is **high,** and the magnitude of the impact is **negligible**. The effect is therefore of **minor adverse** significance.

Impacts on bat species during construction: construction activities will temporarily occupy areas leading to loss and/or degradation of habitat and loss of habitat connectivity used by bats for roosting, commuting and/or foraging (ENC-C-3).

3.11.1.18 As presented in Section 3.7 a total of six different species of bats, including three that are considered to be Species of Principal Importance (NERC 2006) have been recorded utilising habitats within the Hornsea Four Order Limits for commuting and foraging purposes. However, no bat roosts have been identified within or up to a 15 m buffer of the Hornsea Four Order Limits.

3.11.1.19 Construction works associated with Hornsea Four has the potential to affect habitats that may be utilised by commuting and foraging bats. Key considerations for determining the magnitude of the impact include the following parameters:

- The extent of habitat disturbance;
- The duration of habitat disturbance; and
- The timing of disturbance.

3.11.1.20 The maximum construction period across the Hornsea Four onshore Order Limits will be a total of 43 months (landfall is 32 months, onshore ECC is 30 months, logistics compounds are 36 months and the OnSS is 43 months). However, the precise duration of impacts at any one location will be dependent on the specific construction sequence to be followed at that location and the prevailing ground conditions. Currently, no habitat reinstatement works are planned be undertaken along the onshore ECC until construction works have been completed.

3.11.1.21 The number of crossings that have been identified as potentially affecting habitats utilised by bats (i.e. hedgerows and/or watercourses) is 85. The maximum width of the onshore ECC during construction will be 80 m, except at the Network Rail railway crossing and on the approach the landfall and OnSS (Co7).

3.11.1.22 Furthermore, the OnSS and its associated temporary logistics compound are situated adjacent to known and well used bat commuting and foraging routes. These routes were identified during baseline data collection surveys.

3.11.1.23 The following impacts are considered with regard to bats:

- Degradation of key habitats used by commuting and/or foraging bats; and
- Disturbance of commuting and/or foraging bats.

3.11.1.24 Impacts associated with construction works will potentially cover a 43-month maximum construction period, representing three separate active bat seasons and is therefore considered to be a potentially long-term impact. This disruption to commuting and/or foraging bats includes the potential for affecting access to feeding locations or potentially

affecting access to temporary or maternity roosts that may be located outside the Hornsea Four Order Limits.

Magnitude of impact

3.11.1.25 Embedded mitigation outlined as part of the project design is presented in **Table 3.15** with further information on the individual commitments the project has made contained in **Table 3.14**. With the inclusion of these measures, the impact is predicted to consist of localised disturbance and/or loss of habitat, that does not threaten the long-term viability or function of the receptor. The magnitude is therefore considered to be **medium**.

Sensitivity of the receptor

3.11.1.26 The sensitivity of bat species is considered to be **medium**, reflecting that the receptor has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

Receptor importance

3.11.1.27 All bats are EPS, and in line with the parameters in **Table 3.16**: , all bat species are considered to be of **high** importance.

Significance of the effect

3.11.1.28 Overall, it is predicted that the importance of the receptor is **high**, and the magnitude of the impact is **medium**. The effect is of **major adverse** significance due to the disruption of bat commuting and foraging corridors.

Further mitigation

3.11.1.29 Additional mitigation measures to those embedded within the project design have been agreed with relevant stakeholders during the Evidence Plan process, these are presented within **Volume F2, Chapter 3: Outline Ecological Management Plan** and include the following considerations:

- Where removal of sections of hedgerows is required to enable construction works, moveable features will be employed on a nightly basis to ensure continuation of current commuting routes for commuting and/or foraging bats. The moveable features will be of a size and density relative to the hedgerow that is removed and will be put in place at least one hour before dusk each day and removed no earlier than 30 minutes after dawn.
- Lighting required during construction works at the OnSS will only operate when necessary and will be directional to avoid unnecessary illumination. All necessary lighting will be designed to minimise light scatter (kept near or below the horizontal) and in line with Guidance Note 8 – Bats and Artificial Lighting (ILP 2018) which states the following:
    - Illuminance below 0.5 lux directly on features utilised by commuting/foraging bats;

- No UV elements to lighting design
- Use of LED lighting where possible
- Use of a warm light spectrum (i.e. <2700 Kelvin)
- Lighting mounted on the horizontal with no upward tilt
- External lighting should comprise of short (approximately 1 minute) motion sensor timing
- Use of appropriate accessories (such as hoods) to reduce light spill; and
- Lighting directed inwards and not outwards into the commuting corridor.

3.11.1.30 With the adoption of the additional mitigation measures, the magnitude is reduced to **negligible**. The effect is therefore of **minor adverse** significance.

Impacts on breeding and/or wintering bird species during construction: construction activities will temporarily occupy areas leading to loss and/or degradation of habitat and loss of habitat connectivity used by breeding and/or wintering birds (ENC-C-4).

3.11.1.31 As presented in **Section 3.7** a varied assemblage of breeding and over-wintering birds has been recorded within the Hornsea Four Order Limits. Of the species recorded, a number of BoCC4 'red list' and 'amber list' birds were recorded and some species that are protected under Schedule 1 of the Wildlife and Countryside Act, 1981. Survey results showed that those species identified were to be expected within the context of the habitats present within the Hornsea Four onshore Order Limits, these included a number of farmland passerines, ducks, geese, waders and migratory thrushes. In addition, two confirmed breeding pairs of barn owl were recorded during the Hornsea Four breeding bird survey (**Volume A6, Annex 3.4: Breeding Bird Survey Report**).

3.11.1.32 The habitats and bird assemblages recorded during both the breeding bird survey and the over-wintering bird survey were consistent with the wider landscape, with similar habitats available throughout the surrounding agricultural area.

3.11.1.33 Construction works associated with Hornsea Four has the potential to affect habitats that may be utilised by breeding and over-wintering bird species, or the potential to disrupt their feeding options. Key considerations for determining the magnitude of the impact include the following parameters:

- The extent of habitat disturbance;
- The duration of habitat disturbance; and
- The timing of construction works.

3.11.1.34 Whilst the total maximum construction period for cable installation at the landfall will be 32 months, with the total over the entire onshore ECC being 30 months, the precise duration of impacts at any one location will be dependent on the specific construction sequence to be followed at that location and the prevailing ground conditions. Furthermore, the maximum width of the onshore ECC during construction will be 80 m, except at the Network Rail railway crossing and on the approach the landfall and OnSS (Co7).

3.11.1.35 The following impacts are considered with regard to designated sites:

- Degradation of key habitats used by over-wintering and breeding bird species; and
- Disturbance of over-wintering and breeding bird species.

Magnitude of impact

3.11.1.36 Embedded mitigation (Co2, Co7, Co26, Co27, Co68, Co122, Co4, Co33. Co114, Co124 and Co168) outlined as part of the project design is presented in **Table 3.15** with further information on the individual commitments the project has made contained in **Table 3.14**. With the inclusion of these measures the impact is considered to be **low**, indicating that the disturbance (and degradation) is minimal such that there is no net loss of viability or function of the habitat.

Sensitivity of the receptor

3.11.1.37 The sensitivity of breeding and over-wintering birds is considered to be **medium**, reflecting that the receptor has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

Receptor importance

3.11.1.38 According to the parameters in **Table 3.16**, breeding and over-wintering bird species such as those recorded during the over-wintering bird survey effort are considered to be of **high** importance.

Significance of the effect

3.11.1.39 Overall, it is predicted that the importance of the receptor is **high**, and the magnitude of the impact is **low**. The effect is of **moderate adverse** significance.

Further mitigation

3.11.1.40 Additional mitigation measures (as listed below) to those embedded within the project design have been agreed with relevant stakeholders during the Evidence Plan process (ON-ECO-3.4, ON-ECO-3.13), these are presented within **Volume F2, Chapter 3: Outline Ecological Management Plan** and include the following considerations:

- Inclusion of a maximum 100 m buffer around the location of the barn owl nest within the Hornsea Four Order Limits to allow the micro-siting of the landfall access track, following the findings from the pre-construction surveys. Further information on pre-construction surveys is contained in **Volume F2, Chapter 3: Outline Ecological Management Plan**.

3.11.1.41 With the adoption of the additional mitigation measures, the magnitude is reduced to **negligible**. The effect is therefore of **minor adverse** significance.

Impacts on otter and/or water vole during construction: open cut trenching and HDD used to cross watercourses with otter and/or water vole potential could lead to loss of habitat, disturbance and/or connectivity severance (ENC-C-5).

3.11.1.42 As presented in **Section 3.7** no signs of otter (including holts or resting places) were recorded within the Hornsea Four Order Limits during the 2019 survey effort. A low population density of water vole was recorded in six watercourses within the Hornsea Four Order Limits.

3.11.1.43 Construction works associated with Hornsea Four has the potential to affect habitats that may be utilised by water vole or otter, or the potential to disrupt otter commuting routes. Key considerations for determining the magnitude of the impact include the following parameters:

- The extent of habitat disturbance; and
- The duration of habitat disturbance.

3.11.1.44 Although water vole presence has been recorded within a total of six watercourses, at low population densities, only one watercourse is to be crossed using open cut methodologies. The remaining five watercourses with water vole presence will be crossed by trenchless techniques (i.e. HDD) (Co1) (**Volume A4, Annex 4.2: Onshore Crossing Schedule**) and therefore no impact assessment is required. A displacement exercise for the one watercourse to be crossed using open cut methodologies will be undertaken in accordance with an approved low impact water vole licence from Natural England. This approach will be implemented to ensure no water voles are present prior to the onset of the construction programme. Further details are presented within **Volume F2, Chapter 3: Outline Ecological Management Plan**.

3.11.1.45 Whilst the total maximum construction period for cable installation at the landfall will be 32 months, with the total over the entire onshore ECC being 30 months, the precise duration of impacts at any one location will be dependent on the specific construction sequence to be followed at that location and the prevailing ground conditions. Furthermore, the maximum width of the onshore ECC during construction will be 80 m, except at the Network Rail railway crossing and on the approach the landfall and OnSS (Co7).

3.11.1.46 The following impacts are considered with regard to water vole and otter:

- Degradation of key habitats used by water vole and otter; and
- Disturbance of water vole and otter.

Magnitude of impact

3.11.1.47 Embedded mitigation measures (which are secured through Co1, Co4, Co7, Co18, Co41, Co69, Co114, Co122, Co123, Co124, Co157, Co168, Co170 and Co172) outlined as part of the project design is presented in **Table 3.15** with further information on the individual commitments the project has made contained in **Table 3.14**. With the inclusion of these measures the impact is predicted to be immeasurable, undetectable or within the range of normal natural variation change to the extent and condition of habitat. Therefore, the magnitude is considered to be **negligible**.

Sensitivity of the receptor

3.11.1.48 The sensitivity of water vole and otter is considered to be **medium**, reflecting that the receptor has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

Receptor importance

3.11.1.49 According to the parameters in **Table 3.16**: , water vole and otter are considered to be of **high** importance.

Significance of the effect

3.11.1.50 Overall, it is predicted that the importance of the receptor is **high,** and the magnitude is **negligible**. The effect is of **minor adverse** significance, which is not significant in EIA terms.

Impacts on great crested newt populations during construction: works in or within 250 m of waterbodies with great crested newt potential could cause habitat loss, degradation, habitat severance and harm or kill individual animals (ENC-C-6).

3.11.1.51 As presented in **Section 3.7** one of the ponds surveyed for the presence of great crested newt returned a positive result. This pond is situated approximately 200 m from the onshore ECC with a ditch and hedgerow present between the two locations forming a potential corridor of access. Additionally, one pond remains to be surveyed for great crested newts, which will be undertaken during pre-construction ecological surveys (for further details see **Volume F2, Chapter 3: Outline Ecological Management Plan**). Should the presence of great crested newts be confirmed in this pond, mitigation will be required.

3.11.1.52 The potential impacts to great crested newt as a result of Hornsea Four include the following:

- Risk of killing or injuring foraging great crested newts during the construction phase; and
- Temporary terrestrial habitat loss (including agricultural land) for the duration of the onshore construction period (43 months).

3.11.1.53 Potential worst-case mitigation measures which might be required, for the pond with confirmed great crested newt presence as well as the one pond that remains to be surveyed, are set out in a draft great crested newt mitigation licence application. A copy of which has been submitted and agreed with Natural England (ON-ECO-3.19). This document outlines the mitigation measures, in accordance with the Great Crested Newt Mitigation Guidelines (English Nature 2001) and include the following measures (**Volume F2, Chapter 3: Outline Ecological Management Plan**):

- A capture and release programme under licence, including the use of exclusion fencing and receptor sites for translocation, ensuring that fragmentation and severance of GCN is negated/minimised, where practicable;
- Terrestrial habitat reinstatement;
- Ecological supervision of the works; and
- A programme of post-construction monitoring.

Magnitude of impact

3.11.1.54 Embedded mitigation measures (which are secured through Co2, Co4, Co7, Co26, Co36, Co78, Co114, Co119, Co122, Co124 and Co168) outlined as part of the project design is presented in **Table 3.15** with further information on the individual commitments the project has made contained in **Table 3.14**. With the inclusion of these measures the impact is considered to be **negligible**, indicating that the potential disturbance is immeasurable, undetectable or within the range of normal natural variation change to the extent and condition of the habitat.

Sensitivity of the receptor

3.11.1.55 The sensitivity of great crested newt is considered to be **medium**, reflecting that the receptor has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

Receptor importance

3.11.1.56 According to the parameters in **Table 3.16**: , great crested newts are an EPS and are considered to be of **high** importance.

Significance of the effect

3.11.1.57 Overall, it is predicted that the importance of the receptor is **high**, and the magnitude is **negligible**. The effect is of **minor adverse** significance, which is not significant in EIA terms.

Impacts on badgers during construction: Construction activities could disturb badger setts and/or lead to temporary severance of badger territories (ENC-C-9).

3.11.1.58 As presented in **Section 3.7** a number of badger field signs (including two active main setts and one disused main sett) have been recorded within and up to 50 m of the Hornsea Four Order Limits. Hornsea Four has actively avoided the two active main setts by re-routing the onshore ECC to be outside of the industry accepted 30 m disturbance buffer for active badger setts. The third (disused) sett will be subject to further surveys to determine the status prior to construction (Co168). The three outlier setts recorded in June 2021 will be subject to a badger mitigation licence application prior to construction, if the pre-construction surveys confirm they remain present and in use by badgers, to ensure no adverse harm to badgers during the project construction period.

3.11.1.59 Construction works associated with Hornsea Four has the potential to affect habitats that form badger territories, or the potential to disrupt their feeding options. Key considerations for determining the magnitude of the impact include the following parameters:

- The extent of habitat disturbance;
- The duration of habitat disturbance; and
- The access of badgers through habitats subject to construction works.

3.11.1.60 Whilst the total maximum construction period for cable installation at the landfall will be 32 months, with the total over the entire onshore ECC being 30 months, the precise duration of impacts at any one location will be dependent on the specific construction sequence to be followed at that location and the prevailing ground conditions. Furthermore, the maximum width of the onshore ECC during construction will be 80 m, except at the Network Rail railway crossing and on the approach the landfall and OnSS (Co7).

3.11.1.61 The following impacts are considered with regard to badgers:

- Degradation of key habitats used by badgers; and
- Disturbance of badgers.

Magnitude of impact

3.11.1.62 Embedded mitigation measures (which are secured through Co2, Co7, Co26. Co35, Co36, Co41, Co68, Co69, Co1114, Co122, Co123, Co124 and Co168) outlined as part of the project design is presented in **Table 3.15** with further information on the individual commitments the project has made contained in **Table 3.14**. With the inclusion of these measures the magnitude of the impact that construction activities relating to Hornsea Four will have on badgers is considered to be **medium**, indicating that the potential disturbance is localised and such that there it does not threaten the long term viability or function of the habitat.

Sensitivity of the receptor

3.11.1.63 The sensitivity of badgers is considered to be **low**, reflecting that the receptor will be largely unaffected the potential impacts and could recover within the short term (e.g. 1 year) following the completion of the project.

Receptor importance

3.11.1.64 As a regularly occurring population of a nationally important species which is not threatened or rare in the country, and according to the parameters in **Table 3.16**, badgers are considered to be of **low** importance.

Significance of the effect

3.11.1.65 Overall, it is predicted that the importance of the receptor is **low,** and the magnitude is **medium**. The effect is of **minor adverse** significance.

3.11.2 Operation and Maintenance

3.11.2.1 The impacts of the onshore operation and maintenance of Hornsea Four has been assessed on ecology and nature conservation with within the following sections. The environmental impacts arising from the operation and maintenance of Hornsea Four are listed in **Table 3.15** along with the maximum design scenario against which each operation and maintenance phase impact has been assessed.

Impacts on habitats or species during operation: operation of the onshore substation will cause long term habitat loss, degradation and potential displacement of protected species (ENC-O-11).

3.11.2.2 As presented in **Section 3.7** the predominant habitat type in and around the Hornsea Four OnSS is arable land, consisting of crops, ploughed fields and species poor hedgerows. Arable land is typically of low ecological value due to the homogeneity of the habitat alongside farming practices and the presence of herbicides and pesticides within crops. Furthermore, species specific surveys have been undertaken within the footprint of the OnSS (plus an additional 50 m buffer to account for habitats immediately adjacent to the Order Limits). Results from the species-specific surveys are also presented in **Section 3.7**. Baseline surveys undertaken to date have not resulted in the identification of any protected plants or species within the footprint of the OnSS. However, several bat species have been recorded utilising the hedgerows that are present within the Hornsea Four bat survey area, including those present around the perimeter of the planned placement of the OnSS. Similarly, GCN may use this habitat to reach foraging areas. Further consideration with regard to protected species such as bats is provided within the impact assessment for ENC-O-14 below.

3.11.2.3 Furthermore, as detailed within **Chapter 6: Land Use and Agriculture**, disruption and reduction of land during the project operation and maintenance phase was 'scoped out' of assessment at the project scoping stage, as agreed by the Planning Inspectorate (ON-ECO-

3.14). The OnSS consists of a total 20 ha above ground infrastructure predominantly within the centre of an existing agricultural field.

Magnitude of impact

3.11.2.4 The magnitude of this impact is considered to be **low**, in that it will consist of short-term disturbance and/or loss/degradation of habitat, such that there is no loss of viability or function of the habitat.

Sensitivity of the receptor

3.11.2.5 The sensitivity of the receptor is considered to be **low** as it will remain unaffected.

Receptor importance

3.11.2.6 According to the parameters in **Table 3.16**: , agricultural habitats such as those recorded within the footprint of the OnSS are considered to be of **negligible** importance.

Significance of the effect

3.11.2.7 Overall, it is predicted that the importance of the receptor is **negligible** and the magnitude of the impact is **low**. The effect is therefore of **negligible** significance.

Impacts on protected species during operation: operation and maintenance activities of the onshore substation could cause disturbance to protected species (ENC-O-14).

3.11.2.8 As presented in **Section 3.7** a suite of species-specific ecological surveys were undertaken within the onshore Hornsea Four Order Limits (plus a 50 m buffer). Surveys were undertaken in relation to great crested newts, water voles, otter, bats, over-wintering birds and breeding birds. Results from these surveys indicate a low or non-existent presence of the majority of protected species in and around the footprint of the OnSS. The existing field boundaries, consisting of species poor intact hedgerows and small woodland corridors are planned to be incorporated into landscaping options (as detailed within **Volume F2, Chapter 8 Outline Landscape Management Plan**).

3.11.2.9 As presented in ENC-C-3 previously (**Paragraph 3.11.1.18**), a diverse range of bat species was recorded utilising the existing hedgerow networks surrounding the OnSS site. These hedgerows are largely going to be left intact (**Volume A4, Annex 4.2: Onshore Crossing Schedule**), with sections removed to enable the onshore ECC connection works alongside the connection works to the existing Creyke Beck NGET substation. Specific mitigation measures (detailed in Section 4.4; **Volume F2, Chapter 3: Outline Ecological Management Plan**) have been identified to protect the bat commuting and foraging areas. The additional measures include the incorporation of a 10 m 'dark corridor' around the northern and eastern edges of the OnSS, to ensure minimal light spill during operation of the Hornsea Four OnSS. These measures have been agreed with the YWT, the EA and Natural England as part of the

Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 13th November 2019 and the 1st April 2020 (ON-ECO-3.8 and ON-ECO-3.15).

Magnitude of impact

3.11.2.10 The magnitude of the impact that operation and maintenance activities relating to Hornsea Four will have on protected species, such as bats, is considered to be **negligible**, indicating that the potential disturbance is immeasurable, undetectable or within the range of normal natural variation change to the extent and condition of habitat.

Sensitivity of the receptor

3.11.2.11 The sensitivity of protected species, such as bats, is considered to be **medium**, reflecting that the receptor has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

Receptor importance

3.11.2.12 All bats are EPS, and in line with the parameters in **Table 3.16**: , all bat species are considered to be of **high** importance.

Significance of the effect

3.11.2.13 Overall, it is predicted that the importance of the receptor is **high,** and the magnitude is **negligible**. The effect is of **minor adverse** significance.

3.11.3 Decommissioning

3.11.3.1 The impacts of onshore decommissioning of Hornsea Four have been assessed on Ecology and Nature Conservation receptors. The environmental impacts arising from the decommissioning of Hornsea Four are listed in **Table 3.15** along with the maximum design scenario against which each decommissioning phase impact has been assessed.

Impacts on protected species during decommissioning: decommissioning of the onshore substation could lead to temporary disturbance or displacement of protected species (ENC-D-18).

3.11.3.2 As presented in **Section 3.7** a suite of species-specific ecological surveys were undertaken within the onshore Hornsea Four Order Limits (plus a 50 m buffer). Surveys were undertaken in relation to great crested newts, water voles, otter, bats, over-wintering birds and breeding birds. Results from these surveys indicate a low or non-existent presence of the majority of protected species in and around the footprint of the OnSS.

3.11.3.3 As presented in ENC-C-3 and ENC-O-14 previously, a diverse range of bat species was recorded utilising the existing hedgerow networks surrounding the OnSS site.

3.11.3.4 Hornsea Four decommissioning plans currently consist of the dismantling of above ground infrastructure at the OnSS (Co127). Key considerations for determining the magnitude of the impact include the following parameters:

- The extent of habitat disturbance;
- The duration of habitat disturbance; and
- The timing of construction works.

3.11.3.5 The total maximum construction period for decommissioning is currently unknown. Decommissioning would be subject to the same working practices, guidance and adherence to the projects' CoCP (Co124) and EMP (Co168) requirements. Furthermore, Co127 confirms that a Decommissioning Plan will be produced, which will outline and agree on the associated activities, and be in line with the latest available guidance. The approach to decommissioning has been agreed with Natural England, the EA and YWT as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 13th November 2019 (ON-ECO-3.15, ON-ECO-3.16 and ON-ECO-3.17).

3.11.3.6 Further details on relevant commitments that Hornsea Four has embedded within the project design that are applicable, these are shown in **Table 3.14**.

Magnitude of impact

3.11.3.7 The magnitude of the impact that decommissioning activities relating to the Hornsea Four OnSS will have on protected species, such as bats is considered to be no greater than those experienced during construction. This conclusion was agreed with Natural England, the EA and YWT as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 13th November 2019 (ON-ECO-3.15, ON-ECO-3.16 and ON-ECO-3.17). Furthermore, the same embedded mitigation measures (secured through Co127) outlined as part of the project design will be applicable, therefore the impact is predicted to consist of minimal disturbance and/or loss of habitat, such that there is no loss of viability or function of the habitat. The magnitude is therefore considered to be **medium**.

Sensitivity of the receptor

3.11.3.8 The sensitivity of bat species is considered to be **medium**, reflecting that the receptor has some ability to tolerate the potential impacts and could potentially recover to an acceptable status over a 10-year period.

Receptor importance

3.11.3.9 All bats are EPS, and in line with the parameters in **Table 3.16**: , all bat species are considered to be of **high** importance.

Significance of the effect

3.11.3.10 Overall, it is predicted that the importance of the receptor is **high**, and the magnitude of the impact is **medium**. The effect is of **major adverse** significance due to the disruption of bat commuting and foraging corridors.

Further mitigation

3.11.3.11 Additional mitigation measures to those embedded within the project design (which is secured through Co127), have been agreed with stakeholders (i.e. Natural England, the EA and YWT as part of the Hornsea Four onshore Ecology Evidence Plan Technical Panel meeting held on the 13th November 2019 (ON-ECO-3.15, ON-ECO-3.16 and ON-ECO-3.17)) during the Evidence Plan process, these are presented within **Annex F2, Chapter 3: Outline Ecological Management Plan**.

3.11.3.12 With the adoption of these additional mitigation measures, the magnitude is reduced to **negligible**. The effect is therefore of **minor adverse** significance.

3.12 Cumulative effect assessment (CEA)

3.12.1.1 Cumulative effects can be defined as:

- effects upon a single receptor to arise as a result of impact interaction between different environmental topics from Hornsea Four; and
- incremental effects on that same receptor from other proposed and reasonably foreseeable projects and developments in combination with Hornsea Four. This includes all projects that result in a comparative effect that is not intrinsically considered as part of the existing environment and is not limited to offshore wind projects.

3.12.1.2 The overarching method followed in identifying and assessing potential cumulative effects in relation to the onshore environment is set out in **Volume A4, Annex 5.5: Onshore Cumulative Effect Screening Matrix** and **Volume A4, Annex 5.6: Location of Onshore Cumulative Schemes**. The approach is based upon the Planning Inspectorate (PINS) Advice Note 17: Cumulative Effects Assessment (PINS 2017). The approach to the CEA is intended to be specific to Hornsea Four and takes account of the available knowledge of the environment and other activities around the Order Limits.

3.12.1.3 The CEA has followed a four-stage approach developed from PINS Advice Note 17. These stages are set out in Table 2 of **Volume A4, Annex 5.5: Onshore Cumulative Effects**, with Table 4 detailing the onshore long list search area extents or Zone of Impacts for each topic area. The proposed tier structure that is intended to ensure that there is a clear understanding of the level of confidence in the cumulative assessments provided in the Hornsea Four ES is set out in Table 3 of **Volume A4, Annex 5.5: Onshore Cumulative Effects**.

3.12.2 CEA Stage 2 Shortlist and Stage 3 Information Gathering

3.12.2.1 A short list of projects for CEA has been produced using the screening buffer/criteria set out in Table 2 of **Volume A4, Annex 5.5: Onshore Cumulative Effects**. Information regarding all other developments is provided in **Volume A4, Annex 5.5: Onshore Cumulative Effects** and **Volume A4, Annex 5.6: Location of Onshore Cumulative Schemes**.

3.12.2.2 A total of 17 projects have been identified for inclusion on the shortlist of projects to be assessed cumulatively for ecology and nature conservation. Projects that have not been considered as resulting in likely cumulative significant effects (for this topic) are not considered to be functionally connected to habitats within the Hornsea Four Order Limits, or do not have an overlap in project timescales. Summary information on the shortlist projects progressing through this exercise (i.e. the short-list of other projects) for assessment on ecology and nature conservation is provided below in **Table 3.21**.

3.12.3 CEA Stage 3 Assessment

3.12.3.1 As stated in Table 2 of **Volume A4, Annex 5.5: Onshore Cumulative Effects**, the assessment is undertaken in two phases:

- **Table 3.20** sets out the potential impacts assessed in this chapter and identifies the potential for cumulative effects to arise, providing a rationale for such determinations; and
- **Table 3.21** sets out the CEA for each of the projects/developments that have been identified on the short-list of projects screened.

3.12.3.2 It should be noted that the second phase of this assessment is only undertaken if the first phase identifies that cumulative effects are possible. This summary assessment is set out in **Table 3.20**.

Table 3.20: Potential cumulative effects.

Impact		Potential for cumulative effect	Rationale
Construction			
ENC-C-1	Direct impacts on designated sites during construction: temporary construction areas could occupy areas leading to loss and/or degradation of designated sites	Yes	Cumulative impacts to designated sites as described in Section 3.10 could occur if other developments are within close enough proximity to the SSSIs and, depending on the type of development, are either in construction or operation at the same time as Hornsea Four.
ENC-C-3	Impacts on bat species during construction: construction activities will temporarily occupy areas leading to loss and/or degradation of habitat and loss of habitat connectivity used by bats for roosting, commuting and/or foraging.	Yes	Cumulative disruption to bat commuting and/or foraging routes could occur if other developments which affect linear features (such as hedgerows, watercourses and woodland edges) are within close enough proximity to the Hornsea Four Order Limits and their construction timelines overlap.
ENC-C-4	Impacts on breeding and/or wintering bird species during construction: construction activities will temporarily occupy areas leading to loss and/or degradation of habitat and loss of habitat connectivity used by breeding and/or wintering birds.	Yes	Cumulative disruption to habitats utilised by over-wintering birds and breeding birds could occur if other development plans include the occupation of these habitats and they are in close enough proximity to the Hornsea Four Order Limits.
ENC-C-5	Impacts on otter and/or water vole during construction: open cut trenching and HDD used to cross watercourses with otter and/or water vole potential could lead to loss of habitat, disturbance and/or connectivity severance.	Yes	Impacts to watercourses utilised by commuting otters could be exacerbated if other developments include works on watercourses within close enough proximity to the Hornsea Four Order Limits. Impacts to water voles could occur if other developments are within close enough proximity to displaced water voles as a result of the construction works associated with Hornsea Four.
ENC-C-6	Impacts on great crested newt populations during construction: works in or within 250 m of waterbodies with great crested newt potential could cause habitat	Yes	Impacts to terrestrial habitats could be exacerbated if other developments are within a 250 m buffer of the Hornsea Four Order Limits.

Impact		Potential for cumulative effect	Rationale
	loss, degradation, habitat severance and harm or kill individual animals.		
ENC-C-9	Impacts on badgers during construction: Construction activities could disturb badger setts and/or lead to temporary severance of badger territories.	Yes	Cumulative impacts could occur if other developments are within close enough proximity to the Hornsea Four Order Limits.
Operation			
ENC-O-11	Impacts on habitats or species during operation: operation of the onshore substation will cause long term habitat loss, degradation and potential displacement of protected species.	Yes	Cumulative impacts could occur if another development is within close enough proximity of the Hornsea Four OnSS and utilises similar habitats found within, and immediately adjacent, to the Hornsea Four OnSS.
ENC-O-14	Impacts on protected species during operation: operation and maintenance activities of the onshore substation could cause disturbance to protected species.	Yes	Cumulative impacts could occur if another development is within close enough proximity of the Hornsea Four OnSS and utilises similar habitats found within, and immediately adjacent, to the Hornsea Four OnSS.
Decommissioning			
ENC-D-18	Impacts on protected species during decommissioning: decommissioning of the onshore substation could lead to temporary disturbance or displacement of protected species.	Yes	Cumulative impacts could occur if another development is within close enough proximity of the Hornsea Four OnSS and utilises similar habitats found within, and immediately adjacent, to the Hornsea Four OnSS.

3.12.3.3 The second phase of the CEA is a project specific assessment of the potential for any significant cumulative effects to arise due to the construction and/or operation and maintenance of Hornsea Four. To identify whether this may occur, each shortlisted project is discussed in **Table 3.21**.

3.12.3.4 The CEA has been based on information available on each potential project (e.g. as set out on the ERYC planning portal or in an attendant, available ES) and it is noted that the project details available may change in the period up to construction or may not be available in detail at all. The assessment presented here is therefore considered to be conservative, with the level of impacts expected to be reduced compared to those presented here.

3.12.3.5 The CEA has not identified any potential impacts that are considered to be of any greater significance than those identified in isolation and no cumulative effects of significance are forecast.

3.12.3.6 If a project has been cancelled, withdrawn or rejected since the CEA was conducted at PEIR stage (Orsted 2019), it has been removed from **Table 3.21** and is not considered any further.

Table 3.21: CEA for ecology and nature conservation.

Project Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
Jocks Lodge Highway Improvement Scheme	1	Due to the proximity of the development to the project there is the potential for cumulative effects of a direct and / or indirect nature on the receptors identified. However, due to the nature of the development and the regulatory regime under which it will be constructed, it is assumed (with high confidence) that appropriate mitigation measures (including a robust ecological mitigation strategy) are to be incorporated into the design thus limiting the potential for cumulative effects to occur. With planning permission for the Jock Lodge improvement scheme granted in July 2020, it is anticipated that the majority of construction works will have been completed prior to the start of construction works at Hornsea Four in 2024.	No potential for significant cumulative effects.
Leconfield Post Office Development #1	1	Although located only 0.88 km away from the onshore Order Limits, an ecological assessment has been reviewed by the ERYC nature conservation officer, who states that there are no anticipated ecological concerns with the projects. Furthermore, there is not anticipated to be any temporal overlap in construction periods, therefore this project is scoped out of the CEA.	No potential for significant cumulative effects.
Leconfield Post Office Development #2			
Canada Drive Housing Development	1	Approval for this project was granted in March 2020, with the planning consent valid for commencing the development within two years of this date. The submitted Preliminary Ecological Appraisal (PEA) was reviewed by the ERYC nature conservation officer and approved with comment on the developer providing a robust ecological mitigation strategy. However, there is not anticipated to be a temporal overlap in construction periods and furthermore, the project will not be removing habitat favourable to any protected species that may be impacted as a result of the Hornsea Four construction programme, therefore this project is scoped out of the CEA	No potential for significant cumulative effects.
Watton Abbey Farm	1		

Project Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
Riverhead Hall Nursing Home	1	These projects generate nutrient nitrogen and acid deposition or NOx emissions which contribute to in-combination impacts at designated ecological sites. The contributions from these projects have been included in the impact assessment, in order to provide context in regard to the predicted impact of the project alone. The contributions and ensuing impact assessment for these projects has been derived using the Impact Risk Zones (IRZ) provided by Natural England. A full description and quantification of the air quality factors is included within **Chapter 9: Air Quality**, and the ecological evaluation of the impact assessment is presented in **Section 3.11** of this chapter.	Minor adverse (no significant effect)
The Beeches Building 1	1		
The Beeches Building 12			
Kirkburn Grange	1		
Church Farm	1		
Clitheroe	1		
Humberside Egg Laying Unit	1		
Thistledown Farm Livestock Building	1		
Driffield Road Egg Laying Uni	1		
Albanwise Solar Farm	1	The earliest construction start date for Hornsea Four is anticipated to be in 2024. A planning application for the solar farm and battery storage area has been submitted in August 2021, and although a start date for construction works is as yet unknown, there is the possibility that construction works could overlap. The EcIA submitted to support the planning application states that the dominant habitat is arable, which is of low ecological value. No evidence of legally protected or notable species were recorded in the surveys undertaken to inform the submitted EcIA. Appropriate biodiversity mitigation and enhancement measures, as agreed with the ERYC Biodiversity Officer, will be incorporated within the project design. It can therefore be assumed (with high confidence) that these mitigation and enhancement measures, as appropriate to the nature of the development and the regulatory regime under which it will be constructed, will limit the potential for cumulative effects to occur.	No potential for significant cumulative effects.
Creyke Beck substation expansion	3	Construction works associated with the expansion of an existing substation at Creyke Beck is anticipated to be between 2024 and 2027. The earliest construction date for Hornsea Four is also anticipated to be in 2024, therefore there is the potential that construction works would overlap. Whilst information is limited at this time, notable CEA impacts on ecological receptors are anticipated to be foraging /	No potential for significant cumulative effects.

Project Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
		commuting bats, reptiles and nesting birds. However, due to the nature of the development and the regulatory regime under which it will be constructed, it is assumed (with high confidence) that appropriate mitigation measures will be incorporated into the design thus limiting the potential for cumulative effects to occur.	
Scotland England Green Link 2 (SEGL2)	3	The earliest construction start date for Hornsea Four is anticipated to be in 2024. A planning application for the SEGL2 project is due to be submitted in March 2022. The proposed construction phase of the works is anticipated to start in 2024. Therefore, there is the potential for an overlap during construction phases of both SEGL2 and Hornsea Four. It is anticipated that the overlap between projects will be focused on the landfall location. Due to the nature of the development and the regulatory regime under which it will be constructed, it is assumed (with high confidence) that appropriate mitigation measures will be incorporated into the design thus limiting the potential for cumulative effects to occur.	No potential for significant cumulative effects.

3.12.3.7 The CEA for ecology and nature conservation has not identified any projects where significant cumulative effects could arise.

3.13 Transboundary effects

3.13.1.1 A screening of transboundary impacts has been carried out and is presented in Appendix K of the Environmental Impact Assessment: Scoping Report (Orsted 2018). This screening exercise identified that there was no potential for significant transboundary effects regarding ecology and nature conservation from Hornsea Four upon the interests of other European Economic Area (EEA) States and this is not discussed further.

3.14 Inter-related effects

3.14.1.1 Inter-related effects consider impacts from the construction, operation or decommissioning of Hornsea Four on the same receptor (or group). The potential inter-related effects that could arise in relation to ecology and nature conservation conditions are presented in **Table 3.22**. Such inter-related effects include both:

- **Project lifetime effects**: i.e. those arising throughout more than one phase of the project (construction, operation, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation; and
- **Receptor led effects**: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

3.14.1.2 A description of the process to identify and assess these effects is presented in Section 2 of **Volume A1, Chapter 5: EIA Methodology**.

Table 3.22: Inter-related effects assessment for ecology and nature conservation conditions.

Nature of inter-related effect		Assessment alone
Project-lifetime effects		
Construction, Operation and Decommissioning	Impacts to protected species, such as bats, have been assessed for all project stages	Minor adverse impacts following implementation of both embedded mitigation measures and additional mitigation measures to protect commuting and foraging routes utilised by bats within the habitats around the OnSS. It is not anticipated that any inter-related effects will be produced that are of greater significance than those already identified.
Receptor-led effects		
Air Quality: Potential inter-related effects on ecological receptors from noise and vibration and air quality (AQ-C-1, AQ-A-2, AQ-O-3, AQ-O-4 and AQ-D-5)		Due to concurrent multiple activities, the construction phase presents the most likely opportunity for receptor-led effects. A range of effective onshore construction phase mitigation is proposed as part of Hornsea Four, which would be implemented through the CoCP (Co124) and the EMP (Co168). An Outline CoCP (**Volume F2, Chapter 2**) and an Outline EMP (**Volume F2, Chapter 3**) has been provided as part of the ES. Impacts relating to air quality are presented in **Chapter 9: Air Quality**, with further information regarding the significance of those impacts on ecological receptors (i.e. through acid and nitrogen deposition on habitats) presented in **Section 3.11** of this chapter.

3.14.1.3 The assessment concludes that there are no significant inter-related impacts from the construction or operation of Hornsea Four on ecology and nature conservation.

3.15 Conclusion and summary

3.15.1.1 This chapter of the ES has assessed the potential impact of the onshore development of Hornsea Four on ecology and nature conservation receptors. Table 3.23 presents a summary of the significant impacts assessed within this Chapter, any mitigation measures and the residual effects.

3.15.1.2 Table 3.23 should be read in conjunction with the additional narrative included within Section 3.11, which demonstrates that provided the mitigation measures and individual commitments are in place to prevent impact on those receptors from the project, potential impacts are expected to be **minor** or **not significant** in relation to onshore ecological receptors.

Table 3.23: Summary of potential impacts assessed for Ecology and Nature Conservation.

Impact and Phase	Receptor and value/sensitivity	Magnitude and significance	Mitigation	Residual impact
Construction				
Direct impacts on designated sites during construction: Temporary construction areas could occupy areas leading to loss and/or degradation of designated sites (ENC-C-1)	High/Medium	Negligible Minor adverse	Embedded mitigation measures including; Co1, Co2, Co7, Co41, Co18, Co122, Co170, Co172, Co175, Co4, Co33, Co114, Co124, Co168.	Negligible Minor adverse
Direct impacts on bat species (ENC-C-3): Construction activities will temporarily occupy areas leading to loss and/or degradation of habitat and loss of habitat connectivity used by bats for roosting, commuting and/or foraging.	High/Medium	Medium Major adverse	Embedded mitigation measures including; Co2, Co7, Co26, Co27, Co36, Co30, Co68, Co69, Co122, Co4, Co114, Co123, Co124, Co168. Additional measures in line with standard industry guidance and agreed with stakeholders, included within the project OEMP as detailed in **Section 3.11.**	Negligible Minor adverse
Direct impacts on breeding and/or wintering bird species (ENC-C-4): Activities will temporarily occupy areas leading to loss and/or degradation of habitat and loss of	High/Medium	Low Moderate adverse	Embedded mitigation measures including; Co2, Co7, Co26, Co27, Co68, Co122, Co4, Co33, Co114, Co124, Co168.	Negligible Minor adverse

Impact and Phase	Receptor and value/sensitivity	Magnitude and significance	Mitigation	Residual impact
habitat connectivity used by breeding and/or wintering birds.				
Impacts on otter and/or water vole (ENC-C-5): Open cut trenching and HDD used to cross watercourses with otter and/or water vole potential could lead to loss of habitat, disturbance and/or connectivity severance.	High/Medium	Negligible Minor adverse	Embedded mitigation measures including; Co1, Co7, Co41, Co18, Co69, Co122, Co157, Co170, Co172, Co4, Co114, Co123, Co124, Co168, Co114, Co123, Co124, Co168.	Negligible Minor adverse
Impacts on great crested newt populations (ENC-C-6): Works in or within 250 m of waterbodies with great crested newt potential could cause habitat loss, degradation, habitat severance and harm or kill individual animals.	High/Medium	Negligible Minor adverse	Embedded mitigation measures including; Co2, Co4, Co7, Co26, Co36, Co78, Co119, Co122, Co114, Co124, Co168.	Negligible Minor adverse
Impacts on badgers (ENC-C-9): Construction activities could disturb badger setts and/or lead to temporary severance of badger territories.	Low/Low	Medium Minor adverse	Embedded mitigation measures including; Co2, Co7, Co26, Co35, Co36, Co41, Co68, Co69, Co122, Co114, Co123, Co124, Co168.	Medium Minor adverse
Operation				
Impacts on habitats or species (ENC-O-11):	Low/Negligible	Low Negligible	Embedded mitigation measures including; Co30, Co122, Co159, Co193, Co195, Co168.	Low Negligible

Impact and Phase	Receptor and value/sensitivity	Magnitude and significance	Mitigation	Residual impact
Operation of the onshore substation will cause long term habitat loss, degradation and potential displacement of protected species.				
Impacts on protected species (ENC-O-14) Operation and maintenance activities of the onshore substation could cause disturbance to protected species	High/Medium	Negligible Major adverse	Embedded mitigation measures including; Co124, Co168, Co122, Co159. Additional measures in line with standard industry guidance and agreed with stakeholders, included within the project OEMP as detailed in **Section 3.11.**	Negligible Minor adverse
Decommissioning				
Impacts on protected species (ENC-D-18). Decommissioning of the onshore substation could lead to temporary disturbance or displacement of protected species (ENC-D-18).	High/Medium	Medium Major adverse	Embedded mitigation measures including; Co124, Co168, Co122, Co159. Additional measures in line with standard industry guidance and agreed with stakeholders, included within the project OEMP as detailed in **Section 3.11.**	Negligible Minor adverse

3.16 References

Bat Conservation Trust, (2012) Professional Training Standards for Ecological Consultants.

Bat Conservation Trust, (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.).

Bat Conservation Trust and Institute of Lighting Engineers, (2018) Bats and Lighting in the UK.

Chartered Institute of Ecology and Environmental Management (2016). Professional Code of Conduct, Revised June 2016.

Chartered Institute of Ecology and Environmental Management, (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.

The Conservation of Habitats and Species Regulations 2017 (as amended). Available at http://www.legislation.gov.uk/uksi/2017/1012/contents/made (accessed: August 2021).

The Countryside Right of Way (CRoW) Act 2000. Available at https://www.legislation.gov.uk/ukpga/2000/37/contents (accessed: August 2021)

Dean, M., Strachan R., Gow, D. and Andrews, R. (2016) The Water Vole Mitigation handbook (the mammal Society Mitigation Guidance Series. Eds Fiona Matthews and Paul Chanin. The Mammal Society, London.

Department for Environment, Food and Rural Affairs (Defra), (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services.

Department for Environment, Food and Rural Affairs (Defra), (2017) Biodiversity 2020: a strategy for England's wildlife and ecosystem services: Indicators.

Edgar, P., Foster, J. and Baker, J. (2010) Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth.

English Nature, (2001) Great Crested Newt Mitigation Guidelines.

The Hedgerow Regulations 1997. Available at http://www.legislation.gov.uk/uksi/1997/1160/contents/made (accessed: August 2021).

Institute of Environmental Assessment, (1995) Guidelines for Baseline Ecological Assessment.

Joint Nature Conservation Committee, (2003) Herpetofauna Worker's Manual.

Joint Nature Conservation Committee, (2010) Handbook for Phase 1 habitat survey: A technique for environmental audit.

JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. UK Post-2010 Biodiversity Framework. July 2012. Available from: http://jncc.defra.gov.uk/page-6189.

Natural England, (2014) Otters: 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 Environmental and Rural Communities (NERC) Act 2006. Available at https://www.legislation.gov.uk/ukpga/2006/16/contents (accessed: August 2021).

Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000) Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.

Orsted (2018) Hornsea Project Four Scoping Report.

Orsted (2019) Hornsea Four Preliminary Environmental Information Report, Volume 3, Chapter 3: Ecology and Nature Conservation <https://orstedcdn.azureedge.net/-/media/www/docs/corp/uk/hornsea-project-four/01-formal-consultation/pier/volume-3/peir-volume-3-chapter-3-ecology-and-nature-conservation.ashx?la=en&rev=2b500027aaee4277af98404a4626936d&hash=50742B7CC3372C28C71307B4D64802B0>

PINS (2018) Hornsea Four Scoping Opinion. Bristol PINS.
Stone, E.L. (2013) Bats and lighting: Overview of current evidence and mitigation guidance.

Protection of Badgers Act 1992. Available at https://www.legislation.gov.uk/ukpga/1992/51/contents (accessed: August 2021).

Strachan, Moorhouse and Gelling. (2011) Water Vole Conservation Handbook 3rd Edition. Wildlife Conservation Unit, University of Oxford.

Wildlife and Countryside Act (WCA) 1981 (as amended). Available at https://www.legislation.gov.uk/ukpga/1981/69 (accessed: August 2021).